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Delivery of Supported Self-Management in Asthma Reviews: A Mixed Methods Observational Study Nested in the IMP\textsuperscript{2}ART Programme of Work

By Emma Kinley

A Thesis submitted for the degree of Doctor of Philosophy

The University of Edinburgh

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Declaration

I hereby declare that this thesis has been composed solely by myself and that it has not been submitted, in whole or in part, in any previous application for a degree. Except where states otherwise by preference or acknowledgement, the work presented is entirely my own.

Emma Kinley
Abstract

Background: Supported self-management (SSM) reduces the risk of asthma attacks, improves asthma control and quality of life. During routine primary care asthma consultations, healthcare professional (HCP) communication and behaviour can influence a person's skills, knowledge and confidence to manage their own condition. Therefore understanding how supported self-management is delivered in UK primary care can help towards improved HCP delivery of care. This PhD project has been nested within the IMPlementing IMProved Asthma self-management as RouTine (IMP²ART) programme, which is a UK-Wide trial, developing and evaluating a strategy delivering patient, professional, and organisational resources to improve self-management.

Aims and Objectives: The aim of this PhD project was to assess HCP delivery of supported self-management, including patient-centred care and behaviour change strategies to promote asthma self-management during routine primary care reviews. Additional objectives included to explore the influence of the IMP²ART programme on the delivery of supported self-management, and investigate differences (if any) in remote and face-to-face delivery of asthma care.

Methodology: The PhD programme of work consisted of three phases:

1. Understanding the Evidence Base: Firstly, following systematic realist review methodology, I systematically reviewed the existing evidence investigating the delivery of supported self-management during routine
remote asthma consultations. The realist review aimed to: 1) identify and synthesise studies that explored remote asthma consultations and the delivery of supported self-management, 2) explore the context and mechanisms that have contributed to clinically effective, safe and acceptable delivery of supported self-management during remote asthma consultations, and 3) produce recommendations and guidelines for best practice in the delivery of supported self-management during remote consultations for people with asthma.

2. Understanding current clinical practice: I conducted an observational study using video-recordings of routine face-to-face and telephone asthma reviews in a sub-sample of practices participating in the IMPART UK-wide cluster-randomised controlled trial (implementation n~4; control n~6). Analytical methods included: ALFA Toolkit Multi-Channel Video Observation, to code and quantify types of speech, Patient-Centred Observation Form and The Behaviour Change Counselling Index, to assess patient-centeredness and behaviour change counselling used by HCPs.

3. Understanding the clinician’s perspective: In the qualitative phase of the PhD, I conducted semi-structured interviews with seven HCPs to explore clinician’s perceptions, opinions and experiences of delivering supported self-management during routine asthma reviews. Interviews were audio recorded, transcribed and findings were explored using thematic analysis.
Results of the three phases were initially analysed separately using the outlined approaches. A ‘Triangulation Protocol’ process was then conducted to compare, contrast and amalgamate the findings of the mixed methods approaches.

Results:

1. Results of the systematic rapid realist review identified six themes using data from 18 articles to describe how supported self-management is delivered during remote asthma consultations. The findings identified positive benefits associated with remote asthma care including; increased convenience, improved access and attendance at reviews, ability to conduct the core content of an asthma review remotely, completion of asthma action plans, and continuity of care. Typically, these overrode any challenges associated with technological difficulties imposed by remote consultations. The data suggest that overall remote consultations were as, or more highly, accepted than in person consultations for the studies I included, and were as effective and safe as face-to-face reviews.

2. Findings of the observational recordings revealed that HCPs spent the most time during a routine review discussing; an individual’s asthma condition and it’s management, collaboratively reviewing and completing personalised asthma action plan and, training for practical self-management activities (e.g., inhaler technique). Areas of patient-centred care delivery which HCPs discussed using a biopsychosocial focus were; creating and maintaining relationships with patients, as well
as discussing asthma action plans and medication reconciliation. HCPs
delivered empathetic behavioural discussions, however, did not
collaboratively discuss individualised approaches for ways in which a
patient could proactively change their behaviour.
There was a statistically significant difference for the delivery of
supported self-management between IMP²ART implementation and
control group healthcare professionals. Healthcare professionals from
the IMP²ART implementation group spent a higher percentage of time
during routine reviews incorporating and discussing SSM strategies
(ALFA) \( (t (62), =2.122, p =0.038) \). Professionals of implementation
group practices also delivered a more person-centred review (PCOF)
\( (t (60), = 2.06, p = 0.044) \), and used more behaviour change
communication strategies (BECCI) \( (U= 336.5, p = 0.03) \) than
professionals of the IMP²ART control group. I concluded that, on
average, professionals in IMP²ART implementation group practices
delivered more effective SSM strategies during routine asthma reviews.
Findings from the between group analysis of the face-to-face and
remote consultation groups found that on average, both groups spent
similar percentages of time on SSM tasks during routine asthma
reviews (ALFA). Similarly, both groups had similar scores the delivery
of patient-centred care (PCOF) and behaviour change discussions
(BECCI), showing no significant differences in healthcare professional
delivery of SSM between face-to-face and remote consultations.
3. The findings from the qualitative, semi-structured interviews with healthcare professionals identified five themes. The main findings from the themes included; healthcare professionals shared understanding of supported self-management, barriers and facilitators of supported self-management delivery (including healthcare professional motivations, confidence and time barriers), important strategies for supported self-management delivery (including patient education, asthma action plans and inhaler technique), and that there is a place in primary care for remote asthma care.

Five key findings emerged from completing the Triangulation Protocol process, which amalgamated the findings of the three phases of the PhD study;

1. HCP confidence and motivations, and general practice culture are facilitators of effective HCP delivery of supported self-management.
2. Lack of time and large, challenging workloads are perceived as barriers to HCP delivery of supported self-management.
3. HCP and patient asthma education is an effective supported self-management strategy.
4. IMP²ART implementation strategies are associated with increased HCP delivery of asthma supported self-management.
5. Remote consultations devote similar proportion of time to face-to-face reviews for delivery of asthma supported self-management.

**Conclusions:** HCP communication and behaviour can positively or negatively impact a patient’s ability to self-manage their condition. The insights from this
mixed methods PhD programme of work, including the observation of routine asthma reviews, has provided evidence that training programmes directed at providing healthcare professionals with the skills they need to implement a motivating and patient-centred asthma review, in which behaviour change and collaborative supported self-management strategies, can be effective, and should be prioritised during the delivery of routine primary care asthma management. Routine remote reviews are also an acceptable alternative to delivery of supported self-management for asthma care for specific patient groups.
Lay Summary

**Background:** Supported self-management for asthma is when the healthcare professional (usually a practice nurse within a general practice), works with the person with asthma to make sure they know to look after themselves and live well with their asthma. Supported self-management is hard to put in place during routine reviews, and the way in which the health care professional communicates and discusses supported self-management during asthma reviews can positively or negatively impact how people manage their asthma.

The IMP²ART project (IMPlementing IMProved Asthma self-management as RouTine) is a UK-wide study which aims to help practices and healthcare professionals deliver supported self-management more effectively during routine asthma reviews.

**Aims:** This PhD project aimed to explore how healthcare professionals deliver supported self-management during asthma reviews. It also aimed to find out if the IMP²ART study had influenced how healthcare professionals communicate to people with asthma and deliver supported self-management during routine asthma reviews.

Due to the COVID-19 pandemic, and the change to remote delivery of asthma care (via telephone and video reviews), this PhD also aimed to see if there were any differences in how supported self-management is delivered between remote and face-to-face asthma reviews.
Methods: The PhD included three phases:

1. Firstly, I reviewed existing research papers which looked at the delivery of supported self-management during routine remote asthma consultations. The review aimed to see if other studies had found that supported self-management delivered via telephone or video consultations worked as well as face-to-face reviews. I also wanted to see if remote reviews were safe to use, and to see what type of reviews people with asthma and healthcare professionals preferred to use for asthma care.

2. Secondly, I visited general practices which were involved in the IMP²ART study, and video recorded routine asthma reviews. I then analysed the videos to see how the healthcare professional communicated with the person with asthma about how to manage their condition. I video recorded both telephone and face-to-face asthma reviews.

3. I then interviewed healthcare professionals who regularly see people with asthma. I asked about their experiences of delivering asthma care, and if they had any thoughts or opinions on how supported self-management is delivered during asthma reviews.

I then looked through all of the findings from the three phases of the PhD study and put them together to see if there were any similarities or differences.
**Results:** The results of the whole PhD found five main findings:

1. If healthcare professionals are confident, and have the motivation to care for people with asthma, they are more likely to deliver better supported-self management.

2. Lack of time and large, challenging workloads may prevent healthcare professionals from delivering supported self-management as well as they can.

3. Professional and patient education of asthma is an effective supported self-management strategy to make sure people manage their asthma well.

4. Healthcare professionals who received training from the IMP\(^2\)ART programme may have been better at discussing supported self-management to people with asthma.

5. Remote consultations (telephone) spend similar amounts of time to face-to-face reviews for delivery of asthma supported self-management.

**Conclusions:** Healthcare professional communication and behaviour can positively or negatively impact whether a person with asthma is able to look after themselves and their asthma. The findings from this PhD has shown that healthcare professionals should be provided with, and take part in training programmes to help them discuss self-management with people with asthma. Routine remote reviews conducted via telephone or video consultations, work just as well as a face-to-face review for discussing self-management for specific groups of people with asthma.
Dedication

This thesis is dedicated to my dad, who passed away suddenly two months before my PhD submission.

He was always my biggest supporter, believed in me, and encouraged me to follow my dreams. All of my drive, determination and work-ethic comes from him, and although he didn’t get to see me finish this adventure, I know he would have been so proud.
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Contributions to Science: Publications and Presentations

Directly Related to the PhD:

Publications


Conference Presentations and Posters


at the Asthma UK Centre for Applied Research Annual Scientific Meeting, (Leeds, UK) 2022.


Methods Observational Study Nested in the IMP²ART Programme of Work. Poster Presentation at the University of Edinburgh Usher Institute Annual Lecture (Edinburgh, UK) 2022.

**Aligned with the Topic of the PhD:**

**Publications**


**Publications Under Review**


Conference Presentations and Posters


Examples of poster submissions can be found in appendices 2 & 3.

Awards

1) Division of Health Psychology Annual Conference June 2021: Bursary winner provided by the Division of Health Psychology.

2) Primary Care Respiratory Society Conference September 2021: ‘Delivery of supported self-management in remote asthma reviews: a systematic rapid realist review’ selected as the winning poster in the Scientific Research Best Poster Award category (Certificate added as Appendix 1).
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ALFA</td>
<td>Activity Log Files Aggregation</td>
</tr>
<tr>
<td>AUKCAR</td>
<td>Asthma UK Centre for Applied Research</td>
</tr>
<tr>
<td>BCT</td>
<td>Behaviour Change Technique</td>
</tr>
<tr>
<td>BECCI</td>
<td>Behaviour Change Counselling Index</td>
</tr>
<tr>
<td>BTS/SIGN</td>
<td>British Thoracic Society and Scottish Intercollegiate Guidelines Network</td>
</tr>
<tr>
<td>C-M-O</td>
<td>Context-Mechanism-Outcome</td>
</tr>
<tr>
<td>COM-B</td>
<td>Capability + Opportunity + Motivation = Behaviour</td>
</tr>
<tr>
<td>COVID-19</td>
<td>Coronavirus</td>
</tr>
<tr>
<td>ERG</td>
<td>External Reference Group</td>
</tr>
<tr>
<td>GINA</td>
<td>Global Initiative for Asthma</td>
</tr>
<tr>
<td>GP</td>
<td>General Practice/General Practitioner</td>
</tr>
<tr>
<td>HCP</td>
<td>Healthcare Professional</td>
</tr>
<tr>
<td>HRA</td>
<td>Health Research Authority</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>IMP(^2)ART</td>
<td>IMPlementing IMProved Asthma self-management As RouTine</td>
</tr>
<tr>
<td>LTC</td>
<td>Long Term Condition(s)</td>
</tr>
<tr>
<td>NHS</td>
<td>National Health Service</td>
</tr>
<tr>
<td>NICE</td>
<td>National Institute for Health and Care Excellence</td>
</tr>
<tr>
<td>NIHR</td>
<td>National Institute for Health Research</td>
</tr>
<tr>
<td>PCOF</td>
<td>Patient-Centred Observation Form</td>
</tr>
<tr>
<td>PPI</td>
<td>Patient and Public Involvement</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td>PRISMS</td>
<td>Practical Reviews in Self-Management Support</td>
</tr>
<tr>
<td>QOF</td>
<td>Quality Outcomes Framework</td>
</tr>
<tr>
<td>RCT</td>
<td>Randomised Control Trial</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Research &amp; Development</td>
</tr>
<tr>
<td>SDM</td>
<td>Shared Decision Making</td>
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<tr>
<td>SSM</td>
<td>Supported Self-Management</td>
</tr>
<tr>
<td>TDF</td>
<td>Theoretical Domains Framework</td>
</tr>
<tr>
<td>VSR</td>
<td>Video Stimulated Recall</td>
</tr>
</tbody>
</table>
Preface

Healthcare professional delivery of supported self-management for asthma can influence a person’s ability to manage their condition. Nested within the UK-wide NIHR (National Institute for Health Research) funded programme of work; IMP²ART (IMProving IMProved asthma self-management As RouTine), this PhD programme aimed to explore how supported self-management is delivered in routine primary care asthma reviews. Including both in-person and remote consultations (video or telephone), I investigated the delivery of supported self-management through three stages:

- Systematic Rapid Realist Review (Chapter 4),
- Observational Quantitative Study (Chapter 5),
- Qualitative Study (Chapter 6),

Results of the three phases were initially analysed separately. A ‘Triangulation Protocol’ process was then conducted to compare, contrast and amalgamate the findings of the mixed methods approaches. This PhD programme will be of interest to policy makers, primary healthcare professionals and patients seeking to understand how supported self-management can effectively be embedded into routine primary care (implications are outlined in Chapter 9).

Asthma UK Centre for Applied Research (AUKCAR)

The Asthma UK Centre for Applied Research (AUKCAR) is a collaborative network of world-leading asthma researchers, including respiratory experts, both clinical and academic, as well as PhD students and asthma patient representatives (Asthma and Lung UK, 2021). Based within approximately 14
universities across the UK, the centre’s research focuses on developing, testing and implementing interventions which have the potential to achieve significant and sustained reductions in asthma morbidity and mortality. To work towards achieving these goals, AUKCAR focuses on working collaboratively on two fundamental areas of research; 1) preventing asthma attacks, and 2) optimising management to reduce hospitalisation, readmission and deaths. The centre’s drive for first-class asthma research has resulted in programmes of research that work towards better treatments and improving diagnosis and care.

The AUKCAR Postgraduate Training scheme enrols PhD candidates to work towards becoming the next generation of leaders in world-class asthma research. PhD students are supported by the wider multi-disciplinary team at the centre (including academics and clinicians) and in addition to postgraduate training, are offered opportunities and support to other platforms including methodological support, practical resources, structures for robust patient and public involvement and proactive dissemination. This PhD is funded by a Chief Scientist Office, Scotland (CSO) studentship, and has been completed with the support of Asthma and Lung UK Centre for Applied Research [AUK-AC-2018-01].

**How this PhD is aligned with IMP²ART**

This PhD study and thesis will contribute to the overall findings of the IMP²ART (IMPlementing IMProved asthma self-management As RouTine) programme of work, and will have particular relevance to the IMP²ART process evaluation. Although embedded within the IMP²ART programme, this PhD programme will
specifically explore the role of the healthcare professional, and how supported self-management is delivered during routine primary care asthma reviews. This thesis will explore the communication and behaviours of a sub-sample of healthcare professionals within both the IMP²ART implementation and control groups, and through an in-depth analysis of behaviour and communication within routine asthma reviews, assess how healthcare professionals are using patient-centred and motivational strategies to promote asthma self-management.

The insights from this study will inform future recommendations about the training healthcare professionals should receive to equip them to deliver supported self-management, and implement a motivating and patient-centred asthma review. Additionally, the findings of the mixed methods, observational study will inform future roll out of the IMP²ART programme and the delivery of the best possible asthma care.

**Impact of COVID-19 on this PhD programme**

This PhD programme began in October 2019, however due to the Coronavirus (COVID-19) pandemic five months after commencing, the project encountered several challenges. As a key explorative factor of the PhD study was to visit general practices (in person) for data collection procedures, I was initially apprehensive of how the study could continue with the same methodology and approaches. However, after discussing many different options (including remote data collection), and awaiting government updates for UK-wide lockdowns to ease, I worked on adapting certain deliverables to produce relevant research. Whilst awaiting further government updates, I finalised all
ethical and governance applications, and completed the systematic rapid realist review (Chapter 4), which would inform the PhD programme to create a representative and up-to-date programme of work.

Conducting this research during the COVID-19 pandemic allowed me to develop my problem solving skills in research. The challenges that COVID-19 presented required me to explore different methodological, analytical and creative approaches to ensure the research conducted followed all ethical procedures, whilst utilising the most efficient approaches to explore the given research objectives.
1. Introduction to Asthma and Supported Self-Management

1.1 What is Asthma?

Asthma is one of the most prevalent long-term conditions within the UK. Around 5.4 million people are currently receiving treatment for asthma, and annually asthma accounts for 2-3% of primary care consultations and 60,000 hospital admissions (NICE, 2022a; Asthma and Lung UK, 2022). The condition is caused by inflammation of the lining of the airways resulting in hyper-sensitivity and narrowing, temporarily reducing the space for airflow resulting in the cardinal symptom of wheeze. The sensitivity of the airway lining also triggers a barking cough. Asthma can cause variable symptoms such as breathing difficulties e.g., coughing, wheezing, and shortness of breath, and can affect people of all ages. These symptoms may occur randomly or may be a result of exposure to an asthma trigger such as; allergies (e.g. to house dust mites, animal fur, pollen), smoke or air pollution, exercise, and infections such as colds or flu (NHS, 2020).

1.1.1 Asthma Management

There is currently no cure for asthma, but by controlling symptoms through safe and effective management and treatments, people with asthma are able to control their symptoms and reduce the risk of asthma attacks. The management of asthma is an ongoing, dynamic process, where treatment and care needs to be continually reviewed and tailored to adapt to the variation in a person’s current needs and levels of severity. The Global Initiative for Asthma Guidelines (GINA, 2020) states that the aim of asthma management
is to prevent exacerbations, asthma deaths, and to relieve and control symptoms. However, poorly controlled asthma can increase the risk of sometimes severe and occasionally fatal asthma attacks. The aim of asthma management is control of the disease. Complete control is defined as:

‘no daytime symptoms, no night-time awakening due to asthma, no need for rescue medication, no asthma attacks, no limitations on activity including exercise, normal lung function and minimal side effects from medication’ (White et al., 2018).

Asthma control can be achieved through a combination of pharmacological and supported self-management approaches.

1.1.2 Pharmacological Management of Asthma

Pharmacological management of asthma is delivered through treatments and medications which are prescribed to the individual patient to achieve control of their asthma. Asthma is a variable condition underpinned by an inflammatory response. Steroids (inhaled or, in an emergency, oral) is the foundation of asthma treatment, where direct delivery of medication to the lungs reduces the inflammation, variability, symptoms and risk of asthma attacks (British Thoracic Society and Scottish Intercollegiate Guidelines Network (BTS/SIGN), 2019). The three most common prescribed therapies which contribute towards asthma control include;

1. Controller/Preventer inhalers such as inhaled corticosteroids, which should be used regularly to control symptoms and reduce future risks of exacerbations. Preventer treatment needs to be adjusted to the lowest dose
that keeps the patient free of symptoms, this dose may vary over time and according to context.

2. Reliever inhalers (often referred to as ‘Blue Inhalers’ in the UK) which contain medication such as salbutamol, which quickly open the airways during an asthma attack and provide emergency relief of symptoms.

3. Add-on therapies, a combination of controller and reliever, which are used for people with severe asthma, or persistent symptoms (GINA, 2020).

The BTS/SIGN Guidelines (2019) advise that people with asthma should take a ‘stepwise approach’ to the pharmacological management of their condition. The variability in symptom control is a particularly challenging feature of asthma. A stepwise approach aims to control symptoms as soon as possible by starting treatment at the level most likely to achieve this. Patients should start treatment at the step most appropriate to the initial severity of their asthma. The aim is to achieve early control and to maintain it by ‘stepping up’ treatment as necessary and ‘stepping down’ treatment when asthma is controlled. With each individual, there is a need for careful monitoring and to ‘step-up’ and ‘step-down’ individualised treatment over time.

1.1.3 Non-Adherence to Asthma Medications

Adherence to medications is fundamental to the management of asthma. However, half of people with asthma do not take their medications as directed (Horne et al., 2013). Non-adherence may be recognised as being intentional or non-intentional (Dhruve, 2018). Non-intentional non-adherence occurs when the person with asthma wants to adhere, but is unable to because they
lack capacity or resources; for example, they may misunderstand instructions with poor inhaler technique or have physical problems that can limit their ability to adhere. Intentional non-adherence occurs when the patient actively chooses not to follow the recommendations due to individual beliefs and preferences; for example, patients may have doubts about the need for a preventer inhaled corticosteroids inhaler or may be concerned about the associated adverse effects.

A crucial factor which contributes to non-adherence is poor inhaler technique. A review by The Royal Colleges of Physicians (The National Review of Asthma Deaths (NRAD), 2014), found that a significant proportion of patients who died from asthma did not adhere to preventer inhaler medications, overused their reliever inhalers, and 45% died without seeking medical attention. Inhaler medications should only be prescribed to patients once they have received training in the use of the device and have demonstrated satisfactory technique to their healthcare professional. However, the use of asthma medications can be challenging for some patients. Alarmingly, several studies suggest that over 80% of patients with asthma do not use their inhalers correctly (Jahedi et al., 2017; Chrystyn et al., 2017). During a UK inquiry into asthma deaths, Torjesen (2014) discovered that two in three deaths from asthma could have been prevented by better management of the condition, including provision of personal asthma plans for patients, timely reviews of asthma care, and the prescription of more appropriate medications.
Asthma supported self-management is an approach which can aid some difficulties which are associated with the pharmacological management of asthma, and ultimately lead to preventing asthma deaths.

1.2 What is Supported Self-Management?
Definitions of self-care and self-management can often be varied and interchangeable. However, it is critical to distinguish between both. Self-care refers to;

“a wider set of behaviours which both the healthy and the not so healthy take to prevent the onset of illness or disability, and, again to maintain quality of life” (Taylor & Pinnock, 2017).

In contrast, defined by Lorig & Holan (2003) and Vernooij et al., (2015), supported self-management (SSM) is an approach that includes both healthcare professional and patient, and ensures patients with long term conditions have the knowledge, skills, confidence and support to manage the physical, emotional and social impact of their health condition(s). To ensure patients are equipped with these abilities, supported self-management moves beyond a biomedical approach of patient-provider communication, where patients are provided with information or treatment options, to a biopsychosocial, healthcare professional and patient relationship, where patients can play a joint role in guiding their own care (Grady & Gough, 2014).
1.2.1 Supported Self-Management of Long Term Conditions

Most Long Term Conditions (LTCs) (e.g., asthma, diabetes, COPD etc.) have no cure, which can have a devastating effect on a person’s life. For healthcare professionals, working in collaboration with a patient with a long-term condition, supported self-management can help manage the impact of a patient’s condition to access support, make informed decisions, and live with their condition(s).

Research by Taylor et al., (2014) has provided a framework of supported self-management delivery for healthcare professionals working in collaboration with people with long term conditions. The Practical Systematic Review of Self-Management Support (PRISMS) meta-review has developed a taxonomy of 14 components that healthcare professionals and organisations should consider when they are planning to support patients with long term conditions. The components are not relevant to all LTCs, however, encompasses a range of elements which may empower people to learn about their condition, acknowledge the impact on their life, make changes and identify areas where they need support. The review concluded that it is possible to implement LTC self-management in routine care, but for it to be effective, a whole systems approach is required, which considers implementation from the perspective of the patient, the professional and the organisation.

The 14 PRISMS components are provided below in Table 1. The PRISMS framework has been used throughout this thesis as a structure of defining and quantifying healthcare professional delivery of supported self-management,
and use of the framework is further explored within Chapter 4 (systematic rapid realist review) and Chapter 5 (observational study).

Table 1: PRISMS Taxonomy Components of Supported Self-Management Delivery for people with Long Term Conditions (Taylor et al., 2014).

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1. Information about condition and/or its management</td>
<td>Providing people with LTCs with information and instruction about their LTC or about general aspects and principles of managing their LTC (physiology, medication, prognosis, emotional, psychosocial etc.)</td>
</tr>
<tr>
<td>A2. Information about available resources</td>
<td>Providing people with LTCs with information (e.g. written, verbal, visual) on issues such as financial benefits, sources of social or peer support, charitable organisations.</td>
</tr>
<tr>
<td>A3. Provision of agreement on specific clinical action plans and/or rescue medication</td>
<td>Written instructions prepared with or by a healthcare professional to enable the person to stay in control of their condition, tailored to the person, LTC, and severity. Includes how to take medication, recognise symptoms of deterioration and what actions to take.</td>
</tr>
<tr>
<td>A4. Regular clinical review</td>
<td>A regular, scheduled review of the person, their condition and self-management, conducted by a healthcare professional.</td>
</tr>
<tr>
<td>A5. Monitoring of condition with feedback</td>
<td>Monitoring symptoms, behaviours or objective measures related to LTC. Can be done by the person with a LTC or by others but the results must be fed back to the patient. Interpretation, decision and/or action is undertaken by the patient, but may be supported by a healthcare professional. Healthcare professionals may support self-management by reviewing monitored data and providing feedback to the patient.</td>
</tr>
<tr>
<td>A6. Practical support with adherence (medication or behavioural)</td>
<td>Provision of practical help to improve a person’s adherence to medication or behaviour change activities.</td>
</tr>
<tr>
<td>A7. Provision of equipment</td>
<td>Provision of equipment to enable, assist or promote self-monitoring and/or self-management of the LTC.</td>
</tr>
<tr>
<td>Component</td>
<td>Description</td>
</tr>
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<td>--------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>A8. Provision of easy access to advice or support when needed</td>
<td>People with LTCs are provided with flexible access to and timely advice from health services in the event of an urgent or non-urgent question or concern arising.</td>
</tr>
<tr>
<td>A9. Training/rehearsal to communicate with healthcare professionals</td>
<td>Teaching people with LTCs to develop communication skills/techniques to improve relationships, better communicate needs, and enhance shared decision making with healthcare professionals. Also supporting/mentoring people with LTCs to practise the skills they have been taught.</td>
</tr>
<tr>
<td>A10. Training/rehearsal for everyday activities</td>
<td>Teaching people with LTCs to develop skills that support everyday activities and/or supporting people with LTCs to practise the skills they have been taught.</td>
</tr>
<tr>
<td>A11. Training/rehearsal for practical self-management activities</td>
<td>Teaching people with LTCs to develop specific practical skills that will enable them to manage their LTC, and/or supporting people with LTCs to practise the skills they have been taught.</td>
</tr>
<tr>
<td>A12. Training/rehearsal for psychological strategies</td>
<td>Teaching people with LTCs skills in using psychological strategies to help them better manage the consequences of a LTC and/or supporting them to practice the skills they have been taught. May include problem-solving strategies, relaxation techniques, re-framing, distraction, cognitive restructuring, goal setting and action planning (prompts detailed planning of performance of the behaviour/outcome of the behaviour, NB this does not have to be health behaviour focussed).</td>
</tr>
<tr>
<td>A13. Social support</td>
<td>Facilitation of social support, where a person feels cared for and supported by others in a social network. May include befriending, peer support, peer mentoring and group socialising.</td>
</tr>
<tr>
<td>A14. Lifestyle advice and support</td>
<td>Provision of advice and support around health and lifestyle. Relates to practical advice and support in relation to handling life stressors, NOT psychological elements that relate to handling life stressors (see A12 for training/rehearsal in psychological strategies). May include general lifestyle advice and support concerning diet, physical</td>
</tr>
</tbody>
</table>
1.2.2 Supported Self-Management of Asthma

For people living with asthma, one of the most important understandings and challenges of the condition, is being able to control their asthma during their daily life. When ensuring asthma is controlled, an individual may need to remember to: use regular medication, keep a supply of inhalers, and avoid their triggers where possible (Peytremann-Bridevaux et al., 2015; BTS/SIGN, 2019; Asthma and Lung UK, 2020). Importantly, an individual must also be able to recognise when their asthma is deteriorating and make decisions about how to respond to these changes, including when to adjust their medication, when to use emergency treatment and when to seek professional help (Pinnock, 2015).

An essential element of supported self-management is the provision of a Personalised Asthma Action Plan (‘PAAP’ or ‘action plan’). People with asthma have their own personal set of triggers and symptoms, and using a personalised written asthma action plan is the most effective way to keep a record of individual treatment plans (Asthma and Lung UK, 2021). A main priority of asthma management within primary care is to empower each person to take control of their own condition. An asthma action plan, includes individualised self-management information, developed collaboratively between the patient and clinician to provide details of how to help maintain asthma control and regain control in the event of an exacerbation. The action plan supports the patient to adjust their treatment to regain control and reduce their medication when asthma is well controlled. An action plan also includes baseline characteristics (such as lung function), maintenance medication,
instructions on how to respond to increasing symptoms and when to seek medical help (Gatheral et al., 2017). Asthma action plans are adjustable documents which need to be regularly reviewed, revised and refined as clinical and lifestyle circumstances change.

In a systematic review by Pinnock et al., (2017) which synthesised evidence from 27 systematic reviews (270 Randomised Control Trials), the implementation of supported self-management of asthma was found to reduce hospitalisations, accident and emergency (A&E) attendances, unscheduled GP consultations, improve overall asthma control and quality of life. The effectiveness of supported self-management for asthma has been demonstrated in a range of populations including; diverse cultural groups (McCallum et al., 2017), children (Bravata et al., 2009) and adults (Hodkinson et al., 2020; Gibson et al., 2002).

1.2.3 Routine Primary Care Asthma Reviews

One of the most effective ways to support an individual in the control of their asthma is attendance at a regular, primary care, routine asthma review (Gibson et al., 2002; Pinnock, 2015), where with support from a healthcare professional, a personalised treatment plan can be created and regularly reviewed. In a recent meta-analysis conducted by Hodkinson et al., (2020), regularly supported self-management was found to reduce use of healthcare resources and improve quality of life across all levels of asthma severity.

As recommended by guidelines (BTS/SIGN, 2019), the UK Quality Outcomes Framework (QOF) incorporates the standard that all individuals with asthma
should receive an annual review. QOF represents one of the main sources of potential income for general practices across the UK, and is a major part of the new General Medical Services contract. The QOF measures achievement against a range of evidence-based indicators, with points and payments awarded according to the level of achievement (Public Health Scotland, 2020).

An asthma review is a routine check-up conducted with a healthcare professional (usually a practice nurse, general practitioner or clinical pharmacist) and provides the core components of asthma care and management (risk reduction and symptom control) (GINA, 2020). During an asthma review, the aim is to reduce the symptom burden to the patient and to reduce their risk of exacerbations. During a routine asthma review, a continuous cycle of; assessing, adjusting treatments, discussing adherence and supporting self-management takes place;

- **Assessment:** of a patient with asthma includes not only understanding degree of symptom control, but understanding the patient’s individual risk factors and possible co-morbidities which may affect their asthma. During this phase of a routine review, patients and healthcare professionals should discuss their goals and preferences of treatment, as part of a shared decision making process (working collaboratively).

- **Treatments and Adherence to Medication:** to prevent asthma exacerbations and control symptoms includes medications, treating modifiable risk factors and providing non-pharmacological intervention help and support (e.g., stop smoking advice, encouragement of physical activity etc.).
• **Supported Self-Management**: skills should be discussed with the patient, including examples such as; asthma information, inhaler skills, adherence techniques, written asthma action and self-monitoring of symptoms or peak flow (GINA, 2020).

Completing these necessary steps, together with the patient, during a routine review are extremely important, and aim to provide the patient with the skills, knowledge and confidence to manage their asthma (Lorig & Holan, 2003; Hodkinson et al., 2020).

### 1.2.4 The Challenge of Implementing Supported Self-Management

Recommendations for the clinical and personal benefits of implementing supported self-management for asthma have been proposed since the early 1990’s (Wilson et al., 1993; Lahdensuo, 1999). Since then, national and international guidelines (BTS/SIGN, 2019; GINA, 2020; NICE, 2021) have continually advocated that people with asthma should be provided with self-management education, reinforced by an asthma action plan and supported by regular review. Despite the ‘overwhelming’ and robust evidence base for supported self-management’s effectiveness (Pinnock, 2015) it is not yet embedded in routine clinical practice (Dineen-Griffin et al., 2019). Additionally, despite advantageous findings that provision of a written asthma action plan almost halves the risk of hospitalisation, significantly reduces emergency department attendances, and improves overall asthma control and quality of life (Pinnock, 2017), only 1 in 3 people in the UK have an asthma action plan (Asthma and Lung UK, 2020). Implementation of asthma self-management during routine primary care reviews can be achieved, but to be effective, it
requires a whole-systems approach, which considers patient education and resources, healthcare professional skills, and motivational and organisational priorities and routines (Pinnock, 2015).

1.2.5 Comorbidity and Asthma Supported Self-Management

In supporting people with asthma, it may not always be appropriate to focus on asthma as a single disease, as the prevalence of people presenting to primary care with asthma and other multiple chronic conditions (also known as comorbidities or multimorbidity; e.g., diabetes, cardiovascular diseases etc.) is ever increasing and creating a growing complexity and strain for primary care management (Sturmberg et al., 2021). For those with asthma, other respiratory comorbidities (such as chronic obstructive pulmonary disease; otherwise known as COPD) are up to five times more prevalent than in non-asthmatic patients. Asthma is also associated with a significantly higher prevalence of comorbidities including obesity, psychiatric and neurological comorbidities (Su et al., 2016).

Other co-morbidities which are important to consider for individual asthma management include Allergic Rhinitis; a condition which causes inflammation of the inside of the nose caused by an allergen, such as pollen, dust, or mould for example. According to the Allergic Rhinitis and its Impact on Asthma (ARIA) Guidelines (Brożek et al., 2017), the condition is estimated to affect around one in every five people in the UK, and up to 38% of patients with allergic rhinitis also suffer from asthma. To help manage these comorbidities, asthma action plans often include strategies for management of allergic rhinitis (and hay fever) (e.g. allergen avoidance, antihistamines
(oral and intranasal) and intranasal corticosteroids) as they are closely linked. Cardiovascular diseases such as hypertension and chronic heart disease are also important to consider due to the pharmacological management of these conditions. For example, beta-blockers are often prescribed to manage cardiovascular diseases, used to block the release of the stress hormones adrenaline and noradrenaline. However, for those with cardiovascular disease and asthma, beta-blockers have been found to decrease the response to short acting beta-agonists (blue inhalers) (Morales et al., 2017), creating challenges for the healthcare professional and patient in the management of both conditions. Additionally, behavioural risk factors such as smoking are important to consider for asthma supported self-management. Tobacco dependence increases the risk of COPD, and reduces the effectiveness of inhaled corticosteroids (Polosa & Thomson, 2013).

In a cross-sectional study by Wireklint, et al. (2021), which investigated the factors associated with knowledge of self-management in asthma patients in primary care, patients with asthma who had one or more comorbidities had significantly lower knowledge of self-management strategies, including what to do if their condition(s) worsened, than those without other co-morbidities. This could be due to the amount of varying information people with comorbidities need to understand and implement for each of their conditions. Having additional co-morbidities as well as asthma, has been shown to impact asthma control and to influence the efficacy of, or compliance with treatment (Wireklint, et al., 2021). Supporting individuals with asthma and comorbidities presents an additional challenge to healthcare professionals
who must ensure patients have the knowledge and skills to manage all of their condition(s) well.

### 1.3 Remote Consultations

Remote consulting, already promoted as a partial solution to growing challenges of healthcare delivery, was introduced rapidly in response to the global COVID-19 pandemic, to avoid face-to-face contact and thereby minimise infection risk to patients and healthcare staff (Greenhalgh et al., 2020). Remote consulting is defined as;

> “the use of information and communication technologies to deliver healthcare at a distance and to support patient self-management through remote monitoring and personalised feedback” (McLean et al., 2016).

Remote consultations include telephone and video consultations, as well as synchronous or asynchronous internet-based communications, such as emails or web-based consultation platforms. Within UK general primary care, there was a dramatic shift away from face-to-face reviews to telephone, video and on-line consultations (The Health Foundation, 2021). Even prior to the COVID-19 pandemic, a number of researchers and health services around the world were advocating remote reviews as a way to manage the rising number of people with long term health conditions, to improve health outcomes, and reduce the burden on emergency and inpatient services (Kew & Cates, 2016; Pinnock et al., 2022). Remote methods of primary care reviews are now regular modes of consultation, actively chosen by some patients for delivery of
care, as opposed to a public health necessity (Murphy et al., 2021). It was due to this transformation in care, that I modified and refocused the primary research objectives and deliverables of this study to additionally explore the delivery of supported self-management during remote asthma consultations.

1.3.1 Remote Asthma Consultations

Covid-19 was particularly worrying for people with asthma, and therefore it was even more important to understand how a person could most effectively manage their asthma, in addition to shielding and other complications during this time. At the start of the pandemic, the government indicated that people with asthma who were entitled to get the flu jab were clinically vulnerable. This is because flu is one of the top triggers for asthma attacks and the assumption was that, as COVID-19 was a respiratory condition, it would have a similar impact on people with asthma (Asthma and Lung UK, 2021). Emphasis was placed on asthma self-management techniques, including advocating for patients to use preventer medications as prescribed, and following an individualised asthma action plan. This was particularly important if a patient had severe asthma and clinically extremely vulnerable.

Different forms of clinical consultations have advantages and disadvantages for different patient groups (Mann et al., 2021), and there is varied evidence exploring the impact remote asthma consultations may have upon a patient’s care and ability to self-manage. The concerns of the delivery of supported self-management during remote asthma consultations are addressed within the systematic realist review (Chapter 4). Further discussions of the implications of remote consultations on the delivery of patient care are outlined in the next
chapter (Chapter 2). Understanding how supported self-management is delivered across different modes of delivery is critical, together with attempts to improve and embed supported self-management into UK primary care practice.

1.4 IMP²ART (IMPlementing IMProved Asthma Self-Management As RouTine)

The UK-wide implementation trial IMP²ART (IMPlementing IMProved Asthma Self-Management As RouTine) is a NIHR (National Institute for Health Research) funded research project which aims to help general practices embed supported self-management into routine asthma care. Learning from barriers to implementation (Pinnock et al., 2015), the IMP²ART programme has been developed from evidence-based research to provide a whole systems approach to implementing supported self-management into routine asthma care.

In preliminary IMP²ART work (McCleary et al., 2018), the team explored strategies to ensure three key components of supported self-management: 1) patient education, 2) healthcare professional training and 3) organisational support, are facilitated in general practices across the UK. Findings from the preliminary research (Taylor et al., 2014; McCleary et al., 2018) suggested that while the three strategies are all essential for effective supported self-management delivery, these elements are rarely effective in isolation. Effective implementation needs to be multifaceted and multidisciplinary; engage
patients and train and motivate healthcare professionals within the context of an organisation that actively supports self-management (Pinnock et al., 2015).

1.4.1 Aims of the IMP²ART Programme

The overall aim of the IMP²ART programme is to drive a change in the management of asthma by developing an implementation strategy for embedding supported self-management in routine primary care, then testing the strategy in a UK wide cluster randomised control trial (RCT) with clinical and implementation outcomes determined from routinely collected data. 144 practices will be recruited to the cluster RCT. A health economic evaluation will assess the costs from the perspective of the healthcare service but also from a societal perspective. A process evaluation will use mixed methods to explore feasibility and acceptability of the IMP²ART implementation strategy, exploring how supported self-management was implemented (or not) by primary care practices to aid interpretation and inform scaling up and sustainability.

1.4.2 Methods of the IMP²ART Programme: Implementation Strategy

General practices are recruited to the IMP²ART programme as study participants. A randomisation process allocates recruited practices into two arms (implementation and control group) which randomises in a 1:1 ratio. Implementation group practices receive the whole systems implementation strategy as developed and refined in the IMP²ART developmental work (Morrow et al., 2017; McCleary et al., 2018; Daines et al., 2020; Morrissey et al., 2021).
The implementation strategy includes components directed at; 1) patients with asthma, 2) healthcare professionals and 3) the healthcare organisation (primary care practice).

1) **Patient-Facing Strategies and Resources**

For those people with asthma receiving care from an IMP²ART implementation practice, a range of evidence-based, personalised resources are accessible. Developed by the IMP²ART team, resources include links to information on a patient-facing website. Additional patient-facing strategies aim to prompt delivery of supported self-management, including highlighting the importance of PAAP provision in review invitation letters and on waiting room posters or digital displays.

2) **Healthcare Professional Education**

Two online educational modules are provided to healthcare professionals working within the implementation practices;

1) An introductory module for all practice staff which aims to raise awareness of the benefits of supported self-management and increase engagement, motivation and commitment to supporting self-management, so that it becomes a priority across the whole practice team.

2) An in-depth module for clinicians in the practice most involved with delivering asthma care. This module aims to enable healthcare professionals to take a patient centred approach and use behaviour change techniques in clinical practice to promote effective supported self-management. On completion of the course, it is expected that learners can understand the
concept of supported self-management, identify the barriers to effective supported self-management, know a range of techniques to support individual behaviour change, reflect on various approaches to supported self-management and be motivated to adopt the IMP²ART resources identified in their practice implementation plan.

In addition to the completion of the online educational modules, healthcare professionals of implementation practices receive facilitation sessions provided by nurse specialists to facilitate implementation of IMP²ART within practices, over a 12-month period. The facilitator guides the practice to develop their ‘team implementation plan’ for implementing IMP²ART, discusses how core strategies can be adopted/adapted to suit the practice routines, and identifies additional strategies that might help individual practices. Facilitators observe progress, offering additional support and, if necessary, visits to practices struggling to implement supported self-management (IMP²ART facilitation training sessions are discussed in further detail in section 2.5.2).

3) Organisational Strategies

Practices in the IMP²ART implementation arm, receive audit and feedback. Practices are provided with a tailored report on their asthma management and patient level reports for adults and children. The customised feedback report highlights action plan provision and identifies people with ‘active asthma’ who do not have a plan. Identifying people at risk of exacerbations enables practices (who wish to do so) to target high-risk patients. Focused feedback is
sent to the implementation practices each month for the two years (24 months) of their participation in the trial, along with an annual summary report, with a summary of unscheduled care data, number of patients reviewed, and a graph of action plan provision compared to average in the Optimum Patient Care Research Database (OPCRD) (~800 practices UK-wide).

Implementation practices are also provided with an IMP$^2$ART asthma review template embedded in their clinical system (EMIS, SystmOne, Vision, Microtest) for use in asthma reviews. Developed with findings from previous IMP$^2$ART research (Morrissey et al., 2021), the templates are ‘QOF-compliant’ (relevant for practices in England) but also prioritise components of patient-centred care.

Practices within the control group of the intervention continue to provide their usual asthma care and do not receive any of the components of the implementation strategies.

1.4.3 Analysis and Outcomes of the IMP$^2$ART Programme

The IMP$^2$ART process evaluation will use mixed methods to explore the feasibility and acceptability of the IMP$^2$ART implementation strategy; and explore how supported self-management was implemented (or not) by primary care practices. The collected data will explore patient, healthcare professionals’ and organisational outcomes. To summarise, some of the main findings will explore; the differences between control and implementation groups, analysis of routinely collected trial data, researcher/facilitator logs, in-depth case studies and semi-structured interviews.
Figure 1: IMP²ART Infographic
1.5 Summary of Chapter

Asthma is one of the most common long term conditions, and although it cannot be cured, effective supported self-management for asthma can enable patients to control their condition and live a healthy life. Despite recommendations for the clinical and personal benefits of implementing supported self-management for asthma, it is not yet delivered routinely in clinical care. Embedded within the IMP²ART programme work, which aims to help general practices embed supported self-management into routine asthma care, this PhD project explores the role of the healthcare professional during the delivery of supported self-management for asthma.

The next introductory chapter will explore how healthcare professionals are placed in a primary care context to deliver the best possible patient care. The chapter will also critically explore health psychology theories and behaviour change embedded within this research, and how implementation strategies can positively or negatively affect the delivery of patient care.
2. Introduction to Health Psychology and Behaviour Change

The previous chapter discussed the challenge of asthma management, and how supported self-management is a critical aspect of individualised patient care, but is not optimally implemented within UK primary care. This chapter explores what is needed for healthcare professionals to deliver supported self-management and how health psychology theory can be applied to guide our understanding.

Within this chapter, I will critically explore;

- health psychology theory and behaviour change,
- the role of primary care and how healthcare professionals work within a primary care context,
- consultation and communication styles,
- the impact of remote consultations on the delivery of personalised care,
- and the underpinning health psychology theories and models within the IMP²ART programme.

2.1 Health Psychology Theories and Behaviour Change

Health psychology is a specialty area of research, knowledge, and theory that focuses on how biology, psychology, behaviour, and social factors influence individual health and illness. The field of health psychology is focused on promoting optimum health, as well as the prevention and treatment of disease and illness by understanding how people react to, cope with, and recover from illness (Barley & Lawson, 2016). This section of Chapter 2 will explore the
different categories of health psychology theories, models and frameworks which may help to explore the development and mechanisms of change which contribute towards effective supported self-management delivery by healthcare professionals. According to Nilsen (2015), although theories, models and frameworks are distinct concepts, the terms are sometimes used interchangeably.

A core element of health psychology is theory, which is defined as;

‘a systematic way of understanding events, behaviours and/or situations’ (Borghi & Fini, 2019).

Within health psychology, theories help to understand why people do, or do not practice health promoting behaviours, and theories help identify what information is needed to design effective intervention strategies. It is important to recognise however, that no single theory or conceptual framework can or should dominate research or practice in health.

A fundamental model of health psychology is the Biopsychosocial Model of Health and Illness (Engel, 1977) (Figure 2). The biopsychosocial model states that interactions between an individual’s biological, psychological, and social factors can determine the cause and outcome of wellness and disease. The biopsychosocial model argues that any one factor is not solely responsible for health or illness, it is the interplay between people’s genetic makeup (biology), mental health and behaviour (psychology), and social and cultural context that determine the course of their health-related outcomes. The biopsychosocial
model is one of many theories of behaviour within the field of health psychology, and of importance to the delivery of asthma care.

![Biopsychosocial Model of Health and Illness (Engel, 1977)](image)

**Figure 2: Biopsychosocial Model of Health and Illness (Engel, 1977).**

### 2.1.1 Social Cognitive Theory

Another important theory specific to this thesis, is Bandura's (1986) Social Cognitive Theory, which describes the influence of people’s individual experiences, actions of others and environmental factors, and how these impact people's health behaviours. The premise of social cognitive theory is that people learn not only through their own experiences, but also by observing the actions of others and the results of those actions. Social cognitive theory states that individual learning occurs within a social context, and that individual
behaviour can both influence and are influenced by their environment, including observing the behaviour of others and the consequences of their behaviour (Bandura, 1986).

An important concept of social cognitive theory is the concept of self-efficacy; behaviour change is initiated and maintained when individual's feel that they are confident of executing the desired behaviour (self-efficacy) and have a reasonable expectation that the behaviour will result in a desired outcome (outcome expectations) (Bandura, 1977; Bandura, 1997). Self-efficacy is commonly assessed by addressing levels of individual confidence in performing tasks. Self-efficacy is an important concept to consider for the delivery of supported self-management to explore how confident healthcare professionals feel they are to effectively communicate and deliver supported self-management strategies to patients. Healthcare professional's levels of self-efficacy and confidence is explored throughout this thesis.

2.2 Health Psychology and Behaviour Change Models and Frameworks

Differently to theory, frameworks of health psychology are commonly used to describe or guide the process of translating research into practice. Frameworks used within health psychology are often descriptive, and aim to provide structure of identifying factors which may have influenced implementation outcomes (Nilsen, 2015).
2.2.1 Behaviour Change Interventions

Behaviour is a key determinant of health. Behavioural interventions are designed to affect the actions that individuals or groups take with regard to their health (Cutler, 2004). There are numerous health psychology theories, models and frameworks which can be used within research to develop behaviour change interventions, and that can also be applied to help improve healthcare systems, often focusing on prevention and intervention programmes designed to promote healthier lifestyles.

Michie et al., (2018) defines behaviour change interventions as:

‘preventing and stopping people engaging in harmful or risky behaviours, promoting engagement with health protective behaviours, switching from more harmful to less harmful forms of a behaviour, promoting effective use of health care interventions, and promoting effective self-management of diseases.’

Working with both healthcare professionals and patients, behaviour change interventions are designed to help people deal with the biopsychosocial aspects of health and illness, for example; developing treatment protocols to increase adherence to medical treatments, weight loss programmes, smoking cessation, and working with healthcare professionals to communicate more effectively with patients.

Primary healthcare professionals are able to facilitate an environment for opportunistic discussions around patient behaviour change. However, there is a need to bridge the gap between the production of research evidence and the consistent delivery of evidence-based care in routine practice (Greenhalgh et
al., 2014). The past two decades have seen a rise in ‘Evidence Based Practice’ policies, with the aim to ensure evidence based guidelines are implemented effectively (Michie et al., 2018). Research has been conducted to understand how theory and techniques can be used in clinical practice. Although there is no ‘magic bullet’ for changing healthcare professional behaviour in practice (Michie et al., 2005), there are numerous frameworks and behaviour change interventions available to guide policymakers wishing to influence effective change. These frameworks can aid understanding for what intervention may work best, and in which situation. Optimising supporting self-management requires a good understanding of the content of these interventions and how they are proposed to work.

2.2.1.1 Behaviour Change Taxonomy and COM-B Model

To understand the content of interventions, Abraham and Michie (2008) developed a major theoretical framework: The Behaviour Change Techniques Taxonomy (Version 1). A Behaviour Change Technique (BCT) is defined as:

‘an observable, replicable, and irreducible component of an intervention designed to alter or redirect causal processes that regulate behaviour; that is, a technique is proposed to be an ‘active ingredient’’ (Michie et al., 2013).

The taxonomy comprises of 93 hierarchically clustered techniques which have been proven to have a positive effect on individual or group behaviour. Use of the taxonomy allows interventions to be developed for implementation in evidence-based strategies, and provides a useful level of detail for synthesis, comparison, and replication of implementation interventions.
The process of creating behaviour change interventions can also be aided by the Behaviour Change Wheel (BCW), developed by Michie et al., (2011). The Behaviour Change Wheel is a framework that prompts developers to select interventions based on physical, social, psychological, and environmental factors that influence the capability, opportunity, and motivation needed for behaviour change (COM-B). Central to the Behaviour Change Wheel, the COM-B system incorporates Capability, Opportunity, and Motivation as sources of Behaviour. Each component is outlined below with an example of an asthma self-management behaviour.

**Capability:** is defined as ‘An individual’s psychological and physical capacity to engage in the activity concerned’ e.g., a practice nurse has the knowledge and skills to be able to deliver a routine asthma review.

**Opportunity:** is defined as ‘The external social and physical factors that make wanted behaviours more likely to happen, and the unwanted behaviours less likely to happen.” Physical opportunity relates to things in the physical environment which encourage the behaviour e.g., a practice nurse having dedicated time and available resources to provide asthma reviews.

**Motivation:** is defined as anything that energises and directs behaviour e.g., a practice nurse believes in the importance of asthma action plans and is motivated to discuss them with a patient.
Users can determine what needs to change for the desired behaviour to occur by identifying barriers and facilitators and mapping them onto the COM-B framework. The Behaviour Change Wheel then guides users to select potential knowledge translation interventions based on their COM-B analysis.

2.2.1.2 Theoretical Domains Framework
Another relevant framework to consider, and building on the COM-B model, is the Theoretical Domains Framework (TDF) (Michie et al., 2005; Michie et al., 2014). The TDF consists of 14 domains (see Figure 4 below), and is commonly used to design interventions to improve implementation of evidence based practice in a variety of healthcare settings. The TDF has been used primarily in the context of health to understand behaviour at the individual level (Michie et al., 2014), and was initially developed for implementation research to identify
influences on healthcare professional behaviour related to implementation of evidence based recommendations. For example, the TDF has been used in previous research as a framework to identify barriers and enablers to paediatric asthma management in primary care settings (Yamada et al., 2018), and to identify health care professionals' perceived barriers and enablers for personalised severe asthma care (Majellano et al., 2022).

![Figure 4: Theoretical Domains Framework linked to COM-B components (Michie et al., 2014)](image)

Next, I consider the role of primary care within the UK, and the context and challenges that healthcare professionals face during delivery of patient care.
2.3 The Role of Primary Care in Supported Self-Management

Behaviours (of both a patient, healthcare provider, and the relationship between both parties) can play a significant role in influencing and guiding people’s health (NICE, 2007). Changing the health behaviours of a population requires interventions delivered at individual, household, community and population levels. At the heart of the UK’s National Health Service (NHS), primary care services are often the first, most common, and recurring point of contact for patients. Including services such as general practices, primary care is recognised as ideally placed to deliver care (Barnett et al., 2012) as it is able to provide an easy, accessible route to care, whatever the patient’s concern.

However, the UK’s mortality and morbidity is growing dramatically (Van Den Muijsenbergh & Van Weel, 2019). An ageing population and the rising number of people with LTCs (e.g., asthma, diabetes, arthritis, high blood pressure, and some mental health conditions etc.) and other co-morbidities as outlined in section 1.2.5, presents new challenges for the UK’s NHS. Around 5.4 million of the UK population are aged 75 and over, and around 3 million people are living with at least three LTCs (Office of National Statistics, 2021). For people with LTCs, presentations to unscheduled care services are common, often avoidable, and more effective management and treatment in primary care could reduce unscheduled care and emergency department admissions (Guthrie et al., 2017). To combat the challenges of rising rates of long term conditions and complex illnesses, it is becoming ever more valuable for every healthcare service to view each individual patient’s contact with a healthcare provider, as an opportunity for health improvement to positively influence
change in health behaviours and encourage self-management strategies (Dixon & Johnston, 2010).

2.3.1 The Role of the Healthcare Professional within Primary Care

Primary care healthcare professionals (e.g., general practitioners (GPs), practice nurses, pharmacists) play a pivotal role in providing treatment for common illnesses, the management of LTCs such as asthma, diabetes and heart disease, and the prevention of future ill-health through advice, immunisation and screening programmes. However, the role of the primary healthcare professional is multi-faceted and complex, as healthcare professionals are tasked with ‘achieving health for all,’ and seen to be ‘well placed to support public health teams in assessing and addressing causes of disease’ (Van Den Muijsenbergh et al., 2019), whilst simultaneously delivering care for an entire community and individual patients. Currently, there is limited evidence to explore how primary healthcare professionals view this responsibility, however, research suggests that healthcare professionals are ideally placed to support and facilitate behaviour change, including self-management with patients because of their frequent one-to-one patient contact (Keyworth et al., 2018).

2.3.2 The Challenges of Implementation for Primary Healthcare Professionals

Implementation of supported self-management for primary healthcare professionals is behaviour change at two levels;
1) The healthcare professional delivering behaviour change intervention(s), and trying to address patients’ capability, opportunity, motivations and behaviour (COM-B),

2) but additionally, healthcare professionals are also changing their own behaviour, and can therefore be impacted by interventions.

Delivery of opportunistic behaviour change interventions by healthcare professionals both improves clinical outcomes and is cost-effective for the NHS (Webb et al., 2016). Due to these positive findings, there is a plethora of interventions and policies aimed at changing practice habits of primary healthcare professionals (Chauhan et al., 2017). However, bringing evidence into clinical practice is an ongoing challenge due to the organisational and healthcare professional barriers in primary care (Keyworth et al., 2018). Qualitative research exploring primary care nurses’ attitudes towards integrating implementation research into practice suggests there is lack of clinician engagement, and healthcare professionals’ own beliefs about patient motivation to change their behaviour are often a barrier (Chisholm et al., 2012), along with wider barriers such as time, workload, lack of training or managerial support and organisational barriers (Keyworth et al., 2018; Elwell et al., 2013; McArthur et al., 2021).

The role of primary healthcare professionals is also influenced by initiatives such as the MECC (Making Each Contact Count) evidence-based approach to improving people’s health and wellbeing (NICE, 2022b). The MECC training approach enables healthcare workers to engage people in conversations
about improving their health by addressing risk factors such as alcohol, diet, physical activity, smoking and mental wellbeing. MECC utilises brief interventions, delivered whenever the opportunity arises in routine appointments and contacts. Very brief interventions can take as little as 30 seconds to a couple of minutes to complete. A brief intervention involves a conversation, with negotiation and encouragement, and may lead to referral for other interventions, or more intensive support. However, there are often inconsistencies in implementing these approaches during routine care. Often healthcare professionals view MECC behavioural conversations as ‘just another thing to do’ (Keyworth et al., 2019). Healthcare professionals need to be supported in the value of these approaches to increase the delivery of interventions in routine practice.

The identified barriers discussed above create opportunity for specific interventions to target challenges in intervention delivery, and to develop theory based interventions to combat the barriers discussed. However, changing individual patient behaviour is more than just providing knowledge, it is about having an existing, appropriate context and environment to facilitate change using evidence-based techniques that are supportive for change.

### 2.4 Consultation and Communication Styles

Primary healthcare professionals are able to provide an effective context for supporting patient behaviour change through the way in which information is communicated and received during healthcare consultations. Extensive
research states that effective communication is imperative in clinical interactions (Ali, 2017; Van Den Muijsenbergh & Van Weel, 2019). Specifically, within primary care, the value of effective communication in nurse-patient clinical interactions can enhance greater patient engagement in decision making, improve patient adherence to medication and treatment plans, increase social support, safety, and patient satisfaction in care (Henly, 2016; Kwame & Petrucka, 2021).

Communication in medical encounters can be verbal and non-verbal. Important non-verbal communication by a healthcare professional (eye contact, posture, the tone of voice, gestures and postures) can communicate unspoken attitudes, concerns and emotions (Silverman & Kinnersley, 2010). Additionally, research suggests even the position the patient is facing towards the healthcare professional can effect communication and knowledge exchange (McGrath et al., 2007). Existing literature (Makoul et al., 2001; Morrissey et al., 2021) also recommend patient-centred templates in providing effective communication during primary care reviews. Templates within primary care reviews are commonly used in LTC consultations to standardise care for patients and promote consistent data recording (Morrissey et al., 2021). However, using computers and completing templates may limit opportunities to discuss individuals’ concerns about living with their condition, and thus can act as a barrier to providing patient-centred care. This may be due to less patient eye contact while making notes, leading to less professional recognition of emotional aspects provided by the patients, limiting the holistic, biopsychosocial approach to care (McGrath et al., 2007).
2.4.1 Delivery of Patient-Centred Care

The core communication style that facilitates behaviour change, within primary care is known as patient-centred care, an approach to healthcare delivery which supports the role of patients making informed and active choices, rather than remaining passive recipients of their care (Grover et al., 2021). A patient-centred style of healthcare delivery consists of behaviours such as open questions, eliciting patients opinions, and where healthcare professionals and patients work collaboratively to support development of the knowledge, skills and confidence they need to manage their own health and health care more effectively. Crucially, patient-centred care ensures people are always treated with dignity, compassion and respect, and responds to the needs, circumstances and preferences of the individual. The Health Foundation (2016) has created a framework that comprises four principles of patient-centred care:

‘1. Affording people dignity, compassion and respect,

2. Offering coordinated care, support or treatment,

3. Offering personalised care, support or treatment,

4. Supporting people to recognise and develop their own strengths and abilities to enable them to live an independent and fulfilling life.’
There is growing evidence of the need to embrace a person’s choice in their healthcare decisions and to promote the shift away from outdated, paternalistic approaches to healthcare delivery (Kogan et al., 2016). Patient-centred care has been recommended by clinical guidelines (NICE, 2021) for the importance of implementation into clinical practice, including numerous advantages for both the patient and healthcare professional to increase patient engagement, empowerment, and to improve condition control, increase treatment adherence and reduce patient anxiety (Ulin et al., 2015).
However, the term patient-centred care has been widely characterised, and often has similar, but varied meanings of how to define and implement into clinical practice. In 2006, Irwin and Richardson defined patient-centred care as; ‘merging patient education, self-care and evidence-based models of medical practice’. In later research, there have been efforts to update the patient-centred care definition through systematic reviews of articles proposing classifications of ‘patient-centeredness’ (Langberg et al., 2019). Although definitions of patient-centred care have been comprehensively investigated, no agreed global definition exists for the concept of patient-centred care (Grover et al., 2021), potentially resulting in confusion and limiting its implementation into clinical practice. In this thesis, I am using the definition and four principles outlined by The Health Foundation (2016) above.

2.4.2 Delivery of Patient-Centred Care During Routine Asthma Reviews

Supporting self-management is entirely compatible with the patient-centred, holistic nature of primary care, and according to Pinnock et al., (2017) the majority of people with asthma (and other LTCs) have voiced the need for support from healthcare professionals to understand and manage their own condition. More specifically, patient-centred care is pivotal in improving health outcomes for patients with asthma, and can increase patient satisfaction, quality of life, ability to self-manage and reduce hospital admissions (Qamar et al., 2011; Bauman et al., 2003). Gibson et al., (2002), supports this research, and states that information-only asthma education (e.g., provision of a video link or leaflet alone) may be ineffective. This principle strengthens the concept of patient-centred care, and supports the need for more systematic and
comprehensive patient-centred approaches to improve health outcomes for asthma.

2.4.3 Shared Decision Making in Asthma Management

Under the umbrella of patient-centred care, Shared Decision Making (SDM) is a process in which healthcare professionals work together with a patient to reach an agreed decision about the patient’s care (NICE, 2021). In shared decision making, both parties share information; the clinician offers options for possible treatment and management and describes possible associated risks and benefits, and the patient expresses their preferences and values for options of care. Both the clinician and patient are then armed with a better understanding of the relevant factors and shared responsibility in the decision about how to proceed with the patient’s care (Charles et al., 1997).

During routine asthma reviews, delivery of patient care should include a shared decision process to ensure discussions about the patient’s individual asthma goals are considered (Pinnock et al., 2017). For example, this may include important considerations such as asthma control within the broader context of the patient’s life, other comorbidities that may influence treatment, adherence or other aspects of asthma control. By aligning the patient’s goals and moving towards a holistic approach to healthcare, clinicians are then able to work with the patient to create shared aims, develop and incorporate them into the patient’s individualised self-management plan (Gruffydd-Jones & Hansen, 2020). Shared decision making discussions during routine asthma reviews can lead to increased patient satisfaction and adherence, better individual health outcomes, improved asthma control, and quality of life (Kew et al., 2017).
However, there are challenges associated with implementing a shared decision making, patient-centred approach during routine asthma consultations. In a Cochrane Review, Kew et al., (2017) reviewed the evidence on shared decision-making for people with asthma compared with standard asthma care, and concluded that the potential benefit of shared decision making depends on the willingness and ability of both sides to interact. This ability might depend on factors such as;

‘ethnicity, literacy, understanding of health concepts (health literacy), numeracy, beliefs about asthma and medications, desire for autonomy, and the health care system.’ (Kew et al., 2017).

As such, shared decision making will not necessarily be equally acceptable to all patients and may not be applied in the same way across healthcare contexts. Additionally, evidence regarding how best to achieve shared decision making in practice is sparse.

2.4.4 Motivational Interviewing

Another patient-centred communication and consultation approach that can be used during routine asthma care is Motivational Interviewing. Primary healthcare professionals spend relatively extensive time with patients with LTCs, and are uniquely placed to hold opportunistic discussions to support positive behavioural changes during regular routine reviews. Due to the regular frequency of LTC reviews (at least annually), healthcare professionals and patients are able to develop a familiar, collaborative relationship to monitor their condition, and healthcare professionals may be able to get a sense of
what motivates patients, and barriers in their progress in certain areas of lifestyle change. Motivational interviewing is a focused, patient-centred counselling skill which aims to influence patients to make behavioural changes in the interest of their health, by helping them to explore and resolve any uncertainties. Motivational interviewing relies on identifying and mobilising the patient’s intrinsic values and goals to stimulate behaviour change (Miller & Rollnick, 2012). When healthcare professionals use motivational interviewing techniques, they encourage individuals to explore their feelings and find their own motivations to engage in certain behaviours. Motivational interviewing includes a number of approaches; however the most commonly used technique is the use of OARS:

1) **Open-Ended Questions:** Using questions that individuals cannot answer with a ‘yes’ or ‘no’. These questions encourage people to think more deeply about an issue.

   E.g. ‘how would you like things to be different?’ and ‘what have you tried before to make a change?’

2) **Affirmations:** Using statements that recognise a person’s strengths and acknowledging their positive behaviours to build an individual’s confidence.

   E.g. ‘I appreciate it took a lot of courage to discuss this today’ and ‘It sounds like you handled yourself really well in that situation’.

3) **Reflective Listening:** Reflection is defined as statements of understanding, and reassures an individual that their healthcare professional is listening and
trying to understand their point of view. It also gives the person the opportunity to correct any misunderstandings and to elaborate on their feelings.

4) **Summaries:** Using summaries throughout a conversation to reassure the individual that the healthcare professional understands what they have been saying (Miller & Rollnick, 2012).

The motivational interviewing approach focuses on helping patients make their own choices, enabling them to find their motivation and commitment to change, in an open and non-judgemental discussion. Although motivational interviewing overlaps with patient-centred communication, it additionally includes some motivational strategies that can be briefly and easily implemented in primary care settings (e.g., setting an agenda, assessing motivation and confidence for change, helping the patient weigh the costs and benefits of change, and providing medical advice and health feedback). Reflective listening is used to help patients clarify their ambivalence and diffuse resistance (Borrelli et al., 2007).

In a meta-analysis by Vanbuskirk and Wetherwell (2014), which synthesised the findings from RCTs of motivational interviewing for health behaviour outcomes within primary care populations, findings suggested motivational interviewing is useful in primary care settings. During as few as one session, motivational interviewing may be effective in enhancing readiness to change and action directed towards reaching health behaviour change goals. Specifically for asthma management, Gesinde and Harry’s (2018) research revealed that motivational interviewing interventions can improve patient
related outcomes such as self-efficacy towards self-management, and positive behaviour change approaches.

The growing burden of LTCs requires healthcare professionals to provide evidence-based behaviour change counselling for their patients. However, there are challenges associated with delivering MI strategies during routine primary care. Developing healthcare professional’s motivational interviewing skills requires training, practice, and feedback on practice over an extended period of time (Bohman et al., 2013; Schwalbe et al., 2014). Many healthcare professionals who are trained in motivational interviewing strategies take part in brief, introductory workshops where it is common for attendees to report high confidence in their motivational interviewing skills after the training is complete (Madson et al., 2009). Although healthcare professional’s motivational interviewing skills during day-to-day practice do not change substantially after this brief exposure to motivational interviewing (Miller & Rose, 2009), the most effective training experiences for healthcare professionals in motivational interviewing includes multiple training sessions, individual coaching, and feedback from audio/video taped sessions with real world stimulated contexts (Madson et al., 2009).

2.4.5 How Communication Styles Can Influence the Delivery of Supported Self-Management

The pivotal objective of supported self-management is to change patient behaviour, and the ways in which healthcare professionals communicate can positively or negatively affect a patient’s ability to self-manage. Changing patient’s behaviour can be achieved by increasing patients’ skills and
confidence in managing their condition. Lorig and Holman (2003) identify a generic set of communication and behaviour change skills to consider during LTC reviews which have proven to be successful for effective supported self-management, including; ‘1) problem-solving, 2) decision making, 3) resource utilisation, 4) forming a patient-health care provider partnership, 5) taking action.’ Achieving these goals during a routine review can lead to increased patient self-efficacy. Self-efficacy refers to the belief in one’s capability to achieve behaviour necessary to reach a desired goal (Bandura, 1977; Bandura, 1986; Bandura et al., 1999).

Despite the need for primary healthcare professionals to deliver a patient-centred review which facilitates skills for patient self-management, there is a gap in healthcare professional education of any theoretical framework or evidence-based structure for providers to effectively support self-management and facilitate patient behaviour change (Dineen-Griffin et al., 2019). Therefore, there is a need for research to explore the specific strategies and active components of effective supported self-management interventions, and to understand how these might be delivered within primary care, what improvements can be achieved, and the training and system changes needed as a result.
2.5 The Impact of Remote Consultations on Delivery of Personalised Care

Remote consultations are defined as any situation in which the patient and clinician are not in the same room, including synchronous methods of communication, such as consultations by telephone or video consultations (See section 1.4). Since the shift to remote consultations due to the COVID-19 pandemic, concerns have been raised about the effect these styles of consultations may have on the interaction with the patient, compared to standard face-to-face reviews (Mann et al., 2021). Dealing with, and managing the patient’s presenting condition(s) is important, but using the opportunity to explore aspects of health promotion, prevention, and behaviour change is key to utilising the potential of the primary care consultation (Mughal et al., 2022). Understanding the strengths and weaknesses of each mode of communication may influence healthcare professional delivery of supported self-management, patient-centred care and behavioural discussions.

Telephone consultations are acceptable to both GPs and patients, and are seen as an appropriate mode of consultation for non-complex, routine LTC reviews, where patients can be asked to attend later for a face-to-face consultation if further physical examinations are required (Hewitt et al., 2010). However, the subtle features observable during a face-to-face consultation, such as body language (sitting uncomfortably or looking away) and non-verbal cues (e.g. facial reactions), may be lost during telephone consultations. Most importantly, the quality of the interaction and pre-existing rapport and trust will help the patient to share their preferences, needs and concerns, leading to
better shared decision making discussions. Healthcare professionals must use advanced communication skills to pick up patient’s views and preferences, and engage the patient in partnership to manage their health to arrive at shared goals and plans, which can be more challenging when consulting remotely (Mughal et al., 2022).

2.6 Underpinning Health Psychology Theories/Models within the IMP²ART Programme

A key distinction between the IMP²ART programme and this PhD thesis is that IMP²ART is directed at influencing three levels of supported self-management for asthma; 1) the patient, 2) the healthcare professional and 3) the organisation. In contrast, this thesis specifically explores healthcare professional communication and behaviours to deliver supported self-management strategies. However, it is important to understand the theories and models which have underpinned the IMP²ART programme to identify any possible mechanisms of change in healthcare professional behaviour.

There are a number of communication and consultation techniques which have been proven to be effective for patient health outcomes (see section 2.3). However, there are existing barriers and challenges in practice which may limit primary healthcare professionals from delivering evidence-based behaviour change interventions. A key issue to be addressed is how primary healthcare professionals can support self-management in an evidence-based approach and how self-management processes can be integrated into clinical practice.
(Dineen-Griffin et al., 2019). As described by Kennedy et al., (2013), the IMP²ART programme is a whole systems intervention, which targets all members of primary care to integrate supported self-management at the level of the patient, healthcare professional, and the organisation, which has proven effective in improving outcomes for people with asthma (McClearly et al., 2018). Acknowledging these implementation challenges, the following section will explore the theoretically informed implementation strategies used within the IMP²ART programme.

2.6.1 IMP²ART Programme Theory

In addition to building on previous research (Pinnock et al., 2015; McClearly et al., 2018), the IMP²ART programme has been developed with supporting theories and models in order to increase effectiveness. Throughout the programme, both individual behavioural and organisational theories have been embedded into implementation approaches.

Central to the IMP²ART programme are three underlying theories:

1) COM-B Behaviour Change Model (Michie et al., 2011)

As discussed in section 2.1, individual (patient and healthcare professional) behavioural change theories have been guided by the Behaviour Change Wheel (BCW) and the COM-B model (Capability + Opportunity + Motivation = Behaviour) (Michie et al., 2011), to identify elements of the three constructs which need to be targeted to effect change in any given behaviour. The COM-B model was utilised in the development of patient resources for the IMP²ART
programme (e.g. the patient facing website, invitation letters for patients). (See Figure 3: COM-B Model of Behaviour Change, Michie et al., 2011).

2) TheoreticalDomains Framework (TDF) (Michie et al., 2005) for Educational Module Development (Figure 4)

As discussed in section 2.2.2, the TDF comprises a set of theoretical construct ‘domains’ or groups of similar constructs, to describe modifiable factors that can influence healthcare professional behaviour (Patey et al., 2022). During the development phases of the IMP\(^2\)ART programme, a systematic review was conducted by McCleary et al., (2018) to identify features of effective interventions on healthcare professional education to effectively deliver supported self-management for asthma. The Theoretical Domains Framework (TDF) (Michie et al., 2005) acted as a framework to structure and synthesise the evidence for effective education strategies. The TDF domains associated with effective asthma education for healthcare professionals were: ‘social influences’, ‘environmental context and resources’, ‘behavioural regulation’, ‘beliefs about consequences’, and ‘social/professional role and identity’ (McCleary et al., 2018). These domains were priorities for inclusion in the IMP\(^2\)ART education modules for IMP\(^2\)ART implementation healthcare professionals (McClatchey et al., 2022). Additionally, the TDF was utilised in the organisational strategy development (e.g. audit and feedback) for the IMP\(^2\)ART programme. Details of how the TDF domains are incorporated into the IMP\(^2\)ART implementation education modules are discussed in section 2.5.3 below.
3) The iPARIHS (Harvey & Kitson, 2016)

The iPARIHS framework brings together the COM-B model and TDF to structure implementation delivery. The iPARIHS framework (Figure 6) suggests that successful implementation of evidence-based research into practice is a product of a number of factors and can be represented by $SI = Facn (I + R + C)$ where SI is successful implementation; Facn is facilitation; I is the innovation; R is the recipient (individual and collective) and C is the context (inner and outer). In IMP²ART the innovation is supported self-management, the recipient is both the individual patient, the individual healthcare professional and the practice. The context is both the individual practice and the wider health care context.

2.6.2 The Role of Facilitation in IMP²ART: Implementation Strategy for Healthcare Professionals

In order to provide skills, resources and education to the whole general practice team randomised to the implementation group of the IMP²ART programme, practices were provided with a one off facilitation workshop at the outset. The facilitator then maintained contact with the practice over the course of 12 months. The facilitator is central to IMP²ART, as their role brought together all frameworks, theories and IMP²ART components in an effective way of delivery, relevant to each practice.

The facilitators key aims were to:

- Raise awareness of the rationale for supported self-management in asthma and IMP²ART,
• Facilitate the whole practice team to develop a team plan for supported self-management,

• Promote (patient/professional) partnership working to achieve supported self-management through appreciative inquiry and use of behaviour change strategies,

• Provide ongoing facilitation and support for their practices,

• Contribute to the trial process and data collection.

The iPARIHS framework (Harvey & Kitson, 2016) (Figure 6) argues that successful implementation of evidence into practice is a function of the interplay between the innovation, the recipients of the innovation (including individual and teams), the context and the way in which the innovation is facilitated into practice. Facilitation is seen as the active ingredient in implementation and has particular resonance with IMP²ART, in which a core task is enabling practice teams to implement supported self-management.
Figure 6: The iPARIHS Facilitation role and process (Harvey & Kitson, 2016)
2.6.3 IMP\textsuperscript{2}ART Education Programme: Implementation Strategy for Healthcare Professionals

As discussed in Chapter 1, IMP\textsuperscript{2}ART implementation group healthcare professionals were also provided with evidence-based education modules. Improving practitioner skills and confidence was a key priority for IMP\textsuperscript{2}ART, and this needed to include GPs, nurses, and administrative staff. Linking with the COM-B element of ‘social opportunity’, the IMP\textsuperscript{2}ART education programme targeted the whole general practice team, and included two modules with the aim of:

1. Addressing the importance of supported self-management in asthma for the whole practice team (Team-Awareness Module: Module 1),

2. Providing an in-depth education module on supporting self-management for the healthcare professionals who conduct annual asthma reviews with patients (most often nurses in the UK) (Individual Study Module: Module 2).

IMP\textsuperscript{2}ART education modules were developed using the TDF (Michie et al., 2005) to ensure relevant behaviour change elements were included in healthcare professional learning modules. For example, the TDF domain ‘Knowledge’ was addressed by providing evidence and impact of supported self-management provision for asthma. ‘Skills’ was addressed by providing information and exercises on consultation skills, motivational interviewing strategies for communicating with people with asthma, and how to co-create a personalised asthma action plan. The TDF domain ‘beliefs about capabilities’ was addressed through healthcare professionals self-reported measure of
confidence in supporting patients to manage their asthma. The domain ‘beliefs about consequences’ was addressed by providing information in the modules about health/societal costs of asthma and benefits of supported self-management (McClatchey et al., 2022). Through completion of a theoretically informed education programme, it is anticipated that healthcare professionals within the IMP\textsuperscript{2}ART implementation group, who have completed the education modules, will be more aware and able to deliver effective supported self-management. The IMP\textsuperscript{2}ART Education Modules 1 and 2 aims, learning outcomes and content (McClatchey et al., 2022) are outlined below in Table 2.

2.6.4 Remote IMP\textsuperscript{2}ART Strategies

Due to the COVID-19 pandemic, and the shift to remote asthma care, the IMP\textsuperscript{2}ART programme adapted their implementation strategy to include evidence and theory based approaches to remote asthma care. The IMP\textsuperscript{2}ART research team, Professional Advisory Group (PAG), and the Patient and Public Involvement (PPI) group worked together to adapt the guidance to remote reviews for asthma. These findings were incorporated into the implementation of ‘how to’ resources, which were available to the implementation group healthcare professionals in the trial (Delaney et al., 2021). ‘How to’ resources included details of how to effectively deliver telephone, video and online remote reviews.
Table 2: IMP²ART Education Modules 1 and 2 aims, learning outcomes and content (McClatchey et al., 2022)

<table>
<thead>
<tr>
<th>Aim</th>
<th>Team-awareness module: module 1</th>
<th>Individual study module: module 2</th>
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<tr>
<td></td>
<td>To raise awareness of the benefits of supported self-management and increase engagement, motivation and commitment to supporting self-management so that it becomes a priority across the whole practice team.</td>
<td>To enable healthcare professionals to use behaviour change strategies in clinical practice to deliver effective supported self-management.</td>
</tr>
<tr>
<td>Learning Outcomes</td>
<td>• Understand the principles of supported self-management &lt;br&gt; • Recognise the benefits of supported self-management for patients and the practice &lt;br&gt; • Identify roles and contributions in the team approach to supported self-management</td>
<td>• Understand the concept of supported self-management &lt;br&gt; • Identify individual and organisational barriers to effective supported self-management &lt;br&gt; • Use a range of strategies to support behaviour change &lt;br&gt; • Reflect on various approaches to supported self-management &lt;br&gt; • Evaluate self-management resources appropriate for their patient population and context</td>
</tr>
<tr>
<td>Core Module Content</td>
<td>• Introduction (e.g., The National Review of Asthma Deaths (NRAD); definition of supported self-management) &lt;br&gt; • Principles of supported self-management (importance of SSM and barriers to SSM) &lt;br&gt; • Benefits of supported self-management (benefits for patients, general practice, and society) &lt;br&gt; • Teamwork (the team approach to supporting self-management) &lt;br&gt; • Summary, planning and evaluation</td>
<td>• Introduction (learners’ approach to and confidence in supporting self-management) &lt;br&gt; • What is supported self-management? (evidence for SSM) &lt;br&gt; • Barriers to effective supportive self-management (patient and healthcare professional perceptions, and overcoming barriers) &lt;br&gt; • Helping patients to change behaviour (behaviour change and communication skills) &lt;br&gt; • Approaches to supported self-management (working in partnership with patients and motivational interviewing) &lt;br&gt; • Self-management in practice (personalising asthma action plans) &lt;br&gt; • Summary, planning and evaluation &lt;br&gt; • Additional resources</td>
</tr>
</tbody>
</table>
2.7 Conclusions

Primary healthcare professionals are well placed to deliver effective, opportunistic, theory and evidence based behaviour change interventions. However, there are challenges to implementation, and supporting delivery and communication styles of these interventions and discussions by healthcare professionals are of pivotal importance to ensure patients understand their care, and feel confident and able to self-manage their conditions. Within the IMP²ART programme, healthcare professionals have been provided with theory based strategies and education. Throughout this PhD I will draw on the behaviours and communications of primary healthcare professionals to better understand how supported self-management can be effectively communicated and delivered during routine asthma care. The following chapter will outline the aims and objectives of this PhD thesis and the methodology used throughout this programme of work.
3. Aims and Methods of this PhD

3.1 Aims of the PhD

Through a systematic rapid realist review, an in-depth, observational analysis of healthcare professional supported self-management delivery, and semi-structured interviews with healthcare professionals, this PhD project had two principal objectives:

1. To understand how supported self-management is delivered during routine primary care asthma reviews.
2. To explore differences (if any), between healthcare professional delivery of supported self-management within both IMP²ART implementation and control groups, and any differences between the delivery of supported self-management between face-to-face and remote asthma consultations.

The specific aims and objectives of each phase of the PhD are outlined below.

3.1.1 Aims of the Systematic Rapid Realist Review

The systematic rapid realist review (Chapter 4) aimed to explore the delivery of supported self-management during remote asthma reviews (including telephone/video consultations), specifically investigating the evidence for clinical effectiveness, acceptability and safety of supported self-management delivery. Conducting a systematic realist review enabled understanding of whether an intervention/approach works and how and in what context, which
is particularly important to primary care where there is variation in context, infrastructure and populations.

3.1.1.1 Objectives of Systematic Rapid Realist Review:

1. To identify and synthesise studies which explore remote asthma consultations and the delivery of supported self-management.

2. To explore the context and mechanisms that may have contributed to clinically effective, safe and acceptable delivery of supported self-management during remote asthma consultations.

3. To produce recommendations and guidelines for best practice in the delivery of supported self-management during remote consultations for people with asthma.

3.1.2 Aims of the Video-Recorded Observations of Asthma Reviews

The aim of the observational study (Chapter 5) was to video record and observe routine asthma reviews (both face-to-face and remote consultations), in both IMPART implementation practices and control practices, to understand how supported self-management is delivered during routine primary care asthma reviews.

3.1.2.1 Objectives of Quantitative Phase:

1. To observe how self-management strategies are embedded into routine reviews and what proportion of time within a consultation is spent on self-management related tasks.
2. To observe how patient-centred methods and behaviour change counselling are used within asthma consultations.

3. To explore differences in delivery of supported self-management and consultation styles related to allocation in the IMP²ART trial (implementation or control); mode of delivery (remote telephone/video-consultations or face-to-face); and duration of the review.

3.1.3 Aims of Qualitative Interviews with Healthcare Professionals

The aim of the qualitative interviews (Chapter 6) was to explore primary healthcare professional’s views, opinions, and experiences towards the delivery of supported self-management during routine asthma reviews.

3.1.3.1 Objectives of Qualitative Phase

1. To explore healthcare professional views and experiences of delivering supported self-management to asthma patients.

2. To explore how general practices prioritised supported self-management during routine asthma reviews.

3. To explore context, facilitators and barriers that healthcare professionals perceived affected their ability to deliver supported self-management (for example: participation in the IMP²ART implementation strategy; mode of consultation; duration of asthma review appointments).
3.1.4 Aim of the Triangulation Phase

The aim of the triangulation phase (Chapter 7) was to summarise and triangulate the key findings of the three phases of the PhD study;

1) the systematic rapid realist review (Chapter 4),

2) the observational, quantitative findings of the delivery of supported self-management during routine asthma reviews (Chapter 5),

3) and the in-depth qualitative interviews (Chapter 6) which were conducted with healthcare professionals who participated in the observational phase.

3.2 Methodology

The following methodology section provides an overview of the various designs and methodologies applied throughout this thesis, and how the chosen approaches will be combined to reach the outcomes of the PhD. Combining the findings of a systematic rapid realist review, a quantitative analysis of observed video recorded routine asthma reviews, and qualitative interviews involving healthcare professionals who participated in the quantitative observation phase, I will provide a broad understanding of how supported self-management is delivered during routine asthma reviews.

Figure 7 displays a schema of the four phases of the overall PhD study methodology.
Figure 7: Schema of the four phases of the overall PhD study methodology

PhD Study Schema:

Delivery of Supported Self-Management in Asthma Reviews: A Mixed Methods Observational Study
Nested in the IMP²ART Programme of Work

1: Systematic Rapid Realist Review
   - Systematic Rapid Realist Review exploring the delivery of supported self-management via remote asthma reviews.

2: Video-recorded observations of asthma reviews
   - Observations of routine asthma reviews in IMP²ART practices to explore the delivery of supported self-management strategies.

3: Qualitative Interviews with healthcare professionals
   - Semi-structured interviews with IMP²ART healthcare professionals who routinely deliver asthma reviews to explore experiences, attitudes and opinions of self-management delivery.

4:Triangulation
   - Compare and contrast results for overall interpretation of findings.
   - Differences in supported self-management delivery between IMP²ART implementation and control groups and differences in delivery between face-to-face and remote asthma reviews.

Data analysis using systematic rapid realist methodology: exploring the safety, clinical effectiveness and acceptability of self-management delivery.

Data analysis of collected observational video data (quantitative analysis): exploring the differences in self-management delivery between groups (usage of patient-centred/motivational strategies to promote asthma self-management).

Data analysis of collected interview healthcare professionals views and opinions of asthma self-management delivery in practice (thematic analysis).

Realist Systematic Review Results

Observational, quantitative results

Qualitative interview Results

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3.2.1 Study Design

This PhD study utilised a mixed methods approach. Details of the overarching study design are outlined below.

3.2.1.1 Mixed Methods Research

Mixed methods is a research approach whereby researchers collect, analyse, and mix both quantitative and qualitative data in a single study or a series of studies (Creswell, 2017). The approach allows researchers to explore diverse perspectives, and uncover relationships that exist between the intricate layers of multifaceted research, providing data which is more comprehensive and offers a more complete understanding of the problem and potential solutions to the research questions (Vedel et al., 2019).

3.2.1.2 Justification of Mixed Methods Within this Thesis

Mixed methods research approaches are becoming increasingly advocated in healthcare research, more specifically, within primary care research contexts, including large complex interventions (Borkan, 2004; Vedel et al., 2019), where research can be complex and multifaceted. Integrating both quantitative and qualitative research methods can optimise the breadth and depth of a study, and helps to understand the socio-cultural context and the influences of real-world environments (Shaw et al., 2014). Mixed method approaches were chosen within this programme of work to provide a broader understanding of all collected data (both quantitative and qualitative), to explore components of healthcare professional supported self-management delivery.
3.2.1.3 Between-Group Design

Another methodology utilised within this research is a between-group research design. Between-group is a type of experimental design where participants are assigned to different study conditions. In a between-groups design, every participant experiences only one condition (usually an intervention or a control condition), with participants randomly assigned to one of the two groups (Keren, 2014). Comparisons and conclusions can then be derived from the different outcomes of the two groups.

Within the IMP²ART implementation strategy, half of all recruited general practices (n=72) (IMP²ART implementation group healthcare professionals) will receive a number of evidence-based strategies (as outlined in Chapter 1 and 2);

1. Patient resources to support asthma self-management (e.g. a range of action plans; general information for patients)

2. Professional education to motivate and train practices (e.g. online modules to raise awareness and skills in supporting asthma self-management)

3. Organisational strategies to facilitate adoption (e.g. an asthma review template and audit/feedback to motivate healthcare professional behaviour change).

In comparison, the IMP²ART control group practices (n=72) will continue to deliver their standard asthma care. To explore the between-group differences (if any) of asthma supported self-management delivery, an important aspect of
this thesis will provide an in-depth analysis of any comparisons between both
groups’ delivery of supported self-management strategies. An additional
between-group experimental aspect of this thesis will explore the differences
in the delivery of supported self-management (if any) between face-to-face
asthma consultations and remote (telephone or video) consultations.

3.3 Methods

The methods of this thesis will involve four sequential stages, including 1) a
systematic rapid realist review, 2) an observational, quantitative study, 3) a
qualitative interview study, and 4) a triangulation analysis of all stages.

Each method will be discussed further within their corresponding chapter, with
a thorough methodological literature review of chosen data collection methods
and tools. The below section provides a summary of each methodological
approach, and reasoning for why each approach was chosen within this
programme of work.

3.3.1 Systematic Rapid Realist Review (Chapter 4)

Due to the COVID-19 pandemic in 2020 and 2021, healthcare systems globally
were forced to adapt quickly to new modes of remote health care delivery,
including providing routine asthma reviews (Mann et al., 2021). A core
component of asthma care is to support self-management, a guideline-
recommended intervention that reduces the risk of acute attacks, improves
asthma control and quality of life (Pinnock, 2015; Pinnock et al., 2017). To
ensure this PhD thesis was relevant, up-to-date and aligned with current policy
and practice, I sought to explore how supported self-management was delivered during the newly utilised remote technologies of video and telephone consultations.

Given the rapidly changing clinical context and national/international recommendations for implementing supported self-management, providing guidance on this new approach to delivery was timely. Conducting a systematic rapid realist review enables understanding not only about whether an intervention/approach works, but how and in what context, which is particularly important to primary care where there is variation in context, infrastructure and populations. The Realist approach (Pawson, 1996; Saul et al., 2013) provides a rationale, tools, and structure for synthesising complex and difficult-to-interpret evidence from existing research regarding remote asthma care delivery. I used a systematic rapid realist review to respond to the time sensitive issue of the shift to routine remote primary care, enabling the research to provide a quick and pragmatic summary of how supported self-management is delivered during remote reviews and recommendations for future implementation.

Using a systematic rapid realist methodology approach (Pawson, 1996; Saul et al., 2013) the research explores the context and mechanism for clinical effectiveness, acceptability and safety of supported self-management delivery within remote asthma consultations. I systematically searched four electronic databases, and convened an External Reference Group (ERG) which included multidisciplinary members such as clinicians, academics and AUKCAR PPI members to provide expert advice and guidance throughout the study. Data
were extracted using Context-Mechanism-Outcome (C-M-O) configurations and synthesised into overarching themes using the PRISMS taxonomy of supported self-management delivery as a framework to structure and support the findings.

I decided to conduct a systematic realist review as this methodology provided context-specific information about how supported self-management for asthma is delivered remotely by going beyond looking at effectiveness of interventions, and instead allowed me to gain a deeper understanding of what works for whom in what context. My interest in this was stimulated by the shift to remote asthma reviews during the COVID-19 pandemic. However, I chose not to continue with the realist methodology approach and integrate the specific CMO’s that were generated through the rest of this thesis. Instead, I used the overall themes and findings of the systematic realist review in conjunction with the findings of the observational and quantitative study results to create an overarching representation of how supported self-management is delivered in primary care. This decision was made to allow different methodologies to be conducted, interpreted, and then triangulated using the specific ‘Triangulation Protocol’ methodology (O’Cathain et al., 2010 & Farmer et al., 2006), where data of different forms (e.g., quantitative and qualitative) are collected and firstly analysed separately for each component to produce different sets of findings and thus compared for an overarching synthesis of results.
3.3.2 Observational, Quantitative Study (Chapter 5)

The second phase of the PhD programme utilised observational research methods. Observational studies are a research technique where researchers observe participants’ ongoing behaviour, communications, relationships and other relevant components in a natural situation (Boyko, 2013).

Observational research often addresses an existing research question, where the researcher will observe an existing environment/context to explore the research area under review. The researcher usually codes different types of behaviours and communication within the observed data to analyse the interactions for further interpretation. This approach was chosen as visual research is a rapidly expanding field within intervention evaluations. The notion of the ‘Hidden Curriculum’ (Bezemer, 2017), suggests that much of what is taught and learnt throughout a given intervention, is not made explicit enough through written evaluations of knowledge and competencies. Detailed visual analysis is a potentially useful tool and methodology of evaluation as it allows all components of the intervention to be visually made explicit and thus explored.

Observational research is a commonly used method in primary care studies. However, direct observation by a researcher is not always the most appropriate choice for analysing primary care encounters due to the challenges of capturing data in a live setting, particularly when components occur simultaneously (Carthey, 2003). Video recording observations offer a method to eliminate some of these challenges by accurately recording clinical events without the presence of a researcher (Asan & Montague, 2014). Of all
observing and recording techniques, video recording has been recommended as the most appropriate method for exploring healthcare professional and patient communication, as it successfully captures all modalities of the interaction between participants in a consultation (Coleman, 2000).

Video recording methods require careful considerations and planning in order to effectively gather data to address potential research questions. Asan & Montague (2014), have provided a framework for researchers to consider when conducting a video observation study within a primary care setting. This framework outlines five key steps;

‘1) conceptualising the study, 2) legal and ethical issues, 3) participants and sampling, 4) data collection and management, 5) data analysis’.

Following this framework of observational video data collection in primary care settings, each of the five stages has been reviewed and considered throughout the observational, quantitative component of this thesis (Chapter 5).

To investigate how healthcare professionals deliver supported self-management during routine asthma reviews, an observational, quantitative study was conducted. By using data collected from individual patient routine primary care reviews within IMPART primary care practices, I coded interactions to explore the behaviours and communications of healthcare professionals to explore how supported self-management is delivered during routine primary care asthma reviews. Further details of the observational quantitative study can be found within Chapter 5.
3.3.3 Qualitative Study (Chapter 6)

Subsequent to the video recording data collection phase, healthcare professionals who took part in the recordings also participated in a qualitative interview study. The aim of this phase of the PhD was to explore healthcare professional views and experiences of delivering supported self-management during asthma reviews. Incorporating qualitative interviews into the PhD study was a valuable component of the mixed methods approach to ensure a comprehensive understanding of healthcare professional supported self-management delivery by exploring the thoughts, experiences and opinions of the healthcare professionals who regularly deliver asthma care. Interviews were audio-recorded and transcribed verbatim. Data were analysed using inductive thematic analysis following Braun and Clarke’s (2006) guidelines. Further details of the qualitative phase of the study can be found in Chapter 6.

3.3.4 Triangulation Protocol (Chapter 7)

Once the three data collection phases outlined above were completed, I used a mixed methods, triangulation approach to summarise and combine the findings of all stages of the study, the most common and well-known approach to evaluating mixed methods research (Creswell et al., 2003).

Methodological triangulation is defined as the use of more than two methods in studying the same phenomenon under investigation (Olsen, 2004) and is a method used to increase the credibility and validity of research findings (Noble & Heale, 2019). Credibility refers to trustworthiness and how believable a study is; validity is concerned with the extent to which a study accurately reflects or evaluates the concept or ideas being investigated. By combining theories,
methods, and data, triangulation can help ensure that possible biases arising from the use of a single method of data collection or analysis are overcome, and can enrich research findings as it offers a variety of datasets to explain differing aspects of a phenomenon of interest. Importantly for this thesis, triangulation can help explain the results of a study due to its diverse approach to exploring and combining differing results (Noble & Heale, 2019).

Learning from the triangulation methods from Creswell et al., (2003) & Noble & Heale (2019), the specific triangulation approach chosen to evaluate the findings for this PhD study is the ‘Triangulation Protocol’. Outlined by O’Cathain et al., (2010) & Farmer et al., (2006), this method is one of three triangulation techniques used for integrating mixed methods research components. The Triangulation protocol method is used when data of different forms (e.g., quantitative and qualitative), is collected and firstly analysed separately for each component to produce different sets of findings. The triangulation protocol then provides a step-by-step process for integrating, comparing and contrasting findings to produce an overall picture of findings.

Like all research strategies, there are a number of factors which need to be considered when undertaking triangulation methods. Firstly, triangulation methods can be time-consuming, and this type of research often involves an interdisciplinary team. To ensure validity of using the triangulation approach, I firstly independently completed the full triangulation interpretations, which were then verified with my supervisory research team and the AUKCAR Patient and Public Involvement (PPI) group. This process allowed me to ensure a consistent consensus of the findings were reached, and any
subjective independent biases were addressed. Further information on triangulation protocol methodology is explored within Chapter 7 and the triangulation approach for this thesis is presented below in Figure 8.

Figure 8: Triangulation design of this thesis (adapted from Creswell et al., 2003, 2006; Farmer et al., 2006).

3.4 Patient and Public Involvement

Feedback and involvement of members of the AUKCAR Patient and Public Involvement (PPI) group were included throughout all phases of the research:

1) Systematic Rapid Realist Review (Chapter 4): PPI members were included in the External Reference Group meetings who met regularly during the review process to provide expert advice and guidance on selected papers
and interpretations throughout the study. Additionally, PPI members provided feedback on whether the review findings aligned with their experiences of receiving care in current primary care practice.

2) Observational Study (Chapter 5): AUKCAR lay representatives where involved through providing feedback on participant facing documents such as patient information sheets and consent forms. All feedback was acknowledged and valued, and relevant updates were made.

3) Triangulation Phase (Chapter 7): After completing the data collection, analysis, and triangulation process, I presented my thesis results to a group of PPI representatives. During the meeting, members commented on how the results could influence the lives of people with asthma and other suggestions to consider for final implications of the research. Their feedback was extremely welcomed and valued to ensure this thesis provided important novel contributions to asthma research, and importantly to those living with asthma.

PPI involvement in each phase of the thesis are further discussed within corresponding chapters.

3.5 Summary

This methods chapter provides a summary and justification for the chosen methodologies utilised in this programme of work. An embedded mixed methods design was chosen to explore the intricate behaviours and communications of a sample of healthcare professionals’ delivery of supported
self-management. Further methodological details of the systematic rapid realist review, observational, and qualitative study details can be found in the corresponding chapters.

The next chapter discusses the systematic rapid realist review undertaken to understand the shift to remote asthma self-management delivery due to the COVID-19 pandemic. The review explores how asthma supported self-management can be accepted by both patient and healthcare professional, and can be safely and effectively delivered via remote consultations.
4. Systematic Rapid Realist Review

4.1 Justification for Inclusion in PhD Project (Impact of COVID-19)

Five months into commencing this PhD programme, during March 2020, the Coronavirus (COVID-19) pandemic resulted in unprecedented changes across all of society, health care provision, and research. The measures to control the spread of the virus forced public health workforces and local governments to reshape their work in an effort to contain the virus and protect the most vulnerable. The UK NHS radically mobilised to respond to the acute needs of people infected with the virus, at the same time as delivering routine non-COVID-19 health care. More specifically, the way primary care operated profoundly changed, with all procedures moving to remote triage, with patients offered a mode of teleconsultation (video or telephone consultation) to replace their standard face-to-face appointments (Thorlby et al., 2020).

4.1.1 Remote Asthma Consultations & Supported Self-Management

Delivery

In order to continue asthma care and supported self-management delivery for people with asthma, remote consultations soon became one of the only options for healthcare professionals to communicate and conduct routine asthma reviews with patients. However, critics raised concerns about the use of remote delivery for routine primary care, due to opposing evidence of suitability and the many technical, clinical, and organisational policy challenges associated (Donaghy et al., 2019). More specifically, research regarding the
delivery of supported self-management during remote asthma consultations was sparse and rapidly dated with advances in technology. Doubts were present about if and when remote asthma consultations were a safe and effective alternative to being seen face-to-face (Kew & Cates, 2016). Recommendations for future research emphasised the need to explore how telecommunications can be implemented in ways that are most valued by patients and clinicians, to fit within the organisational and technical infrastructure of healthcare services (Ignatowicz et al., 2019).

In light of the discussions above, this chapter will provide the methodologies and findings of a systematic rapid realist review, conducted to explore the delivery of supported self-management for asthma during routine remote consultations, and was conducted during the first phase of the PhD study. Please see schema below (Figure 9).

This systematic rapid realist review was published in the Health Expectations Journal in 2022 (Kinley et al., 2022), and the pdf of the full published paper can be found in Appendix 4.
Figure 9: PhD Study Schema: Systematic Rapid Realist Review Phase
4.2 Aims of Review

The aim of the systematic rapid realist review was to not only inform the subsequent direction of the PhD project’s scope, but to also inform the IMP²ART trial with evidence-based strategies to effectively implement supported self-management remotely. Using a systematic rapid realist review approach (Saul et al., 2013), the research aimed to explore the clinical effectiveness, safety and acceptability of the delivery of supported self-management for asthma via remote routine reviews. I aimed to explore how, for whom and under what circumstances supported self-management can be delivered during remote asthma consultations.

Using realist methodology, I aimed to:

1. identify and synthesise studies which explore remote asthma consultations and the delivery of supported self-management.
2. explore the context and mechanisms that may have contributed to clinically effective, safe and acceptable delivery of supported self-management during remote asthma consultations.
3. produce recommendations and guidelines for best practice in the delivery of supported self-management during remote consultations for people with asthma.
4.3 Study Design & Theory

4.3.1 Realist Methodology

Devised by Pawson & Tilly (1997), Realist Methodology is a theory-driven review process which focuses on understanding the interplay of an intervention’s Context (C) and Mechanisms (M), to uncover the Outcome (O) by which an intervention works (or not) (C-M-O configurations).

4.3.2 Protocol and Registration

A protocol for the review was created and registered on the PROSPERO database:

https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020207543. The protocol followed RAMESES publication standards for Realist Reviews (Wong et al., 2013). The period of study was August 2020 to March 2021.

4.3.3 Realist Methodology Training

To complete the review, I undertook training provided by The Centre for Advancement in Realist Evaluation and Synthesis (CARES), in the form of a four-day online training workshop in June 2020. The workshop provided an opportunity to examine the fundamental concept of realist evaluation and synthesis. During the training, I explored the advantages and challenges of using realist methodology for evaluating or synthesising evidence; to move past the question of ‘was it successful?’ to better understand how, for whom, and under what circumstances interventions produce their particular outcomes. In combination with this training, and through attending additional realist webinars and reading of wider literature to understand various
approaches and perspectives of realist methodology, I felt confident to begin the realist approach to research.

4.3.4 Methodology: Systematic Rapid Realist Review & Reasons for Use

Systematic rapid realist review methodology, developed by Saul et al., in 2013, was the chosen approach for this review as the method still preserves the core elements of realist methodology; context-mechanism-outcome (C-M-O) configurations in a timely manner, where there is an emerging evidence base for the subject area under review. An important feature of realist methodology is to engage an External Reference Group (ERG) of experts who provide informed direction to the data identification and theory development throughout the entirety of the review, and to ensure the review is grounded in local context.

The nine step methodology of a systematic rapid realist review is summarised below in Figure 10. The nine step process outlined below are similar to the procedure for a Cochrane or other systematic review for the process of collecting and filtering through selected literature, although fundamentally differ due to their iterative nature (i.e., steps one through seven may be revisited iteratively throughout the review process). The primary differences between a standard realist synthesis and systematic rapid realist review involve the realist philosophical approach to how the extraction, analysis and synthesis are completed (focusing on how context interacts with mechanisms to produce outcomes), and the involvement of external experts in shaping the final product.
Figure 10: The Systematic Rapid Realist Review Approach (Adapted from Saul et al., 2013).
4.3.5 Role of the External Reference Group

A critical strength of conducting a systematic rapid realist review is the involvement of an External Reference Group (ERG). Members of the ERG for this review included members of the IMP²ART research group, wider clinicians and researchers, and external experts within primary care delivery. Members met twice during the review process, initially to provide feedback on project scope and included full-text articles. The group then reconvened to review findings from the data extraction and data synthesis phases. Feedback from the group ensured that the data collected was relevant to current practice and enabled us to expand on the synthesis of the final findings. Contributions from the ERG were essential to identify gaps in literature and theory development, and allowed me to produce a context-specific outcome that is useful to policymakers and responsive to emerging issues. Specific feedback obtained from the two ERG meetings are discussed within section 4.5 below.

4.3.6 Theory: Initial Programme Theory

Within Realist Methodology, a programme theory is defined as ‘the specific idea about how a programme causes the intended or observed outcomes’ (Shearn et al., 2017), and should be the central aspect of any realist evaluation or synthesis. For this review, I created an initial programme theory by conducting an initial scoping exercise of existing literature to explore the delivery of routine asthma reviews via remote consultations. From this initial broad search of relevant literature, the research group (including members of my supervisory team) created a preliminary programme theory. This process defined the appropriate scale of the research and ensured the area under
review addressed the research questions appropriately. Although not an essential element of a systematic rapid realist review due to possible time limitations, creation of a programme theory is a recognised step in realist approaches. The initial programme theory formed the basis of the iterative data collection, data extraction, data synthesis and subsequent theory development stages.

4.3.7 Middle Range Theory: PRISMS Taxonomy of Supported Self-Management

Middle-Range Theories in realist research are identified as;

‘pre-existing psychological and sociological theories, at a higher level of abstraction, could be used to a greater extent to inform programme development’ (Shearn et al., 2017).

Middle Range theories can often be incorporated into realist research to act as a framework to build initial programme theories and subsequently build on the findings of the research. To aid the development of this review, the PRISMS (Practical Reviews in Self-Management Support) Taxonomy of Supported Self-management (Taylor et al., 2014), was used as a middle range framework for data collection, data analysis, and development of the final programme theory. The PRISMS taxonomy was also used within this review to explore what components of supported self-management are delivered during routine remote asthma reviews as a broader mapping framework (See Section 1.2.1 and Table 1).
4.4 Methods

4.4.1 Scoping the Literature

I undertook the initial scope of relevant literature exploring delivery of routine asthma reviews via remote consultations. From this initial broad search, I created a preliminary programme theory. This process defined the scale of the research and ensured that the review focussed appropriately on the research questions. The initial programme theory formed the basis of the iterative data collection, data extraction, data synthesis and subsequent theory development stages.

4.4.2 Searching Process

The following databases were searched in October 2020: MEDLINE, EmBase, PsychINFO, and Cochrane Library. Key search terms that were likely to identify studies relevant to the research questions, and to address the purpose of the review were used (Appendix 5). I searched for qualitative, quantitative, mixed-method studies and grey literature published after 2000, to reflect contemporary remote consultation technologies, and the introduction in the UK of the Quality Outcomes Framework (QOF) in 2004 (which incentivised regular reviews for LTCs including asthma). Using the PICOS Framework (Schardt et al., 2007) eligibility criteria were developed (Table 3), and studies that did not meet the inclusion criteria, or were not published in the English language were excluded. Consistent with a realist synthesis approach, it was still possible for data beyond this framework to be included in the review, if the article contributed to the development of the review’s programme theory.
Documents were assessed iteratively individually, and collectively by the study team, to determine whether the evidence provided was “good enough and relevant enough” (Saul et al., 2013) to inform the creation of appropriate C-M-O configurations within the data. In line with the iterative approaches of realist methodologies, I used snowballing techniques (such as searching companion papers and citation tracking) for all included articles to ensure important texts were not overlooked. I also searched for additional relevant grey literature (e.g., policy documents, opinion pieces) from a variety of sources (including any suggested by the ERG). The search process was iterative, overlapped with data extraction and analysis, and was directed towards the evidence gaps and finding explanatory information.
Table 3: Inclusion and exclusion criteria for the Systematic Rapid Realist Review database search, following the PICO5S Framework (Schardt et al., 2007)

<table>
<thead>
<tr>
<th>Inclusion</th>
<th>Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>Participants with other long term health conditions (unless the study presents data for people with asthma separately). Patients under severe asthma clinics (because they have specialist needs which may be different to the majority of primary care patients).</td>
</tr>
<tr>
<td>Adults or children with a diagnosis of asthma. Healthcare professionals who regularly deliver asthma care.</td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>Studies that use automated telehealth interventions (e.g., mobile apps or email consultations) and do not include personalised contact with a healthcare professional in real time. Interventions targeted at people under a severe asthma clinic. No remote consultation delivery.</td>
</tr>
<tr>
<td>Remote consultations (e.g., telephone/video consultations). Includes delivery of supported self-management.</td>
<td></td>
</tr>
<tr>
<td>Comparison</td>
<td>Trials that do not compare remote asthma care consultations versus standard face-to-face (in-person) reviews.</td>
</tr>
<tr>
<td>Trials that compare remote asthma care consultations versus standard face-to-face (in-person) reviews. Before- and after studies, assessing the implementation of remote reviews.</td>
<td></td>
</tr>
<tr>
<td>Outcomes</td>
<td>Trials that do not present any form of self-management support.</td>
</tr>
<tr>
<td>Delivery of a standard primary care asthma review.</td>
<td></td>
</tr>
<tr>
<td>Study design</td>
<td>Studies that do not meet the study design inclusion criteria.</td>
</tr>
<tr>
<td>Quantitative, qualitative, and mixed-method studies.</td>
<td></td>
</tr>
</tbody>
</table>

4.4.3 Selection and Appraisal of Documents

EndNote X8 was used to export citations from the database searches and identify duplicates. Titles/abstracts and potentially eligible full texts were independently screened by two reviewers (EK & IS; Imogen Skene, PhD
Student, AUKCAR, second reviewer for project) to ensure consistency of approach, and any disagreements were resolved by discussion.

It was during this stage, that the first ERG meeting took place (November 2020) to review the list of full text articles, provide feedback on the importance of included papers and to suggest any other publications or research that might contribute data to the review. There was also an emphasis during this stage on grey literature or ‘difficult to find’ documents which may have not otherwise been identified. From the feedback provided by the group, any gaps in the literature were addressed by iteratively modifying the search terms/inclusion and exclusion criteria to capture any further relevant documents.

4.4.4 Data Extraction

A data extraction template form (shown in Table 4) was created to extract data from the selected literature, particularly focusing on Context-Mechanism-Outcomes configurations (C-M-O's) (C-M-O extractions explained within Table 5 below). The PRISMS taxonomy (Taylor et al., 2014) was used as an additional framework during the data extraction phase by categorising C-M-O’s into one of the 14 components of supported self-management delivery, in order to streamline the subsequent data synthesis processes. The data extraction template also outlined whether each C-M-O related to the grouping of ‘acceptability, safety and clinical effectiveness’ of supported self-management delivery during routine remote asthma consultations, in line with the project’s aims and objectives. Context-Mechanism-Outcome configurations were extracted from all full text articles, including quantitative,
qualitative or contextual data from any part of selected papers (e.g., introduction, methods, discussion sections of papers etc.).

Example of a C-M-O configuration:

**Context (C):** ‘people with asthma scheduled for a routine review’,

**Mechanism (M):** ‘who were provided with a review via telehealth technology (telephone/video consultation)’,

**Outcome (O):** ‘were more likely to attend their routine asthma review, and attend subsequent routine remote reviews’.

I continually considered the relevance and rigour of each included C-M-O and regularly discussed with the research team how individual data extracts should be interpreted to ensure appropriate inferences were made. I completed the data extraction, and a quarter of all data extraction was completed by IS to ensure consistency of approach.
Table 4: Systematic Rapid Realist Review Data Extraction Form

<table>
<thead>
<tr>
<th>No</th>
<th>Reference</th>
<th>Context – Mechanism – Outcomes Configurations</th>
<th>Safety/ Clinical Effectiveness / or Acceptability</th>
<th>PRISMS Taxonomy Component</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Background information e.g., setting and demographics to outline possible Contextual factors;</td>
<td>Key workings that contributed to the design and functioning of a pathway to identify Mechanisms and resources;</td>
<td>Information and evidence suggestive of the successes or failures of different aspects of an intervention (Outcomes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resource</td>
<td>Reaction/Response</td>
<td></td>
</tr>
</tbody>
</table>

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Table 5: Systematic Rapid Realist Review: Data Extraction Phase: C-M-O Configurations Explained: Pawson & Tilly (1997)

<table>
<thead>
<tr>
<th>Context (If)*</th>
<th>Mechanism (Because)**</th>
<th>Outcome (Then)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical</td>
<td>Physical (E.g. Technology)</td>
<td>Cognitive</td>
</tr>
<tr>
<td>Cultural</td>
<td>Economic</td>
<td>Emotional (how people feel)</td>
</tr>
<tr>
<td>Economic</td>
<td>Informational</td>
<td>Conscious</td>
</tr>
<tr>
<td>Psychological</td>
<td>Emotional</td>
<td>Subconscious</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Positive</td>
<td></td>
</tr>
<tr>
<td>Institutional</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>Values</td>
<td>Neutral</td>
<td></td>
</tr>
</tbody>
</table>

*(Already existing – happens outside the insertion of an intervention) **(Happens because of the insertion of an intervention)
4.4.5 Analysis and Synthesis Process

In line with data extraction, to synthesise the findings, all extracted C-M-Os were mapped against the PRISMS taxonomy components. I considered C-M-Os for each component of self-management and identified key themes within and across each component, and whether there was variance in the frequency of delivery of each component. Following this, I considered the association of C-M-Os to the outcomes of acceptability, clinical effectiveness and safety. Key themes were created from all C-M-O and taxonomy components until data saturation was reached. The findings from the data extraction and synthesis phases were presented to the ERG. Their feedback ensured the final findings and themes addressed any gaps in practice that the analysis may have not represented.

4.5 External Reference Group Meetings

To recruit to the ERG, potential members were approached via email to take part. Members were asked to attend two meetings, the first in November 2020 and the second in February 2021. Selected members were experts within the field of asthma, primary care and realist methodology. Each meeting took place online via Zoom (due to COVID-19 restrictions). I chaired both sessions, and provided a detailed presentation of the review aims, realist methodology and objectives for each meeting, in addition to facilitating important contributions and feedback from members of the group throughout. Contributions from external experts were essential to identify gaps and to
ensure selected documents were of key importance, ensuring significant pieces of research were included if they had not been identified by the searches.

4.5.1 First External Reference Group Meeting: 25th November 2020

The first ERG meeting took place on 25th November 2020. During the initial meeting, I provided the group with an overarching summary of the review’s aims, review questions, methodology, and asked for the group to provide feedback on project scope and included full-text articles.

From this meeting, the group provided three papers for inclusion within the review. Other feedback from this meeting included the need for consistent terminology and definitions of supported self-management throughout the study. It was discussed there can sometimes be confusion between definitions of ‘self-management’ and ‘supported self-management’ and to ensure consistent approaches to terminology when collecting data. To act on this feedback, and consistent data collection methods, I incorporated the use of the PRISMS Taxonomy (Taylor et al., 2014) as a mapping framework for the data extraction phase. Using PRISMS as a framework, offered an approach for consistent data extraction and staying consistent with supported self-management delivery components and terminology.

4.5.2 Second External Reference Group Meeting: 23rd February 2021

After the data extraction and data synthesis phases were complete, the second External Reference Group Meeting took place on 23rd February 2021. During this meeting, the six key themes found from the analysis were presented to the
group. Important feedback was obtained from both clinicians and primary care researchers confirming the findings of the review, ensuring that the data collected was relevant to current practice. Further feedback and areas for consideration were discussed, enabling us to expand on the synthesis of the final key themes.

4.6 Results

4.6.1 Selection of Included Studies
A total of 1519 articles were identified in the search, of which 15 papers (Greenhalgh, et al., 2018; Donaghy, et al., 2019; Brown, et al., 2017; Chongmelaxme, et al., 2019; Godden & King, 2011; Goodridge & Marciniuk, 2016; Gruffydd-Jones, et al., 2005; Hanlon, et al., 2017; Ignatowicz et al., 2019; Kew & Cates, 2016; Pinnock, 2003; Pinnock, et al., 2007; Raju, et al., 2012; Van Gaalen, et al., 2010; Vitacca, et al., 2010) met the inclusion criteria and were included in this systematic rapid realist review. The ERG identified an additional three papers (Thiyagarajan, et al., 2020; Hamour, et al., 2020; Paré, et al., 2010), totalling 18 included studies. The PRISMA flow diagram (Moher et al., 2015) illustrates the search strategy and results (Figure 11).

4.6.2 Study Characteristics
Included studies were published between 2003 and 2020 and were undertaken in the UK (n=10), USA and Canada (n=7), and Italy (n=1). Most included papers were systematic literature reviews (n=5) or meta-reviews (n=3), including data from a total of 366 unique primary studies represented within
these systematic reviews. Eleven papers had the primary aim of exploring the use of remote consultations in routine asthma reviews. Detailed study characteristics can be found below in Table 6.

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**Figure 11:** Search strategy and results of systematic realist review (Moher et al., 2015).
**Table 6: Detailed study characteristics of included papers in Systematic Rapid Realist Review**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Study Design</th>
<th>Study Location</th>
<th>No. of Participants / Studies</th>
<th>Mode of Remote Delivery</th>
<th>Outcomes Assessed</th>
<th>PRISMS Component of CMOs</th>
<th>Key Findings/ Outcomes (of CMO configurations)</th>
<th>Relevance to Safety, Clinical Effectiveness &amp; Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown et al., (2017)</td>
<td>Cohort Pilot Study</td>
<td>United States of America</td>
<td>18 people with asthma</td>
<td>Tele-health: telephone &amp; video consultations</td>
<td>Patient satisfaction with telemedicine experience survey</td>
<td>A1, A3, A4, A5, A11</td>
<td>Telehealth resources are an acceptable and convenient means to deliver asthma education and regular routine reviews for patients in a rural, medically underserved community. Through use of graphics and pictures during the video consultation, patients facilitated greater discussion and perceived retention of information about common asthma triggers. Written asthma action plans provided via telehealth can help increase patient self-efficacy to use their action plans. Patients were able to recognise their early warning symptoms and review details of their action plans, resulting in taking relief medication. Professionals are able to review documents provided by patients e.g., asthma symptom diary, and are able to provide feedback to the patient via remote technologies. Video consultations facilitated demonstration of inhaler technique when the camera was positioned from the waist up.</td>
<td>Acceptability &amp; Clinical Effectiveness</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Reference</th>
<th>Study Design</th>
<th>Study Location</th>
<th>No. of Participants/Studies</th>
<th>Mode of Remote Delivery</th>
<th>Outcomes Assessed</th>
<th>PRISMS Component of CMOs</th>
<th>Key Findings/Outcomes (of CMO configurations)</th>
<th>Relevance to Safety, Clinical Effectiveness &amp; Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chongmelaxme et al., (2019)*</td>
<td>Systematic Review and Meta-Analysis</td>
<td>United States of America, United Kingdom, Asia, Europe</td>
<td>22 studies</td>
<td>Tele-consultations &amp; tele-case management</td>
<td>Asthma Control and Asthma Patient’s Quality of life</td>
<td>A3, A5</td>
<td>Improvements in patient quality of life were found when tele-case management was used, in comparison to all other tele-medicine approaches. The tele-case management study included: collaborative patient’s self-management, monitoring patient’s health status, interactive communication and provision of an action plan.</td>
<td>Clinical Effectiveness</td>
</tr>
<tr>
<td>Donaghy et al., (2019)</td>
<td>Qualitative Study (interviews with patients and clinicians)</td>
<td>United Kingdom</td>
<td>21 asthma patients and 13 clinicians</td>
<td>Video consultations</td>
<td>Patients and clinicians’ experiences of video consultations</td>
<td>A4, A8, A9</td>
<td>Opportunities for remote reviews resulted in increased patient attendance to their regular review (easier access to advice and support). Continued, existing doctor-patient relationships facilitated greater communication and shared decision making between patient and healthcare professionals for self-management decisions.</td>
<td>Acceptability &amp; Clinical Effectiveness</td>
</tr>
<tr>
<td>Godden &amp; King (2011)*</td>
<td>Qualitative Study (interviews with clinicians)</td>
<td>United Kingdom</td>
<td>20 clinicians</td>
<td>Tele-health</td>
<td>Clinician perspectives of telehealth</td>
<td>A8, A4</td>
<td>Interacting with patients via different technologies, which they are comfortable with, can work more conveniently for patients, and they are therefore more likely to attend their routine review. Telemonitoring and conducting routine reviews (via telephone or video), can result in people with asthma being more</td>
<td>Acceptability &amp; Safety</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Reference</th>
<th>Study Design</th>
<th>Study Location</th>
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<th>Outcomes Assessed</th>
<th>PRISMS Component of CMOs</th>
<th>Key Findings/Outcomes (of CMO configurations)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goodridge &amp; Marciniuk. (2016)*</td>
<td>Literature Review</td>
<td>Canada</td>
<td>Not applicable</td>
<td>Tele-health</td>
<td>Explores implementation of telehealth in rural and remote settings</td>
<td>A5, A6, A7</td>
<td>Remote technologies can promote patient-centred care by facilitating communication between patients and supporting self-management with provider feedback. Prescribing medicine over remote consultations is possible, provided that the patient and healthcare professional have an existing relationship.</td>
</tr>
<tr>
<td>Greenhalgh et al., (2018)</td>
<td>Mixed Methods Study</td>
<td>United Kingdom</td>
<td>24 clinician interviews, 30 videotaped remote consultations 17 audiotaped face-to-face consultations</td>
<td>Video consultations</td>
<td>Good practice and implementation of video consultations</td>
<td>A4, A8</td>
<td>Patients showed greater engagement, improved self-management, overall control, and a significant reduction in 'did not attend' rates when attending remote consultations. Remote consultations allow prompt clinical input, and improved patient confidence in self-management.</td>
</tr>
<tr>
<td>Reference</td>
<td>Study Design</td>
<td>Study Location</td>
<td>No. of Participants / Studies</td>
<td>Mode of Remote Delivery</td>
<td>Outcomes Assessed</td>
<td>PRISMS Component of CMOs</td>
<td>Key Findings/ Outcomes (of CMO configurations)</td>
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<td>---------------------------------------------</td>
<td>--------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Gruffydd-Jones and Ward (2005)</td>
<td>Randomised control trial</td>
<td>United Kingdom</td>
<td>194 asthma patients</td>
<td>Telephone consultations</td>
<td>Asthma Control, NHS costs, Quality of life, Exacerbations</td>
<td>A1, A3, A4</td>
<td>Remote consultations significantly improve access to routine care. Patients are more likely to receive their annual review if conducted via telephone. Increased patient understanding of individual condition, shared decision making between patient and healthcare professional, and provision of action plan.</td>
</tr>
<tr>
<td>Hanlon et al., (2017)*</td>
<td>Meta-Review</td>
<td>United States of America, Europe, Asia, Oceania</td>
<td>53 systematic reviews (232 RCTs)</td>
<td>Tele-health</td>
<td>Effective self-management support</td>
<td>A1, A3, A5</td>
<td>There are little or no significant differences in the provision of supported self-management components between remote and face-to-face care for asthma (however, different for other long term conditions). Remote care is a safe alternative mode of delivery of self-management support (meta-analysis results).</td>
</tr>
<tr>
<td>Ignatowicz et al., (2019)</td>
<td>Review of Reviews</td>
<td>Not stated</td>
<td>35 review articles (systematic, meta-review and literature reviews)</td>
<td>Video conferencing (only asthma outcomes were assessed)</td>
<td>Use of internet video conferencing (patient satisfaction/patient outcomes)</td>
<td>A1, A4, A8, A9</td>
<td>Implementation of videoconferences for routine asthma reviews can reduce barriers to treatment and increase convenience for patients. Remote reviews may improve relationships between patient and healthcare professionals, which lead to more frequent contact with the specific clinician who is known to the patient and likely to know particular young patient's personal circumstances and</td>
</tr>
<tr>
<td>Reference</td>
<td>Study Design</td>
<td>Study Location</td>
<td>No. of Participants / Studies</td>
<td>Mode of Remote Delivery</td>
<td>Outcomes Assessed</td>
<td>PRISMS Component of CMOs</td>
<td>Key Findings/ Outcomes (of CMO configurations)</td>
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<tr>
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<tr>
<td>Kew and Cates (2016)</td>
<td>Systematic Review</td>
<td>United Kingdom, United States of America, Netherlands, Denmark</td>
<td>6 studies including 2100 participants</td>
<td>Remote consultations using technology: telephone, video consultations</td>
<td>Safety and efficacy of remote vs face-to-face asthma consultations</td>
<td>A3, A4, A5, A6</td>
<td>Remote asthma consultations provides an unobtrusive and efficient way of maintaining contact with patients. Remote check-ups may not disrupt a person’s life in the way a regular clinic visit might, and may serve to enhance self-management behaviours such as keeping a personalised action plan up to date and adherence to medications.</td>
</tr>
<tr>
<td>Pinnock (2003)</td>
<td>Editorial Response</td>
<td>United Kingdom</td>
<td>Not applicable</td>
<td>Telephone consultations vs face-to-face</td>
<td>The potential of telephone consultations for providing routine asthma care</td>
<td>A1, A2, A4, A8, A14</td>
<td>Telephone reviews help overcome the barrier of access to care which may otherwise take up a lot of patient’s time to access a clinic. Remote reviews can provide patients with information regarding their asthma and management of their asthma, links to supporting literature/websites for available resources, and advice and support around health and lifestyle via telephone consultation.</td>
</tr>
<tr>
<td>Reference</td>
<td>Study Design</td>
<td>Study Location</td>
<td>No. of Participants / Studies</td>
<td>Mode of Remote Delivery</td>
<td>Outcomes Assessed</td>
<td>PRISMS Component of CMOs</td>
<td>Key Findings/ Outcomes (of CMO configurations)</td>
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<tr>
<td>Pinnock (2007)</td>
<td>Before-and after implementation study</td>
<td>United Kingdom</td>
<td>1809 asthma patients in 1 UK practice</td>
<td>Telephone consultations vs face-to-face</td>
<td>Uptake of telephone reviews, asthma morbidity and cost to practice</td>
<td>A1, A4</td>
<td>Patients provided with a routine telephone review offer a stable 'maintenance' phase of monitoring. In turn, can increase patient's confidence in managing their own condition.</td>
</tr>
<tr>
<td>Raju et al., (2012)</td>
<td>Prospective cohort study</td>
<td>United Kingdom</td>
<td>48 adult patients with asthma</td>
<td>Telephone consultations vs face-to-face</td>
<td>Action plan implementation by phone to improve asthma control</td>
<td>A1, A3, A4</td>
<td>Asthma control can not only be assessed via telephone, but also significantly improved when the action plan is discussed with the healthcare professional during routine reviews.</td>
</tr>
<tr>
<td>Van Gaalen et al., (2012)</td>
<td>Review</td>
<td>United Kingdom</td>
<td>Not applicable</td>
<td>Tele-management for asthma</td>
<td>Developments in tele-management for the management of people with asthma</td>
<td>A1, A3, A5, A8</td>
<td>Use of telemedicine provides patients with the tools to self-manage and control their condition (self-monitoring, patient is able to detect and respond to symptom worsening and can easily contact a healthcare professional). Use of telemedicine enables proactive individual patient care through the provision of a personalised asthma action plan.</td>
</tr>
<tr>
<td>Vitacca et al., (2010)</td>
<td>Editorial Response/ Expert Review</td>
<td>Italy</td>
<td>Not applicable</td>
<td>Teleassistance for respiratory care</td>
<td>Teleassistance in providing respiratory care</td>
<td>A1, A4, A5, A6, A11</td>
<td>Results in quick transmission of information and clinical data in real-time, thus leading to greater continuity of care. Remote reviews can provide active education and support. Use of monitoring via telemedicine can result in</td>
</tr>
<tr>
<td>Reference</td>
<td>Study Design</td>
<td>Study Location</td>
<td>No. of Participants/Studies</td>
<td>Mode of Remote Delivery</td>
<td>Outcomes Assessed</td>
<td>PRISMS Component of CMOs</td>
<td>Key Findings/Outcomes (of CMO configurations)</td>
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<tr>
<td>Hamour et al., (2020)</td>
<td>Feasibility Assessment</td>
<td>United Kingdom, Canada, Switzerland</td>
<td>10 participants</td>
<td>Video consultations</td>
<td>Practicality, feasibility and utility of screen-sharing technologies to complete asthma action plans remotely</td>
<td>A1, A3, A9</td>
<td>Patients felt editing the document (PAAP) with the clinician collaboratively improved communication, avoided misunderstandings and enhanced shared decision making between the individual and healthcare professional. PAAPs helped patients consolidate the information delivered to better understand their asthma and how to manage their condition. Online screen-sharing is a practical approach to joint completion of asthma action plans.</td>
</tr>
<tr>
<td>Pare et al., (2010)</td>
<td>Systematic Review</td>
<td>United States of America, Europe, Asia</td>
<td>62 studies</td>
<td>Tele-monitoring/tele-consultation</td>
<td>Clinical effects associated with home telemonitoring</td>
<td>A5, A9</td>
<td>During remote consultations, patients are able to actively participate in their own care and as such, consultations may result in fewer asthma related symptoms, and improved overall asthma control.</td>
</tr>
<tr>
<td>Thiyyagarajan et al., (2020)</td>
<td>Systematic Scoping Review</td>
<td>United Kingdom, United</td>
<td>7 studies</td>
<td>Video consultations</td>
<td>Patients and healthcare professional</td>
<td>A8</td>
<td>Remote consultation (specifically video consultations) can lead to improved access to support. Video consultations may be more</td>
</tr>
</tbody>
</table>

earlier detections of symptoms exacerbations. As these measures may be missed by a patient who would not visit a practice for a face-to-face review.
<table>
<thead>
<tr>
<th>Reference</th>
<th>Study Design</th>
<th>Study Location</th>
<th>No. of Participants / Studies</th>
<th>Mode of Remote Delivery</th>
<th>Outcomes Assessed</th>
<th>PRISMS Component of CMOs</th>
<th>Key Findings/ Outcomes of CMO configurations</th>
<th>Relevance to Safety, Clinical Effectiveness &amp; Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>States of America</td>
<td></td>
<td>experiences of video consultations in primary care</td>
<td></td>
<td></td>
<td>convenient for patients, but is not considered superior to a face-to-face consultation.</td>
<td></td>
</tr>
</tbody>
</table>

*Only data relevant to the current review extracted.

**Abbreviations:** CMOs = Context-Mechanism-Outcome Configuration; PRISMS = Practical Reviews In Self-Management Support; RCT = Randomised controlled trial.

**PRISMS Components Explained:**

A1. Information about condition and/or its management
A2. Information about available resources
A3. Provision of/agreement on specific clinical action plans and/or rescue medication
A4. Regular clinical review
A5. Monitoring of condition with feedback
A6. Practical support with adherence (medication or behavioural)
A7. Provision of equipment
A8. Provision of easy access to advice or support when needed
A9. Training/rehearsal to communicate with healthcare professionals
A10. Training/rehearsal for everyday activities
A11. Training/rehearsal for practical self-management activities
A12. Training/rehearsal for psychological strategies
A13. Social support
A14. Lifestyle advice and support (Full definitions can be found within Table 1).
4.6.3 Main Findings

The data extraction process was completed for the 18 included articles (full C-M-O configurations can be found in Appendix 6). The most common self-management support strategies (classified with the PRISMS taxonomy: see section 1.2.1) extracted from the literature during C-M-O configurations were:

**A4: Regular clinical reviews,**

**A1: Information about condition and/or its management,**

**A5: Monitoring of condition with feedback,**

**A3: Provision of/agreement on specific clinical action plans and/or rescue medication,**

**A8: Provision of easy access to advice or support when needed (see Table 7).**

Six key themes were identified which are described below, with an overarching C-M-O to outline the key conclusions of each theme (Table 8). Each theme presents findings from both the perspective of a person with asthma and healthcare professional, in addition to any differences between the use of telephone and video consultations. Data saturation was reached for all themes.
### Table 7: Extracted CMOs mapped to PRISMS Taxonomy Components

<table>
<thead>
<tr>
<th>PRISMS Taxonomy Component</th>
<th>No. of Times Extracted From Literature: C-M-O Configurations</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1: Information about condition and/or its management</td>
<td>11</td>
</tr>
<tr>
<td>A2: Information about available resources</td>
<td>1</td>
</tr>
<tr>
<td>A3: Provision of agreement on specific clinical action plans and or rescue medication</td>
<td>9</td>
</tr>
<tr>
<td>A4: Regular clinical reviews</td>
<td>12</td>
</tr>
<tr>
<td>A5: Monitoring of condition with feedback</td>
<td>9</td>
</tr>
<tr>
<td>A6: Practical support with adherence (medication or behavioural)</td>
<td>3</td>
</tr>
<tr>
<td>A7: Provision of equipment</td>
<td>1</td>
</tr>
<tr>
<td>A8: Provision of easy access to advice or support when needed</td>
<td>8</td>
</tr>
<tr>
<td>A9: Training/rehearsal to communicate with healthcare professionals</td>
<td>5</td>
</tr>
<tr>
<td>A10: Training/rehearsal for everyday activities</td>
<td>0</td>
</tr>
<tr>
<td>A11: Training/rehearsal for practical self-management activities</td>
<td>2</td>
</tr>
<tr>
<td>A12: Training/rehearsal for psychological strategies</td>
<td>0</td>
</tr>
<tr>
<td>A13: Social support</td>
<td>0</td>
</tr>
<tr>
<td>A14: Lifestyle advice and support</td>
<td>1</td>
</tr>
</tbody>
</table>
**Table 8: Six Key Themes of systematic rapid realist review**

<table>
<thead>
<tr>
<th>Findings: Key Themes</th>
<th>Context – Mechanism – Outcomes (C-M-O) Configurations</th>
</tr>
</thead>
</table>
| **1) Increased regular patient attendance and increased monitoring of the patient** | **Background information (setting and demographics to outline possible Contextual factors);**  
People with asthma scheduled for a routine review…  
Healthcare professionals conducting routine asthma reviews…  
People with asthma whose routine review is conducted remotely… | **Key workings that contributed to the design and functioning of a pathway to identify Mechanisms and resources;**  
…who were provided with a review via telehealth technology (telephone/video consultation)…  
…via telephone/video consultation, with patients regularly attending routine remote reviews…  
…via video consultation… | **Information and evidence suggestive of the successes or failures of different aspects of an intervention (Outcomes);**  
…were more likely to attend their routine asthma review, and attend subsequent routine remote reviews.  
(Donaghy et al., 2019; Brown et al., 2017; Godden & King, 2011; Goodridge & Marciniuk, 2016; Gruffydd-Jones et al., 2005; Hanlon et al., 2017; Ignatowicz et al., 2019; Kew & Cates, 2016; Pinnock et al., 2007; Vitacca et al., 2010; Thiyagarajan et al., 2020).  
…have more opportunities to monitor a patient and provide regular support for self-management.  
(Brown et al., 2017; Chongmelaxme et al., 2019; Goodridge & Marciniuk, 2016; Kew & Cates, 2016; Van Gaalen et al., 2010; Vitacca et al., 2010).  
…can have their condition and management successfully monitored, and the use of video can lead to increased patient attendance to regular routine reviews.  
(Brown et al., 2017; Goodridge & Marciniuk, 2016). |
<table>
<thead>
<tr>
<th>Findings: Key Themes</th>
<th>Context – Mechanism – Outcomes (C-M-O) Configurations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background information (setting and demographics to outline possible Contextual factors):</strong></td>
<td><strong>Key workings that contributed to the design and functioning of a pathway to identify Mechanisms and resources:</strong></td>
</tr>
<tr>
<td>People with asthma, whose routine review is conducted remotely...</td>
<td>...via telephone consultation...</td>
</tr>
<tr>
<td><strong>2) Opportunities to provide individualised information about asthma and asthma management</strong></td>
<td>People with asthma who are scheduled for a routine asthma review...</td>
</tr>
<tr>
<td>Healthcare professionals conducting a routine asthma review...</td>
<td>...when review is conducted via remote technologies...</td>
</tr>
<tr>
<td>Findings: Key Themes</td>
<td>Context – Mechanism – Outcomes (C-M-O) Configurations</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Background information (setting and demographics to outline possible Contextual factors):</strong></td>
<td><strong>Key workings that contributed to the design and functioning of a pathway to identify Mechanisms and resources:</strong></td>
</tr>
</tbody>
</table>
| People with asthma whose routine review is conducted remotely... | ...via video consultation with document sharing/recording functions... | ...are able to understand and engage in personalised discussions and information regarding their asthma condition and management. 
(Brown et al., 2017; Gruffydd-Jones et al., 2005; Ignatowicz et al., 2019; Hamour et al., 2020). |
| People with asthma whose routine review is conducted remotely... | ...via telephone consultation... | ...are able to understand and engage in personalised discussions and information regarding their asthma condition and management. 
(Pinnock, 2003; Pinnock et al., 2007; Raju et al. 2012; Vitacca et al., 2010). |
| **3) Provision of convenient/flexible access to advice and support** | For people with asthma... | ...the availability of healthcare professionals to conduct remote consultations (video/telephone consultation)... | ...can provide patients with a timely and appropriate option to gain advice and support from healthcare professionals regarding their condition. 
(Donaghy et al., 2019; Brown et al., 2017; Godden & King, 2011; Goodridge & Marciniuk, 2016; Ignatowicz et al., 2019; Kew & Cates, 2016; Vitacca et al., 2010; Thiyagarajan et al., 2020). |
<table>
<thead>
<tr>
<th>Findings: Key Themes</th>
<th>Context – Mechanism – Outcomes (C-M-O) Configurations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Background information (setting and demographics to outline possible Contextual factors):</strong> Healthcare professionals conducting routine asthma reviews...</td>
<td><strong>Key workings that contributed to the design and functioning of a pathway to identify Mechanisms and resources:</strong> ...when delivering review via remote consultation... <strong>Information and evidence suggestive of the successes or failures of different aspects of an intervention (Outcomes):</strong> ...can provide more convenient delivery of routine care for patients to access advice and support. (Greenhalgh et al., 2018; Brown et al., 2017; Godden &amp; King, 2011; Pinnock, 2003).</td>
</tr>
<tr>
<td>People with asthma...</td>
<td><strong>...when a routine review is conducted via video consultation or telephone...</strong> <strong>...may find the mode of consultation delivery more convenient and flexible to fit their everyday lives, resulting in increased and flexible access to advice and support.</strong> (Kew &amp; Cates, 2016; Vitacca et al., 2010).</td>
</tr>
<tr>
<td><strong>4) Enhanced healthcare professional-patient relationships and communication with patients:</strong> People with asthma, scheduled for a routine asthma review...</td>
<td><strong>...when a review is conducted with the same clinician each time...</strong> <strong>...positive working relationships between patient and healthcare professional can be created and sustained, leading to positive patient outcomes.</strong> (Donaghy et al., 2019; Chongmelaxme et al., 2019; Goodridge &amp; Marciniuk, 2016; Gruffydd-Jones et al., 2005; Ignatowicz et al., 2019; Kew &amp; Cates, 2016; Raju et al., 2012; Hamour et al., 2020).</td>
</tr>
<tr>
<td>When a clinician is conducting a routine remote asthma review...</td>
<td><strong>...and there is an existing relationship between patient and healthcare professional...</strong> <strong>...the healthcare professional is able to engage the patient in shared decision making and self-management strategies.</strong></td>
</tr>
<tr>
<td>Findings: Key Themes</td>
<td>Context – Mechanism – Outcomes (C-M-O) Configurations</td>
</tr>
<tr>
<td>---------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>Background information (setting and demographics to outline possible Contextual factors); Key workings that contributed to the design and functioning of a pathway to identify Mechanisms and resources;</td>
<td>Information and evidence suggestive of the successes or failures of different aspects of an intervention (Outcomes)</td>
</tr>
<tr>
<td>When an asthma patient’s review is conducted remotely…</td>
<td>…and via video consultation…</td>
</tr>
<tr>
<td>(Chongmelaxme et al., 2019; Goodridge &amp; Marciniuk, 2016; Gruffydd-Jones et al., 2005; Kew &amp; Cates, 2016; Raju et al., 2012; Hamour et al., 2020).</td>
<td>…collaborative discussions and self-management strategies can be effectively communicated and discussed. (Goodridge &amp; Marciniuk, 2016; Hamour et al., 2020).</td>
</tr>
<tr>
<td>5) Appropriate provision of specific practical asthma self-management strategies (action plans and inhaler technique)</td>
<td>People with asthma who are scheduled for a routine asthma review…</td>
</tr>
<tr>
<td>…that is conducted via telephone/video consultation, and includes a discussion/provision of a personalised asthma action plan takes place…</td>
<td>…can increase patients' understanding, enabling them to stay in control of their asthma, recognise symptoms of deterioration and what actions to take. (Brown et al., 2017; Chongmelaxme et al., 2019; Gruffydd-Jones et al., 2005; Kew &amp; Cates 2016; Raju et al., 2012; Van Gaalen et al., 2010; Hamour et al., 2020).</td>
</tr>
<tr>
<td>Healthcare professionals conducting a routine asthma review…</td>
<td>…when the review is conducted via remote consultation…</td>
</tr>
<tr>
<td>…can effectively communicate practical self-management advice (e.g., inhaler technique and action plans) and enable collaborative discussions with patients. (Brown et al., 2017; Vitacca et al., 2010).</td>
<td></td>
</tr>
<tr>
<td>Findings: Key Themes</td>
<td>Context – Mechanism – Outcomes (C-M-O) Configurations</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td><strong>Background information (setting and demographics to outline possible Contextual factors):</strong></td>
<td><strong>Key workings that contributed to the design and functioning of a pathway to identify Mechanisms and resources:</strong></td>
</tr>
<tr>
<td>People with asthma whose review is conducted via video consultation...</td>
<td>...when provided with information on practical self-management strategies (asthma action plans/inhaler technique)...</td>
</tr>
<tr>
<td>People with asthma whose review is conducted via telephone consultation...</td>
<td>...when provided with information on practical self-management strategies...</td>
</tr>
<tr>
<td><strong>6) Increased patient confidence &amp; self-efficacy</strong></td>
<td>People with asthma who are scheduled for a routine asthma review...</td>
</tr>
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</table>
4.6.4 Main Findings: Six Key Themes

Theme 1: Increased regular attendance and increased monitoring of the patient

Patients: For patients with asthma, the increase in regular attendance at reviews conducted remotely was due to a number of advantages including increased convenience, time and cost savings for patients (Donaghy et al., 2019; Brown et al., 2017; Godden & King, 2011; Gruffydd-Jones et al., 2005; Ignatowicz et al., 2019; Thiyagarajan et al., 2020). Remote reviews were perceived as better at meeting patient needs and preferences compared to a standard face-to-face review, as they reduced barriers to treatment and eased access to routine care (Donaghy et al., 2019; Brown et al., 2017; Godden & King, 2011; Gruffydd-Jones et al., 2005; Hanlon et al., 2017; Kew & Cates, 2016; Pinnock, 2003; Pinnock et al., 2007; Vitacca et al., 2010; Thiyagarajan et al., 2020; Hamour et al., 2020). Regular attendance at remote reviews and supported self-management delivery led to an increase in patient confidence and enablement in individual asthma care (Ignatowicz et al., 2019; Pinnock et al., 2007).

Healthcare Professionals: Symptoms can be monitored, reviewed, interpreted, and acted on safely during remote consultations. Increased patient attendance at routine remote reviews created regular opportunities for healthcare professionals to provide feedback on monitored asthma symptoms to patients (e.g., monitoring peak flows and asthma triggers) (Brown et al., 2017; Chongmelaxme et al., 2019; Goodridge & Marciniuk, 2016; Kew & Cates, 2016; Van Gaalen et al., 2010; Vitacca et al., 2010). Additionally, the
opportunity to maintain contact and ongoing monitoring was one of the most commonly recognised advantages of remote consultations (Brown et al., 2017; Chongmelaxme et al., 2019; Kew & Cates, 2016). Patients’ medication and asthma action plans could be reviewed, reinforcing earlier detection of symptoms or deterioration (Van Gaalen et al., 2010; Vitacca et al., 2010).

**Video consultations:** In addition to enabling feedback on monitored asthma symptoms or behaviours, video consultations have particular advantages for monitoring a patient’s condition through systems such as ‘document camera’ or ‘picture-in-picture’ functions, which facilitated patients and healthcare professionals ability to review the contents of documents (e.g., asthma action plans) together (Brown et al., 2017; Goodridge & Marciniuk, 2016).

**Telephone consultations:** A number of articles supported telephone reviews as an efficient way of maintaining contact with asthma patients. Telephone consultations facilitated regular discussions and met patient needs and preferences due to increased patient convenience, resulting in increased regular attendance at routine telephone reviews (Kew & Cates, 2016; Vitacca et al., 2010).

**Theme 2: Opportunities to provide individualised information about asthma and asthma management**

**Patient:** Video and telephone consultations were reported as a safe and effective mechanism to facilitate the delivery of individualised information about asthma and asthma management, resulting in increased patient
understanding of their condition (Brown et al., 2017; Gruffydd-Jones et al., 2005; Ignatowicz et al., 2019; Pinnock, 2003; Raju et al., 2012; Van Gaalen et al., 2010; Vitacca et al., 2010; Hamour et al., 2020; Paré et al., 2010), improved health outcomes (Ignatowicz et al., 2019), and improved overall asthma control (Raju et al., 2012). Remote consulting provided opportunities for patients to learn about their condition (Hanlon et al., 2017; Pinnock et al., 2007), and increased patient satisfaction with the mode of consultation (Brown et al., 2017; Gruffydd-Jones et al., 2005; Ignatowicz et al., 2019; Hamour et al., 2020).

Healthcare Professional: Use of both video and telephone consultations were recognised as effective communication strategies for healthcare professionals to provide individualised information, instructions, education and signposting of other essential resources to patients (Brown et al., 2017; Gruffydd-Jones et al., 2005; Hanlon et al., 2017; Ignatowicz et al., 2019; Pinnock, 2003; Raju et al., 2012; Van Gaalen et al., 2010; Vitacca et al., 2010; Hamour et al., 2020; Paré et al., 2010).

Video consultations: Patients found video consultation technology visually appealing and engaging, enhancing understanding of asthma education (e.g., information about asthma triggers). Use of video technology facilitated greater discussion between patients and healthcare professionals (Brown et al., 2017; Gruffydd-Jones et al., 2005; Ignatowicz et al., 2019; Hamour et al., 2020). Recording functions allowed patients to record their review then re-watch, consolidate, and confirm the information discussed (Hamour et al., 2020).
**Telephone consultations:** Several studies supported the use of telephone consultations as an effective tool to deliver individualised information to patients (Pinnock, 2003; Pinnock et al., 2007; Raju et al., 2012). More specifically, telephone reviews were recognised as a timely (Vitacca et al., 2010), effective means to provide information and instruction to be efficiently transferred to patients to manage their asthma.

**Theme 3: Provision of convenient/flexible access to advice and support**

**Patients:** Remote consultations provided more convenient and flexible access to advice and support for patients with asthma, compared to attending a face-to-face review (Kew & Cates, 2016; Vitacca et al., 2010). Particular groups who favoured the convenience and timeliness of remote consultations were patients who live in rural communities (Brown et al., 2017; Goodridge & Marciniuk, 2016), patients whose lives are structured around work, study or childcare (Donaghy et al., 2019), younger patients who are more familiar with the use of technology (Godden & King, 2011; Ignatowicz et al., 2019) and older, vulnerable patients with reduced mobility (Ignatowicz et al., 2019; Thiyagarajan et al., 2020). Ease of access was particularly helpful for patients who noticed a change in symptoms or peak flow readings and were able to contact a healthcare professional promptly via remote consultation (Godden & King, 2011). Remote asthma consultations may potentially narrow socioeconomic inequalities in access to healthcare, by being more accessible to vulnerable groups (Ignatowicz et al., 2019; Thiyagarajan et al., 2020).
Healthcare Professionals: Healthcare professionals may have more availability to conduct a remote video or telephone review, enabling them to respond more promptly than a face-to-face appointment may have offered (Greenhalgh et al., 2018; Brown et al., 2017; Godden & King, 2011; Pinnock, 2003).

Video and telephone consultations: For some patients, telephone and video consultations were a preferred method of consultation, and patients were more likely to attend this type of review, leading to increased engagement (Kew & Cates, 2016; Vitacca et al., 2010).

Theme 4: Enhanced healthcare professional-patient relationships and communication

Patients: Patients whose reviews are conducted with the same clinician each time (potentially facilitated by remote consultations), reported better health-related outcomes and greater satisfaction with the consultation (Chongmelaxme et al., 2019; Goodridge & Marciniuk, 2016; Gruffydd-Jones et al., 2005; Kew & Cates, 2016; Raju et al., 2012; Hamour et al., 2020). Benefits may include; increased shared decision making (Donaghy et al., 2019; Ignatowicz et al., 2019; Hamour et al., 2020), more discussion of personal preferences (Donaghy et al., 2019; Ignatowicz et al., 2019), and increased attendance at reviews (Goodridge & Marciniuk, 2016). Reviews conducted with the same clinician were seen to be particularly important to young people (Ignatowicz et al., 2019), leading to more engagement and increased
confidence in self-management strategies. The mechanism for this was the trust built due to an existing relationship between healthcare professional and patient (Ignatowicz et al., 2019).

Healthcare Professionals: A number of studies suggested that when a relationship is established between patient and healthcare professional, telephone and video technologies are a suitable platform to engage in shared decision making and discussion of self-management strategies. The existing relationship ensures the healthcare professional is able to recognise changes in a person’s condition due to their prior awareness of personal circumstances (Chongmelaxme et al., 2019; Goodridge & Marciniuk, 2016; Gruffydd-Jones et al., 2005; Kew & Cates, 2016; Raju et al., 2012; Van Gaalen et al., 2010; Vitacca et al., 2010; Hamour et al., 2020).

Video consultation: Patients were able to discuss their asthma action plan with their healthcare professional during remote reviews. Video-facilitated collaboration through technologies such as ‘screening sharing’ and ‘editing documents’ allowed the patient and healthcare professional to work together to personalise their action plan. Recording functions enabled patients to revisit their review and help consolidate the information delivered, to improve understanding of their asthma and how to manage their condition (Goodridge & Marciniuk, 2016; Hamour et al., 2020).
Theme 5: Appropriate provision of specific practical asthma self-management strategies (e.g., action plans and inhaler technique)

Patients: Specific practical asthma self-management strategies can be effectively communicated, delivered and discussed during remote asthma reviews. An individualised, written asthma action plan can be successfully discussed via telephone or video consultation. Remote provision/discussion of an action plan leads to positive patient outcomes such as increased patient understanding (Brown et al., 2017; Chongmelaxme et al., 2019; Gruffydd-Jones et al., 2005; Kew & Cates, 2016; Raju et al., 2012; Van Gaalen et al., 2010; Hamour et al., 2020), improved control of their condition (Brown et al., 2017; Gruffydd-Jones et al., 2005; Kew & Cates, 2016; Raju et al., 2012; Van Gaalen et al., 2010), increased quality of life (Chongmelaxme et al., 2019), greater patient self-efficacy (Brown et al., 2017), and allows patients who may not regularly attend face-to-face reviews to have their action plan reviewed (Kew & Cates, 2016).

Healthcare Professionals: The use of video and telephone consultations are an effective alternative for discussing a patient’s asthma action plan. Discussion of individualised asthma action plan information and medications can be safely reviewed to increase patient understanding of their condition, medication adherence, and how to recognise symptom deterioration. Healthcare professionals were able to demonstrate inhaler technique and provide education using the visual aids and tools of video consultation technologies effectively and safely (Brown et al., 2017; Vitacca et al., 2010).
**Video consultation:** When healthcare professionals are communicating and demonstrating practical strategies such as inhaler technique via video consultation, patients were able to understand and learn from the instructions when the healthcare professional’s video camera was positioned from the waist up (allowing the demonstration to be fully visualised) (Brown et al., 2017). Similarly, healthcare professionals could review the patients’ technique. Online screen-sharing technologies allowed patients and healthcare professionals to collaboratively edit asthma action plans during video consultations (Hamour et al., 2020). This led to improved communication, avoided misunderstandings, and enhanced shared decision making between individual and healthcare professional. The improved attendance at remote consultations enabled these specific skills to be reviewed with more patients (Vitacca et al., 2010).

**Telephone consultation:** Telephone consultations are a safe and effective alternative to face-to-face reviews to discuss and provide practical self-management advice and support. Individual asthma action plans can be discussed over the telephone and then converted into written versions and sent to patients after the consultation. This technique of discussions and provision of action plans were seen to significantly improve asthma control (Gruffydd-Jones et al., 2005; Raju et al., 2012).

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**Theme 6: Increased patient confidence and self-efficacy**

**Patient:** Through the increased engagement with a remote consultation and prompt clinical input, patients can feel more empowered and have up-to-date
strategies to manage their condition (Brown et al., 2017; Gruffydd-Jones et al., 2005; Ignatowicz et al., 2019; Pinnock, 2003; Pinnock et al., 2007; Van Gaalen et al., 2010; Vitacca et al., 2010; Paré et al., 2010). Patients also gained confidence in their self-management techniques from regularly attending remote reviews which may they have missed from non-attendance to a face-to-face review. The overall increase in patient confidence leads to confidence in their understanding of how to identify impending attacks and ability to act appropriately (Greenhalgh et al., 2018; Van Gaalen et al., 2010)

4.6.5 Overarching Synthesis

The overarching synthesis from the six key themes identified that, in relation to the study’s key aims (to explore the safety, clinical effectiveness and acceptability of supported self-management delivery in remote asthma consultations); remote consultations were overall, more highly accepted than in-person consultations by patients and healthcare professionals, and were a safe and effective alternative to face-to-face reviews. These findings have been presented in Table 9.
Table 9: Synthesis of findings corresponding to key aims.

<table>
<thead>
<tr>
<th></th>
<th>Remote (video/telephone) versus face-to-face (in person) asthma consultations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acceptability</strong></td>
<td>Higher levels of acceptability from both patients and healthcare professionals for remote delivery of asthma care.</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td>Remote consultations were recognised as a safe alternative to a face-to-face review.</td>
</tr>
<tr>
<td><strong>Clinical Effectiveness</strong></td>
<td>Remote consultations were recognised as a clinically effective alternative to a face-to-face review.</td>
</tr>
</tbody>
</table>

4.7 Discussion

4.7.1 Summary of Findings

Six themes were identified using data from 18 articles to describe how supported self-management is delivered during remote asthma consultations. I identified positive benefits associated with remote asthma care including; increased convenience, improved access (including for some vulnerable groups) and attendance at reviews, ability to conduct the core content of an asthma remotely (especially video reviews which enabled practical tasks such as checking inhaler technique), completion of asthma action plans (screen sharing or discussed with documents sent post-consultation), and continuity of care. Typically, these overrode any challenges associated with technological challenges imposed by remote consultations. The data suggests that overall, remote consultations are more highly accepted than in-person consultations for the studies included, and were a safe and clinically effective alternative to face-to-face reviews.
4.7.2 Interpretations in Relation to Current Literature

Guidelines for asthma management (WHO, 2019; GINA, 2020) recommend that asthma should be monitored in primary care by routine clinical review on at least an annual basis. Every asthma consultation is an opportunity to review, reinforce, and extend patient’s knowledge and skills, and is a core component of supported self-management (Taylor et al., 2014; Pinnock, 2015). There is evidence of greater reductions in hospitalisations and emergency department visits in trials where the intervention includes regular review (Powell & Gibson, 2002; Hodkinson et al., 2020). The findings of this systematic rapid realist review show that using remote means to provide consultations can increase patient engagement and attendance at asthma reviews and that one mechanism for the benefits of telehealth communications is the convenience of telephone or video consultations which facilitates attendance at reviews.

Providing people with asthma with information and guidance for self-management of their asthma is an essential aspect of all routine reviews. The current findings highlight that the use of telephone and video consultations is an acceptable, effective and safe alternative to face-to-face consultations for providing patients with this information. Importantly, the partnership between patient and healthcare professional should enable information to be discussed, understood and agreed between patient and healthcare professional. Such shared decision-making can improve clinical outcomes and quality of life by actively engaging people with long term conditions in managing their own health (Kew et al., 2017). Telephone and video consultations have potential to be effective platforms that can facilitate shared decision making.
Asthma is a variable condition, and some people with asthma may be well controlled and need very little support for many months. However, when symptoms are triggered, access to healthcare professional care needs to be flexible in timing and mode of delivery (Kielmann et al., 2010). As an alternative to face-to-face consultations, remote reviews can be seen as providing flexible and convenient access to healthcare professional support enabling patients to be provided with appropriate and prompt clinical input. Such flexible access to healthcare professionals promotes patients' confidence and self-efficacy in their ability to self-manage their condition, as well as learn from the environment and healthcare professional conducting the review, which coincides with the social cognitive theory, that people learn not only through their own experiences, but also by observing the actions of others and the results of those actions. Remote reviews were shown to facilitate patient self-efficacy through higher attendance and learning of supported self-management strategies.

The provision of a personalised asthma action plan is an essential strategy in supporting people with asthma to take the right actions at the right time (Asthma and Lung UK, 2021). People with asthma spend a matter of minutes in a routine review with their healthcare professional, the rest of the time, they are making their own decisions about the medication they should take and when they should seek medical help. It is therefore essential that asthma reviews are used to educate patients what to do if their asthma control deteriorates and to empower them to take timely and appropriate action.
Findings from this review highlight the acceptability, clinical effectiveness and safety of delivering action plans in remote routine reviews.

Kew & Cates (2017), in a Cochrane review, concluded that there were no significant differences between face-to-face and remote asthma reviews in terms of exacerbations, asthma control, or quality of life, though there was insufficient information to rule out differences in efficacy or safety. Consistent with the ‘what/how/context’ aims of a realist synthesis (Pawson et al., 2005; Pawson, 2006), our findings extend this Cochrane review by identifying which aspects of supported self-management can be delivered via remote means, describing strategies that enable provision of video or telephone consultations, and for whom and under what circumstances remote reviews may be most beneficial.

Kearney (2021), reflects on the fast pace at which UK NHS services have moved to remote care when the COVID-19 pandemic demanded social distancing, concluding that it will be essential for future health care services to ‘do things differently’ in their approach to LTC management and the delivery of supported self-management. The report concludes that it is critical to plan carefully for the use of remote technologies, and to identify the best practice of supported self-management delivery at scale and in a sustainable way. The findings of our review provide the context and mechanisms for effective asthma supported self-management delivery.
4.7.3 Strengths and Limitations

To my knowledge, I have conducted the first systematic rapid realist review in the area of asthma supported self-management delivery via remote consultations. The review was completed in a timely manner, given the shift to remote care driven by the COVID-19 pandemic, and I explored the (rapidly expanding) use of video and/or telephone consultations, and systematically identified the perceived benefits and challenges of each mode of delivery in relation to each theme. Additionally, the findings are explored through the perspective of both the healthcare professional and the patient. A final strength is that I utilised a robust realist methodology, which is gaining ever-growing significance in its contributions to healthcare research (Wong et al., 2012).

A weakness of the study was the time constraints that I overcame by use of a rapid realist review. By design, conducting a rapid realist reviews are rapid, and I recognise that a more detailed approach such as a realist synthesis may have revealed, challenged or confirmed some of the themes presented in the findings of this study, due to its ability to test presented theories. However, I believe the findings have been systematically constructed, and all feedback provided by the multidisciplinary ERG were considered and actioned. Additionally, the use of the PRISMS taxonomy (Taylor et al., 2014) as a framework for analysis allowed the structure and interpretation to be grounded in the existing evidence-base.

An additional weakness of realist methodology is the subjectivity of the data extraction, and the challenge of extracting unbiased C-M-O’s. The primary research studies are generally not reported in line with realist concepts (C-M-
O Configurations) and therefore data extraction requires the researcher to interpret data to explore the context and mechanistic features of the research. Although every effort was made to ensure a non-biased approach to data extraction, I recognise that there may be a bias to positive findings. To overcome this, I ensured data extraction included all intervention outcomes (successful or not), enabling inclusive interpretation of impact. However, studies may only describe successful components of their interventions and may only present positive or significant findings within a publication, leading the reviewer to an overly positive interpretation. I involved a second reviewer in the data extraction phase to provide an independent perspective. The research team regularly discussed potential findings to ensure consistency, and the ERG ensured clarity and balanced interpretation.

This review was completed during the COVID-19 pandemic period, but all studies included in the data, pre-dated the pandemic. Post-COVID research may present different findings as healthcare adapts to new models of asthma care. Additionally, I was dependent on the completeness of the included studies, so some potentially important contexts may not have been evaluated. For example, I did not have evidence to inform the role of remote support for self-management in the context of people living with disabilities, or ethnic minority groups potentially with language barriers. Future research should specifically explore remote supported self-management delivery for such groups.

I also acknowledge that although the review findings indicate either equivalence or greater benefit of remote self-management delivery, there may
still be groups for whom face-to-face reviews are a preferred methods of health care delivery and communication. Additionally, the participations of the selected studies may have been those comfortable with taking part in remote research studies, and therefore this may not be a fully representative group, hence the positive findings. Lastly, I recognise that the ‘safety’ variable measured within this review has not been tested within a controlled trial. Although I found no indication that remote delivery of supported self-management causes harm, I would recommend future studies to explore this further.

4.7.4 Implications of Findings for this PhD

This review was completed to ensure my research is relevant for a post-COVID health care context and up to date with best practice of asthma care. Completing this work also provided a basis for an additional question for the PhD study, not only to observe the delivery of supported self-management in practice and impact of the IMP²ART implementation strategy, but to explore how supported self-management is delivered during telephone or video consultations compared to face-to-face asthma reviews.

4.8 Conclusions

Remote technologies will remain in everyday healthcare. This systematic rapid realist review has explored the context and mechanisms by which asthma supported self-management can be supported and delivered during video and telephone reviews. Across a broad range of contexts, remote consultations are
highly accepted by both patients and healthcare professionals, and are a clinically effective and safe alternative to face-to-face reviews to provide self-management support. The findings of this systematic rapid realist review can inform the conduct of remote asthma reviews, and implementation of supported self-management techniques into future asthma care.

The following chapter will outline the next phase of this thesis; an observational study to explore how supported self-management is delivered in clinical practice.
5. Video-Recorded Observation of Asthma Reviews

The previous chapter detailed the results of the systematic rapid realist review exploring the acceptability, clinical effectiveness and safety of delivering supported self-management during remote asthma reviews. The review provided an overview of remote asthma care and presented mostly positive findings associated with remote consultations and supported self-management delivery.

This chapter will outline the observational, quantitative phase of the PhD study, and will provide a more detailed exploration into healthcare professional communication styles and behaviours during routine asthma reviews (both face–to-face and remote reviews). The detailed analysis will explore how supported self-management is delivered in routine asthma reviews, and provide an insight of individual healthcare professional delivery of behaviour change counselling and patient-centred care during routine asthma reviews. Please see schema (Figure 12) below.
Figure 12: PhD Study Schema: Video-recorded observations of asthma reviews phase
5.1 Aims of Observational Study

The aim of the observational study was to record and observe routine asthma reviews (both face-to-face and remote consultations) in both IMP^ART implementation practices and control practices, to understand how supported self-management is delivered during routine primary care asthma reviews.

5.1.1 Objectives of Quantitative, Observational Phase:

1. To observe how self-management strategies are embedded into routine reviews and what proportion of time within a consultation is spent on supported self-management related tasks.

2. To observe how patient-centred methods and behaviour change counselling are used within asthma consultations.

3. To explore differences in delivery of supported self-management and consultation styles related to allocation in the IMP^ART trial (implementation or control); mode of delivery (remote telephone/video-consultations or face-to-face); and duration of the asthma review.

5.2 Literature Review of Tools to Address Objectives 1 and 2

During the initial months of my PhD project, I reviewed the literature to explore an understanding of what existing tools, scales, and instruments have been used to measure and analyse consultations and patterns of communications between patients and healthcare professionals in primary healthcare settings. I searched databases such as PubMed, MEDLINE and Cochrane library to
identify existing studies which had used measures to code clinical healthcare professional and patient interactions. Search terms included ‘coding primary care consultations’ ‘assessing patient centred communication’ ‘assessing quality of clinical communication’, and ‘assessing quantity of clinical communication’ were used to identify existing literature. Searches dated back to 1990. Papers and tools were then reviewed for relevance to each research objective.

In this section, I will compare and critically evaluate the potentially relevant, validated tools in order to select the best analysis to answer each objective.

5.2.1 Objective 1: What proportion of time within an asthma consultation is spent on supported self-management tasks?

The first objective within the observational, quantitative phase of the study, was to explore how supported self-management tasks are prioritised within a routine asthma review. I aimed to address this objective by coding and quantifying how much time is spent on self-management tasks within the recorded review, compared to other tasks.

To explore the most appropriate tool for this objective, a critical comparison and assessment of three tools used frequently to code and measure healthcare consultation timings and communications within existing research was conducted;

- The RIAS (Roter Interaction Analysis System) (Roter and Larson, 2002)
- TIMER (Time Interval Medical Event Recorder) (Pringle et al., 1986)
• ALFA Toolkit (Activity Log Files Aggregation) (de Lusignan et al., 2008)

5.2.1.1 RIAS (Roter Interaction Analysis System) (Roter and Larson, 2002)

The Roter Interaction Analysis System (RIAS) was established by Roter and Larson in 2002. The RIAS coding method is tailored to patient and provider exchange, specific to medical encounters and measured directly from audio or video-recorded data. Coders analysing a recording of a consultation assign each ‘utterance’ spoken by the patient or provider to one of 41 mutually exclusive and exhaustive categories. Examples of categories include: ‘Data Gathering’, ‘Patient Education and Counselling’ and ‘Building a Relationship’. Descriptive statistics are calculated for the 41 RIAS categories and the larger functional categories.

Disadvantages that limit the use of the RIAS included acquiring the most up to date training details and documents to complete the assessments. Without a full week accredited training, followed by 50–60 hours of coding practice with RIAS software to achieve acceptable levels of efficiency and reliability, the researcher cannot complete the method (Cavaco & Roter, 2010). Studies evaluating the use of RIAS methodology (Pires & Cavaco, 2014) also criticised the lack of research which incorporates another similar, parallel measure to increase concurrent validity. Without the confirmation of comparable results from a similar method, it is difficult to determine the legitimacy of the measure.

Others have also disputed the RIAS (Sandvik et al., 2002), for its contradiction of coding categories. The RIAS manual lists more than one criterion for coding.
In some cases, these criteria may contradict one another, making it difficult for interpretation and resulting in bias and individual preference of the assessor. Additionally, the RIAS is considered a dated tool as it was initially based on the work of Robert Bales (1950) which, in the 1970s, was transposed to the investigation of the communication in medical consultations (Pires & Cavaco, 2014). The encouragement of behaviour change in medical consultation is a development from the past 50 years, where there has been a significant rise in encouraging healthcare professionals to routinely embed high-quality health promotion and behavior change techniques into clinical practice (Davis et al., 2015). The RIAS therefore may not have captured these additional essential elements of the research.

5.2.1.2 TIMER (Time Interval Medical Event Recorder) (Pringle et al., 1986)

Introduced by Pringle et al., (1986), the Time Interval Medical Event Recorder (TIMER) was created as an appraisal tool to quantify time taken to complete different tasks within a medical consultation for both patient and healthcare professional. The TIMER method divides the recorded data into five-second segments where instances of certain tasks are coded into groups. As consultations vary in duration, the amount of time in each group is converted into a percentage. The TIMER has been used to investigate the use of video recordings in consultations in UK primary care. Pringle et al., (1990) used this method of analysis to explore whether healthcare professional behaviour changed due to the presence of a camera within consultations. The research found no difference in variance for each of the 27 parameters included in TIMER for both implementation and control groups, showing that the presence
of a video camera does not influence healthcare professional behavior in consultations (which is specifically encouraging for this current PhD study).

However, the TIMER method has been mostly employed in research that investigates the influence of the presence of a computer and how it is used within healthcare consultations. It is also a dated technique with little recent research using the methodology. TIMER’s categories may be an effective tool for setting categories for tasks to be completed within a consultation, however as no TIMER software is provided, the method acts more as a framework than validated software.

5.2.1.3 ALFA Toolkit (Activity Log Files Aggregation) (de Lusignan et al., 2008)

The Activity Log Files Aggregation (ALFA) toolkit was created by de Lusignan (2008) and has been widely used to analyse multichannel video recordings of primary care clinical consultations. In a study by Kumarapeli & de Lusignan (2013), which incorporated a multi-channel video observation (ALFA toolkit, 2008), time taken on clinical tasks was captured in four different methods:

1) developing a method to display multichannel video of the consultation;

2) code and measure activities, including computer use and verbal interactions;

3) automate the capture of nonverbal interactions;

4) aggregate multiple observations into a single navigable output
The main aim of the ALFA research was to measure the influence of technology/computers on the clinical consultation using all four simultaneous recording methods, and three video cameras to capture different angles and aspects of the consultation (data feed from the computer, mouse movements, keyboard use).

However, the second method of the ALFA (2: code and measure activities) has been used in other research studies (Hayward et al., 2015), adapted as a suitable, more updated method of the TIMER (Pringle et al., 1986) to code and quantify time taken on tasks within healthcare consultations. The procedure of this method includes first developing a framework for describing common parts of a consultation. The time taken to complete tasks is then measured through detailed analysis of the recorded audio or video data, whereby proportions of the consultation spent on each task can be calculated. Once this analytical process is complete, each tasks’ data is converted into a percentage of time from the whole consultation.

5.2.1.4 Conclusions for Objective 1

The method of quantifying time spent on supported self-management tasks within the recorded consultation data provides valuable insights into how supported self-management tasks are prioritised within routine asthma reviews. It also provides additional understanding into whether IMP2ART implementation strategies or mode of consultations influenced the amount of time spent on supported self-management strategies.
After considering all tools and methods discussed above, I decided to utilise the ALFA Toolkit (*Method 2: code and measure activities*), where tasks within a consultation can be measured through a detailed analysis of recorded data to calculate proportions of time spent on tasks. As there is no verified tool that specifically explores the delivery of supported self-management, the ALFA was chosen due to its flexibility to incorporate additional categories to the framework, e.g., PRISMS components (Taylor et al., 2014).

Some ALFA toolkit items were removed from the original coding framework, including non-supported self-management tasks (discussed further below in section 5.3.7.2), as a core element of the work conducted by de Lusignan was to explore the influence and use of the computer on clinical outcomes during consultations (de Lusignan et al., 2009). Although use of the computer was an important aspect in capturing the dynamics of each recorded review, the focus of the current research was to explore supported self-management delivery, and therefore, coding elements were primarily focused on capturing SSM only.

Additionally, as computer use was not the main concern for my study, I opted to only use one camera (as opposed to the ALFA multichannel recording) which aimed to capture the whole consultation room, but primarily aimed at capturing the healthcare professional.

The adapted ALFA toolkit coding framework is provided below in Figure 13.
**IMP²ART (IMPllementing IMProved Asthma self-management as Routine)**

*Delivery of Supported Self-Management in Asthma Reviews: A Mixed Methods Observational Study Nested in the IMP²ART Programme of Work*

**Objective 1** – How are self-management tasks prioritised within asthma consultations? (What proportion of time within a consultation is spent on self-management related tasks?). Adaptions of ALFA Toolkit Method 2 (de Lusignan, 2008): a Framework for describing common components of a standard asthma consultation.

Practice Name: _____________  Professional Name: _____________

Mode of Consultation (face-to-face/video/telephone): _____________

Patient/Recording ID: _____________  Date of Review: _____________

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Component within review (type of communication or behaviour between both healthcare professional and patient)</th>
<th>Time taken (in seconds) to complete the task throughout review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Management (PRISMS components)</td>
<td>A1: Time spent discussing individual asthma condition and/or its management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A2: Time spent referring to other available asthma resources and services (improving access to services)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A3: Time spent collaboratively reviewing and completing personalised asthma action plan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A4: Time spent discussing attendance to regular reviews</td>
<td></td>
</tr>
<tr>
<td>A5: Time spent providing feedback on individual monitored asthma data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A6: Time spent discussing asthma control and possible triggers, practical support with adherence (medication or behavioural)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A7: Time spent providing equipment/discussion of new equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A8: Time spent discussing how to access advice or support when needed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A9: Time spent training/rehearsal to communicate with healthcare professionals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A10: Time spent on training/rehearsal for everyday activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A11: Time spent training/rehearsal for practical self-management activities (e.g., inhaler technique)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A12: Time discussing psychological strategies (problem solving, goal setting, action planning, relaxation techniques etc)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A13: Time discussing individual social support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A14: Time spent discussing lifestyle factors e.g., smoking, diet, exercise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A15: Other: Time spent on screen sharing (discussing something on screen with the patient)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A16: Other: time spent setting the patient agenda for the consultation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A17: Other: Time spent talking about other conditions or multimorbidity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Self-management – Please state:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 13: ALFA toolkit coding framework*
5.2.2 Objective 2: How are Patient-Centred Methods and Behaviour Change Counselling Delivered During Asthma Reviews?

Delivering a patient-focused review, which provides self-management advice and support is pivotal to the mechanisms by which IMP\textsuperscript{2}ART is expected to work (see section 2.5.1). The second objective of the quantitative, observational research is to explore how healthcare professionals are delivering patient-centered and behaviour change counselling conversations during asthma consultations.

To explore the most appropriate tool for this objective, a critical comparison and assessment of two tools used frequently to code and measure the delivery of patient-centre care and behaviour change conversations within existing research was conducted;

- PCOF (Patient-Centred Observation Form) (Makoul, 2001)
- BECCI (Behaviour Change Counselling Index) (Lane, 2002)

5.2.2.1 PCOF (Patient-Centred Observation Form) (Makoul, 2001)

The Patient Centered Observation Form (PCOF) was created by Makoul in 2001. Since then, the instrument has been revised in response to feedback from its users and advances in this area of research. Researchers using the PCOF assess communication by working through the thirteen categories and grade the healthcare professional on the level of biomedical or biopsychosocial communication in the consultation specific to each element stated (e.g., ‘maintain relationship through interaction’ or ‘patient activation and engagement’). According to the systematic review by Brouwers et al., (2017),
which assessed instruments designed to measure patient-centeredness in healthcare professional and patient communication, the PCOF tool contained all six of the ‘Dimensions of Patient-Centeredness’. Stewart et al., (2004) suggested a comprehensive definition of these dimensions:

‘1) exploring the disease and the illness experience,

2) understanding the whole person,

3) finding common ground

4) incorporating prevention and health promotion,

5) enhancing the doctor–patient relationship,

6) ‘being realistic’ about personal limitations’

The other (n=13) instruments included in the systematic review measured patient-centeredness in various compilations of dimensions but did not incorporate them all. Additionally, the PCOF tool was one of only two instruments included in the review that had been specifically created by assessors to score the consultations as an outside observer (e.g., through video recordings).

Training to complete the PCOF assessments takes 1 hour, delivered by the University of Washington and is available at: https://depts.washington.edu/fammed/pcof/. The training website includes two variations of the instrument; PCOF for completion by doctors and PCOF for completion by nurses. Both forms include important aspects for delivering patient-centered supported self-management. After a critical review of both
forms, I contacted the creator of the PCOF via email to discuss the suitability of each form and its application for use within my PhD project. The creator recommended that the ‘Nurse’ form was a suitable analytical method for this PhD research. The reasons behind this decision include the specific ‘Self-Management Support, Goal setting and Action Planning Section’ incorporated in the assessment. The doctor version assesses the basis of self-management support; however, the nurse version assesses self-management support and self-management follow up. The nurse form also encompasses clinical aspects of a consultation e.g., ‘Vitals, Checks Meds’ etc. By including these important dimensions of a consultation, it also allows the research to assess patient-centeredness for the whole consultation.

However, the tool has been criticised for levels of reliability by Chesser et al., (2013), whose research investigated the use of the PCOF tool in 13 clinician-patient encounter observations. Overall, Chesser found that reliability for the PCOF was dependent on the content of communication being scored, and the training history and expertise of the evaluator. The results challenge researchers and physicians to improve the overall reliability of the form, scoring instructions and guidelines, which are advised to be more clearly defined using discrete instances of observable physician behavior to improve interrater reliability. Discrepancies in rating instruments are inevitably apparent due to the subjective nature of interpreting patient-centered behaviours and rater interpretations.
Additionally, the PCOF was originally developed to provide and articulate focused feedback to others after viewing recorded data of healthcare professional and patient healthcare interactions and the delivery of patient-centred components. As the aim of this study was to code a large amount of data, rather than provide individualised feedback on each recorded encounter, after consultation with the creator of the PCOF (Keen et al., 2015), it was agreed the tool could be appropriately used within this research project as coding framework to address patient-centred care delivery.

Given the findings of the PCOF, I felt it necessary to include a further observational rating tool which would allow for all levels of behaviour change counselling to be additionally assessed.

5.2.2.2 BECCI (Behavior Change Counselling Index) (Lane, 2002)

As discussed in section 2.3.4, an evidence-based method for counselling patients about health behaviour change is Motivational Interviewing (Miller & Rollnick, 2002). Motivational Interviewing involves guiding patients, more than directing, and is ‘a skilful clinical style for prompting patients to understand their own motivations for making behaviour changes in the interest of their health’ (Spollen et al., 2010). The medicalised version of motivational interviewing is often referred to as ‘Behaviour Change Counselling’. In relation to supported self-management, motivational interviewing is a proven evidence-based technique associated with improved self-management abilities among patients with LTCs (Song et al., 2014).
The BECCI (Behaviour Change Counselling Index) developed by Lane (2002), is a tool used to measure practitioner competence in behaviour change counselling skills during consultations. In previous research, the BECCI checklist has demonstrated acceptable levels of validity, reliability and responsiveness (Lane et al., 2005). Each item on the BECCI is scored using a five-point Likert-type scale. Mean total scores, also known as Practitioner BECCI scores, are calculated as the mean across all items, ranging from 0 (not at all) to 4 (a great extent). An example of the items included in the checklist are: ‘Practitioner invites the patient to talk about behaviour change’ and ‘Practitioner actively conveys respect for patient choice about behaviour change.’ To be an ‘approved’ rater of the BECCI, the researcher should have a good basic knowledge of behaviour change counselling and the checklist. Additionally, raters should undertake background reading, watch a training video, and gain an understanding of how the checklist works, whereby all resource references are provided. I undertook all recommended training before use of the BECCI.

Despite the extensive use of the BECCI, previous evidence for measuring patient-doctor communication and aspects of behaviour change communication has mostly been performed with stimulated scenarios (Roter, 2003). This limits the reliability of using the tool in real-life primary care settings where unexpected patient and healthcare professional behaviors may arise. Another limitation of BECCI is that it focusses purely on the practitioner behaviour rather than patients, which may prove to be a missing, vital element of explaining different motivations behind healthcare professional behaviour.
5.2.2.3 Conclusions for Objective 2

Both the PCOF (Makoul, 2001), and BECCI (Lane, 2002), were chosen as measures to ensure comprehensive aspects of behaviour change and patient-centred care delivery were captured for analysis. Both instruments have been regarded as reliable and validated to explore the concept of how supported self-management is communicated and delivered during asthma consultations.

The PCOF was adapted as a scoring tool to incorporate the 53 items stated within the framework. The BECCI was also used in conjunction with the PCOF as an analytical method to ensure all aspects of behaviour change counselling were captured and evaluated.

The PCOF and BECCI coding frameworks can be found below in Figures 14 and 15.
<table>
<thead>
<tr>
<th>Element</th>
<th>MA/Nurse Centered Biomedical Focus</th>
<th>Patient Centered Biopsychosocial Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishes Rapport</td>
<td>[ ] 1a. Uses 0-2 elements</td>
<td>[ ] 1c. Uses 2-4 elements</td>
</tr>
<tr>
<td>- Introduces self (before gazing at computer)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Warm greeting (before gazing at computer)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Acknowledges all in the room by name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Uses eye contact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Humor or non medical interaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintaining Relationship Through the Interaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Uses verbal or non-verbal empathy, including during vitals</td>
<td>[ ] 2a. Uses 0-1 elements</td>
<td>[ ] 2c. Uses 3 or more elements</td>
</tr>
<tr>
<td>- Listens well using continuers phrases (‘um, mm’)</td>
<td>[ ] 2b. Uses 2 elements</td>
<td></td>
</tr>
<tr>
<td>- Paraphrases important verbal content</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Demonstrates presence, curiosity, intent focus, not seeming “nudged”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- By acknowledging distractions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collaborative upfront agenda setting</td>
<td>[ ] 3a. Uses 0-1 elements</td>
<td>[ ] 3c. Uses 3 elements</td>
</tr>
<tr>
<td>- Acknowledges agenda items from other team member (eg. receptionist, from form, or from EMR)</td>
<td>[ ] 3b. Uses 2 elements</td>
<td></td>
</tr>
<tr>
<td>- Additional elicitation: “something else?” - each elicitation counts as a new element</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Confirms what is most important to patient?</td>
<td>NAME THE PROBLEMS RAISED BY PATIENT OR MA/Nurse:</td>
<td></td>
</tr>
<tr>
<td>Maintains Efficiency through transparent (out loud) thinking</td>
<td>[ ] 4a. Uses 0 elements</td>
<td>[ ] 4c. Uses 2 or more elements</td>
</tr>
<tr>
<td>- About visit MA/Nurse time use</td>
<td>[ ] 4b. Uses 1 element</td>
<td></td>
</tr>
<tr>
<td>- About entire visit organization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- About problem solving strategies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Respectful interruption/redirection using EEE: Excuse your self, Empathetive/validate issue being interrupted. Explain the reason for interruption (eg, for Agenda setting, Topic tracking)</td>
<td>[ ] 4c. Uses 2 or more elements</td>
<td></td>
</tr>
<tr>
<td>Basics: Vitals, Checks Meds and Paperwork</td>
<td>[ ] 5a. Uses 0-1 elements</td>
<td>[ ] 5c. Uses 3 elements</td>
</tr>
<tr>
<td>- Prepares patient and shares vital findings ≥ 2 times</td>
<td>[ ] 5b. Uses 2 elements</td>
<td></td>
</tr>
<tr>
<td>- Asks about refills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Medication reconciliation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Activation and Engagement</td>
<td>[ ] 6a. Uses 0-1 elements</td>
<td>[ ] 6c. Uses ≥ 3 elements</td>
</tr>
<tr>
<td>- Encourages patient to bring up important issues</td>
<td>[ ] 6b. Uses 2 elements</td>
<td></td>
</tr>
<tr>
<td>- Explores patient verbal cue about psychosocial or physical concern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Explores patient non-verbal cue about underlying concern</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Patient Centered Observation Form: MA/Nurse

<table>
<thead>
<tr>
<th>Element</th>
<th>MA/Nurse</th>
<th>Observer</th>
<th>Observ#</th>
<th>Date</th>
<th>Patient Centered Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Biomedical Focus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electronic Medical Record Use</strong></td>
<td>7a. Uses 0 or 1 element</td>
<td>7b. Uses 2 elements</td>
<td>7c. Uses 3 or 4 elements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ By 10 seconds, describes reason for each screen gaze</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Shares/points at screen during at least 2 visit phases (agenda setting, history, Rx / Lab review, typing AVS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Maintains eye contact and/or shares screen at least 2/3's of the visit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Ask patient to confirm or contribute to documentation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gathering Information</strong></td>
<td>8a. Uses 0 elements</td>
<td>8b. Uses 1-2 elements</td>
<td>8c. Uses 3 or more elements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Collects focused history per problem</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Uses reflecting statement</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Uses summary/clarifying statement</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count each time the skill is used as one element</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self management support: Goal setting and action plan development</strong></td>
<td>9a. Uses 0-2 elements</td>
<td>9b. Uses 3-5 elements</td>
<td>9c. Uses ≥ 6 elements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Not present in every interview</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Asks if patient wants to create a health goal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Asks patient to brainstorm activities to reach goal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Asks patient to choose one activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Asks patient to name activity frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Asks patient to identify when to do activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Assesses patient confidence (1 through 10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Assesses patient barriers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Adjusts plan to address barriers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Uses action plan worksheet (in AVS or separate)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Affirms prior / current behavior change efforts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self management Follow-up: Checking on progress, revision</strong></td>
<td>10a. Uses 0-1 element</td>
<td>10b. Uses 1-3 elements</td>
<td>10c. Use ≥ 4 elements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Assesses progress on prior goals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Problem solves with patient to revise action plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Celebrates patient successes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&quot;normalized&quot; struggles with self management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Ask about including action plan in today's agenda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Closure and System Navigation</strong></td>
<td>11a. Uses 0-1 elements</td>
<td>11b. Uses 2-3 elements</td>
<td>11c. Use ≥ 4 elements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Asks for questions about today's topics.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Assesses patient comfort with system navigation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Provides system navigation aid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Uses Teachback = Asking the patient to explain his/her understanding of the plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Prints After Visit Summary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Combines Teachback and AVS creation while sharing the screen. (Counts for 3 elements)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 14: Patient-Centred Observation Form (PCOF)**
Behavior Change Counselling Index (BECCI)

BECCI is an instrument designed for trainers to score practitioners' use of Behaviour Change Counselling in consultations (either real or simulated). To use BECCI, circle a number on the scale attached to each item to indicate the degree to which the patient/practitioner has carried out the action described.

Before using BECCI, please consult the accompanying manual for a detailed explanation of how to score the items. As a guide while using the instrument, each number on the scale indicates that the action was carried out:

0. Not at all  
1. Minimally  
2. To some extent  
3. A good deal  
4. A great extent

The Topic: ______________

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Practitioner invites the patient to talk about behaviour change</td>
<td>not at all 3 4</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>a great extent</td>
</tr>
<tr>
<td>2. Practitioner demonstrates sensitivity to talking about other issues</td>
<td>not at all 3 4</td>
</tr>
<tr>
<td></td>
<td>a great extent</td>
</tr>
<tr>
<td>3. Practitioner encourages patient to talk about current behaviour or status quo</td>
<td>not at all 3 4</td>
</tr>
<tr>
<td></td>
<td>a great extent</td>
</tr>
<tr>
<td>4. Practitioner encourages patient to talk about change</td>
<td>not at all 3 4</td>
</tr>
<tr>
<td></td>
<td>a great extent</td>
</tr>
<tr>
<td>5. Practitioner asks questions to elicit how patient thinks and feels about the topic</td>
<td>not at all 3 4</td>
</tr>
<tr>
<td></td>
<td>a great extent</td>
</tr>
<tr>
<td>6. Practitioner uses empathic listening statements when the patient talks about the topic</td>
<td>not at all 3 4</td>
</tr>
<tr>
<td></td>
<td>a great extent</td>
</tr>
<tr>
<td>7. Practitioner uses summaries to bring together what the patient says about the topic</td>
<td>not at all 3 4</td>
</tr>
<tr>
<td></td>
<td>a great extent</td>
</tr>
<tr>
<td>8. Practitioner acknowledges challenges about behaviour change that the patient faces</td>
<td>not at all 3 4</td>
</tr>
<tr>
<td></td>
<td>a great extent</td>
</tr>
<tr>
<td>9. When practitioner provides information, it is sensitive to patient concerns and understanding</td>
<td>not at all 3 4</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>a great extent</td>
</tr>
<tr>
<td>10. Practitioner actively conveys respect for patient choice about behaviour change</td>
<td>not at all 3 4</td>
</tr>
<tr>
<td></td>
<td>a great extent</td>
</tr>
<tr>
<td>11. Practitioner and patient exchange ideas about how the patient could change current behaviour (if applicable)</td>
<td>not at all 3 4</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>a great extent</td>
</tr>
</tbody>
</table>

Practitioner BECCI Score: ______________

Practitioner speaks for (approximately): -

More than half the time □  About half the time □  Less than half the time □

*Figure 15: Behaviour Change and Counselling Index Form (BECCI)*
5.3 Methods

5.3.1 Design

The observational research was conducted as a non-randomised control study, to explore healthcare professional delivery of supported self-management in IMP²ART implementation and control groups, including both face-to-face and telephone asthma reviews.

5.3.2 Ethical Considerations and Governance

The Office for Research Ethics Committee (REC) (Ref No: 20/NI/0177) (Appendix 7) ethical approval was granted through the Integrated Research Application System (IRAS). During this phase of gaining full ethical approval of the PhD study, all accompanying documents, such as online consent forms and information sheets (patient version Appendix 8, healthcare professional version Appendix 9), data collection tools (e.g., interview topic guides) and the study protocol were reviewed, and approval was granted.

As healthcare professionals were recruited from general practices across both England and Scotland, regulatory approvals were approved and sought from:

- Health Research Authority (HRA) (English approvals): Ref No: 20/NI/0177 (Appendix 10)
- National Research Scotland (NRS) (Scottish Approvals): Ref No: NRS21/280392

A Letter of Clinical Research Access (Research Passport): ‘granted rights of Clinical Research Access to carry out Approved Research in the course of
current PhD programme of study at the University of Edinburgh’ (Appendix 11) was obtained to conduct the research within clinical settings.

Local Research & Development (R&D) for each recruited healthcare professional’s primary care practice were obtained to grant access to each general practice. An example of R&D approval document can be found in Appendix 12. Organisational Information Documents (OIDs) were also completed by each individual recruited healthcare professional’s general practice. This document acted as a ‘contract’ between the researcher and practice for the research to take place.

5.3.3 Study Population

Of the 144 IMP²ART trial practices, I aimed to recruit a sub-sample of practices in both the implementation group (n=5) and the control groups (n=5). In total, this would capture approximately 10 healthcare professionals across all practices (one healthcare professional from each general practice). For the purposes of this study, the healthcare professional was the member of staff in the practice who usually regularly conducts asthma reviews (most likely a practice nurse, but possibly other members of the team including general practitioners or pharmacists).

5.3.3.1 Sample Size Calculations

Sample size calculations of the research were determined through a mixed methods approach to the research objectives. Through discussions with my supervisory team, and assistance of a statistician based at The University of
Edinburgh, it was confirmed that the research would be addressed in a mostly descriptive, mixed methods approach.

In order for the research to be conducted quantitatively, and to perform a sample size calculation, a primary outcome of the research would have needed to have been chosen. However, as the research valued all research objectives equally, it was not possible to choose one primary outcome. Additionally, if the research were to be evaluated quantitatively, a much larger sample size would have been needed to achieve a given power. Due to the methodologies and timeframes of the research, a large sample size of data would not have been achievable to complete within this observational study.

To address the stages of the study, the determinant of sample size were considered by reaching data saturation from the in-depth style of data collection. Sample sizes were also dependent upon the recruitment stages of the IMP²ART programme who were still recruiting general practices at the time of this observational study’s data collection. Therefore, all general practices who were recruited to IMP²ART by this stage were approached to take part in this study.

It was anticipated that the recordings of asthma reviews would take place in an allocated morning, afternoon or full day of a scheduled asthma clinic, and therefore it was estimated that on average, around 8-10 consultations per clinic would be recorded. This number varied within each practice clinic e.g., due to consent or nonattendance. However, in total I aimed to collect data from between 60-80 individual asthma reviews across all practices.
5.3.3.2 Study Population Inclusion and Exclusion Criteria

Although the primary aims of the study were to explore the individual behaviours and communication of healthcare professionals, both healthcare professionals and patients with asthma were recruited to the study. Inclusion and exclusion criteria are defined below for both groups in Table 10.

Table 10: Inclusion & Exclusion Criteria for healthcare professional and patient participation

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Healthcare Professional</strong></td>
<td>- Healthcare professional only providing unscheduled care for acute events (not routine reviews).</td>
</tr>
<tr>
<td>- Healthcare professional who regularly delivers a routine asthma clinic e.g., practice nurse or GP.</td>
<td></td>
</tr>
<tr>
<td>- Works within a recruited IMP^2ART practice (implementation or control group).</td>
<td></td>
</tr>
<tr>
<td>- Has attended IMP^2ART facilitation training (for implementation group only).</td>
<td></td>
</tr>
<tr>
<td><strong>Asthma Patient</strong></td>
<td>- Unable to give own consent to participate in the study.</td>
</tr>
<tr>
<td>- Patients with an asthma diagnosis for which medication has been prescribed in the last 12 months.</td>
<td>- Unable to understand and communicate in the English language (only consultations conducted in English will be able to be analysed).</td>
</tr>
<tr>
<td>- Patient is scheduled for an asthma review within the participating practice (may have other co-morbidities but primary reason for appointment is an asthma review).</td>
<td>- Aged 4 or under.</td>
</tr>
<tr>
<td>- Aged 5 years and over.</td>
<td></td>
</tr>
</tbody>
</table>

5.3.4 Recruitment Strategy

5.3.4.1 Identifying Healthcare Professionals and Practices

Healthcare professionals recruited to take part were identified through the IMP^2ART database of randomised, recruited practices (both implementation
and control groups). This database included practice information such as contact details, key members of staff within the practice, and any further essential information specific to the practice. As part of the initial IMP\textsuperscript{2}ART consent process, practices were informed that further process evaluation data would be collected for the study, and that they may be contacted to take part in further research embedded in the programme. All IMP\textsuperscript{2}ART general practices who had been randomised at the time of the PhD study recruitment were approached to take part (n=64).

Practices and healthcare professionals were initially contacted via email and informed study details. At this stage it was made clear how data collection would take place to ensure that practices had suitable information prior to agreeing to participate (an initial recruitment email example can be found as Appendix 13). If the practice was interested in taking part or wished to receive further information, a video call (initial research meeting) would be organised with the healthcare professional. During these initial research meetings, details of the study were discussed, including; what would be expected of the practice if they wished to be involved, logistics of the data collection, details of consent (both healthcare professional and patient), and possible dates to visit for data collection. These meetings were positively received by recruited healthcare professionals, and allowed a working relationship to be formed between myself and the healthcare professional. I also regularly communicated with the healthcare professional/practice staff (e.g. admin staff) in the weeks leading up to the data collection visit date to maintain regular contact and answer any queries which the healthcare professional may have had.
5.3.4.2 Patient Consent

The research consent process was completed using the University of Edinburgh online survey platform, this included both information sheets and consent forms (healthcare professional and patient versions of online consent process provided in Appendices 8 and 9). All information sheets and consent forms received feedback from the Asthma UK Centre for Applied Research (AUKCAR) Patient and Public Involvement (PPI) group and were approved by ethics and governance. Patients with asthma provided consent for their asthma reviews to be recorded, viewed, and analysed. Participants (patients or healthcare professionals) were free to withdraw from the study at any point and did not need to offer a reason (no participants wished to withdraw from the study). All data collected from these participants would be removed and destroyed immediately upon request.

To recruit patients with asthma to take part in the recordings, I worked with the practice to select the most appropriate healthcare professional to contact patients and inform them of the research recording clinic. For some practices, this healthcare professional was a research nurse, member of the admin team, or the asthma nurse taking part in the research. This healthcare professional would contact patients whose routine asthma review was due at the time of the scheduled recording clinic to inform them of the research, and ask if they would like to take part. Patients would then be provided with the link to the online consent processes via text or email. Once patients had completed the consent, I was able to see the names and details of patients booked in for the recording clinic via the completed online consent forms.
On the day of data collection, within the scheduled recording clinic, the healthcare professional would remind the patient they were being recorded as part of the research, and offer another opportunity for the patient to confirm they understand the research, ask any further questions, and confirm they were still happy to be take part. As I was also present in the general practice on the day of recordings, I often introduced myself to patients within the waiting room and asked if they had any further questions.

If a patient was unable to adequately understand verbal explanations or written information in English, they were excluded from the research as they were unable to provide informed consent. Patient participation was also at the discretion of the healthcare professional as they purposefully sampled the participants to take part. If a patient was accompanied by a friend, relative or carer during their asthma review, I asked for this additional person to complete the consent process on the day of the asthma review. However, this rarely took place due to COVID-19 socially distancing rules were patients were encouraged to attend their review alone.

For child consent processes, the initial invitation to take part was sent to the parent or guardian of the child. Then after reading the information sheet, the online consent process would ask the parent/guardian to complete the following questions ‘Please state your age (if you are completing on behalf of a child please state their age)’. Due to the differences in consent procedures in England and Scotland, if under 15 was selected, the patient was then directed to a page asking, ‘will your child’s asthma review be taking place in Scotland or England’. If England was selected, the parent/guardian was
directed to complete the consent process on behalf of the child. If Scotland was selected, the patient was directed to a page which stated:

'Within Scotland, children are able to consent for themselves to take part in research. This section is to be completed by the person aged 15 or under in Scotland. If you feel your child is capable of consenting for themselves, please allow your child to complete the consent sections within this section. If your child is not able to, please consent on their behalf.'

There were then age appropriate consent questions (reviewed by the AUKCAR PPI group).

Please see below for flow chart (Figure 16) of consent processes. Figure 17 outlines the study patient recruitment and consent strategy for all ages of participants.
Figure 16: Patient consent process diagram via online consent form
Step 1: Email or telephone lead contact from IMP²ART practices to provide details of the study and ask if they would like to meet (via video call or telephone) to discuss the possibility of taking part.

Step 2: Initial study meeting: If the practice replied with interest, a video or telephone call was arranged to discuss the project details and what taking part would include for the practice, professional and patients.

Step 3: Arrange a data collection date and time which the 'recording clinic' could take place: Healthcare professional to provide the details of a named contact within the practice admin team who would be able to offer help to contact and gain consent from patients. Arrange a meeting with a member of the practice admin team.

Step 4: Practice admin meeting: Ask the admin to telephone any patients who are scheduled to have a routine asthma review. Patients would be booked into the 'recording clinic' and informed about the research via telephone. If the patient was happy to take part, the practice admin would email/text the patient the online consent survey to complete before their review.

Step 5: Review the online consent survey: Identify the patients who have completed the consent for their asthma review to be recorded. Patients would provide the date, time and name of the practice for their scheduled review.

Step 6: When visiting the practice: Obtain list of patients who have consented to taking part. Working with the professional taking part in the recordings, note time of each consented patients’ review and record their asthma review.

Figure 17: Study patient recruitment and consent strategy
5.3.5 Pilot Data Collection

Best practice of evaluating any intervention is to use a carefully phased approach, starting with a pilot study targeted at each of the key aspects of the design, and moving on to an exploratory and then a definitive evaluation (Craig et al., 2008). To test the data collection, data analysis, recruitment and consent procedures of the observational study, a pilot data collection took place in a general practice in England in September 2021. This practice was chosen as a pilot practice as it had previously worked with the IMP²ART team to help develop and test the implementation strategies. They were also not recruited to the IMP²ART trial as an implementation or control group, but were aware of the programme’s aims and strategies.

During the pilot data collection, I collected eight patient recordings (six face-to-face and two telephone consultations). Whilst obtaining the data from this practice, I gained useful knowledge for the best approaches of obtaining the study’s data, including patient consent (both first and secondary consent), the most efficient approach to setting up the recording equipment within the clinic rooms, how to approach patients who may not have completed the online consent to take part, and how to work with the practice staff to ensure a smooth and undisruptive approach to recordings.

One of the most important findings from the pilot data collection was understanding the process of gaining patient consent, and a need to ensure the process was as straightforward and clear as possible for patients. Initially the study was approved by ethics and governance with a two-step consent process; firstly to ask patients to consent for their asthma reviews to be
recorded, then after recordings had taken place, a second consent was sent to the patients via email to consent for their reviews to be viewed and analysed. This two-step consent process was initially proposed to allow patients time to consider whether they were still happy for their reviews to be viewed post-review. However, after completing the pilot data collection, only 25% of patients completed the second consent process (eight patients consented to asthma reviews being recorded, however, only two of the eight patients consented again for the reviews to then be viewed and analysed for data analysis to take place). This could be due to a number of reasons, for example, as the second consents were sent via email, patients may have been less motivated to complete them. Therefore, to ensure I was able to use all collected data for subsequent analysis, I amended my ethics and governance applications to include a single-step patient consent process. This information sheet and consent form allowed patients to agree for their asthma reviews to be recorded and to be viewed and analysed after recordings had taken place.

The photograph below in Figure 18 was taken during the pilot data collection. It displays how the video camera was set up in the consultation room of the practice. Although the layout of each practice was different, the video camera was usually positioned in the corner of the room to be less obtrusive.
5.3.6 Data Management

After collecting the pilot data collection, I practiced uploading the recordings and using the software, analysis and scoring tools. Collected video and audio recordings were collected on an encrypted recorder, stored on an encrypted laptop then immediately transferred onto my individual encrypted University of Edinburgh Data Store server. I was the only person able to access the Data Store server, which is a controlled and secured service environment for undertaking research using sensitive data (personal, sensitive-personal, or confidential, and including NHS sensitive data). Data was transferred from the
camera using the University of Edinburgh’s secure data sync service. All files were encrypted using ‘VeraCrypt container encryption’ service which is password protected. Only myself and my supervisory team were aware of this password. All data storage systems used within the research had available back-up solutions and were supported by the University of Edinburgh’s data information services and support team.

5.3.7 Statistical Analysis

Specific analysis approaches for each objective are outlined below in Table 11.

Table 11: Statistical Plan for quantitative analysis

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Analysis plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) To observe how supported self-management strategies are embedded into routine asthma reviews and what proportion of time within a consultation is spent on self-management related tasks.</td>
<td>Collected video data were coded using the ALFA framework to code amount of time (% of the whole review) spent on supported self-management related tasks.</td>
</tr>
<tr>
<td>2) To observe how patient-centred methods and behaviour change counselling discussions are used within asthma consultations.</td>
<td>Collected video data was coded using the PCOF and BECCI form to measure delivery of patient-centred care elements and behaviour change counselling discussions.</td>
</tr>
<tr>
<td>3) To explore differences in delivery of supported self-management and consultation styles related to allocation in the IMP²ART trial (implementation or control); mode of delivery (remote telephone/video-consultations or face-to-face); and duration of the review.</td>
<td>Shapiro-Wilk tests for the ALFA, PCOF, and BECCI, were performed in SPSS (Version 25) to present levels of distribution data. For smaller sample size, Shapiro–Wilk tests should be used as it has more power to detect the nonnormality. Differences between ALFA, BECCI &amp; PCOF scores were calculated for differences between IMP²ART implementation and control groups and differences between face-to-face and remote groups using independent sample t-tests or non-parametric tests (Mann-Whitney tests) depending on levels of distribution.</td>
</tr>
</tbody>
</table>
5.3.7.1 Analysis Approach Objective 1: Assessing the Proportion of Time Within an Asthma Review Spent on Supported Self-Management Related Tasks

Each recorded asthma review was imported into NVivo, a computer software package used to facilitate data analysis (Version 12: QSR International Pty Ltd.; NVivo, 2020). As discussed above in section 5.2.1, objective one was addressed using a framework adapted from the ALFA toolkit (de Lusignan et al., 2008) (Figure 13), to code amount of time spent on supported self-management tasks during routine asthma reviews. All individual recordings were coded by interpreting each interaction as a certain ‘component’ outlined within the ALFA framework. Total supported self-management delivery was then calculated as a percentage for each individual asthma review; e.g., in total, an asthma review may spend around 60% of consultation time on self-management related tasks. These scores were then organised into the relevant grouping of collected video data e.g., an IMP²ART intervention, remote recording etc. All scores were inputted into SPSS for subsequent analysis to address objective 3 of the study (between-group analysis).

5.3.7.2 Rules for Coding Objective 1: The Proportion of Time Within an Asthma Review Spent on Supported Self-Management Related Tasks

The rules of coding for the ALFA framework used for analysis is outlined below in Table 12. The table also includes justification for why particular components have been incorporated into the framework, including existing evidence, literature and IMP²ART related exploratory outcomes. Some original ALFA toolkit items were removed from the coding framework, including non-
supported self-management tasks, as a core element of the work conducted by de Lusignan was to explore the influence and use of the computer on clinical outcomes during consultations (de Lusignan et al., 2009). Although use of the computer was an important aspect in capturing the dynamics of each recorded review, the focus of the current research was to explore supported self-management delivery, and therefore, coding elements were primarily focused on capturing supported self-management only.

To ensure a comprehensive framework of supported self-management tasks were incorporated into the ALFA, the PRISMS taxonomy (Taylor et al., 2014) components were added to the framework to structure the delivery of supported self-management codes. Although some components may have been less relevant for the delivery of asthma care, I included all 14 PRISMS components to ensure all possible supported self-management components were captured. Other self-management components which may not have been incorporated in the PRISMS framework, but were still deemed important to explore (e.g., specific components of the IMP²ART implementation deliverables) were added to the framework (components A15, A16, and A17).

Table 12 below outlines each component of the ALFA framework used for coding the collected data of routine asthma reviews to address research objective one: ‘What proportion of time within an asthma consultation is spent on self-management related tasks?’ The table provides the rules and interpretations of each coding component, highlights the reason for including each element and existing research which has used a similar approach. All coding components were discussed in-depth with my supervisory team.
### Table 12: Rules/Interpretations of coding ALFA framework components

<table>
<thead>
<tr>
<th>Coding component of ALFA framework</th>
<th>Rules/Interpretation of coding</th>
<th>Supporting Literature/Evidence for inclusion in framework</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRISMS: A1:</strong> Time spent discussing individual asthma condition and/or its management</td>
<td>Time spent reviewing asthma (e.g., medications/current management). General aspects and principles of managing their asthma.</td>
<td>Supported self-management tasks based on the 14 PRISMS (Taylor et al., 2014) components of supported self-management delivery by a healthcare professional during a long term condition review.</td>
</tr>
<tr>
<td><strong>PRISMS: A2:</strong> Time spent referring to other available asthma resources and services (improving access to services)</td>
<td>Time spent referring to resources and services (e.g., Asthma and Lung UK website/groups or services which would help asthma management).</td>
<td></td>
</tr>
<tr>
<td><strong>PRISMS: A3:</strong> Time spent collaboratively reviewing and completing personalised asthma action plan</td>
<td>Time spent collaboratively working on asthma action plan, time spent discussing what should be included in asthma action plan or how to use it.</td>
<td></td>
</tr>
<tr>
<td><strong>PRISMS A4:</strong> Time spent discussing attendance to regular reviews</td>
<td>Time spent making another review appointment, or advising to attend yearly asthma reviews.</td>
<td></td>
</tr>
<tr>
<td><strong>PRISMS A5:</strong> Time spent providing feedback on individual monitored asthma data</td>
<td>Time spent providing feedback on asthma data: e.g., new/previous peak flow score.</td>
<td></td>
</tr>
<tr>
<td><strong>PRISMS A6:</strong> Time spent discussing asthma control and possible triggers, practical support with adherence (medication or behavioural)</td>
<td>Time spent discussing triggers and how to control these (e.g., hay fever, dust, pets, weather etc.). Practical advice and support with triggers.</td>
<td></td>
</tr>
<tr>
<td><strong>PRISMS A7:</strong> Time spent providing equipment/discussion of new equipment</td>
<td>Time spent prescribing new equipment (e.g., new inhalers, peak flow meters, spacers).</td>
<td></td>
</tr>
<tr>
<td>Coding component of ALFA framework</td>
<td>Rules/Interpretation of coding</td>
<td>Supporting Literature/Evidence for inclusion in framework</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
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<td>-----------------------------------------------</td>
</tr>
<tr>
<td>PRISMS A8: Time spent discussing how to access advice or support when needed</td>
<td>Time spent informing the patient how to access asthma support (e.g., phoning the practice/emergency care).</td>
<td></td>
</tr>
<tr>
<td>PRISMS A9: Time spent training/rehearsal to communicate with healthcare professionals</td>
<td>Time spent discussing with the patient how to communicate with healthcare professionals (e.g., what to discuss at next review, what to discuss with healthcare professionals in the event of an exacerbation/emergency).</td>
<td></td>
</tr>
<tr>
<td>PRISMS A10: Time spent on training/rehearsal for everyday activities</td>
<td>Time spent discussing everyday activities which enable self-management (e.g., how to wash peak flow meter).</td>
<td></td>
</tr>
<tr>
<td>PRISMS A11: Time spent training/rehearsal for practical self-management activities (e.g., inhaler technique)</td>
<td>Time spent discussing/practicing inhaler technique or other practical self-management strategies.</td>
<td></td>
</tr>
<tr>
<td>PRISMS A12: Time discussing psychological strategies (problem solving, goal setting, action planning, relaxation techniques etc.)</td>
<td>Time spent discussing using psychological strategies to help manage condition (e.g., relaxation strategies (yoga), goal setting, action planning etc.).</td>
<td></td>
</tr>
<tr>
<td>PRISMS A13: Time discussing individual Social Support</td>
<td>Time spent discussing what social support a person has or advice of peer support, group socialising etc.</td>
<td></td>
</tr>
<tr>
<td>PRISMS A14: Time spent discussing lifestyle factors e.g., smoking, diet, exercise.</td>
<td>Time spent discussing health and lifestyle, practical advice and support (e.g., diet, physical exercise, smoking).</td>
<td></td>
</tr>
<tr>
<td>Coding component of ALFA framework</td>
<td>Rules/Interpretation of coding</td>
<td>Supporting Literature/Evidence for inclusion in framework</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td><strong>(A15) Self-Management</strong> – Other: Time spent on screen sharing</td>
<td>Time spent collaboratively screen sharing and discussing an aspect of patient’s asthma or asthma management.</td>
<td>This component was included to explore patient involvement in their asthma management plans which may be shown on the healthcare professional’s computer screen.</td>
</tr>
<tr>
<td>on screen sharing (discussing something on screen with the patient)</td>
<td>(element of patient-centred care)</td>
<td></td>
</tr>
<tr>
<td><strong>(A16) Self-Management</strong> – Other: time spent setting the patient</td>
<td>Time spent (usually at the beginning of a review) setting the agenda for the session (discussing what they will talk through during the session).</td>
<td>Included in the IMP²ART implementation training, this component was included to note any differences between control group and intervention group agenda setting priorities during routine reviews.</td>
</tr>
<tr>
<td>setting the patient agenda for the consultation</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(A17) Self-Management</strong> – Other: Time spent talking about other</td>
<td>Time spent discussing other long term condition (LTC) management (e.g., does the patient also have COPD/heart conditions etc – any other multimorbidity’s).</td>
<td>This component was included to explore how often healthcare professionals discuss other possible co-morbidities which may affect their asthma control and management.</td>
</tr>
<tr>
<td>conditions or multimorbidity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PRISMS = Practical Reviews in Self-Management Support (Taylor et al., 2014)**
5.3.7.3 Analysis Approach Objective 2: Delivery of Patient-Centred Care and Behaviour Change Counselling During Routine Asthma Reviews

As discussed in section 5.2.2, using the recorded data of routine asthma reviews, I used two analytical tools to explore healthcare professional delivery of patient-centred care and behaviour change counselling:

- PCOF (Patient-Centred Observation Form) (Makoul, 2001) (Figure 14)
- BECCI (Behavior Change Counselling Index) (Lane, 2002) (Figure 15)

Analysis for both tools were conducted by viewing the recorded data, and scoring the healthcare professional on their relevant behaviours and communication during the asthma review.

PCOF scores were calculated by observing the data and scoring the PCOF to indicate whether the healthcare professional had completed the stated task as a checklist ‘yes/no’ categorisation. Scores were calculated out of a maximum total of 53. Examples of PCOF components include statements such as:

- ‘listens well using continuer phrases’,
- ‘confirms what is most important to the patient’ (Figure 14).

PCOF scores were then analysed to explore average delivery of individual components within PCOF ‘groupings’; e.g. ‘Establishes Rapport’ and ‘Maintaining Relationship Through the Interaction’. The higher mean PCOF score, indicated that healthcare professionals had delivered a more patient-centred review with a biopsychosocial focus. Lower average PCOF grouping scores indicated a more biomedical focus of delivery of care. An additional
important aspect of the PCOF form was the grouping; ‘Self-management support: goal setting and action plan development’, which was particularly relevant to explore the delivery of supported self-management strategies. Full coding interpretations of the PCOF can be found below in Table 13.

BECCI scores were calculated by viewing the collected video data of recorded asthma reviews and scoring the practitioner on each BECCI item. Each BECCI item’s score used a Likert scale for scoring, which indicated whether the item was carried out between: ‘0 = not at all, 1 = minimally, 2 = to some extent, 3 = a good deal, and 4 = a great extent’. Examples BECCI items include;

- ‘practitioner invites the patient to talk about behaviour change’
- ‘practitioner uses empathic listening statements when the patient talks about the topic’ (Figure 15).

The 11 BECCI items were summed and divided by 11 to get an overall mean BECCI score ranging from 0 to 4; higher scores reflected greater provider use of behaviour change counselling skills. Each BECCI item was then analysed individually to explore any items which may have scored well, compared to others which presented evidence for areas of improvement.

5.3.7.4 Rules for Coding Objective 2: Delivery of Patient-Centred Care and Behaviour Change Counselling During Routine Asthma Reviews

I created rules/interpretations of coding to ensure consistency throughout the data analysis process. Rules for coding framework for the PCOF and BECCI are provided in Table 13 and Table 14, and provide further clarification for how recorded data were coded.
Table 13: Rules/Interpretations of coding PCOF (Patient-Centred Observational Form) framework components. Full framework can be found in Figure 14.

<table>
<thead>
<tr>
<th>PCOF Grouping</th>
<th>PCOF Element</th>
<th>Rules/Interpretation of coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishes Rapport</td>
<td>Introduces self (before gazing at computer)</td>
<td>Healthcare professional greets patient and introduces themselves.</td>
</tr>
<tr>
<td></td>
<td>Warm Greeting (before gazing at computer)</td>
<td>Warm/kind greeting.</td>
</tr>
<tr>
<td></td>
<td>Acknowledges all in the room by name</td>
<td>Acknowledges all (may just be healthcare professional and patient) but is there anyone else in the room?</td>
</tr>
<tr>
<td></td>
<td>Uses eye contact</td>
<td>Uses eye contact throughout the consultation (<em>this criterion was not considered for telephone consultations</em>).</td>
</tr>
<tr>
<td></td>
<td>Humour or non-medical interaction</td>
<td>Some non-medical interaction or humour e.g., social chit-chat</td>
</tr>
<tr>
<td>Maintaining Relationship</td>
<td>Uses verbal or non-verbal empathy</td>
<td>Shows empathy (understanding what the person is saying and what they are going through) (e.g., recognising a person’s emotions)</td>
</tr>
<tr>
<td>Through the Interaction</td>
<td>Listens well using continuer phrases (‘um hum’)</td>
<td>Listens well and continuer phrases to allow patient to provide more information without seeming rushed.</td>
</tr>
<tr>
<td></td>
<td>Paraphrases important verbal content</td>
<td>Repeats/paraphrases what patient says to confirm what they are saying.</td>
</tr>
<tr>
<td></td>
<td>Demonstrates presence, curiosity, intent focus, not seeming rushed or by acknowledging distractions</td>
<td>Focuses on patient’s speech without seeming rushed, and listens to patient well.</td>
</tr>
<tr>
<td>PCOF Grouping</td>
<td>PCOF Element</td>
<td>Rules/Interpretation of coding</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Collaborative Upfront Agenda Setting</strong></td>
<td>Acknowledges agenda items from form or electronic medical record</td>
<td>Acknowledges that they will be working through questions on the computer provided by the electronic health record or forms to fill in.</td>
</tr>
<tr>
<td></td>
<td>Additional elicitation – ‘something else’</td>
<td>Asking the patient to add more to the discussion e.g., ‘is there anything else?’</td>
</tr>
<tr>
<td></td>
<td>Confirms what is important to the patient</td>
<td>Asks what is important to the patient (can ask at any moment throughout the consultation)</td>
</tr>
<tr>
<td><strong>Maintains Efficient through transparent (Out Loud) Thinking</strong></td>
<td>About healthcare professional/nurse time use</td>
<td>Does the healthcare professional tell the patient the timing of different tasks and how long different aspects of the consultation may take?</td>
</tr>
<tr>
<td></td>
<td>Entire visit organisation</td>
<td>Does the healthcare professional give an overview to the patient of what they will be doing within the review? Does the professional outline the timing of the whole session? How long will they be there for today?</td>
</tr>
<tr>
<td></td>
<td>Problem solving strategies</td>
<td>Does the healthcare professional discuss problem solving strategies out loud with the patient?</td>
</tr>
<tr>
<td></td>
<td>Respectful interruption/redirection using ‘EEE’: Excuse yourself, Empathise/validate issue for being interrupted, Explain the reason for interruption</td>
<td>If the healthcare professional interrupts the patient, is it for a validated reason? If so, do they use the three EEE’s (Excuse yourself, Empathise/validate issue for being interrupted, Explain the reason for interruption)?</td>
</tr>
<tr>
<td>POCF Grouping</td>
<td>POCF Element</td>
<td>Rules/Interpretation of coding</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Basics: Vitals, Check Meds and Paperwork</td>
<td>Prepares patient shares vital findings &gt; 2 times</td>
<td>Provides feedback data or findings about the patient’s asthma.</td>
</tr>
<tr>
<td></td>
<td>Asks about paperwork</td>
<td>Asks about asthma action plan.</td>
</tr>
<tr>
<td></td>
<td>Asks about refills</td>
<td>Asks about inhaler refills.</td>
</tr>
<tr>
<td></td>
<td>Medication reconciliation</td>
<td>Does the healthcare professional list what medication the patient is currently using/should be using for their asthma?</td>
</tr>
<tr>
<td>Patient Activation and Engagement</td>
<td>Explores patient verbal cue about psychosocial or physical concern</td>
<td>Picks up on patients verbal discussions about a concern they may have.</td>
</tr>
<tr>
<td></td>
<td>Explores patient non-verbal cue about underlying concern</td>
<td>Picks up on patients body language or other non-verbal cues which may indicate patient concern.</td>
</tr>
<tr>
<td></td>
<td>Asks if patient has questions</td>
<td>Ask if patients has questions – can be at any moment throughout the consultation.</td>
</tr>
<tr>
<td></td>
<td>Encourages patient to address concerns with provider</td>
<td>Provides opportunities for patient to discuss any concerns they may have.</td>
</tr>
<tr>
<td></td>
<td>Explores contextual influence: family, cultural and spiritual.</td>
<td>Asks questions about a person’s family, culture etc.</td>
</tr>
<tr>
<td>Electronic Medical Record Use</td>
<td>By 10 seconds, describes reason for each screen gaze</td>
<td>Explains why they are looking at the computer to the patient.</td>
</tr>
<tr>
<td></td>
<td>Shares/points at screen during at least 2 phases</td>
<td>Moves the computer screen towards the patient.</td>
</tr>
<tr>
<td></td>
<td>Maintains eye contact and/or shares screen at least 2/3rds of the visit</td>
<td>Maintains eye contact or has the screen visible for patient to see what is being entered for at least 2/3rd of the visit (this criterion was not considered for telephone consultations).</td>
</tr>
<tr>
<td>POCF Grouping</td>
<td>POCF Element</td>
<td>Rules/Interpretation of coding</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>---------------------------------------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Gathering Information</td>
<td>Asks patient to confirm or contribute to documentation</td>
<td>Asks patient to confirm or contribute to asthma action plan.</td>
</tr>
<tr>
<td></td>
<td>Collects focused history per problem</td>
<td>Gathers information about history of asthma.</td>
</tr>
<tr>
<td></td>
<td>Uses reflecting statement</td>
<td>Uses statements that reflect what the patient has said e.g., 'it sounds like you…’ ‘so you feel like…’</td>
</tr>
<tr>
<td></td>
<td>Uses summary/clarifying statements</td>
<td>Uses statements which summarise what the patient has said to confirm.</td>
</tr>
<tr>
<td>Self-management Support: Goal Setting and Action Planning Development</td>
<td>Asks if patient wants to create a health goal</td>
<td>Does the healthcare professional ask the patient to think of a health behaviour/goal they would like to improve? E.g., stop smoking/increasing exercise.</td>
</tr>
<tr>
<td></td>
<td>Asks patient to brainstorm activities to reach goal</td>
<td>Patient and healthcare professional thinks of activities the person could do to reach their goal.</td>
</tr>
<tr>
<td></td>
<td>Asks patient to choose one activity</td>
<td>Patient and healthcare professional think of one activity related to health goal.</td>
</tr>
<tr>
<td></td>
<td>Asks patient to name activity frequency</td>
<td>Patient and healthcare professional think about when and how often the activity could take place.</td>
</tr>
<tr>
<td></td>
<td>Asks patient to identify when to do activity</td>
<td>Patient and healthcare professional think about the most appropriate time to undertake the activity.</td>
</tr>
<tr>
<td></td>
<td>Assesses patient confidence</td>
<td>Does the healthcare professional ask how confident the patient feels? Do they discuss patient confidence for the activity/health goal?</td>
</tr>
<tr>
<td>POCF Grouping</td>
<td>POCF Element</td>
<td>Rules/Interpretation of coding</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Assesses patient barriers</td>
<td>Does the healthcare professional ask the patient if they anticipate any barriers to completing the behaviour goal?</td>
<td></td>
</tr>
<tr>
<td>Adjusts plan to address barriers</td>
<td>Does the healthcare professional revise their health behaviour activities to ensure they don’t come up against the barriers they have discussed?</td>
<td></td>
</tr>
<tr>
<td>Uses action plan worksheet</td>
<td>Does the healthcare professional use an asthma action plan worksheet to note down the health goals/activities they have discussed?</td>
<td></td>
</tr>
<tr>
<td>Affirms prior/current behaviour change effort</td>
<td>Acknowledges prior or current behaviour goal (maybe even congratulate or feedback on goals).</td>
<td></td>
</tr>
<tr>
<td><strong>Self-management Follow Up:</strong> Checking on Progress, revision</td>
<td>Assess progress on prior goals</td>
<td>Does the healthcare professional acknowledge prior patient goals?</td>
</tr>
<tr>
<td></td>
<td>Problem solves with patient to revise action plan</td>
<td>Are there any changes to the patient’s management of their asthma? Is this updated in their asthma action plan?</td>
</tr>
<tr>
<td></td>
<td>Celebrates patient successes</td>
<td>Does the healthcare professional congratulate or celebrate patient’s management of their asthma?</td>
</tr>
<tr>
<td></td>
<td>‘Normalises’ struggles with self-management</td>
<td>Healthcare professional acknowledges that self-management of asthma can be challenging.</td>
</tr>
<tr>
<td></td>
<td>Ask about including action plan in today’s agenda</td>
<td>Is an asthma action plan used within the consultation?</td>
</tr>
<tr>
<td>PCOF Grouping</td>
<td>PCOF Element</td>
<td>Rules/Interpretation of coding</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Closure and System Navigation</td>
<td>Asks for questions about today’s topics</td>
<td>Healthcare professional asks patients if they have any questions about what they have discussed during the consultation.</td>
</tr>
<tr>
<td></td>
<td>Assess patient comfort with system navigation</td>
<td>Asks if patient understands use of asthma action plan etc.</td>
</tr>
<tr>
<td></td>
<td>Provides system navigation aid</td>
<td>Helps patient to understand asthma action plan.</td>
</tr>
<tr>
<td></td>
<td>Uses Teach back – Asking the patient to explain his/her understanding of the asthma action plan</td>
<td>Does the healthcare professional ask the patient to explain their understanding of the asthma action plan?</td>
</tr>
<tr>
<td></td>
<td>Prints after visit summary</td>
<td>Print emails texts asthma action plan to patient after consultation.</td>
</tr>
<tr>
<td></td>
<td>Combines teach back and AVS creation while sharing the screen</td>
<td>Combining teach back and screen sharing whilst completing asthma action plan.</td>
</tr>
</tbody>
</table>
Table 14: Interpretations of coding BECCI (Behaviour Change Counselling Index) framework components. Full framework can be found in Figure 15.

<table>
<thead>
<tr>
<th>Component of BECCI</th>
<th>Interpretation of coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Practitioner invites the patient to talk about behaviour change</td>
<td>Healthcare professional invites the patient to discuss a change in behaviour to manage/support their asthma.</td>
</tr>
<tr>
<td>2. Practitioner demonstrates sensitivity to talking about other issues</td>
<td>Healthcare professional listens well and is sensitive to other issues which the patients may be dealing with in addition to their asthma.</td>
</tr>
<tr>
<td>3. Practitioner encourages patient to talk about current behaviour or status quo</td>
<td>Healthcare professional encourages patient to talk about their current behaviour for managing their asthma (or other behaviours e.g., exercise/diet/smoking etc.).</td>
</tr>
<tr>
<td>4. Practitioner encourages patient to talk about change</td>
<td>Healthcare professional encourages patient to talk about making positive changes to an aspect of their behaviour.</td>
</tr>
<tr>
<td>5. Practitioner asks questions to elicit how patient thinks and feels about the topic</td>
<td>Healthcare professional asks questions about the patient’s thoughts or feelings (about their asthma or about changing an asthma related behaviour).</td>
</tr>
<tr>
<td>6. Practitioner uses empathic listening statements when the patient talks about the topic</td>
<td>Healthcare professional actively listens and is empathetic during conversations about change (not passing judgement and understanding what the patient may be going through). Examples of empathic statements include: *I can see how difficult this has been.‘, <em>I hear what you are saying.</em> etc.</td>
</tr>
<tr>
<td>7. Practitioner uses summaries to bring together what the patient says about the topic</td>
<td>Healthcare professional summarises important verbal content from the discussions about behaviour change to remind the patient what has been discussed.</td>
</tr>
<tr>
<td>Component of BECCI</td>
<td>Interpretation of coding</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>8. Practitioner acknowledges challenges about behaviour change that the patient faces</td>
<td>Healthcare professional talks about challenges the patient my face when changing a behaviour, and understands the difficulties associated with changing behaviour.</td>
</tr>
<tr>
<td>9. When practitioner provides information it is sensitive to patient concerns and understanding</td>
<td>Information relayed to patient is at a level which the patient can understand.</td>
</tr>
<tr>
<td>10. Practitioner actively conveys respect for patient choice about behaviour change</td>
<td>Healthcare professional ensures patient has choice about engaging in the behaviour change.</td>
</tr>
<tr>
<td>11. Practitioner and patient exchange ideas about how the patient could change current behaviour</td>
<td>Discussions between the healthcare professional and patient about how the patient could change behaviour.</td>
</tr>
</tbody>
</table>
5.3.7.5 Analysis Approach Objective 3: Sub-Group Analysis:

**Differences Between Groups**

Analytical approaches were discussed with a Senior Lecturer in Medical Statistics at the University of Edinburgh, and with a statistician from AUKCAR, who confirmed the proposed analysis were appropriate to draw significant conclusions and address the research objectives. The three quantitative aspects of the study; 1) coding amount of time spent on self-management tasks (ALFA), 2) delivery of patient-centred care (PCOF), and 3) behaviour change counselling (BECCI), were initially analysed separately for each individual asthma review recording, before between-group analysis of scores were calculated. Data were analysed using IBM SPSS version 26. I was aware of the need not to over-interpret the data from this small sample size of collected routine asthma reviews, as a much larger sample size would have been needed to ensure the results were not created by chance.

Based on the assessment of normality (to see if the data was normally distributed or not), I used independent sample t-tests or non-parametric tests (Mann-Whitney tests) to compare differences of scores between groups (IMP²ART intervention vs IMP²ART control group scores, and differences between face-to-face and remote delivery scores). In accordance with the conventional acceptance of statistical significance at a P-value of 0.05 or 5%, CI are frequently calculated at a confidence level of 95%. In general, if an observed result is statistically significant at a P-value of 0.05, then the null hypothesis should not fall within the 95% CI.
5.4 Results

5.4.1 Descriptive Statistics

During November 2021 to July 2022, observational video recordings of routine asthma reviews were collected from 10 (n=6 control; n=4 implementation) IMP²ART general practices from across the UK. Please see Figure 19 below which includes the locations of recruited practices.

12 healthcare professionals (from the 10 general practices) took part in the study, and in total, 64 (n=37 control, n=27 implementation) individual patient asthma reviews were recorded (both face-to-face, n=49, and remote telephone reviews, n=15).

An overview of the collected data characteristics can be found in Table 15.

Table 15: Overview of collected observational, video recorded data

<table>
<thead>
<tr>
<th>Data characteristics</th>
<th>Overview of collected data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of recruited general practices</td>
<td>10 general practices:</td>
</tr>
<tr>
<td></td>
<td>• 4 IMP²ART implementation and 6 IMP²ART control practices</td>
</tr>
<tr>
<td>Total number of asthma reviews recorded</td>
<td>64 routine primary care asthma reviews:</td>
</tr>
<tr>
<td></td>
<td>• 49 face-to-face &amp; 15 remote telephone consultations</td>
</tr>
<tr>
<td></td>
<td>• 27 from the IMP²ART implementation group and 37 from IMP²ART control group.</td>
</tr>
<tr>
<td>Total number of primary care practitioners</td>
<td>12 healthcare professionals:</td>
</tr>
<tr>
<td></td>
<td>• 11 practice nurses and 1 clinical pharmacist</td>
</tr>
<tr>
<td></td>
<td>• 4 IMP²ART implementation healthcare professionals and 8 IMP²ART control healthcare professionals</td>
</tr>
</tbody>
</table>

All healthcare professionals of the IMP²ART implementation group had completed all implementation strategies of the IMP²ART intervention (including
module one and two of the education modules). Demographic details of each recruited practice, including practice location, asthma patient list size, practice deprivation score, dates of randomisation to IMP²ART programme, date of data collection and amount of time implementation strategy had been embedded into routine care (for implementation practices only), are detailed below in Table 16.

Table 17 outlines the demographic detail differences between groups (IMP²ART implementation vs. control groups) for general practice asthma list size, deprivation scores and time allocated to asthma reviews.
<table>
<thead>
<tr>
<th>Practice No.</th>
<th>IMP²ART implementation/control group</th>
<th>No. of recruited HCPs</th>
<th>Practice clinical research network location</th>
<th>Practice list size (grouped)</th>
<th>Asthma list size</th>
<th>Deprivation score*</th>
<th>Asthma review time allocated</th>
<th>IMP²ART workshop date</th>
<th>Amount of time implementation strategy embedded</th>
<th>Date(s) of data collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control</td>
<td>2 (practice nurses)</td>
<td>Kent, Surrey and Sussex</td>
<td>&gt;20,000</td>
<td>2919</td>
<td>14.5</td>
<td>20 minutes</td>
<td>-</td>
<td>-</td>
<td>08/11/2021 – 12/11/2021</td>
</tr>
<tr>
<td>2</td>
<td>Implementation</td>
<td>1 (practice nurse)</td>
<td>Yorkshire and Humber</td>
<td>10,000 - 20,000</td>
<td>855</td>
<td>31.2</td>
<td>30 minutes</td>
<td>16/06/2021</td>
<td>6 months</td>
<td>10/01/2022 – 12/01/2022</td>
</tr>
<tr>
<td>3</td>
<td>Implementation</td>
<td>1 (practice nurse)</td>
<td>Northwest Coast</td>
<td>10,000 - 20,000</td>
<td>600</td>
<td>32.4</td>
<td>20 minutes</td>
<td>26/05/2021</td>
<td>9 months</td>
<td>07/02/2022</td>
</tr>
<tr>
<td>4</td>
<td>Control</td>
<td>1 (clinical pharmacist)</td>
<td>Wessex</td>
<td>&lt;10,000</td>
<td>492</td>
<td>16.3</td>
<td>20 minutes</td>
<td>-</td>
<td>-</td>
<td>12/02/2022 – 15/02/2022</td>
</tr>
<tr>
<td>5</td>
<td>Control</td>
<td>1 (practice nurse)</td>
<td>Yorkshire and Humber</td>
<td>10,000 - 20,000</td>
<td>1206</td>
<td>31.3</td>
<td>20 minutes</td>
<td>-</td>
<td>-</td>
<td>09/03/2022 – 10/03/2022</td>
</tr>
<tr>
<td>6</td>
<td>Control</td>
<td>1 (practice nurse)</td>
<td>West of England</td>
<td>&lt;10,000</td>
<td>570</td>
<td>27.2</td>
<td>20 minutes</td>
<td>-</td>
<td>-</td>
<td>22/03/2022 – 24/03/2022</td>
</tr>
<tr>
<td>7</td>
<td>Implementation</td>
<td>1 (practice nurse)</td>
<td>Kent, Surrey and Sussex</td>
<td>&lt;10,000</td>
<td>448</td>
<td>11.5</td>
<td>15-20 minutes</td>
<td>11/01/2022</td>
<td>3 months</td>
<td>03/04/2022 – 05/04/2022</td>
</tr>
<tr>
<td>Practice No.</td>
<td>IMP²ART implementation/control group</td>
<td>No. of recruited HCPs</td>
<td>Practice clinical research network location</td>
<td>Practice list size (grouped)</td>
<td>Asthma list size</td>
<td>Deprivation score*</td>
<td>Asthma review time allocated</td>
<td>IMP²ART workshop date</td>
<td>Amount of time implementation strategy embedded</td>
<td>Date(s) of data collection</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------</td>
<td>-----------------------</td>
<td>--------------------------------------------</td>
<td>-----------------------------</td>
<td>-----------------</td>
<td>-------------------</td>
<td>------------------------</td>
<td>------------------------</td>
<td>--------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>8</td>
<td>Control</td>
<td>2 (practice nurses)</td>
<td>East of England</td>
<td>&lt;10,000</td>
<td>657</td>
<td>27.2</td>
<td>20 minutes</td>
<td>-</td>
<td>-</td>
<td>24/04/2022 – 26/04/2022</td>
</tr>
<tr>
<td>9</td>
<td>Control</td>
<td>1 (practice nurse)</td>
<td>NHS Research Scotland South</td>
<td>&lt;10,000</td>
<td>679</td>
<td>2.1 (°Scottish deprivation score, not comparable to English practices)</td>
<td>30 minutes</td>
<td>-</td>
<td>-</td>
<td>01/06/2022</td>
</tr>
<tr>
<td>10</td>
<td>Implementation</td>
<td>1 (practice nurse)</td>
<td>North Thames</td>
<td>&lt;10,000</td>
<td>439</td>
<td>19.3</td>
<td>20 minutes</td>
<td>23/02/2022</td>
<td>5 months</td>
<td>27/07/2022 – 29/07/2022</td>
</tr>
</tbody>
</table>

*Deprivation status of practice: (England median = 21.4 [≤21.4 is less deprived; >21.4 is more deprived]) (Scotland median = 3.1 [≤3.1 is less deprived; >3.1 is more deprived).
Table 17: Demographic detail differences between general practice groups (IMP²ART implementation vs. control groups)

<table>
<thead>
<tr>
<th>Demographic Detail</th>
<th>Mean (SD) and range of IMP²ART Implementation Group Practices</th>
<th>Mean (SD) and range of IMP²ART Control Group Practices</th>
<th>Difference between IMP²ART implementation and control group practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma List Size</td>
<td>585.50 (SD=194.26) (439 – 855)</td>
<td>1087.17 (SD=931.99) (492 – 21919)</td>
<td>No statistical significance between groups on asthma list size, t(8) = -1.041, p=0.328.</td>
</tr>
<tr>
<td>(number of active asthma patients per practice)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deprivation Score*</td>
<td>23.30 (SD=7.43) (14.50 – 31.30)</td>
<td>23.60 (SD=10.00) (11.50 – 32.40)</td>
<td>No statistical significance between groups on deprivation score, t(7) = 0.52, p=0.96.</td>
</tr>
<tr>
<td>Time Allocated to Asthma Reviews (in minutes)</td>
<td>22.50 (SD=5) (15 - 30)</td>
<td>21.67 (SD=4.08) (20 - 30)</td>
<td>No statistical significance between groups on time allocated for asthma reviews, t(8) = 0.29, p=0.779.</td>
</tr>
</tbody>
</table>

* Deprivation scores only calculated for English practices. Scottish deprivation score (one General Practice) was not comparable to English practices.
Figure 19: UK map of recruited practices to observational, quantitative study (n=10 practices, plus 1 pilot study general practice = 11 general practices in total).
5.4.2 Statistical Analysis

To report the results of the study, I will state the observational, quantitative objectives and provide the descriptive and statistical analysis to address each objective.

5.4.2.1 Objective 1: To observe how self-management strategies are embedded into routine reviews and what proportion of time within a consultation is spent on self-management related tasks.

On average, of the 64 video recorded asthma reviews, healthcare professionals spent 34 minutes 34 seconds delivering a routine asthma review. Differences between group scores for duration of review are outlined during objective 3 (section 5.4.2.3).

ALFA score (%) was coded as the proportion of time spent on supported self-management during the recorded asthma review. From the 64 video recorded asthma reviews, on average, healthcare professionals spent 53.13% (ranging from 35.65% - 69.56%) of review time on supported self-management tasks. The supported self-management task which healthcare professionals spent the most time delivering was ‘A1: Time spent discussing individual asthma condition and/or its management’ with an average percentage of time of 27.8%. Table 18 below shows each ALFA supported self-management component and the average amount of time spent on each component during the recorded asthma reviews.

The total average percentage of time spent on ALFA supported self-management tasks per practice is shown below in Figure 20.
Table 18: Average percentage of time spent on ALFA supported self-management components in recorded asthma reviews

<table>
<thead>
<tr>
<th>ALFA supported self-management component</th>
<th>Mean % (SD) of time spent on component during total recorded asthma reviews</th>
<th>Range of % of time spent on component during recorded asthma reviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time spent discussing individual asthma condition and/or its management (A1)</td>
<td>27.8% (7.74)</td>
<td>13.8% - 43.9%</td>
</tr>
<tr>
<td>Time spent referring to other available asthma resources and services (improving access to services) (A2)</td>
<td>2.7% (2.14)</td>
<td>0.2% - 7.4%</td>
</tr>
<tr>
<td>Time spent collaboratively reviewing and completing personalised asthma action plan (A3)</td>
<td>6.3% (5.82)</td>
<td>0.7% - 19.8%</td>
</tr>
<tr>
<td>Time spent discussing attendance to regular reviews (A4)</td>
<td>1.1% (0.56)</td>
<td>0.5% - 2.3%</td>
</tr>
<tr>
<td>Time spent providing feedback on individual monitored asthma data (A5)</td>
<td>5.8% (4.87)</td>
<td>0.7% - 18.2%</td>
</tr>
<tr>
<td>Time spent discussing asthma control and possible triggers, practical support with adherence (medication or behavioural) (A6)</td>
<td>3.6% (2.77)</td>
<td>0.4% - 14.6%</td>
</tr>
<tr>
<td>Time spent providing equipment/discussion of new equipment (A7)</td>
<td>3.4% (3.92)</td>
<td>0.6% - 18.1%</td>
</tr>
<tr>
<td>Time spent discussing how to access advice or support when needed (A8)</td>
<td>1.4% (0.81)</td>
<td>0.4% - 3.1%</td>
</tr>
<tr>
<td>Time spent training/rehearsal to communicate with health care professionals (A9)</td>
<td>1.4% (0.28)</td>
<td>1.4% - 1.4%</td>
</tr>
<tr>
<td>Time spent on training/rehearsal for everyday activities (A10)</td>
<td>2.3% (1.77)</td>
<td>0.3% - 6.8%</td>
</tr>
<tr>
<td>Time spent training/rehearsal for practical self-management activities (e.g., inhaler technique) (A11)</td>
<td>5.4% (3.76)</td>
<td>0.5% - 15.6%</td>
</tr>
<tr>
<td>ALFA supported self-management component</td>
<td>Mean % (SD) of time spent on component during total recorded asthma reviews</td>
<td>Range of % of time spent on component during recorded asthma reviews</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Time discussing psychological strategies (problem solving, goal setting, action planning, relaxation techniques etc). (A12)</td>
<td>4% (3.62)</td>
<td>1% - 11.5%</td>
</tr>
<tr>
<td>Time discussing individual Social Support (A13)</td>
<td>2.7% (1.22)</td>
<td>1.2% - 3%</td>
</tr>
<tr>
<td>Time spent discussing lifestyle factors e.g., smoking, diet, exercise. (A14)</td>
<td>4.4% (4.02)</td>
<td>0.3% - 15.8%</td>
</tr>
<tr>
<td>Other: Time spent on screen sharing (discussing something on screen with the patient) (A15)</td>
<td>6% (7.47)</td>
<td>0.7% - 11.3%</td>
</tr>
<tr>
<td>Other: time spent setting the patient agenda for the consultation (A16)</td>
<td>1% (0.75)</td>
<td>0.4% - 2.6%</td>
</tr>
<tr>
<td>Other: time spent talking about other multimorbidities (A17)</td>
<td>3.8% (2.36)</td>
<td>0.4% - 8.9%</td>
</tr>
</tbody>
</table>
Figure 20: Average Total Percentage of time spent on ALFA SSM Tasks per practice
5.4.2.2 Objective 2: To observe how patient-centred methods and behaviour change counselling are used within asthma consultations.

Delivery of Patient Centered Care (PCOF):

Delivery of patient-centred care was coded using the PCOF (Patient-Centred Observation Form). Reviews were coded out of 53, 1 for each element which was evident within the recorded asthma review. In total out of 64 video recorded asthma reviews, healthcare professionals scored an average of 26, with scores ranging from 18 to 36.

As discussed in section 5.3.7.3, mean PCOF grouping scores were then calculated. The higher mean PCOF score (closer to the possible maximum score for PCOF grouping) indicated that healthcare professionals had a more patient-centred and biopsychosocial focus during delivery of care within routine asthma reviews. Lower mean PCOF grouping scores indicated lower patient-centred care delivery, and a more biomedical focus.

Mean scores for each PCOF grouping can be seen in Table 19 below.
<table>
<thead>
<tr>
<th>PCOF Grouping</th>
<th>Possible maximum score for grouping</th>
<th>PCOF Score Mean (SD)</th>
<th>Range of PCOF score</th>
<th>Biomedical/ Biopsychosocial focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishes Rapport</td>
<td>5</td>
<td>4.6 (0.71)</td>
<td>2-5</td>
<td>Biopsychosocial</td>
</tr>
<tr>
<td>Maintaining Relationship Through the Interaction</td>
<td>4</td>
<td>3.7 (0.61)</td>
<td>2-4</td>
<td>Biopsychosocial</td>
</tr>
<tr>
<td>Collaborative Upfront Agenda Setting</td>
<td>3</td>
<td>0.6 (0.66)</td>
<td>0-3</td>
<td>Biomedical</td>
</tr>
<tr>
<td>Maintains Efficiency Through Thinking Out Loud</td>
<td>4</td>
<td>1.31 (0.92)</td>
<td>0-4</td>
<td>Midway between biomedical and biopsychosocial</td>
</tr>
<tr>
<td>Basics: Vitals, Checks, Meds and Paperwork</td>
<td>3</td>
<td>2.9 (0.78)</td>
<td>1-4</td>
<td>Biopsychosocial</td>
</tr>
<tr>
<td>Patient Activation and Engagement</td>
<td>5</td>
<td>2.8 (1.32)</td>
<td>0-5</td>
<td>Biopsychosocial</td>
</tr>
<tr>
<td>Electronic Medical Record Use</td>
<td>4</td>
<td>1.8 (1.09)</td>
<td>0-4</td>
<td>Midway between biomedical and biopsychosocial</td>
</tr>
<tr>
<td>Gathering Information</td>
<td>3</td>
<td>2.9 (0.3)</td>
<td>1-3</td>
<td>Biopsychosocial</td>
</tr>
<tr>
<td>Self-Management Support: Goal Setting and action plan development</td>
<td>10</td>
<td>1.6 (1.7)</td>
<td>0-7</td>
<td>Biomedical</td>
</tr>
<tr>
<td>Self-Management Follow-up: Checking on progress, revision</td>
<td>5</td>
<td>2.1 (1.02)</td>
<td>0-4</td>
<td>Midway between biomedical and biopsychosocial</td>
</tr>
<tr>
<td>Closure and System Navigation</td>
<td>6</td>
<td>1.78 (1.06)</td>
<td>0-4</td>
<td>Biomedical</td>
</tr>
</tbody>
</table>
**Delivery of Behaviour Change Discussions (BECCI):**

The delivery of behaviour change counselling was coded using the BECCI (Behaviour Change Counselling Index). Each BECCI item score used a Likert scale for scoring (0 = not at all - 4 = a great extent), which indicated to what extent the item was carried out by the healthcare professional.

In total out of 64 video recorded asthma reviews, healthcare professionals scored an average of 2 out of 4 for BECCI scores, indicating on average, healthcare professionals delivered behaviour change discussions ‘to some extent’. As discussed in section 5.3.7.3, mean BECCI scores for all healthcare professionals were then calculated for each BECCI item.

Average BECCI item scores of recorded asthma reviews are shown in Table 20 below.
Table 20: Average BECCI item scores of recorded asthma reviews

<table>
<thead>
<tr>
<th>BECCI Item</th>
<th>BECCI Score Mean (SD)</th>
<th>Range of BECCI score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Practitioner invites the patient to talk about behaviour change</td>
<td>1.8 (0.85)</td>
<td>0-4</td>
</tr>
<tr>
<td>2. Practitioner demonstrates sensitivity talking about other issues</td>
<td>2.5 (0.8)</td>
<td>1-4</td>
</tr>
<tr>
<td>3. Practitioner encourages patient to talk about current behaviour or status quo</td>
<td>2.2 (0.73)</td>
<td>1-4</td>
</tr>
<tr>
<td>4. Practitioner encourages patient to talk about change</td>
<td>1.7 (0.83)</td>
<td>0-4</td>
</tr>
<tr>
<td>5. Practitioner asks questions to elicit how patient thinks and feels about the topic</td>
<td>1.6 (0.71)</td>
<td>0-3</td>
</tr>
<tr>
<td>6. Practitioner uses empathic listening statements when the patient talks about the topic</td>
<td>2.4 (0.77)</td>
<td>1-4</td>
</tr>
<tr>
<td>7. Practitioner uses summaries to bring together what the patient says about the topic</td>
<td>2.4 (0.5)</td>
<td>2-3</td>
</tr>
<tr>
<td>8. Practitioner acknowledges challenges about behaviour change that the patient faces</td>
<td>1.5 (0.91)</td>
<td>0-4</td>
</tr>
<tr>
<td>9. When practitioner provides information, it is sensitive to patient concerns and understanding</td>
<td>2.6 (0.64)</td>
<td>1-4</td>
</tr>
<tr>
<td>10. Practitioner actively conveys respect for patient choice about behaviour change</td>
<td>2.1 (0.77)</td>
<td>1-4</td>
</tr>
<tr>
<td>11. Practitioner and patient exchange ideas about how the patient could change current behaviour</td>
<td>1.4 (0.99)</td>
<td>0-4</td>
</tr>
</tbody>
</table>
5.4.2.3 Objective 3: To explore differences in delivery of supported self-management and consultation styles related to allocation in the IMP²ART trial (implementation or control); mode of delivery (remote telephone consultations or face-to-face); and duration of the review.

Number of patient asthma reviews collected in each group, total and average length of recorded reviews are outlined below in Table 21 and Table 22.

Table 21: Number of asthma reviews, total and average lengths of recorded reviews (IMP²ART intervention groups)

<table>
<thead>
<tr>
<th>IMP²ART intervention group</th>
<th>IMP²ART implementation</th>
<th>Number of recorded asthma reviews</th>
<th>Average length of asthma review</th>
<th>Range of length of asthma review</th>
<th>Total amount of data collected in time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27 (21 face-to-face and 6 remote)</td>
<td>18 minutes 46 seconds</td>
<td>6 minutes – 47 minutes</td>
<td>8 hours, 27 minutes, 21 seconds</td>
<td></td>
</tr>
<tr>
<td>IMP²ART control</td>
<td>37 (28 face-to-face and 9 remote)</td>
<td>16 minutes 40 seconds</td>
<td>6 minutes – 30 minutes</td>
<td>10 hours, 13 minutes, 58 seconds</td>
<td></td>
</tr>
</tbody>
</table>

Table 22: Number of asthma reviews, total and average lengths of recorded reviews (mode of consultation groups)

<table>
<thead>
<tr>
<th>Mode of consultation</th>
<th>Number of recorded asthma reviews</th>
<th>Average length of asthma review</th>
<th>Range of length of asthma review</th>
<th>Total amount of data collected in time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face-to-face</td>
<td>49</td>
<td>18 minutes 55 seconds</td>
<td>7 minutes – 47 minutes</td>
<td>15 hours, 25 minutes</td>
</tr>
<tr>
<td>Remote (telephone)</td>
<td>15</td>
<td>13 minutes 5 seconds</td>
<td>6 minutes – 20 minutes</td>
<td>3 hours, 16 minutes, 19 seconds</td>
</tr>
</tbody>
</table>

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Duration of recorded asthma reviews: Between group analysis

On average, healthcare professionals spent 34 minutes 34 seconds delivering a routine asthma review. Results from an independent samples t-test showed that there was no statistically significant difference between IMP\textsuperscript{2}ART implementation and IMP\textsuperscript{2}ART control groups for duration of time spent delivering a routine asthma review, $t (62), = -1.01$, $p = 0.691$. However, there was a statistically significant difference between duration of routine asthma review between face-to-face and remote telephone consultations, $t (62), =2.504$, $p = 0.02$. 
**Descriptive ALFA Mean Scores**

*Table 23: Descriptive ALFA scores*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Minimum ALFA Score (%)</th>
<th>Maximum ALFA Score (%)</th>
<th>ALFA Score Mean % (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMP²ART implementation (n= 27)</td>
<td>35.65</td>
<td>69.56</td>
<td>M = 55.31 (7.78)</td>
</tr>
<tr>
<td>Control (n=37)</td>
<td>36.09</td>
<td>68.14</td>
<td>M = 50.94 (8.38)</td>
</tr>
<tr>
<td>Face-to-face review (n=49)</td>
<td>35.65</td>
<td>66.67</td>
<td>M = 52.79 (8.18)</td>
</tr>
<tr>
<td>Remote, telephone review (n=15)</td>
<td>38.88</td>
<td>69.56</td>
<td>M = 52.77 (9.21)</td>
</tr>
</tbody>
</table>

On average, the implementation group had a higher proportion of time spent on supported self-management tasks (ALFA score %, M=55.31, SD=7.78), compared to the control group (ALFA score %, M=50.94, SD=8.38).

**ALFA IMP²ART implementation vs control groups: Distribution of data**

Prior to exploring between-group differences of supported self-management delivery between the IMP²ART implementation and control groups, tests of normality were conducted. Shapiro-Wilk tests for the ALFA, PCOF, and BECCI, were performed in SPSS (Version 25). Although there are various methods for normality testing for small sample size, Shapiro–Wilk test should be used as it has more power to detect the nonnormality and this is the most popular and widely used method (Mishra et al., 2019). For normally distributed data, an independent samples t-test was used to compare differences between groups. If data were not normally distributed, Mann-Whitney U tests were used to compare differences between groups.
**ALFA Scores: IMP²ART implementation vs control group: Distribution of data**

Data were normally distributed at the 95% significance level for the ALFA IMP²ART intervention group (\(W (27) = 0.97, p=0.62\)) and the IMP²ART control group scores (\(W (37) = 0.96, p=0.26\)) (see Figure 21 below).

*Figure 21: Histogram of normal distribution (ALFA scores for differences between IMP²ART implementation and control practices)*
**ALFA Scores: IMP²ART Implementation vs Control Groups**

Results from an independent samples t-test showed that there was a statistically significant difference between IMP²ART implementation and IMP²ART control group practice healthcare professionals on ALFA scores (percentage of time during a routine review spent on supported self-management tasks), \( t(62), =2.122, p =0.038 \). IMP²ART Implementation group healthcare professionals had a higher mean statistic ALFA score of 55.31 (SD=7.78), compared to the mean IMP²ART control practice score of 50.94 (SD=8.38).

![Mean ALFA score by IMP²ART group](image)

*Figure 22: Mean ALFA scores by IMP²ART group*
An extra between group, sub analysis was then performed to see if there were any differences between scores for the ALFA IMP²ART implementation face-to-face versus remote groups, and ALFA control group face-to-face versus remote group scores.

Data were normally distributed at the 95% significance level for the IMP²ART implementation, face-to-face group ($W (21)=0.93, p=0.14$) and the implementation remote group ($W (6)=0.99, p=0.97$) for ALFA scores. Data were normally distributed at the 95% significance level for the control face-to-face group ($W (28)=0.97, p=0.68$) and the control remote group ($W (9)=0.88, p=0.16$) for ALFA scores. Therefore, independent samples t-tests were conducted to explore differences between groups.

There was no statistically significant difference between the IMP²ART implementation group face-to-face ($M=52.54, SD = 9.82$) versus IMP²ART implementation group remote ($M=60.02, SD = 6.37$) ALFA scores; $t (25), = -1.750, p=0.22$. Similarly, there was no statistically significant difference between the IMP²ART control face-to-face group ($M=51.91, SD = 8.52$) versus IMP²ART control remote group ($M=47.93, SD = 7.59$) ALFA scores; $t(35), =1.246, p=0.22$.

This extra subgroup analysis highlights that the significant differences for ALFA scores in IMP²ART implementation versus control groups are not due to the type of consultation within groups.
**ALFA Scores: Face-to-face vs Remote Consultations: Distribution of data**

Data were normally distributed at the 95% significance level for the ALFA face-to-face ($W(49)=0.98, p=0.62$) and ALFA remote consultations group scores ($W(15)=0.95, p=0.47$) scores.

*Figure 23: Histogram of normal distribution (ALFA scores for differences between face-to-face and remote consultation delivery)*
**ALFA Scores: Face-to-face vs Remote Consultations**

Results from an independent samples t-test showed that there was no statistically significant difference between face-to-face and remote telephone consultations on ALFA scores (percentage of time during a routine review spent on supported self-management tasks), $t(62) = 0.009 \ p = 0.350$. Mean scores were similar for both groups, face-to-face reviews mean statistic ALFA score of 52.79 (SD=8.18), compared to the mean remote, telephone consultation score of 52.77 (SD=9.21).

![Mean ALFA score by Mode of consultation](image)

*Figure 24: Mean ALFA score by Mode of consultation*
**Descriptive PCOF Mean Scores:**

*Table 24: Descriptive PCOF scores*

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Minimum PCOF score (out of 53)</th>
<th>Maximum PCOF score (out of 53)</th>
<th>PCOF Score (out of 53) Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMP²ART implementation (n=27)</td>
<td>18</td>
<td>36</td>
<td>M = 27.56 (5.61)</td>
</tr>
<tr>
<td>Control (n=37)</td>
<td>18</td>
<td>34</td>
<td>M = 25.05 (4.11)</td>
</tr>
<tr>
<td>Face-to-face review (n=49)</td>
<td>18</td>
<td>36</td>
<td>M = 26.29 (4.76)</td>
</tr>
<tr>
<td>Remote, telephone review (n=15)</td>
<td>19</td>
<td>35</td>
<td>M = 25.53 (5.55)</td>
</tr>
</tbody>
</table>

On average, the implementation group had a higher average PCOF score (PCOF score, M=27.56, SD=5.61), compared to the control group (PCOF score M=25.05, SD=4.11).
**PCOF Implementation vs Control Groups: Distribution of data**

Data were normally distributed at the 95% significance level for the PCOF IMP\(^2\)ART implementation group \((W(27)=0.93, p=0.52)\) and the IMP\(^2\)ART control group scores \((W(37)=0.96, p=0.25)\).

*Figure 25: Histogram of normal distribution (PCOF scores differences between IMP\(^2\)ART implementation and IMP\(^2\)ART control practices)*
**PCOF Scores: IMP²ART Implementation vs Control Groups**

Results from an independent samples t-test showed that there was a statistically significant difference between IMP²ART implementation and IMP²ART control group practice healthcare professionals on PCOF scores (delivery of patient-centred care), \( t(60) = 2.06, p = 0.044 \). IMP²ART implementation group healthcare professionals had a higher mean statistic PCOF score of 27.56 (SD=5.61), compared to the mean IMP²ART control practice score of 25.05 (SD=4.11).

![Mean PCOF score by IMP²ART group](image)

*Figure 26: Mean PCOF scores by IMP²ART group*
An extra between group, sub analysis was then performed to see if there were any differences between scores for the PCOF IMP²ART implementation face-to-face versus remote groups, and PCOF control group face-to-face versus remote group scores.

Data were normally distributed at the 95% significance level for the IMP²ART implementation, face-to-face group \((W (21)=0.94, p=0.22)\) and the implementation remote group \((W (6)=0.87, p=0.23)\) for PCOF scores. Data were normally distributed at the 95% significance level for the control face-to-face group \((W (28)=0.97, p=0.52)\) and the control remote group \((W (9)=0.94, p=0.58)\) for PCOF scores. Therefore independent samples t-tests were conducted to explore differences between groups.

There was no statistically significant difference between the IMP²ART implementation group face-to-face \((M=27, SD = 5.46)\) versus IMP²ART implementation group remote \((M=29.50, SD = 6.22)\) PCOF scores; \(t (25), = -0.961, p=0.35.\) Similarly, there was no statistically significant difference between the IMP²ART control group face-to-face \((M=25.70, SD = 4.18)\) versus IMP²ART control group remote \((M=22.88, SD = 3.18)\) PCOF scores; \(t(35), =1.189, p=0.07.\)

This extra subgroup analysis highlights that the significant differences for PCOF scores in IMP²ART implementation versus control groups are not due to the type of consultation within groups.
**PCOF Scores: Face-to-face vs Remote Consultations: Distribution of data**

Data were normally distributed at the 95% significance level for the PCOF face-to-face ($W (49) = 0.97, p=0.16$) and PCOF remote consultation group scores ($W (15)=0.90, p=0.10$).

*Figure 27: Histogram of normal distribution (PCOF scores for differences between face-to-face and remote consultation delivery)*
**PCOF Scores: Face-to-face vs Remote Consultations**

Results from an independent samples t-test showed that there was no statistically significant difference between face-to-face and remote telephone consultations on PCOF scores (delivery of patient-centred care), \( t (62), = 0.515, p = 0.608 \). Mean scores were similar for both groups, face-to-face reviews mean statistic PCOF score of 26.29 (SD=4.76), compared to the mean remote, telephone consultation score of 25.53 (SD=5.55).

*Figure 28: Mean PCOF score by Mode of consultation*
Descriptive BECCI Mean Scores:

Table 25: Descriptive BECCI scores

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Minimum BECCI score (out of 4)</th>
<th>Maximum BECCI score (out of 4)</th>
<th>BECCI Score (out of 4) Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMP²ART implementation (n= 27)</td>
<td>1.23</td>
<td>3</td>
<td>M = 2.21 (0.58)</td>
</tr>
<tr>
<td>Control (n=37)</td>
<td>1</td>
<td>2.82</td>
<td>M = 1.9 (0.52)</td>
</tr>
<tr>
<td>Face-to-face review (n=49)</td>
<td>1</td>
<td>2.82</td>
<td>M = 2.11 (0.52)</td>
</tr>
<tr>
<td>Remote, telephone review (n=15)</td>
<td>1</td>
<td>3</td>
<td>M = 1.79 (0.63)</td>
</tr>
</tbody>
</table>

On average, the implementation group had a higher average BECCI score (BECCI score, M=2.21, SD=0.58), compared to the remote consultation group (BECCI score, M=1.79, SD=0.63).
BECCI Implementation vs Control Groups: Distribution of data

Data from the BECCI IMP\textsuperscript{2}ART implementation group was not normally distributed ($W(27) = 0.904, p=0.016$) and therefore the Mann-Whitney U test was chosen as an appropriate test to explore differences between non-normally distributed groups.

![Histogram of not normal distribution](image)

*Figure 29: Histogram of not normal distribution (BECCI scores differences between IMP\textsuperscript{2}ART implementation and control practices)*
**BECCI Scores: IMP²ART Implementation vs Control Groups**

Results from a Mann-Whitney U test showed that there was a statistically significant difference between IMP²ART implementation and IMP²ART control group practice healthcare professionals on BECCI scores (delivery of behavior change techniques), \( (U = 336.5, p = 0.03) \). IMP²ART implementation group healthcare professionals had a higher mean statistic BECCI score of 2.21 (SD=0.58), compared to the mean IMP²ART control practice score of 1.90 (SD=0.52).

![Mean BECCI score by IMP²ART group](image)

*Figure 30: Mean BECCI scores by IMP²ART group*
An extra between group, sub analysis was then performed to see if there were any differences between scores for the BECCI IMP²ART implementation face-to-face versus remote groups, and BECCI control group face-to-face versus remote group scores.

Data were normally distributed at the 95% significance level for the IMP²ART implementation, face-to-face group \((W (21)=0.87, p=0.009)\) and the implementation remote group \((W (6)=0.97, p=0.89)\) for BECCI scores. Data were not normally distributed and therefore the Mann-Whitney U test was chosen as an appropriate test to explore differences between non-normally distributed groups. Data were normally distributed at the 95% significance level for the control face-to-face group \((W (28)=0.97, p=0.69)\) and the control remote group \((W (9)=0.91, p=0.38)\) for BECCI scores. Therefore independent samples t-tests were conducted to explore differences between IMP²ART control face-to-face and remote groups.

There was no statistically significant difference between the IMP²ART implementation group face-to-face \((M=2.16, SD = 0.61)\) versus IMP²ART implementation group remote \((M=2.40, SD = 0.44)\) BECCI scores; \((U= 74, p=0.55)\). However, there was a statistically significant difference between the IMP²ART control group face-to-face \((M=2.07, SD = 0.46)\) versus IMP²ART control group remote \((M=1.38, SD = 0.33)\) BECCI scores; \(t(35), =0.252, p=0.001\).

This extra subgroup analysis highlights that the significant differences for BECCI scores in the IMP²ART implementation versus control groups could
be due to the differences between the type of consultation in the control groups, where control group healthcare professionals of the face-to-face group scored more highly for the delivery of behaviour change counselling discussions.
**BECCI Scores: Face-to-face vs Remote Consultations: Distribution of data**

Data were normally distributed at the 95% significance level for the BECCI face-to-face \((W (49) = 0.95, p=0.052)\) and BECCI remote consultation group scores \((W (15) = 0.94, p=0.36)\).

*Figure 31: Histogram of normal distribution (BECCI scores for differences between face-to-face and remote consultation delivery)*
**BECCI Scores: Face-to-face vs Remote, Telephone Consultations**

Results from an independent samples t-test showed that there was no statistically significant difference between face-to-face and remote telephone consultations on BECCI scores (delivery of behavior change techniques), $t(62) = 1.958, p = 0.55$. Mean scores were higher in the face-to-face group. Face-to-face review mean statistics BECCI score of 2.21 (SD=0.53), compared to the mean remote, telephone consultation score of 1.79 (SD=0.63).

![Figure 32: Mean BECCI score by Mode of consultation](image)

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Correlation Matrix

To explore whether the three tools used to measure the delivery of supported self-management for healthcare professionals (ALFA, PCOF and BECCI) positively correlate, a correlation matrix was produced. Table 26 shows the correlation matrix, showing the correlation coefficients and p values for levels of statistical significance between variables.

Table 26: Correlation Matrix of correlations between ALFA, PCOF and BECCI variables

<table>
<thead>
<tr>
<th></th>
<th>ALFA Scores</th>
<th>BECCI Scores</th>
<th>PCOF Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALFA Scores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BECCI Scores</td>
<td>r=0.41**, p=0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCOF Scores</td>
<td>r=0.45**, p=0.001</td>
<td>r=0.74**, p=0.001</td>
<td></td>
</tr>
</tbody>
</table>

Note: ** Correlation is significant at the .01 level (two-tailed)

Table 26 shows that there was a positive correlation between all variables, as one variable increases so does the other. Correlation coefficient scores (r value) range from -1 to 1. -1 scores show a negative correlation, scores above 0-1 show a positive correlation. The highest correlation level was between the PCOF and BECCI scores, which measure the delivery of patient centred care and behaviour change counselling discussions. This analysis provides evidence that all three measures are linearly related.
5.5 Discussion

5.5.1 Summary of Observational Study Findings

ALFA Scores:

The findings from the observational, quantitative study explored how supported self-management is delivered in UK primary care practices. The findings suggest that on average, healthcare professionals spend around 34 minutes delivering a routine asthma review, and are most commonly conducted by practice nurses.

The ALFA supported self-management components that healthcare professionals spent most time incorporating into routine reviews included discussing individual asthma condition and/or its management, collaboratively reviewing and completing a personalised asthma action plan, training/rehearsal for practical self-management activities (e.g., inhaler technique) and screen sharing (discussing something on screen with the patient).

PCOF Scores:

On average, healthcare professionals delivered around half of the PCOF elements of patient-centred care (26 out of 53 for PCOF scores). Higher levels of patient-centred care (indicating a biopsychosocial focus of delivery of care) were found for healthcare professionals in areas such as; establishing rapport, maintaining relationships throughout the interaction, gathering information (such as vitals), medications and paperwork.
Lower levels of patient-centred care delivery (indicating a biomedical focus) were found in areas such as collaborative upfront agenda setting, self-management support (including goal setting and action plan development), and towards the end of reviews, closure and system navigation aid support were found to show low levels of patient-centred care delivery.

**BECCI Scores:**

Results of the BECCI analysis suggested that overall, healthcare professionals delivered behaviour change counselling discussions ‘to some extent’. BECCI items were healthcare professionals discussed behaviour change ‘a good deal’ included demonstrating sensitivity talking about other issues, and when providing information, healthcare professionals were sensitive to patient concerns and understanding.

Items were healthcare professionals delivered behaviour change discussions ‘minimally’ included areas such as asking the patients questions to elicit how they thought or felt about a topic, acknowledging challenges about behaviour change that the patient faces, and exchanging ideas about how the patient could change current behaviour.

Findings of the ALFA, PCOF and BECCI are explored in section 5.5.2 below, in relation to each individual research objective.

**Differences between sub-groups:**

When comparing IMP²ART implementation and IMP²ART control group healthcare professionals for the delivery of supported self-management, implementation groups, on average, spent more of the consultation time
incorporating and discussing supported self-management strategies during routine reviews (ALFA). Healthcare professionals of the implementation group also delivered a more patient-centred review (as measured by the PCOF), and discussed more behaviour change discussions (as measured by the BECCI), with patients than healthcare professionals of the IMP²ART control group. Concluding that on average, IMP²ART implementation healthcare professionals delivered more supported self-management strategies during routine asthma consultations.

Findings from the between group analysis of the face-to-face and remote consultation groups found that on average, both groups spent similar percentages of time on supported self-management tasks during routine asthma reviews (ALFA). Similarly, both groups had similar scores the delivery of patient-centred care (PCOF) and behaviour change discussions (BECCI), showing no significant differences in healthcare professional delivery of supported self-management between face-to-face and remote consultations.

5.5.2 Discussion of Findings in Relation to Objectives

Objective 1: To observe how self-management strategies are embedded into routine reviews and what proportion of time within a consultation is spent on self-management related tasks (ALFA):

The results from the ALFA analysis provide an overarching view of the differences in time spent on supported self-management tasks during routine asthma reviews. Although through a small sample size (further discussed in
limitations section 5.5.4), the findings in relation to this objective provide evidence for which supported self-management components can be more carefully targeted for future healthcare professional training and interventions. The findings specifically outline which supported self-management components could be encouraged for discussion such as; ‘training/rehearsal to communicate with health care professionals’, or ‘time spent setting the patient agenda for the consultation’. However, it is important to consider that some supported self-management tasks may take less time than others. For example, discussing attendance to a regular review, one of the most effective ways to control an individual’s asthma (Gibson et al., 2002; Pinnock, 2015), may only take a few seconds of discussion during a review, compared to demonstrating and providing feedback on inhaler technique which may take a larger proportion of allocated review time.

An additional finding suggests that healthcare professionals are not spending time setting the patient’s agenda at the beginning of a routine review. Included in the IMP²ART implementation strategy, agenda setting was incorporated into the healthcare professional’s asthma review template and includes an opening question ‘What does the patient want to discuss?’ to encourage providing patient-centred care and self-management support (Morrissey et al., 2020). Additionally, the findings suggest healthcare professionals are not spending time discussing with individuals how they can access advice or support when needed, and how to communicate effectively with health care professionals. Knowing when and how to access advice and support is a core supported self-management component of asthma. Importantly, an individual must be able to
recognise when their asthma is deteriorating and make decisions about how to respond to these changes, including when to adjust their medication, when to use emergency treatment and when to seek professional help (Pinnock, 2015). Without these discussions taking place with a healthcare professional during routine reviews, people with asthma may be unaware of the most timely and effective approach to gaining professional advice should they require help, guidance or support with their asthma.

A positive finding is that healthcare professionals are spending an encouraging amount of time during asthma reviews collaboratively reviewing and completing a personalised asthma action plan, one of the most effective supported self-management strategies for asthma management (Gatheral et al., 2017; Asthma and Lung UK, 2021). Additionally, healthcare professionals are spending time screen sharing with the patient. As discussed in section 2.3.2, Gibson et al., (2002), states that information-only asthma education (e.g., provision of a video link or leaflet alone) may be ineffective. The findings that healthcare professionals are screen sharing during asthma reviews strengthens the concept of patient-centred care, and includes a shared decision making process to ensure discussions about the patient’s individual asthma goals are considered (Pinnock et al., 2017; Gruffydd-Jones & Hansen, 2020). Shared decision making discussions during routine asthma reviews can lead to increased patient satisfaction and adherence, better individual health outcomes, improved asthma control, and quality of life (Kew et al., 2017).
Objective 2: To observe how patient-centred methods and behaviour change counselling are used within asthma consultations (PCOF/BECCI):

The findings of the descriptive PCOF analysis revealed areas of patient-centred care delivery that healthcare professionals of this study delivered using a biopsychosocial approach. For example, healthcare professionals were able to create and maintain effective patient-professional relationships, which is an important component of supported self-management delivery, where patients and healthcare professionals can play a joint role in guiding their patient care (Grady & Gough, 2014). Additionally, results suggested healthcare professionals scored highly on the grouping ‘Basics: Vitals, Checks Meds and Paperwork’ which includes elements such as: ‘asks about paperwork’ (asthma action plans) and ‘medication reconciliation’. Which suggest healthcare professionals were discussing patient’s asthma action plans and their current medications for managing their asthma, which are both guideline recommended strategies for asthma supported self-management (Peytremann-Bridevaux et al., 2015; BTS/SIGN, 2019; Asthma and Lung UK, 2020).

The findings of the PCOF analysis have also provided evidence for areas of improvement in patient-centred care delivery. Healthcare professionals scored lower PCOF scores for the groupings ‘Collaborative Upfront Agenda Setting’, ‘Self-Management Support: Goal Setting and action plan development’ and ‘Closure and System Navigation.’ Elements within the ‘Collaborative Upfront Agenda Setting’ included ‘acknowledges agenda items from electronic medical record’ and ‘confirms what is most important to the patient’. This finding
suggests some healthcare professionals did not ask patients what is most important for them to discuss during their routine asthma review. This item is an important aspect of the IMP²ART implementation strategy, where IMP²ART implementation practices are issued with an updated electronic patient template which includes an opening question: ‘*What does the patient want to discuss?*’ to encourage providing patient-centred care and self-management support (Morrissey et al., 2020). This findings could be due to the unequal number of IMP²ART implementation and control practice video recordings (IMP²ART implementation practice patient recordings n=27, control practice patient recordings n=37), or low levels of fidelity to the intervention from IMP²ART implementation healthcare professionals. Additionally, healthcare professionals of this study scored lower average scores for the PCOF grouping: ‘*Self-Management Support: Goal Setting and action plan development*’. This grouping includes elements such as ‘*asks if patient wants to create a health goal*’ and ‘*asks patient to brainstorm activities to reach goal*’. This finding suggests healthcare professionals did not engage in behavioural change discussions during the routine asthma reviews.

Results from the BECCI analysis suggest that healthcare professionals scored highly for use of behaviour change counselling when demonstrating sensitivity talking about other issues during asthma reviews, and were sensitive to patient concerns and understanding. However, healthcare professionals scored minimally when exchanging ideas about how the patient could change current behaviour. These findings suggest that healthcare professionals are delivering empathetic care to patients, however, are not collaboratively discussing
individualised approaches for ways in which a patient can proactively change their behaviour.

**Objective 3:** To explore differences in delivery of supported self-management and consultation styles related to allocation in the IMP²ART trial (implementation or control); mode of delivery (remote telephone/video-consultations or face-to-face); and duration of the review:

**Interpretations of Results: IMP²ART implementation vs Control Groups**

As outlined above, healthcare professionals of the IMP²ART implementation group showed significant differences in the delivery of supported self-management compared to the IMP²ART control group in all three areas of supported self-management delivery assessed in this study; amount of time on supported self-management discussions (ALFA), delivery of patient-centred care (PCOF) and behaviour change counselling (BECCI). As discussed in the introductory Chapters 1 and 2, the healthcare professionals of the IMP²ART implementation group were provided with theory and evidence-based strategies, which the findings of this study suggests, has enabled these healthcare professionals to embed supported self-management strategies into routine care more effectively, and provide a more patient-centred review, with more behaviour change counselling discussions. The IMP²ART 3-level implementation strategy included;

1. patient-facing strategies and resources,
2. healthcare professional education,
3. and organisational strategies to aim to influence the practice culture of asthma care.

Specifically for this study, which explores healthcare professional delivery of supported self-management, the ‘healthcare professional education’ strategy of IMP²ART may have influenced the healthcare professionals to increase their knowledge, skills and confidence in supported self-management delivery.

The two online educational modules provided to IMP²ART implementation healthcare professionals aimed to raise awareness of the benefits of supported self-management and increase engagement, motivation and commitment to supporting self-management. Module one was designed for the whole practice team, to highlight the team role in supporting self-management, and module two was completed by healthcare professionals in the practice most involved with delivering asthma care. Module two aimed to enable healthcare professionals to use behaviour change and motivational interviewing techniques in clinical practice to enhance supported self-management delivery. These educational modules were developed using TDF domains (Michie et al., 2005) to ensure all relevant behaviour change elements were included. Through mapping the education modules to theoretically informed information and exercises to support healthcare professional individual behaviour change, IMP²ART implementation healthcare professionals may have been influenced to deliver supported self-management strategies more effectively. All healthcare professionals recruited to this study in the IMP²ART implementation group had completed modules one and two by the time of data
collection, highlighting potential impact of the educational modules on the delivery of supported self-management.

Other IMP²ART strategies which may have influenced the delivery of supported self-management from implementation healthcare professionals is the strategy aimed at guiding organisational priorities. As the whole practice is recruited to the IMP²ART implementation arm, they receive an audit and feedback strategy. Practices are provided with a tailored report on their asthma management and patient level reports. Focused feedback is sent to the implementation practices monthly, with a summary of unscheduled care data, number of patients reviewed, and a graph of asthma action plan provision. Implementation practices were also provided with review templates that prioritise components of patient-centred care and were embedded onto their clinical systems for use in asthma reviews, which may have positively impacted their delivery of patient-centred care (PCOF).

These organisational components may have influenced the practice culture to ensure asthma care was a priority for all staff members, and thus ensuring supported self-management strategies are at the forefront of priorities during routine asthma reviews. On average, implementation practices had six months between their IMP²ART implementation workshop session to observational data collection, for the IMP²ART strategies to embed into routine care. Although other factors may have influenced the data (discussed below during strengths and limitations), I can assume that this amount of time had allowed the IMP²ART strategies to be embedded into healthcare professional delivery of care, and in turn more effective provisions of supported self-management.
Despite the significant differences in ALFA scores between IMP²ART implementation and IMP²ART control groups, the control group still spent an encouraging amount of time incorporating supported self-management tasks into routine reviews (approximately half of the allocated review time), revealing that current primary healthcare professionals adhere to asthma supported self-management recommendations and guidelines (GINA, 2020; NICE, 2021). However, current guidelines may benefit from including IMP²ART strategies, to improve the amount of time spent on supported self-management during routine reviews. Additionally, the control group scored lower on average on measures of patient-centred care (PCOF) compared with the IMP²ART implementation group. This highlights, that despite the universal guidelines for optimising patient-centred care, the need for healthcare professionals to be regularly trained and updated in the delivery of patient-centred care is crucial to influence supported self-management delivery.

Interpretations of Results: Face-to-face vs Remote Consultations

The results of this study suggest that there were no significant differences between the delivery of supported self-management during routine face-to-face reviews and remote consultations. Although descriptive mean ALFA, PCOF and BECCI scores between the two groups were slightly higher in the face-to-face groups, the findings were not statistically significant. These similar results between groups could be due to the rapid response provided by clinical guidelines (Greenhalgh et al., 2020), in how to effectively deliver remote consultations during the COVID-19 pandemic, to ensure remote care could be delivered as effectively as face-to-face care. Although the majority of asthma
care in the UK was delivered face-to-face in general practice prior to the pandemic, a multitude of clinicians and academics have been advocating for the use of remote consultations for effective primary care for decades to improve health outcomes and reduce the burden on emergency and inpatient services (Greenhalgh et al., 2020; Kew & Cates., 2016).

The IMP²ART programme also adapted their implementation strategies to develop practical resources for remote management of asthma (Delaney et al., 2021) in response to the shift to remote asthma care during the COVID-19 pandemic. The IMP²ART research team, Professional Advisory Group (PAG) and Patient and Public Involvement (PPI) group worked together to adapt the guidance to remote reviews for asthma at the start of the pandemic. The newly developed guidance was incorporated into the implementation strategy ‘how to’ resources, which were available to the IMP²ART implementation group via an IMP²ART general practice staff facing website in the trial.

Despite the non-significant differences between face-to-face and remote scores for supported self-management delivery, scores for behaviour change counselling (BECCI) were lower on average in the remote consultation group. This highlights the challenges which healthcare professionals may face in incorporating behaviour change discussions into routine remote reviews.

5.5.3 Strengths
The observational study had several strengths which contributed to the credibility of the results. Firstly, to inform the analysis of video-recorded asthma review consultations, I undertook a methodological literature review of
existing tools and validated measures used within observational, implementation research to analyse consultations and patterns of communication between patients and clinicians (see section 5.2). I scoped existing literature and critically reviewed validated measures, developed and used for exploring healthcare professional delivery of supported self-management communication, patient-centred care and behaviour change counselling. From potential tools, I identified three measures that used in conjunction, would provide a multifaceted view of supported self-management delivery, patient-centred care, and behaviour change counselling (ALFA, PCOF, BECCI). Combining these tools strengthened the analysis to ensure a comprehensive overview of supported self-management delivery could be explored for the observational research, whilst also offering opportunities to learn from the findings and generate possible implications to inform future research, practice and policy.

Additionally, the process of data collection and analysis was thoroughly tested during the pilot phase of the study (September 2021), ensuring a smooth process for subsequent data collection visits, and allowing any challenges to be overcome by completing the whole process before attending the first recruited practice. Changes to the data collection process were implemented. As discussed in section 5.3.5, during the planning/pilot stages, a two stage patient consent process was in place, firstly to gain consent from the patient for their asthma review to be recorded, secondly for the patient’s asthma review to be viewed and analysed. However, during the pilot study, 75% of collected data was unable to be used for subsequent analysis as patients did
not complete the second stage of consent (asthma review to be viewed and analysed). Due to this challenge, I then submitted an amendment to the ethics board, which was approved for a single consent stage to take place (gaining consent for asthma reviews to be recorded, viewed and analysed within one process). Completing a pilot process was imperative to ensure data collection and analysis could be completed effectively.

Another strength of this study was the population sample which included real world healthcare professionals and asthma patients (12 healthcare professionals and 64 individual asthma patients), and not simulated scenarios which are often used within observational healthcare research. Real world asthma reviews were recorded and analysed, likely to be reflective of current UK practice, as they were conducted and recorded in the context which they usually would be (face-to-face or remotely) within UK-based NHS general practices. The use of real world data strengthens the applicability of the findings. Additionally, rich, real world data was collected during the lifting of the COVID-19 pandemic restrictions (late 2021-mid 2022), providing valuable insight into how primary care were delivering care at this time. These data are rare, and of pivotal importance to understand how healthcare is delivered following a worldwide respiratory pandemic. The findings from the remote consultation objectives are timely and appropriate for wider dissemination due to the rapid shift to remote asthma care.

This research is also novel to the field of public health research. It is the first to specifically explore the delivery of asthma supported self-management within a complex healthcare intervention (IMP²ART), whilst specifically
exploring healthcare professional communication and behaviours, which has not yet been explored in practice. The findings will add evidence that theoretically informed training and healthcare professional education may be effective in influencing healthcare professional delivery of supported self-management strategies.

**5.5.4 Limitations**

The generalisability of these results are subject to certain limitations. Most importantly within observational research, it is crucial to critically assess the presence of the camera and/or researcher during data collection. The phenomenon is known as the ‘Hawthorne Effect’ (Adair, 1984), and states that there is a tendency for some individuals who are being recorded to alter their behaviour in response to their awareness of being observed, and work harder or perform better. Observational research can be a valuable way to gather data and observe real behaviours, provided the researcher or participants do not cause a behavioural change from the norm. The Hawthorne Effect could be present for both healthcare professionals and patients within this research study. Healthcare professionals were aware they were being recorded to observe their delivery of asthma care, which may have altered their behaviour. Healthcare professionals were also aware of the research recording clinic at least two weeks before data collection took place. This may have provided time to prepare extra resources or revise certain aspects of care for the recording day. Similarly for asthma patients, some may have been more involved and engaged in discussions due to the presence of the camera and involvement in the study. The Hawthorne Effect raises the question if the
recordings are an accurate representation of how asthma reviews are being conducted in practice. However, for the process of collecting and producing ethically viable data, all participants must be aware they are being recorded when partaking in research, which adds an additional uncontrollable factor to observational research. However, when acknowledging this limitation for the subgroup analysis, the possibility of the Hawthorne Effect would have been apparent within all groups, and therefore should not have impacted these findings.

Reflecting upon Bandura’s social cognitive theory (1986) were behaviour change is initiated and maintained when individual’s feel that they are confident of executing the desired behaviour (self-efficacy) and have a reasonable expectation that the behaviour will result in a desired outcome (outcome expectations), it is important to consider the individual differences, and personalities of healthcare professionals and patients when taking part in observational research. Some participants may have been more confident or shy to engage whilst being recorded, which could have affected the amount of asthma management being discussed. For example, if a patient was particularly talkative about other concerns during a review, this may have been more difficult to embed supported self-management for asthma into conversations. Additionally, personality, confidence, self-efficacy levels and skills of the healthcare professional may have altered the level of engagement in different strategies whilst being recorded, e.g., not engaging in behaviour change conversations due to being apprehensive in using the correct communication techniques.
An additional uncontrollable factor was that patient participation was also partially at the discretion of the healthcare professional and members of staff at the general practice, as they purposefully sampled the participants to take part by contacting and scheduling them into the recording clinic. This approach may have allowed healthcare professionals to select participants with well controlled asthma who were more effective with their self-management strategies. This obstacle was difficult to overcome due to being unable to access personal patient information during the study. However, I aimed to mitigate any effects from the Hawthorne Effect, individual differences in healthcare professionals and any bias in patient participation by recruiting professionals from both IMP²ART control and implementation groups, therefore equalising any impact, as any differences in behaviours may have existed in both groups.

It could also be suggested that a gap from the data collection process, was that patient details (such as age, gender, multimorbidity level, mental health conditions etc.) were not collected from participating patients. As discussed earlier in Section 1.2.5, comorbidities for those with asthma present an additional challenge which healthcare professionals must consider to ensure patients have the knowledge and skills to manage their condition(s) well. By not collecting this level of patient data, I was unable to provide possible exploratory factors which may have influenced the content of discussions that took place during individual asthma reviews, and therefore may have influenced supported self-management discussions due to conflicting patient agendas. Collecting these data would have created a larger, more explanatory
study to explore whether individual patient characteristics have any impact on how supported self-management is delivered in practice. However due to time constraints of this PhD programme, and to address the overall thesis objective of how healthcare professionals deliver supported self-management for asthma, I chose to collect participating healthcare professional demographic data only.

Another limitation of the study was sample size of groups, which was largely variable and inconsistent. For example, within the face-to-face and remote consultations groups, there was a large difference in collected data; face-to-face \( (n=49) = 15 \) hours, 25 minutes of recorded data, remote \( (n=15) = 3 \) hours, 16 minutes. The face-to-face group had over 12 hours more data. However, to ensure correct statistical analysis was still completed given the difference in sample sizes to draw appropriate conclusions, consultations with a University of Edinburgh senior statistician took place, who confirmed calculating differences between means (independent samples t-test/Mann-Whitney U tests) were still appropriate, tests of normality were also completed.

Additionally, there may have been limitations associated with the use of the tools and measures for analysis. The use of the PCOF (Makoul, 2001), was developed in 2001, and since then there have been varying updates to the definitions of patient-centred care (see section 2.3.1), specifically with the introduction of remote delivery in primary care. The measure may have been interpreted subjective to my individual researcher bias, and understanding of patient-centred care. At the root of patient-centred care is what matters to the person and what is important to them. To capture this more effectively, patient
accounts should have captured and evaluated to understand their individual experiences of patient-centred care.

Another possible weakness of the study was the inconsistency in approaches to asthma care due to the COVID-19 pandemic. Data collection took place between September 2021 – July 2022, where although COVID-19 restrictions had begun to ease, some restrictions and uncertainties remained in primary care, specifically in the area of asthma care for use of monitoring and diagnostic tools. For example, during the early months of the data collection period, healthcare professionals conducting face-to-face reviews were not able to use peak flow meters to monitor patient’s asthma. However, towards the spring of 2022, general practices and healthcare professionals had begun to implement the use of peak flow meters and diagnostic tools, due to the ease of COVID constraints. One healthcare professional used the FeNO machine (FeNO devices are a novel medical technology used to aid in the diagnosis of asthma. FeNO devices measure fractional exhaled nitric oxide in the breath of patients) (Stonham & Baxter, 2021). These inconsistencies in approaches may have influenced some healthcare professional’s scores, specifically on the ALFA tool where one component is to score ‘A5: percentage of time spent providing feedback on individual monitored asthma data’. However, this weakness may have been mitigated by collecting data from both IMP²ART groups across the span of the data collection phase.

Another important weakness was the demographic data related to where general practices were located. Although every effort was made to contact IMP²ART practices from across the UK, a large proportion of participating
practices were from the south of England, and only one practice in Scotland. However, deprivation scores were calculated for practices in both the IMP²ART implementation and control groups, resulting in similar average practice deprivation scores (implementation practices $M=23.6$, control groups $M=23.3$ (>21.4 is more deprived), concluding that on average all practices were from more deprived areas. This finding relates to the Inverse Care Law (Tudor-Hart, 1971) which describes the contradictory relationship between the need for health care and its actual utilisation, where those who most need medical care are least likely to receive it. On the other hand, those with least need of health care tend to use health services more (and more effectively). Although the general practices who took part in this study, were from mostly deprived areas, I cannot confirm if the patients who accessed the services of these general practices were those who were more in need. Analysis for this study were not based on the patients deprivation status, but on the deprivation of the practice which may have included areas with a range of deprivation. In addition to this, research by Mercer and Watt (2007) states that patients accessing and engaging in primary care in more deprived areas, have a greater number of long term conditions and chronic health problems and psychosocial conditions. Despite this, patients from more deprived areas, on average, receive shorter clinical reviews than those general practices within more affluent areas. This literature suggests that data from this study may have included patients with more long-term conditions other than asthma, which may have resulted in patients with competing agendas. Collecting data from more deprived and more affluent areas may have resulted in different findings.
Recruitment was also a major challenge, but valuable learning opportunity whilst conducting this research. Practice recruitment began in September 2021 (recruitment strategy is outlined in Figure 17 above). The initial stage of the recruitment strategy was to email the lead contact from the IMP²ART practice (both implementation and control groups). However, a number of practices who were contacted initially, did not respond to the email invitations. During discussions with my supervisory team, I decided to change the wording of the initial study email. The two email templates can be seen in Appendix 13, and shows the minimal changes made to the wording of the recruitment email. After the changed email was sent to newly randomised practices, there was an increased uptake in interest to take part in the study. This could be due to a number of reasons; practice readiness to take part, or the drive to arrange a call to discuss the study in more detail due to the added wording of ‘Would it be possible to arrange a quick call to discuss the study?’ I also began to telephone practices to ask to speak to the lead IMP²ART contact. This approach was particularly difficult as clinicians were often busy with patients or generally unable to take calls. One practice was recruited using the first email template, compared to seven using the second email template. Two were recruited via phone call.

Although the practices were randomised to IMP²ART implementation or control groups, I recruited a limited number of subgroup practices who volunteered to be video recorded. I was also aware of allocation, so the coding of the videos may have been biased. Data may have also been coded subjectively. Due to timeframe allocated to conduct this research, a secondary
analysis was not possible. It is for these reasons that the findings from the study demonstrate an association between group differences and cannot infer causality.

5.5.5 Discussion of Findings with Previous Literature

*Allocation in the IMP²ART trial*

The findings of this study have provided evidence that in the subsample of practices I observed, IMP²ART implementation group practice healthcare professionals were associated with improved delivery of supported self-management, patient-centred care and behaviour change counselling. These findings could be due to a number of reasons, one of which was that the IMP²ART implementation strategy may have had an effect, and can improve healthcare professional approaches to the delivery of supported self-management for asthma. These findings support previous literature which have investigated effective supported self-management strategies (as discussed in Chapter 1) (Taylor et al., 2014; Pinnock, 2015; Dineen-Griffin et al., 2019), that implementation of asthma self-management in routine reviews can be achieved, but to be effective, it requires a whole-systems approach, which considers patient education and resources, healthcare professional skills and motivational and organisational priorities and routines.

Additionally, this research facilitates the use of appropriate theory to develop and implement effective healthcare interventions. As discussed in Chapter 2, embedded within the development of the IMP²ART programme, was a number
of evidence-based and theoretical approaches to implementation; iPARIHS an implementation theory (Harvey & Kitson, 2016), COM-B a behaviour change theory (Michie et al., 2011) and the Theoretical Domains Framework (Michie et al., 2005). The findings of this study suggest that the underpinning theories and models used within the development of the intervention programme, work together to produce an effective implementation strategy.

As discussed in Chapter 2, effective supported self-management strategies are built on collaborative healthcare professional and patient communication techniques (Pinnock et al., 2017). The findings of this study support that patient-centred care, shared decision making, and motivational interviewing strategies encourage supported self-management for asthma patients due to positive findings of PCOF and BECCI scores within the implementation groups. Specifically, within primary care, research has focused on the value of effective communication in nurse-patient clinical interactions, which can enhance greater patient engagement in several patient related outcomes (Henly, 2016; Kwame & Petrucka, 2021). However, importantly to acknowledge within this study was the participation of a clinical pharmacist within the IMP²ART control group. Interestingly from the coded data, this healthcare professional scored highly on all areas of ALFA, PCOF and BECCI. This raises the issue of consistency across the delivery of asthma care. This healthcare professional had been working in practice for over 30 years and may have received different training in the delivery of asthma care. These results may have also been due to the individual differences and personality of this healthcare professional, however it is important to recognise that for the
future of asthma care, training for all healthcare professionals must be consistent to ensure an effective, holistic approach to care.

*Remote consulting*

Previous research had raised concerns about the use of remote delivery of routine primary care due to opposing evidence of suitability and the many technical, clinical, and organisational policy challenges associated (Donaghy et al., 2019). More specifically, research regarding the delivery of supported self-management during remote asthma consultations has rapidly dated with advances in technology (Kew & Cates, 2016). Additionally, as discussed in Chapter 2, it can be challenging to implement patient-centred care and behaviour change discussions into remote LTC consultations (Mann et al., 2021; Mughal et al., 2022). However, this PhD study suggests that there are no significant differences between face-to-face and remote delivery of supported self-management for asthma care, although this should be treated with caution due to the individualised nature of asthma management, and patient’s should be provided with the choice of their preferred mode of consultation.

As health care provision may possibly shift to a more permanent option of remote care for certain groups of individuals, there is a need for remote supported self-management to be further investigated to ensure a consistent approach to care remains. It is important to remember that remote reviews may only be suitable for certain population groups (as discussed in the systematic rapid realist review findings section 4.6.4); patients whose lives are structured
around work, study or childcare (Donaghy et al., 2019), younger patients who are more familiar with the use of technology (Godden & King, 2011; Ignatowicz et al., 2019) and older, vulnerable patients with reduced mobility (Ignatowicz et al., 2019; Thiyagarajan et al., 2020). Patients should be provided with the choice of which mode of consultation they prefer, which will in turn increase patient engagement and delivery of patient-centred care through recognising what is important for each individual patient (Mughal et al., 2022).

5.6 Conclusions and Next Steps
This observational study has provided an understanding of how supported self-management is delivered in a routine primary care context, and has presented data including 64 individual asthma patient’s routine reviews, conducted by 12 healthcare professionals, across 10 UK primary care practices. Results from the ALFA analysis suggested that the most time during a routine asthma review is spent discussing an individual’s asthma condition and it’s management, collaboratively reviewing and completing a personalised asthma action plan, and training for practical self-management activities (e.g., inhaler technique). The findings from the PCOF analysis identified areas of patient-centred care delivery which healthcare professionals delivered using a biopsychosocial focus, such as creating and maintaining relationships with patients, discussing asthma action plans and medication reconciliation. The PCOF findings identified areas for future patient-catered care delivery improvement such as conducting behavioural change discussions and upfront
agenda setting. Scores from the BECCI analysis suggested that healthcare professionals are not collaboratively discussing individualised approaches for ways in which a patient can proactively change their behaviour. Healthcare professionals from the IMP²ART implementation group spent a higher percentage of time discussing supported self-management strategies, delivered a more patient-centred review, and discussed more behaviour change strategies with patients, than healthcare professionals of the IMP²ART control group. Additional sub-group analysis suggested that there are no significant differences between the delivery of supported self-management between face-to-face and remote asthma consultations.

The study provides evidence that healthcare professionals should be provided with consistent, theoretically informed training, education and resources for effective communication and behavioural strategies for supported self-management delivery. The next chapter will discuss the qualitative, semi-structured interview study which took place with healthcare professionals recruited to the observational recordings research, to explore their thoughts, views and experiences of asthma supported self-management delivery in the context of UK primary care.
6. Qualitative Study

In the previous chapter, I explored healthcare professional delivery of supported self-management in clinical practice during routine asthma reviews, including the prioritisation of self-management tasks and delivery of behaviour change counselling and patient-centred care. The results outlined which supported self-management components healthcare professionals spent most time incorporating into a routine review, and how patient-centred care and behaviour change counselling were discussed during consultations. Subgroup analysis suggested that healthcare professionals recruited to the IMP²ART implementation group practices spent more time on supported self-management strategies and discussions during routine reviews. These healthcare professionals also delivered a more patient-centred review and had more meaningful behaviour change discussions. There were also no significant differences between the delivery of supported self-management between modes of consultation (face-to-face versus remote consultations).

To build on these findings, and gain a deeper understanding of healthcare professional delivery of supported self-management, and their views, opinions and experiences of conducting primary care asthma reviews, I conducted semi-structured interviews with healthcare professionals who took part in the recordings of asthma reviews. This chapter describes the aims of the qualitative interviews, the methods used to collect the data, and the findings of the thematic analysis.
6.1 Healthcare Professional Delivery of Supported Self-Management for Asthma

Primary care nurses are at the forefront of the management of long term conditions, and in many situations, are responsible for delivering regular asthma reviews (Leyshon, 2016; Scullion, 2018). Supporting self-management is predominantly viewed as a nurse-led role, with general practitioners (GPs) often feeling unfamiliar with the practicalities of the provision of supported self-management, such as asthma action plans, and instead, tend to see asthma patients only in the case of an asthma exacerbation (Morrow et al., 2017).

Previous research has explored healthcare professionals' perspectives, experiences and opinions of implementing supported self-management for asthma in UK general practice. Moffat et al., (2007) explored the views of practice nurses towards the implementation of supported self-management strategies (e.g., PAAPs; personalised asthma action plans) during asthma reviews, concluding that nurses encountered many barriers which restricted the provision of delivering effective and collaborative PAAPs, such as individual patient issues (e.g., psychosocial factors, level of control) and/or healthcare professional issues (e.g., ease of use, time available, job roles). Healthcare professionals expressed lacking necessary communication skills for dealing with patient asthma control issues, particularly where these were psychosocial factors. Healthcare professional and organisational issues such as lack of training, and poor patient and healthcare professional communication, were perceived as impairing asthma management. Additionally, these were used to explain the poor uptake of delivering
supported self-management in general practice and primary care, concluding that there is a need to identify key communication skills for effective healthcare professional and patient partnerships in adult asthma management. Pinnock et al., (2015), echoes this guidance, and states that to ensure primary care nurses are able to engage in effective implementation of supported self-management, a whole systems approach is required, where the organisation prioritises healthcare professional engagement and training.

More recently, a qualitative study by Morrow et al., (2017) (conducted as part of the IMP²ART programme development work), explored how primary care practices prioritise asthma self-management, their existing asthma management routines, and the barriers and facilitators to supported self-management delivery. The study concluded by stating that nurses found the barriers to provision of self-management to be; 'poor attendance at asthma clinics, lack of time, demarcation of roles, limited access to a range of resources, and competing agendas in consultations, often due to multimorbidity.' Further updated data is needed in the area of healthcare professionals’ perspectives and experiences of delivering supported self-management, to ensure evidence-based, effective recommendations can be produced.

Following the observational study, qualitative interviews were a critical process of conducting this mixed-methods PhD programme. Qualitative interviews were chosen to ensure the findings from the systematic rapid realist review and observational study were able to be contextualised and add richer detail
to the findings. The qualitative interviews aimed to increase the credibility of the results and strengthen the validity of the overall PhD results.

### 6.1.1 IMP²ART Strategies for Implementation Practice Healthcare Professionals

Each healthcare professional who delivers asthma care should conduct routine reviews using the most up to date asthma guidelines (GINA, 2020; NICE, 2021). However, there may be other individualistic experiences, personality types and contextual factors which may facilitate or hinder abilities to deliver effective supported self-management strategies (Dineen-Griffin et al., 2019). Implementation of complex interventions (such as the IMP²ART programme), requires an organisational approach, in addition to strategies directed at both staff and patients (McCleary et al., 2018), and therefore the views and experiences of healthcare professionals are essential to ensure interventions consider all persons and context involved during evaluation processes.

Details of the components delivered to IMP²ART implementation group healthcare professionals can be found in section 2.5.3.

### 6.2 Aims and Objectives of Qualitative Phase

This section of the thesis aims to explore healthcare professional views and experiences of supporting asthma self-management in routine asthma reviews. Coinciding with current literature suggesting practice nurses most commonly deliver routine asthma reviews (Leyshon, 2016; Morrow, et al., 2017; Scullion, 2018), I chose to conduct semi-structured interviews with the
healthcare professionals who took part in the observational study, to gain an in-depth understanding of their thoughts, opinions and experiences of delivering supported self-management during routine reviews. In conjunction with the findings of the systematic rapid realist review and observational phases of the study, I anticipated that the qualitative data would provide extensive and personal perspectives of supported self-management delivery from the healthcare professional’s opinion. The qualitative data was the last component of the mixed methods research to triangulate for the final interpretation of findings. Please see schema (Figure 33) below.

6.2.1 Objectives of Qualitative Phase

1. To explore healthcare professional views and experiences of delivering supported self-management to asthma patients.

2. To explore how general practices prioritised supported self-management during routine asthma reviews.

3. To explore context, facilitators and barriers that healthcare professionals perceived affected their ability to deliver supported self-management (for example: mode of consultation; duration of asthma review appointments).
Figure 33: PhD Study Schema: Qualitative interviews with healthcare professionals phase
6.3 Literature Review of Methodologies to Address Qualitative Approaches

To explore healthcare professional perspectives of delivering supported self-management within asthma consultations, two qualitative methods of data collection and analysis were considered; 1) semi-structured interviews, or 2) video-stimulated recall. Advantages and limitations of using each method were considered, and a conclusion was reached for the most appropriate method to answer the proposed research objectives.

6.3.1 Semi-Structured Interviews

Qualitative semi-structured interviews are defined as;

‘attempts to understand the world from the subjects’ point of view, to unfold the meaning of peoples’ experiences and to uncover their lived world prior to scientific explanation’ (DeJonckheere & Vaughn, 2019),

and are an effective method for data collection to:

1) collect qualitative, open-ended data, 2) explore participant thoughts, feelings and beliefs about a particular topic and 3) delve deeply into personal and sometimes sensitive issues.

Semi-structured, in-depth interviews are commonly used within qualitative research, and are the most frequently used qualitative method in health services research, particularly in primary care research settings (Kallio et al., 2016; Busetto et al., 2020). However, there are limitations to the methodological approach including interviewer bias and validity; when a
researcher is present, there is always a risk that this may influence the interviewee’s response. Critics suggest that the interviewer effect introduces bias that may cause the validity of the interview results to be questioned (Williamson & Burns, 2014). The timing of semi-structured interviews may also limit the depth of responses if there is not enough allocated time for participants to feel comfortable to provide an extensive response/discussion.

6.3.2 Video Stimulated Recall

I also considered using the method of Video Stimulated Recall (VSR) (Lyle, 2003). VSR interviewing is a research technique where participants view a recorded video sequence of their behaviour, and are then invited to reflect on their decision-making processes during the videoed event. The VSR method is often used to understand and reflect on why the participant made the decisions they did within the recordings and allows the researcher to compare the perceived findings from the video’s data and the reflection of the participant’s VSR. This technique was considered as interviews took place with the healthcare professionals who took part in the observational recording phase, and therefore recordings of their behaviours and communication in relation to supported self-management delivery had already been captured. Further reflections and questions could then be built on this data to explore participant’s recall of their behaviours.

However, the VSR method has a considerable number of limitations, which were thoroughly considered. Firstly, participant’s accounts are retrospective and are limited to that which is remembered and reported. The feelings and thoughts expressed in the context of the post-consultation interview may not
reflect the thoughts at the time of the consultation and are subject to researcher influence. The wording of questions also has extreme importance in VSR interviews. If questions were leading or influenced the participant to think or respond in a certain way, this could be noted as an intervention, as it could result in a change in participant response or behaviour (Nguyen et al., 2013). This was a particularly important aspect to consider for this research study, as participants from both the implementation and control groups of the IMP²ART programme participated, and therefore this method may have risked contamination of the control group.

6.3.3 Conclusions for Qualitative Approaches

Given the possibility of the VSR method possibly leading the participants to researcher influence and bias, as well as the unknown certainties at the time of COVID-19 restrictions and social distancing measures to conduct VSR in person, I decided to utilise the method of semi-structured interviews. Semi-structured interviews are the most common method of collecting qualitative data in primary care settings (Kallio et al., 2016; Busetto et al., 2020), and when using triangulation in mixed methods research (to be further explored in Chapter 7), semi-structured interviews are an effective method to validate and explore new concepts, or explain results from additional quantitative phases of a mixed methods study (DeJonckheere & Vaughn, 2019).
6.4 Methods

6.4.1 Design

The qualitative components of the research were conducted following the framework and recommendations provided by DeJonckheere & Vaughn, (2019) for designing and conducting semi-structured interviews in primary care research. This framework was chosen as it outlines the steps required to carefully design and conduct semi-structured interviews with emphasis on applications in primary care research.

Table 27: Steps to Designing and Conducting Semi-Structured Interviews (DeJonckheere & Vaughn, 2019)

<table>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Determining the purpose and scope of the study</td>
</tr>
<tr>
<td>2</td>
<td>Identifying participants</td>
</tr>
<tr>
<td>3</td>
<td>Considering ethical issues</td>
</tr>
<tr>
<td>4</td>
<td>Planning logistical aspects</td>
</tr>
<tr>
<td>5</td>
<td>Developing the interview guide</td>
</tr>
<tr>
<td>6</td>
<td>Establishing trust and rapport</td>
</tr>
<tr>
<td>7</td>
<td>Conducting the interview</td>
</tr>
<tr>
<td>8</td>
<td>Memoing and reflection</td>
</tr>
<tr>
<td>9</td>
<td>Analysing the data</td>
</tr>
<tr>
<td>10</td>
<td>Demonstrating the trustworthiness of the research</td>
</tr>
<tr>
<td>11</td>
<td>Presenting findings in a paper or report</td>
</tr>
</tbody>
</table>

6.4.1.1 Developing the Interview Guide

To gain an understanding of healthcare professional experiences and views of delivering supported self-management for asthma, a semi-structured guide
was developed, which allowed a more flexible approach to ensure that the same general areas of information were collected from each healthcare professional interview, whilst still providing freedom and adaptability to uncover personal perspectives and experiences from each participant. The guide included open ended questions in a conversational format, and was designed to take between 20-30 minutes. This interview time was deemed appropriate due to the busy clinics healthcare professionals were running on the day of data collection. The interview topic guide can be found in Appendix 14.

6.4.2 Ethical Considerations and Governance

Ethical approvals to complete the qualitative phase of the study were captured in accordance with the whole study approval and governance processes (please see section 5.3.2 and Appendices 7, 10, 11 & 12).

6.4.3 Study Population and Recruitment Strategy

Healthcare professionals from both the IMP²ART implementation and IMP²ART control groups, who had taken part in the observational recordings were invited to take part in the qualitative phase of the study. Healthcare professionals were invited to take part in the post-observational interviews prior to agreeing to take part in the observational recordings.

6.4.3.1 Healthcare Professional Consent

Healthcare professional consent to take part in post-recording semi-structured interviews were captured in the healthcare professional consent survey. The online consent survey included the statement:
‘I understand that I may be asked to take part in a short interview with the researcher after the recordings have taken place.’

Professional’s completed this consent process at least two weeks before the data collection took place, to ensure there was ample time for informed consent.

6.4.4 Procedure

Whilst organising the data collection procedures for the observational, video recordings, healthcare professionals were asked to arrange a convenient time for an interview to take place on the day the observational recordings were taking place. All interviews were conducted face-to-face and were often conducted once video recordings had taken place, however if a patient did not attend, or there was a break during the days scheduled patient appointments, interviews may have also be conducted then, depending on convenience for the healthcare professional. Interviews were recorded using an encrypted digital voice recorder. Audio files of the collected interview data were then transcribed verbatim. I then uploaded the interview transcripts to NVivo (Version 12) (platform for undertaking qualitative coding and analysis) for subsequent thematic analysis procedures.

6.4.5 Thematic Analysis

The analysis technique of Braun and Clarke (2006); Thematic Analysis, was chosen to analyse the data. The main theoretical standpoint of this approach is to recognise reoccurring ideas. Overall themes, followed by more in depth subthemes and further explanatory codes allows for specific patterns to be recognised and interpreted. Thematic analysis goes beyond simply accepting
given words and thoughts, and delves deeper into understanding implicit and explicit ideas within a whole data set. Themes, subthemes and finally codes and concepts can be derived from interpretations within data, until data saturation has been reached. Analysis was conducted following the work of Braun & Clarke (2006), six phases of thematic analysis (Table 28).

Table 28: Phases of Thematic Analysis (Braun & Clarke, 2006)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description of the process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Familiarising yourself with your data</td>
<td>Transcribing data, reading and re-reading the data, noting down initial ideas.</td>
</tr>
<tr>
<td>2. Generating initial codes</td>
<td>Coding interesting features of the data in a systematic fashion across the entire data set, collecting data relevant to each code.</td>
</tr>
<tr>
<td>3. Searching for themes</td>
<td>Collating codes into potential themes, gathering all data relevant to each potential theme.</td>
</tr>
<tr>
<td>4. Reviewing Themes</td>
<td>Checking if the themes work in relation to the coded extracts and the entire data set, generating a thematic ‘map’ of the analysis.</td>
</tr>
<tr>
<td>5. Defining and naming themes</td>
<td>Ongoing analysis to refine the specifics of each theme, the overall story the analysis tells, generating clear definitions and names for each theme.</td>
</tr>
<tr>
<td>6. Producing the report</td>
<td>The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.</td>
</tr>
</tbody>
</table>

6.4.5.1 Thematic Analysis: Qualitative Comparisons between implementation and control groups

In order to compare qualitative data between IMP²ART implementation and IMP²ART control group healthcare professionals, a qualitative comparative thematic analysis was conducted during the analysis stage. According to Guest et al., (2012), to conduct an appropriate qualitative comparison of two
sets of thematically produced data, the researcher qualitatively compares the content of narratives and highlights similarities and differences between groups. At the most basic level, an analyst simply examines the differential expression of themes across groups and notes which themes/concepts are similar across groups and which are different. This type of comparison is driven by two overarching questions:

“Are some themes present in one data set but not another?” and,

“If a theme is present in data sets from both groups in an analysis, is the expression of that theme different between groups?” (Guest et al., 2012)

As an overall aim of this thesis was to compare IMP²ART implementation group and IMP²ART control group healthcare professional’s delivery of supported self-management, to explore any key similarities or differences within the extracted themes, data from the two groups were coded separately, then compared and amalgamated to highlight similarities or contrasts of findings from both groups. A narrative exploration of key findings/themes can be found below.

6.5 Results

6.5.1 Participant Characteristics

Of the 12 healthcare professionals invited to participate, seven took part in post-observational recording interviews (three IMP²ART implementation group, and four IMP²ART control group healthcare professionals), including six practice nurses and one clinical pharmacist. For participants who did not
participate (n=5), reasons for non-participation included lack of time during data collection visits (overrunning or busy schedules and clinics). Participant demographics are outlined below in Table 29.

Table 29: Semi-structured interview participants' demographics

<table>
<thead>
<tr>
<th>Healthcare professional ID</th>
<th>IMP²ART implementation/control group</th>
<th>Age Group</th>
<th>Gender</th>
<th>Current Role</th>
<th>No. of years qualified in role</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP1</td>
<td>Control</td>
<td>40-50</td>
<td>Female</td>
<td>Practice Nurse</td>
<td>6 Years</td>
</tr>
<tr>
<td>HP3</td>
<td>Implementation</td>
<td>40-50</td>
<td>Female</td>
<td>Practice Nurse</td>
<td>30 years</td>
</tr>
<tr>
<td>HP4</td>
<td>Implementation</td>
<td>30-40</td>
<td>Female</td>
<td>Practice Nurse</td>
<td>5 years</td>
</tr>
<tr>
<td>HP5</td>
<td>Control</td>
<td>40-50</td>
<td>Male</td>
<td>Clinical Pharmacist</td>
<td>2 years</td>
</tr>
<tr>
<td>HP6</td>
<td>Control</td>
<td>50-60</td>
<td>Female</td>
<td>Practice Nurse</td>
<td>2 years</td>
</tr>
<tr>
<td>HP7</td>
<td>Control</td>
<td>50-60</td>
<td>Female</td>
<td>Practice Nurse</td>
<td>19 years</td>
</tr>
<tr>
<td>HP8</td>
<td>Implementation</td>
<td>50-60</td>
<td>Female</td>
<td>Practice Nurse</td>
<td>15 years</td>
</tr>
</tbody>
</table>

6.5.2 Key Themes

Thematic analysis produced a total of five over-arching themes (some of which contain subthemes); combining the concepts from both IMP²ART implementation and control group practice healthcare professionals. Discussions revealed personal opinions, views and experiences of supported self-management delivery during routine asthma reviews (for full thematic analysis coding frameworks see Appendix 15).
To preserve healthcare professional anonymity, quotes have been coded as: HP (Healthcare Professional), number 1-8, and C or I (Control or Implementation), depending on which IMP²ART group their general practice belonged to (e.g. HP1-C, HP3-I etc.). Table 30 below outlines the five key themes from the thematic analysis.
Table 30: Table of five key themes from thematic analysis (both IMP²ART control and implementation professionals)

<table>
<thead>
<tr>
<th>Theme</th>
<th>Main Findings from themes</th>
</tr>
</thead>
</table>
| 1) Understanding of Supported Self-Management | Healthcare professionals defined their understanding of what supported self-management meant to them using similar terminology. For example, both groups highlighted supported self-management as;  
  • empowerment, encouraging patients to take control of their asthma,  
  • understanding the patient’s condition,  
  • using a collaborative approach,  
  • supporting patients to make informed decisions about their care (shared decision making),  
  • ensuring patients have a ‘toolkit’ to manage their asthma, including resources and HCP support,  
  • Understanding the patient, the impact their asthma has on their lives, and how important asthma management is to them, is key to understand the context of the patient, then effective strategies can be further tailored to the patient. |
| 2) Barriers and Facilitators of Supported Self-Management Delivery | **Barriers:**  
The main barrier to effective delivery of SSM was lack of time allocated to routine reviews. Patients are often signposted to other services to address other issues as there is not enough time to do so within a standard review (e.g., stop smoking, anxiety), which could prevent delivering a holistic review and collaboratively addressing all the patient’s concerns for their asthma management.  
Control group professionals identified patients themselves as a barrier to effective supported self-management delivery.  
**Facilitators:**  
**Motivations:** Both groups acknowledged two distinct differences in their motivations to deliver effective SSM for asthma including internal, personal motivations, and external motivations. |
<table>
<thead>
<tr>
<th>Theme</th>
<th>Main Findings from themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Confidence:</strong></td>
<td>All healthcare professionals confirmed they are confident in the delivery of asthma supported self-management. All healthcare professionals stated they are always willing to attend training and/or learn about new approaches to treatment to stay up to date with asthma management, which would in turn sustain their confidence. Implementation group professionals acknowledged that sometimes their confidence can be affected by their workloads and trying to stay up to date with guidance/treatment.</td>
</tr>
<tr>
<td><strong>Practice Culture:</strong></td>
<td>Both groups regarded their individual general practices to have a positive practice culture to deliver the best care possible for patients.</td>
</tr>
<tr>
<td><strong>3) Strategies for supporting Self-Management for Asthma</strong></td>
<td>Healthcare professionals acknowledged the importance of patient education. Similar findings suggest that once patients understand their asthma (e.g., educating patient by explaining the inflammatory process and what each inhaler is specifically used for) they can then manage it more effectively. HCP’s reflected that often patients will say ‘I’ve never had it explained to me like that before’ and can then understand why they are undertaking certain steps to manage their condition. Although both groups acknowledged the importance of asthma education as a key SSM strategy, the implementation group also reflected on the importance of management plans and inhaler technique as necessary SSM components.</td>
</tr>
<tr>
<td><strong>4) Remote Asthma Reviews</strong></td>
<td>Healthcare professionals acknowledged there is a place for remote asthma reviews in primary care asthma management and regarded remote reviews as a useful alternative to see specific groups of patients; including those who may not otherwise be able to visit the practice, and for those who are known to the healthcare professional to have controlled asthma and can act as more of a ‘check in.’ All HCP’s stated they would prefer to see a patient face-to-face to deliver a more holistic asthma review, and to be able to notice more non-verbal communication.</td>
</tr>
<tr>
<td><strong>5) IMP²ART Programme (Implementation Group)</strong></td>
<td>Healthcare professionals views of the IMP²ART programme were positive, however stated they may not have learned anything new, but it has reiterated and emphasised HCP’s knowledge, skills and confidence on SSM delivery. The asthma review template was also seen to be a positive resource provided by the programme.</td>
</tr>
</tbody>
</table>
The section below will describe the findings of each theme in detail.

1) **Understanding of Supported Self-Management:**

The theme of ‘understanding of supported self-management’ highlights that healthcare professionals across both groups had similar opinions of what supported self-management for asthma means to them, and what they hope to achieve/deliver during a routine asthma review. Participants typically described supported self-management as empowering and encouraging patients to take control and ownership of their own asthma.

‘Empowering the patient’ HP1-C

‘I think empower is the most important word actually. It’s about tailoring and empowering patients to fully understand their condition to feel that they’re in control of that…’ HP5-C

‘…Encouraging them to make their own decisions on their treatment and their care…’ HP3-I

‘…Empowering the patient to take ownership for their asthma…’ HP4-I

Participants defined supported self-management as a collaborative approach to managing a patient’s asthma, through creating a positive healthcare professional and patient relationship, and supporting patients to make informed decisions about their care (shared decision making).

‘I think it’s about having a relationship between the practitioner and the patient…to help them make decisions on their asthma care.’ ‘…develop a relationship…’ HP3-I
'I think when we come up with a plan with what they want, what they think, what they agree with, we come up with the plan together.' HP5-C

'I think if you can get along with the patient and let them explain things…’ ‘Also being approachable…and making them feel more comfortable so they can actually ask, and that no question is silly.’

HP8-I

Healthcare professionals defined supported self-management as ensuring patients have a ‘toolkit’ to manage their asthma, including resources to make informed decisions about their health.

‘Encouraging them to make their own decisions on their treatment and their care but they feel as though they’ve got someone who they can ask for particular guidance.’ HP3-I

‘Understanding of their asthma and why it is the way it is and the toolkit they’ve got to help.’ HP1-C

‘So, in the past, years and years ago, it was as if we kept all the knowledge back to ourselves. Whereas now, the more you can impart on the patients, the more they can manage it.’ HP6-C

Additionally, participants described supported self-management as understanding the patient, the context in which they are living, and the impact their asthma has on their lives, to then tailor effective supported self-management strategies to the patient.
‘Key thing is to see their chronic condition in context of their lives… understanding patient goals, understanding the impact the condition has on a patient, impact on their life, understanding what they comprehend and what they feel capable to do.’ HP5-C

‘…tailoring it (asthma treatment) to their needs…’ HP8-I

‘...they have a great deal to say in the choices they have, so, there’s quite a lot they can interact with...’ HP3-I

2) **Barriers and Facilitators of Supported Self-Management Delivery**

Healthcare professionals communicated their personal barriers and facilitators to delivering supported self-management during routine asthma reviews. Subthemes of facilitators (motivations, confidence and practice culture) and barriers are outlined as subthemes below.

**Motivations:**

Healthcare professionals in both groups acknowledged internal and external motivations to deliver effective supported self-management for asthma. Internal, personal motivations included a vested interest in asthma and its management, a passion for people taking ownership of their conditions, and ensuring patients are treated in a way in which they would also like to be treated.

‘Because it works better, and I like to be treated that way, and I believe in it.’ HP6-C
'There’s also another more altruistic motivation to actually treat individuals in the way that I would want to be treated. I know I am a healthcare professional, but I would want to feel, that I owned, or was at least a partner in my care management.' HP5-C

‘I have a vested interest in asthma, I’ve always enjoyed looking after asthma.’ HP3-I

‘But yes apart from that I am quite passionate about people taking ownerships for their diseases…’ HP4-I

External motivations to deliver effective supported self-management included reasons such as; awareness of the increasing hospitalisations/deaths related to asthma, burden on the wider NHS, and the need to ensure effective management from primary care.

‘I’m very much aware of how, over the years, asthma may have not been correctly treated, whether it be medication wise or with all the other support services. And the hospitalisations for asthma, the deaths caused for asthma, untreated asthma, it’s a lot and it’s still quite high.’ HP6-C

‘The interest in kind of the self-management is, if they can’t sort their asthma right before it even becomes a big problem, that almost saves the hospital admission.’ HP3-I

‘Well, I think the biggest thing is the amount of asthmatics and deaths caused by asthma, that actually that’s what we want to prevent.’ HP8-I
‘…from a kind of a wider NHS point of view it’s to prevent hospitalisation.’ HP4-I

Confidence:

All healthcare professionals confirmed they are confident in the delivery of supported self-management for asthma. All healthcare professionals also stated due to the dynamic nature of asthma management, they are willing to attend training and/or learn about new approaches to treatment to stay up to date with asthma management, which would in turn sustain their confidence and provide more up to date tailored care to patients.

‘I think generally confident, I think you know, we get a new inhaler sometimes and it can take a while to work out how to work it yourself! (laughs). But yeah, I would generally I’m pretty confident…’ HP7-C

‘So, we all try to keep ourselves up to date, and we do go on courses, during covid a lot, virtual ones. But yes we try, you know nobody knows everything we’re all on a big learning curve aren’t we with everything.’ HP6-C

‘But I’m always up to learn new techniques or if there’s something that’s going to help… I kind of try and do that anyway, but yeah if there was programme or any kind of education I would sign myself up for it.’ HP1-C

‘I think I’m fairly confident, but there’s always things you can learn.’ HP3-I
‘I definitely would say it’s always worth reflecting and trying to keep up to date.’ ‘…there’s a lot to keep up to date.’ HP8-I

Healthcare professionals from the implementation group stated their confidence can sometimes be affected by their heavy workloads, and can often feel overwhelmed trying to stay up to date with guidance/treatment, but did acknowledge they would feel confident to approach other members of staff and work together to stay up to date.

‘There’s always tips you can pick up on from everyone else and I think that’s why nurses are always constantly trying to keep themselves updated on all the varying things we have to come across every day.’ HP3-I

‘I think when the other nurse has done her training, she has been dabbling, she’d done some online asthma training, but her confidence will grow, then that will mean it can be shared, a bit like with the diabetics, she’ll see them, so will I. And it’ll be great, because she’ll obviously been updated and she can feedback to me, so we do work really well together considering that we don’t work on the same site, we do support each other.’ HP8-I

Healthcare professionals were overall extremely motivated (both due to internal, personal and external, wider NHS factors) and confident to effectively deliver supported self-management, and felt supported by other members of their teams to address any issues in delivery they had collaboratively.
**Practice Culture**

Both groups regarded their individual general practices as having a positive practice culture to deliver the best care possible for patients, including embedding supported self-management into long term condition reviews and trying to empower patients to manage their conditions effectively. This positive practice culture facilitated delivery of supported self-management.

‘I have to say there is a culture of trying to empower our patients in general. You know, like trying to raise awareness and helping patients to understand what they can do, what our role is and we’re always trying to promote that.’ HP1-C

‘I think our practices has been doing the self-management plans, we have been quite a proactive practice with asthma and with other breathing conditions.’ HP3-I

Healthcare professionals also stated there was a culture within their practices to try and keep up to date with research and guideline recommendations, and to ensure continuous training/healthcare professional development for all healthcare professionals of the practice.

‘Yeah I do think so, you know they’ll print off or they’ll refer them to NHS reputable sites and things to check things out, so I think, a couple of the doctors, senior partners do, we have medical students, second year, foundation doctors as well. So, we’re very much for training and we’ve been talking about having student nurses as well.’ HP8-I
‘… following all the right guidance, and why it’s done and all the rationale behind it, and I think we all do.’ HP6-C

‘Yes, it’s a very, very good practice this. It’s very positive. We’re always trying to do better and give the patient’s a good experience too. We value good patient feedback because it means we’re doing a good job.’ HP6-C

Overall, both groups stated that they are working and delivering care within a positive practice environment and culture.

**Barriers**

Both healthcare professionals from the IMP²ART implementation and control group regarded the main barrier to effective delivery of supported self-management as lack of time allocated to a routine asthma review. Healthcare professionals felt there is not enough time to go into detail of supported self-management techniques such as the personalised asthma action plan, and that allocated time for an asthma review should be increased to ensure all supported self-management components can be discussed in detail with patients.

‘So, time is the biggest constraint because there’s an awful lot to get through in an asthma review. So, we have half an hour allocated in a year which is not enough.’ HP3-I

‘I think it’s just time.’ ‘but again, it’s that time. If I can have 30 minutes going forward…’ HP8-I
Healthcare professionals of both groups also stated lack of time can restrict more meaningful, patient-centred conversations from taking place including behaviour change discussions. Patients are often signposted to other services to address other issues as there is not enough time to do so within a standard review (e.g., stopping smoking services, anxiety), which could prevent delivering a holistic review and collaboratively addressing all the patients concerns for their asthma management.

‘So, I think they’re still a little bit dependant on us in taking ownership. We’re not really liberating them to maybe move forward because we’re not investing the time in their education to support them…’ HP5-C

‘So, things like the stop smoking, things like anxiety, that has to go elsewhere, because with the best will in the world we haven’t got that time…’ ‘…Sometimes the time restricts you for how deep you can go, and it tends to be that you have to skirt and then send to other people that have got more time. So, I try and be as involved as I can be, but time is a really big issue.’ HP3-I

Two participants, both in the control group, identified patients as a barrier to effective supported self-management delivery. Participants suggested that patients still regard healthcare professionals as the person who can ‘fix’ their asthma and do not take a collaborative view or ownership of their asthma management.

‘I think they’re still a little bit dependant on us in taking ownership.’ ‘…I don’t think patients understand it yet. Particularly
when we’re working with an older generation, they haven’t
adjusted to the idea that they’re partners in their health.’ HP5-C

‘They’re understanding, and how much information they want
really. Some people don’t particularly listen as well as other
people.’ HP7-C

3) Strategies for supporting Self-Management for Asthma

When discussing supported self-management strategies that are key to deliver
during a routine review, both groups acknowledged the importance of building
the foundation of patient education, and the importance of providing patients
with tailored information about the underlying contexts of their asthma and
asthma management (e.g., the inflammatory process, their symptoms, triggers
and the medications they are using and why).

‘… they get their brown and their blue inhalers mixed up. ‘Well, it’s
the reliever right okay, right. So do I take that one every day?’ So,
they even get their words mixed up. And then when I try and
explain the inflammatory process, and I try to get them to think of
the process… I say, ‘does this help?’ and they say, ‘you’re the first
person that’s ever explained this to me”. HP6-C

‘…if we explain why they’re taking that drug, they’re more like ‘ahh
I get it now.’ HP3-I

‘Quite often they’re unsure, and you’ll often find if they’ve got two
inhalers, a preventative and reliever, the one that they’re taking as
if it was their preventative is actually their reliever, and not really understanding the difference.' HP8-I

Healthcare professionals reflected that often patients will say ‘I've never had it explained to me like that before’ (HP6-C) and then patients are able to understand why they are undertaking certain steps to manage their condition. Additionally, all healthcare professionals noted the importance of assessing inhaler technique, and providing and collaboratively completing a personalised asthma action plan as necessary supported self-management components to discuss during a routine review.

‘Looking at the management plan is always there, so we’re looking at what their symptoms are, where their medication is, whether we can step down, whether we need to start stepping up…’ HP3-I

‘I think having the management plan. I think they just like having a clear plan of what to do when, when to increase, when to decrease and helping them to recognise their symptoms and pre-empt any problems.’ HP1-C

‘…Inhaler technique, because if they’re not doing that properly they’re going to get exacerbations, people aren’t necessarily going to think that’s down to inhaler technique, change to medication and what have you, when actually it’s just something as very simple as how they are taking it.’ HP4-I

Providing the patient with education about their individual asthma and management, the use of PAAPs, and inhaler technique and education about using their inhaler were regarded as the most important supported self-
management techniques, essential to deliver during a routine review and likely to be effective.

4) Remote Asthma Reviews

Due to the shift to remote asthma reviews during the COVID-19 pandemic, all healthcare professionals had views and experiences of remote supported self-management delivery, and confirmed there was a place for remote reviews in the management of asthma in primary care. Both groups regarded remote asthma reviews as a useful alternative for specific groups of patients, including; those who may not otherwise be able to visit the practice, and for those who are known to the healthcare professional to have asthma that is well controlled. In these instances, remote reviews can act as a ‘check in’.

‘…they work very, very well, particularly for patients who are struggling to come in’. ‘…those who can’t physically get in, you know mobility problems and things…’ HP6-C

‘For some it works brilliantly because it is just a check in.’ HP1-C

‘I do think for a lot of patients the remote reviews work perfectly well.’ ‘…So, I definitely think there is a place, and I think the doctors have found that especially with COVID a lot of the patient they can deal with quite nicely over the phone.’ HP8-I

Remote reviews were also seen as an effective tool to triage patients. If the healthcare professional felt that a patient’s asthma was uncontrolled, they would ask them to come into the practice for a face-to-face review.
‘A lot of people are more than happy to do the telephone, so it hasn’t been a big issue, and if I have needed to see patients they’re quite happy to come in, so it hasn’t been a particular issue.’ HP3-I

‘And more so it was helpful with patients because we’d asked them to do the asthma control test online, so we’d have a good basis to go from, and so there were patients that were really, really bad that we’d have to bring them in to see them.’ HP6-C

Remote reviews also offered the opportunity to provide patients with digital resources, which may be more accessible and understandable to patients.

‘I’ve found it helps being able to send links across like text links to Asthma UK and things like that. Just so they’ve got a visual prompt as well.’ HP1-C

‘Digital resources are really helpful because they’re ever present.’ HP5-C

However, the healthcare professionals from both groups noted some differences between face-to-face and remote delivery of asthma supported self-management. Although there was a place for remote reviews in asthma care, all healthcare professionals stated they would prefer to see a patient face-to-face to deliver a more holistic approach to patient care, and to be able to notice non-verbal communication. In addition, telephone consultations can be difficult with some patients when assessing their understanding and engagement.
‘I definitely find the phone calls a bit repetitive, and I’m discussing it again and it’s almost like it hasn’t really fully sunk in.’ … ‘over the phone was difficult with some people…’ HP1-C

‘I prefer face-to-face’s because on the phone you can’t pick up the non-verbal cues. So, when I patient comes in, I’m already assessing when they walk through the door. When they’re on the phone I can’t see them.’ ‘On the telephone you just can’t pick up the non-verbal’s.’ HP3-I

‘Oh yeah absolutely, I mean it’s looking at the whole person holistically isn’t it; you know it’s very task orientated if you’re doing it over the phone. But you know if they’re coming into the surgery you can see things more.’ HP4-I

‘I mean I would always much rather see someone face to face.’ HP8-I

Healthcare professionals also stated they feel unable to adequately assess patient’s inhaler technique during a remote review.

‘…you’re just guessing on inhaler technique. As it’s the main stay of treatment, you’re really struggling on making decisions. I mean we have had one today … were there’s a decision to not change the therapy because you think they’ll get some additional benefit from changing their inhaler technique, and you can’t judge that down the phone.’ HP5-C

‘Over the telephone we wouldn’t be able to look at their inhaler technique.’ HP4-I
Healthcare professionals confirmed there is a place for remote reviews in asthma care, however it is key to understand the patient, their understanding of their asthma, and how they manage their condition. HCPs also emphasised the importance of providing patient choice to ensure remote care is delivered effectively.

5) IMP²ART Programme (Implementation Group):
A main difference extracted from the data was the discussion of IMP²ART strategies within the implementation group. Healthcare professionals in this group felt that even though they may not have learned anything new from the IMP²ART programme, it had reiterated and expanded their knowledge, skills and confidence in supported self-management delivery. Additionally, HCPs described involvement the IMP²ART programme as a positive experience.

‘The IMP²ART has really just consolidated what we’re already doing. Unfortunately, I don’t feel that I have learned anything particularly new, but it’s been nice to know what we’re doing has been the right thing from day one.’ HP3-I

‘I feel like I knew anyway but IMP²ART has just reiterated really, and gone over the basics.’ HP4-I

The asthma review template was also seen to be a helpful resource provided by the IMP²ART programme. Healthcare professionals stated it has helped to guide and structure asthma reviews to ensure important components of a review are delivered.
‘Emphasised it yeah, what we need to do to try and keep these patients controlled, also the asthma control test, we were doing that any way, but that’s a really good way… and just generally the template. You know, we’re only human we can’t remember everything, so just having that template there as a prompt.’ HP4-I

‘I just think for me, if I go through the template, that can actually help to try and sort of keep to that structure, otherwise it is very easy to… to steer off (laughs).’ HP8-I

Overall, healthcare professionals stated that the IMP² ART workshops and modules had highlighted the importance of supported self-management, how to effectively deliver supported self-management in practice, and healthcare professionals described this as a positive experience.

6.6 Discussion

6.6.1 Overview of Qualitative Findings

From the results provided, five themes emerged, providing insight into healthcare professionals’ views and experiences of supported self-management for asthma;

1) Understanding of Supported Self-Management: Healthcare professionals defined their understanding of what supported self-management meant to them using similar terminology; empowerment, encouraging patients to take control of their asthma, using a collaborative approach and understanding the context in which the patient is living with their asthma.
2) Barriers and Facilitators of Supported Self-Management Delivery: Healthcare professionals identified a number of facilitators such as internal and external motivations, confidence and practice culture to deliver supported self-management. Barriers included lack of time allocated to routine reviews, preventing delivering a holistic review and collaboratively addressing all the patients concerns for their asthma management.

3) Strategies for Supporting Self-Management for Asthma: Healthcare professionals acknowledged the importance of patient education, asthma action plans and inhaler technique as necessary supported self-management components.

4) Remote Asthma Reviews: Healthcare professionals acknowledged there is a place for remote asthma reviews in primary care asthma management and regarded remote reviews as a useful alternative to see specific groups of patients.

5) IMP²ART Programme (Implementation Group): Healthcare professionals views of the IMP²ART programme were positive, however stated they may not have learned anything new, but it has reiterated and emphasised HCP’s knowledge, skills and confidence on supported self-management delivery.
6.6.2 Discussion of Findings/Themes in relation to qualitative objectives

Using the findings of the thematic analysis, this section will outline the findings in relation to the qualitative research objectives.

**Objective 1:** To explore healthcare professional views and experiences of delivering supported self-management to asthma patients.

Firstly, the theme of ‘Understanding of Supported Self-management’ highlights that all healthcare professionals have similar views and personal values of what supported self-management means to them, and how they hope to empower patients and work collaboratively to help them manage their condition. This consensus of definition could be due to the UK-wide clinical guidelines (BTS/SIGN, 2019; GINA, 2020; NICE, 2021), which healthcare professionals follow during an annual asthma review.

As discussed in section 1.2, Lorig & Holan (2003), Grady & Gough (2014) and Vernooij et al., (2015), define supported self-management as an approach that includes both healthcare professional and patient, and ensures patients with LTCs have the knowledge, skills, confidence and support to manage the physical, emotional and social impact of their health conditions, where patients can play a joint role in guiding their own care. Healthcare professionals opinions from this qualitative analysis closely reflect these definitions. Clarity and agreement on the definitions ensures that all healthcare professionals have the correct foundations of knowledge to understand and receive supported self-management interventions.
Due to the shift to ‘**Remote Asthma Reviews**’ in response to the COVID-19 pandemic (Stewart et al., 2022), this theme was particularly useful to explore to ensure that the delivery of supported self-management was relevant to current practice. Remote asthma reviews were generally regarded as a useful alternative to see specific groups of patients. These patients included those who may not otherwise be able to visit the practice, and for those who are known to the professional to have controlled asthma, where they can act as more of a ‘check in.’ Professionals acknowledged there is a place for remote reviews in primary care asthma management, coinciding with current literature reviewing the provision of remote asthma care (Kinley et al., 2022; Thiyagarajan et al., 2020; Stewart et al., 2022).

Despite professionals agreeing that there was a place for remote reviews in primary asthma care, all healthcare professionals stated they would prefer to see a patient face-to-face to deliver a more holistic review, and to be able to notice more non-verbal communication. This finding could highlight the need for more tailored remote behaviour change/patient-centred care interventions for asthma to be explored. In an existing literature review by Al-Durra et al., (2015), findings suggested that the majority of published literature regarding remote interventions for asthma, do not use any documented behavioural change theory, clinical guidelines, and/or assessment tools to inform their design. This research highlights that there is a need for targeted interventions to aim to increase healthcare professional’s ability to explore behaviour change conversations with asthma patients during remote consultations.
**Objective 2:** To explore how general practices prioritised supported self-management during routine asthma reviews.

The third theme of *Strategies for Supporting Self-Management for Asthma* confirmed that all professionals have similar views and experiences of which supported self-management strategies are most effective to ensure patients are able to manage their asthma. Patient education, inhaler technique, and the provision and collaborative completion of PAAPs were regarded as the most important techniques, which were prioritised during routine reviews. Clinical guidelines (BTS/SIGN, 2019; GINA, 2020; NICE, 2021), support these findings that all people with asthma should be offered self-management education, a written personalised asthma action plan and be supported by regular review. However, attendance to a regular routine review was not mentioned by healthcare professionals as a key component of supported self-management strategies for asthma.

**Objective 3:** To explore context, facilitators and barriers that healthcare professionals perceived affected their ability to deliver supported self-management (for example: participation in the IMP²ART implementation strategy; mode of consultation; duration of asthma review appointments).

The second theme of *Barriers and Facilitators of Supported Self-Management Delivery* explores the individual facilitators (subthemes of facilitators: personal motivations, confidence and practice culture) and barriers that healthcare professionals have towards the delivery of supported self-
management. The findings suggested that all healthcare professionals have similar motivations (both internal and external, wider-NHS implications), and similarly high levels of confidence and self-efficacy. However, it could be that all individuals were already confident in their abilities. This level of healthcare professional confidence could be explained due to the types of healthcare professionals from both groups who volunteered to take part in the interviews (and observational recordings), who may have already had high levels of self-efficacy for their delivery of care to be recorded, analysed and used for research purposes.

Although all healthcare professionals stated they were confident in supported self-management delivery, implementation group practices acknowledged that sometimes their confidence was affected by their workloads and trying to stay up to date with guidance/treatment. As primary healthcare professionals who deliver asthma care often specialise in other LTCs (e.g., diabetes, heart conditions), participants felt confidence could be strained by having to be aware of all the varying condition management approaches. IMP²ART implementation healthcare professionals, however, acknowledged that if they were unaware of any asthma management techniques, they could approach colleagues within their practice to support and learn from each other. This approach to collaborative working could be due to the ‘whole team’ approach which is embedded in the IMP²ART implementation strategies to positively impact practice views and culture on supported self-management. One of the most important tasks for the first facilitation workshop is to engage the practice team in the aims and ethos of IMP²ART. The team education module (Module
one) was designed to encourage collaborative team working towards supported self-management by exploring the practices perceived importance, understanding and procedures around supported self-management.

Levels of healthcare professional motivation and confidence also coincides with the subtheme of facilitators of supported self-management; ‘Practice Culture.’ As stated in McCleary et al., (2018), implementation of complex interventions requires an organisational, whole systems approach. This theme highlights how both healthcare professionals of the IMP² ART implementation and control group felt their general practice had a positive practice workplace culture, which prioritised supported self-management, aimed to empower patients to effectively manage their conditions, engaged in training/learning opportunities to stay up to date with research/healthcare professional development, followed guidance, and continuously gained patient feedback. A workplace that encourages these components, and gives employees a sense of purpose, belonging, and empowerment can in turn improve connection and trust with staff members, ultimately improving the patient experience (Marshall et al., 2003). This finding also coincides with the Social Cognitive Theory (Bandura, 1986) discussed in Section 2.1, that individual’s learn not only through their own experiences, but also by observing the actions of others and the results of those actions. The organisation has a crucial role in creating a positive culture where individuals can learn from others behaviour, which promotes and enables an effective environment to support healthcare professionals to provide self-management.
One key element of the IMP\textsuperscript{2}ART implementation facilitation, and delivery of the implementation strategies was to consider the practice culture. If there is a culture of embracing change in a practice, this practice may be more ready to integrate IMP\textsuperscript{2}ART than practices where change has not always been successful in the past (Mannion & Davies, 2018). As with any group there may be power dynamics, for example between different healthcare professional groups or between different levels of seniority. The IMP\textsuperscript{2}ART online education module one aimed to address this issue by emphasising the importance of the whole team, and how each member of a practice has a significant role to play in supporting self-management.

Healthcare professionals from both the IMP\textsuperscript{2}ART implementation and control groups regarded the barriers to effective delivery of supported self-management as lack of time allocated to a routine asthma review. Healthcare professionals felt there is not adequate time allocated to annual reviews to delve into certain supported self-management techniques in enough detail, such as the personalised asthma action plan. Healthcare professionals of both groups also stated that lack of time restricted more meaningful, patient-centred conversations from taking place. Patients are often signposted to other services to address issues as there is not enough time to discuss behaviour change strategies within a standard review (e.g., stop smoking, anxiety), which could prevent delivering a holistic review and collaboratively addressing all the patients concerns for their asthma management. Future interventions could create more time-sensitive, tailored intervention training for healthcare professionals and supported self-management delivery which provide an
evidence-based approach to providing more timely, targeted interventions for delivery of specific supported self-management strategies.

Although both groups acknowledged lack of time as the main barrier to effective supported self-management delivery, IMP²ART control group professionals also identified patients themselves as a barrier to effective delivery. Control group healthcare professionals noted that patients considered professionals as the person who can ‘fix’ their asthma, and sometimes did not take a collaborative view or ownership of their asthma management. The IMP²ART implementation strategies emphasised to professionals how to encourage a patient to be more collaborative in their own care, and to provide resources to patients (e.g. a patient-facing asthma information website). This therefore suggests IMP²ART implementation group healthcare professionals aligned with the view that patients can be encouraged to take ownership of their conditions.

The final theme of the ‘IMP²ART Programme (Implementation Group)’ noted that the healthcare professionals whose practices were in the IMP²ART implementation group generally felt they had not learned anything new from taking part in the IMP²ART programme, but it has reiterated and emphasised healthcare professional’s knowledge, skills and confidence on supported self-management delivery, and was a positive experience overall. The asthma review template provided to IMP²ART implementation practices was also seen as a positive resource provided by the programme which helped guide and structure asthma reviews to ensure important components of a review were delivered. These results are similar to those reported by Morrissey et al.,
(2021), who stated that templates can improve documentation of key measures and act as a reminder tool within consultations. However, concerns in use of templates have been expressed that they may encourage a checklist approach to consultations, thereby restricting communication and reducing opportunities for discussion about supported self-management (Swinglehurst et al., 2012; Blakeman et al., 2011). However, findings from the implementation professionals suggest the template has aided their self-management discussions. It should be noted that healthcare professionals in the IMP²ART implementation group had more years of clinical experience and may well have already been motivated to deliver supported self-management. This could influence the confidence of the healthcare professional’s skills and knowledge in the area of supported self-management due to their years of experience working in the role.

6.6.3 Strengths and Limitations
A strength of the research was the quality of rich data collected, including healthcare professionals’ views and experiences of supported self-management delivery whilst currently working in primary care settings. A further strength of this phase of the research was the chosen method of semi-structured interviews. During the interview process, open ended questions were utilised, providing an opportunity for healthcare professionals to open up in different areas of asthma and supported self-management delivery they felt were important to discuss. I aimed to conduct the interviews in a professional and flexible approach, whilst encouraging the participants to delve into different questions by asking statements such as ‘can you expand on that a
little further for me please…” to ensure all questions were discussed in detail. Conducting this qualitative research allowed a valuable component of the mixed-methods thesis to be generated, and in conjunction with the findings of the systematic rapid realist review and observational study, the results strengthened the outcomes of the overall PhD triangulation.

However, the results from this qualitative research may be subject to certain limitations. For instance, healthcare professionals who agreed to take part in the semi-structured interviews were those recruited to take part in the observational video recordings. Healthcare professionals who took part in this phase of the research were likely to have been particularly confident in their knowledge and abilities to deliver supported self-management, as they were willing to be video recorded. Therefore, the study’s findings may have been limited by the absence of those healthcare professionals who may not have been as involved in research, confident in their abilities, or newly starting their careers in healthcare. However, this weakness could be mitigated by the inclusion of both IMP²ART control and implementation group participants when assessing any differences in findings between groups.

Additionally, the small sample size of seven participants may have only reflected the opinions and experiences of a limited number of healthcare professionals. Five healthcare professionals were unable to take part due to busy work schedules on the day of data collection. Findings may have differed if all healthcare professionals of the observational study were able to take part. To combat this imbalance, contacting other healthcare professionals from IMP²ART practices (implementation and control groups) to take part who had
not agreed to the video-recording study, may have allowed for extra data to be collected. This limitation however, aimed to be mitigated through the thematic methodology used to analyse the data, which ensures themes arise only when data saturation has been reached.

An additional limitation is the reflexivity of the data analysis. As I am a member of the IMP^2^ART team, my close connection and understanding of the programme may have influenced the analysis in favour of positive findings from the IMP^2^ART trial. Additionally, multi-disciplinary members of the IMP^2^ART team helped to interpret aspects of the data, which may have influenced the lens through which the data was interpreted. The findings of this qualitative research will be prepared for publication. When formulating the publication, I will work with experienced, qualitative researchers to second code and analyse the data, in an effort to reduce any risk of bias as a result of single coding.

### 6.7 Conclusions

The purpose of the qualitative research was to gain an in-depth understanding of healthcare professional’s thoughts, opinions and experiences of delivering supported self-management during routine asthma reviews. The main findings identified included; healthcare professionals shared understanding of supported self-management, barriers and facilitators of supported self-management delivery (including healthcare professional motivations, confidence and time barriers), important strategies for supported self-
management delivery (including patient education, asthma action plans and inhaler technique), and that there is a place in primary care for remote asthma care.

This research was conducted to ensure healthcare professional’s opinions and experiences of supported self-management were captured, evaluated and considered for any future recommendations. As healthcare professionals are at the forefront of delivering asthma care, it was imperative to understand their knowledge, motivations, barriers, experiences and ideas for effective implementation, to ensure they are able to transfer these collaborative supported self-management skills to work with patients.

The next chapter will summarise and triangulate the findings from the systematic rapid realist review, observational study, and semi-structured interviews to uncover any similarities, contrasts and significant conclusions for the delivery of supported self-management for asthma in UK primary care.
7. Summary of Findings

The aim of this chapter is to summarise and triangulate the key findings of the systematic rapid realist review (Chapter 4), the observational, quantitative findings of the delivery of supported self-management during routine asthma reviews (Chapter 5), and the in-depth qualitative interviews (Chapter 6) which were conducted with healthcare professionals who participated in the observational phase. By amalgamating the findings of all three phases of the PhD study, a deeper understanding of the topic area will be uncovered (Tashakkori & Creswell, 2007). These findings will be combined with existing evidence about supported self-management delivery for asthma, and generate evidence-based conclusions for how healthcare professionals can effectively embed supported self-management strategies into routine asthma care.

7.1 Triangulation Methodology

As discussed in the previous Methods Chapter (Chapter 3), triangulation methodology has been chosen to explore, summarise and interpret the findings of the three phases of this PhD research. Through combining and contrasting different forms of data, triangulation is a method used to increase the credibility and validity of research findings (Noble & Heale, 2019), and can help ensure that possible biases are overcome in individual studies, leading to enriched research findings.
7.1.1 Triangulation Protocol Methodology

The specific triangulation approach chosen for this PhD study is the ‘Triangulation Protocol’ methodology. Outlined by O’Cathain et al., (2010) & Farmer et al., (2006), this method is one of three triangulation techniques commonly used for integrating mixed methods research components. The Triangulation Protocol method is used when data of different forms (e.g., quantitative and qualitative) is collected and analysed separately for each component to produce different sets of findings. The process of triangulating the findings from different methods then takes place at the interpretation stage of a study, to create a full picture of the combined findings.

Figure 34 below shows the point of application for use of the three different triangulation techniques: 1) ‘Triangulation Protocol’, 2) ‘Following a Thread’, and 3) ‘Mixed Methods Matrix’.

![Figure 34: Point of application for the three techniques for integrating data for triangulation (O’Cathain et al., 2010)](image-url)
A step-by-step process for completing a Triangulation Protocol is provided by Farmer et al., (2006). The method requires producing a ‘Convergence Coding Matrix’ to display findings emerging from each component of a study on the same page. This is followed by consideration of where there is agreement, partial agreement, silence, or dissonance between findings from different components.

As the data for this thesis has three phases; 1) systematic rapid realist review, 2) observational, quantitative data and 3) qualitative, thematic data, has been analysed separately, I chose to use the Triangulation Protocol methodology as this approach is utilised when all data sources have been analysed separately, and ready for full interpretation of all findings are to be compared and contrasted.

The full Triangulation Protocol process is outlined below in Table 31.
Table 31: Six Steps of undertaking a Triangulation Protocol (Farmer et al., 2006)

<table>
<thead>
<tr>
<th>Step</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sorting</td>
<td>Sort findings from each data source or method into similarly categorised segments that address the research question(s) of interest to determine areas of content overlap and divergence.</td>
</tr>
</tbody>
</table>
| 2. Convergence Coding             | Identify the themes from each data source. Compare the findings to determine the degree of convergence of (a) essence of the meaning and prominence of the themes presented and (b) provincial coverage and specific examples provided in relation to each theme. Characterise the degree and type of convergence using the following typification’s of concurrence (or nonconcurrence) within theme areas. Convergence coding scheme:

1) Agreement = There is full agreement between the sets of results on both elements of comparison (e.g., meaning and prominence are the same, provincial coverage and specific examples provided are the same).

2) Partial agreement = There is agreement on one but not both components (e.g., the meaning or prominence of themes is the same, provincial coverage or specific examples provided are the same).

3) Silence = One set of results covers the theme, whereas the other set of results is silent on the theme or example.

4) Dissonance = There is disagreement between the sets of results on both elements of comparison (e.g., meaning and prominence are different; provincial coverage and specific examples provided are different). |
| 3. Convergence assessment          | Review all compared segments to provide a global assessment of the level of convergence. Document when and where researchers have different perspectives on convergence or dissonance of findings.                        |
| 4. Completeness assessment         | Compare the nature and scope of the unique topic areas for each data source or method to enhance the completeness of the united set of findings and identify key differences in scope and/or coverage. |
| 5. Research comparison             | Compare the assessments of convergence or dissonance and completeness of the united set of findings among multiple researchers to (a) clarify interpretations of the findings and (b) determine degree of agreement among researchers on triangulated findings. Plan for how disagreements will be handled and how final decisions on interpretations will be made. |
| 6. Feedback                        | Feedback of triangulated results to research team and/or stakeholders for review and clarification.                                                                                                                                                                               |
7.2 Summary of Findings from Three Phases of PhD Study

I next present a summary of the findings from the three individual phases of PhD study, before combining, contrasting and amalgamating the outcomes by completing the Triangulation Protocol and convergence coding matrix.

7.2.1 Summary of Findings from the Systematic Rapid Realist Review (Chapter 4)

The findings from the systematic rapid realist review identified six themes using data from 18 articles to describe how supported self-management is delivered during remote asthma consultations. The findings identified positive benefits associated with remote asthma care including; increased convenience, improved access (including for some vulnerable groups) and attendance at reviews, ability to conduct the core content of an asthma remotely (especially video consultations which enabled practical tasks such as checking inhaler technique), completion of asthma action plans (screen sharing or discussed with documents sent post-consultation), and continuity of care. Typically, these overrode any challenges associated with any technological difficulties imposed by remote consultations. The data suggest that overall remote consultations are more highly accepted than in person consultations for the studies included, and were an effective and safe alternative to face-to-face reviews.

7.2.2 Summary of Findings from the Observational Recordings (Chapter 5)

To summarise the findings of the observational, quantitative recordings, practice nurses mostly conducted routine asthma reviews, and on average,
duration of reviews was around 34 minutes. The supported self-management components that healthcare professionals spent most time discussing (ALFA scores) during routine reviews were; individual asthma condition and it’s management, collaboratively reviewing and completing a personalised asthma action plan and training for practical self-management activities (e.g., inhaler technique). The findings from the PCOF analysis identified areas of patient-centred care delivery which healthcare professionals delivered using a biopsychosocial focus, such as creating and maintaining relationships with patients, as well as discussing asthma action plans and medication reconciliation. The PCOF findings also identified areas for patient-catered care delivery improvement, such as conducting behavioural change discussions and upfront agenda setting. Scores from the BECCI analysis suggested that healthcare professionals are delivering empathetic care to patients, however, are not collaboratively discussing individualised approaches for ways in which a patient can proactively change their behaviour.

The subgroup analysis findings revealed that IMP²ART implementation groups, on average, spent a higher percentage of the consultation time incorporating and discussing supported self-management strategies during routine reviews (ALFA). Healthcare professionals of the implementation group also delivered a more patient-centred review (PCOF), and discussed more behaviour change strategies (BECCI) with patients than healthcare professionals of the IMP²ART control group. Concluding that on average, IMP²ART implementation healthcare professionals delivered more supported
self-management and behaviour change strategies, and provided a more patient-centred review during routine asthma reviews.

Between group analysis of the face-to-face and remote consultation groups found that on average, both groups spent similar percentages of time on supported self-management tasks during routine asthma reviews (ALFA). Similarly, both groups had similar scores for the delivery of patient-centred care (PCOF) and behaviour change strategies (BECCI), showing no significant differences in healthcare professional delivery of supported self-management between face-to-face and remote asthma consultations.

7.2.3 Summary of Findings from the Qualitative, Semi-Structured Interviews (Chapter 6)

The findings from the qualitative, semi-structured interviews with healthcare professionals, which aimed to gain an in-depth understanding of thoughts, opinions and experiences of delivering supported self-management during routine asthma reviews, identified five main themes. The main findings from the themes suggested; healthcare professionals had a shared understanding of supported self-management definitions, barriers and facilitators of supported self-management delivery (including healthcare professional motivations, confidence and time barriers), important strategies for supported self-management delivery (including patient education, asthma action plans and inhaler technique), and that there is a place in primary care for remote asthma care.
7.3 Triangulation of Findings

Following the Triangulation Protocol process outlined by Farmer et al., (2006), below I present the step-by-step process for completing the triangulation analysis and the ‘Convergence Coding Matrix’ (Table 32), to display findings emerging from each component of a study on the same document. Figure 35 provides the levels of agreement for each key findings from the triangulation method.

Step-by-Step process for completing Triangulation Protocol:

**Step 1: Sorting:** The key themes and findings from each phase of the PhD study were outlined in the Triangulation Protocol Convergence Coding Matrix (Table 32). As the themes were being inputted, and any replication occurred, I combined these themes together to determine areas of content overlap and divergence.

**Step 2: Convergence Coding:** To determine the level of agreement between the key themes identified from all stages of the study, I stated the ‘level of agreement with other phases of the research’ as either ‘agreement, partial agreement, silence or dissonance’ within Table 32 below. This allowed me to reflect on agreements or gaps within the presented themes to produce key findings which addressed the thesis objectives.

**Step 3: Convergence Assessment:** The next step was to review all compared segments to provide an overarching assessment of the level of convergence (levels of agreement). There was either agreement or partial
agreement on 80% (4 out of 5) themes. One theme had higher levels of dissonance which is discussed below in section 7.3.1.

**Step 4: Completeness Comparison:** To explore the completeness comparison of emerged findings, I related each finding to existing research discussed within this thesis. This created a more complete picture of how the key combined findings relate to the existing literature which has been critically discussed within this programme of work.

**Step 5: Researcher Comparison:** The findings were presented to my multi-disciplinary PhD supervisory group, to clarify interpretations and to determine the degree of agreement among researchers of triangulated findings. Full agreement was reached for each theme after discussions and clarifications within the group.

**Step 6: Feedback:** The findings of the triangulation process were presented to the AUKCAR Patient and Public (PPI) group in October 2022 (further discussed within Discussion Chapter 8: Section 8.2.2). The group provided feedback on the presented findings, and a Q&A session was held to discuss patient perspectives and implications of the presented results.
Table 32: Triangulation Protocol of three phases of PhD Study: Convergence coding matrix

<table>
<thead>
<tr>
<th>Key Theme/Finding</th>
<th>Present in Phase(s) of PhD Study</th>
<th>Key Findings</th>
<th>Level of Agreement &amp; Discussion (Agreement, Partial Agreement, Silence, Dissonance)</th>
<th>Relation to Existing Research Discussed within Thesis</th>
</tr>
</thead>
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| 1) HCP confidence and motivations, and general practice culture are facilitators of effective HCP delivery of supported self-management | Chapter 5: Quantitative, Observational phase  
Chapter 6: Qualitative, semi-structured interviews phase | • Within the qualitative, semi-structured interviews, a core theme discovered was facilitators of SSM delivery. Specifically, this included HCP levels of confidence, motivations, and practice culture.  
• HCPs confirmed they are confident in the delivery of asthma SSM.  
• HCPs acknowledged their internal, personal, and external motivations to deliver effective SSM for asthma.  
• All HCPs regarded their individual practice to have a positive culture to deliver the best possible care for | Agreement: Chapter 5:  
• Quantitative, Observational phase: Findings from the observational study suggest that IMP2ART implementation HCPs delivered SSM more effectively.  
• Theoretical informed interventions were embedded within the intervention strategy to improve healthcare professional confidence, motivations, and to influence the whole general practice culture to embed SSM. These findings suggest the IMP2ART strategies can help to facilitate SSM delivery.  
Silence: Chapter 4: Systematic Realist Review: Finding not explored within systematic realist review. | Use of theory and evidence-based models can increase HCP’s confidence and motivations to implementation (COM-B Model of Behaviour Change (Michie et al., 2011)). Practice culture can also be influenced by targeting the whole practice team. Recommended by Kennedy et al., (2013), the IMP2ART programme is a whole systems intervention, which targets all members of primary care to integrates SSM at the level of the patient, HCP, and service organisations, which has proven effective in improving outcomes for patients. |
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<th>Key Theme/Finding</th>
<th>Present in Phase(s) of PhD Study</th>
<th>Key Findings</th>
<th>Level of Agreement &amp; Discussion (Agreement, Partial Agreement, Silence, Dissonance)</th>
<th>Relation to Existing Research Discussed within Thesis</th>
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| 2) Lack of time and large, challenging workloads are perceived as barriers to HCP delivery of supported self-management | Chapter 5: Quantitative, Observational phase  
Chapter 6: Qualitative, semi-structured interviews phase | - Lack of time during routine reviews was the most prevalent barrier to SSM discussed in HCP interviews. HCPs felt lack of time impacts the ability to deliver SSM (e.g., PAAPs), and can restrict more meaningful conversations from occurring.  
- Patients are often signposted to other services to address other issues (e.g., stop smoking, anxiety), as allocated review time is limited. This prevents delivering a holistic review and collaboratively addressing patients | Dissonance: Chapter 5:  
- Quantitative, Observational phase: The quantitative, observational results suggested that healthcare professionals within the IMP²ART implementation group spent a higher percentage of time delivery/discussing SSM techniques. This finding highlights that IMP²ART strategies enable healthcare professionals to overcome the barrier of time within routine reviews.  
- The IMP²ART implementation programme provides the education and training to facilitate HCPs staying up to date with current asthma management approaches.  
- The observational recordings (Chapter 5) BECCI findings suggest healthcare professionals are not collaboratively discussing individualised approaches for | Despite the overwhelming and robust evidence base for supported self-management’s effectiveness, it is not yet routinely delivered in routine clinical practice (Dineen-Griffin, et al., 2019). Previous research has explored primary care nurses attitudes towards integrating research into practice, and suggests there is lack of clinician engagement and healthcare professionals’ beliefs about patient motivation to change their behaviour (Chisholm et al., 2012), or wider barriers such as time, workload, lack of training or managerial support and organisational barriers (Keyworth et al., 2018; |
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<th>Level of Agreement &amp; Discussion (Agreement, Partial Agreement, Silence, Dissonance)</th>
<th>Relation to Existing Research Discussed within Thesis</th>
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| 3) Healthcare professional and patient education is an effective supported self- | Chapter 4: Systematic Rapid Realist Review | - HCP education: Within the qualitative interviews, all healthcare professionals stated due to the dynamic nature of asthma management, they are | Agreement: (Chapter 4) Systematic Realist Review:  
- Findings suggested that remote consultations were a safe and effective mechanism to facilitate the delivery of individualised information and | There is an increasing need for primary care healthcare professionals to deliver a patient-centred review which facilitates skills for patient self-management, however there is a gap in healthcare professional |
|                   |                                 | concerns for their asthma management.  
- SSM delivery can be affected by HCP workloads and trying to stay up to date with guidance/treatment. As primary care HCPs who deliver asthma care often specialise in other conditions (e.g., diabetes, heart conditions), healthcare professionals felt delivery of care can be strained by having to be aware of all the varying management approaches. | ways in which a patient can proactively change their behaviour. This may be due to the lack of time within scheduled reviews to conduct behavioural conversations.  
Dissonance: Chapter 4: Systematic Rapid Realist Review: Results from the systematic realist review suggest that SSM can be effectively delivered via remote consultations. However time barriers were not assessed during this review. | Elwell et al., 2013; McArthur et al., 2021). |
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| management strategy | Chapter 5: Quantitative, Observational phase  
Chapter 6: Qualitative, semi-structured interviews phase: | always willing to attend training and/or learn about new approaches to treatment to stay up to date with asthma management, which is key for delivering patient-centred care to patients.  
- HCPs stated they continuously follow guidance, and engage in training/learning opportunities to stay up to date with research/healthcare professional development.  
- Patient education: HCPs described patient education as an effective tool for delivering asthma SSM (e.g. improving patient education can in turn improve asthma management). | personalised asthma education, resulting in increased patient understanding of their condition, improved health outcomes, and improved overall asthma control.  
Agreement: Chapter 5: Quantitative, Observational phase:  
- Observational results suggested that healthcare professionals engaged in the implementation strategies provided by the IMP²ART programme. Implementation HCPs delivered SSM more effectively, which highlight healthcare professional engagement in learning and educational modules. | education of theoretical frameworks to effectively support self-management and facilitate patient behaviour change (Dineen-Griffin et al., 2019).  
During the development phases of the IMP²ART programme, a systematic review was conducted (McCleary et al., 2018) to identify features of effective interventions (identified by the Theoretical Domains Framework (TDF)) on healthcare professional education to effectively deliver SSM for asthma. The TDF domains associated with effective asthma education for healthcare professionals were priorities for inclusion in the IMP²ART education modules for IMP²ART implementation healthcare |
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<th>Key Theme/Finding</th>
<th>Present in Phase(s) of PhD Study</th>
<th>Key Findings</th>
<th>Level of Agreement &amp; Discussion (Agreement, Partial Agreement, Silence, Dissonance)</th>
<th>Relation to Existing Research Discussed within Thesis</th>
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| 4) IMP²ART implementation strategies support HCP delivery of SSM for asthma | Chapter 5: Quantitative, Observational phase  
Chapter 6: Qualitative, Semi-structured interviews | HCPs from the IMP²ART implementation group spent more time delivering SSM strategies during routine reviews, delivered a more patient-centred review, and discussed more behaviour change strategies with patients, than control group HCPs. | Agreement: Chapter 6:  
- HCPs in the IMP²ART implementation group had positive views of the IMP²ART programme.  
- Findings suggest the programme has reiterated and emphasised HCP's knowledge, skills, and confidence of SSM delivery. The asthma review template was also seen to be a positive resource provided by the programme. HCPs stated it has helped guide and structure asthma reviews to ensure important components of a review are delivered.  
Silence: Not explored within the systematic realist review (Chapter 4). | Previously identified as a gap in asthma care of how to effectively implement SSM intervention into primary care (Pinnock, 2015; Pinnock et al., 2017). There is also a gap in healthcare professional education of any theoretical framework or evidence-based structure for providers to effectively support self-management and facilitate patient behaviour change (Dineen-Griffin et al., 2019). Key findings from this PhD add evidence to finding effective ways to encourage HCPs to routinely embed behaviour change interventions into their practice (Keyworth et al., 2018). |
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<th>Key Theme/Finding</th>
<th>Present in Phase(s) of PhD Study</th>
<th>Key Findings</th>
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<th>Relation to Existing Research Discussed within Thesis</th>
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| 5) Remote consultations devote similar proportion of time to face-to-face reviews for delivery of asthma supported self-management | Chapter 4: Systematic Rapid Realist Review  
Chapter 5: Quantitative, Observational phase  
Chapter 6: Qualitative, semi-structured interviews phase: | • Findings from the systematic rapid realist review provided evidence for positive benefits associated with remote asthma care including: increased convenience, improved access (including for some vulnerable groups) and attendance at reviews, ability to conduct the core content of an asthma remotely, completion of asthma action plans, and continuity of care. Typically, these overrode any challenges associated with technological challenges imposed by remote consultations.  
• The data suggests that overall remote consultations are more highly accepted than in person consultations | Agreement: Chapter 5: Quantitative, Observational phase:  
• Results from the observational study suggests there are no significant differences between the delivery of SSM between face-to-face and remote asthma consultations. Healthcare professionals spent similar amounts of time delivering SSM strategies, patient-centred care, and discussing behaviour change counselling in both the face-to-face and remote consultation groups.  
Agreement: Chapter 6: Qualitative, semi-structured interviews phase:  
• HCPs acknowledged there is a place for remote asthma reviews in primary care asthma management and regarded remote reviews as a useful alternative to see specific groups of patients.  
Dissonance: Chapter 6: Qualitative, semi-structured interviews phase: | Since the shift to remote consultations due to the COVID-19 pandemic, concerns have been raised about the impact that these styles of consultations may have on the interaction with the patient, compared to standard face-to-face reviews (Mann et al., 2021). Doubts still remained about if and when remote asthma consultations are a safe and effective alternative to being seen face-to-face (Kew & Cates, 2016). |
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|                   |                                 | for the studies I included, and were an effective and safe alternative to face-to-face reviews. | • Although HCPs stated remote reviews are effective in SSM delivery, HCPs would prefer to see a patient face-to-face to see non-verbal communication, and to deliver a more holistic asthma review.  
• HCPs stated they feel unable to assess patient inhaler technique during a remote review, and that telephone consultations can be difficult with some patients to assess their understanding and engagement. |                                                   |
Figure 35: Levels of agreement for each key finding from Triangulation Protocol
7.3.1 Summary of Triangulated Findings

Five key themes/findings emerged from completing the Triangulation Protocol process, combining the findings of the three phases of the PhD study;

1. Healthcare professional confidence, motivations and general practice culture are facilitators of effective healthcare professional delivery of supported self-management,
2. Lack of time and large, challenging workloads are perceived as barriers to healthcare professional delivery of supported self-management,
3. Healthcare professional and patient asthma education is one of the most effective supported self-management strategies,
4. IMP²ART implementation strategies are associated with increased healthcare professional delivery of asthma supported self-management,
5. Remote consultations devote similar proportion of time to face-to-face reviews for delivery of asthma supported self-management.

Below I will explore each key finding from the triangulation process.

7.3.1.1 Triangulation Key Theme 1: Healthcare professional confidence, motivations and general practice culture are facilitators of effective healthcare professional delivery of supported self-management:

The first key findings which emerged from the triangulation process was the facilitators of supported self-management delivery, including healthcare professional confidence, motivations and general practice culture. The qualitative phase (Chapter 6) thematic analysis suggests healthcare
professionals in both the IMP²ART implementation and control groups were confident in the delivery of asthma supported self-management and acknowledged their internal, personal and external motivations to deliver effective supported self-management for asthma. Additionally, all healthcare professionals regarded their individual general practices to have a positive practice culture to deliver the best care possible for patients, which prioritised and facilitated the provision of effective supported self-management.

The findings from the observational phase (Chapter 5) agreed with the qualitative themes, as findings suggested that IMP²ART implementation healthcare professionals may have delivered supported self-management more effectively. Embedded within the IMP²ART implementation strategy was theoretically informed, evidence-based theory to improve healthcare professional confidence and motivations, and to influence the culture of the whole general practice to embed supported self-management. The specific IMP²ART implementation theories which may have contributed to healthcare professional confidence and motivations (COM-B Model of Behaviour Change, Michie et al., 2011; TDF, Michie et al., 2005) and Practice culture influences (Kennedy et al., 2013) are further discussed in section 8.1.1.2 below.

**7.3.1.2 Triangulation Key Theme 2: Lack of time and large, challenging workloads are perceived as barriers to healthcare professional delivery of supported self-management:**

The triangulation finding theme two identified the barriers to healthcare professional delivery of supported self-management delivery, including lack of time during routine reviews, and large, competing workloads. A prominent
theme from the thematic analysis (Chapter 6) was that lack of time during routine reviews was the most prevalent barrier to effective supported self-management delivery. Healthcare professionals expressed that there is not enough time to discuss certain supported self-management techniques in detail, such as the personalised asthma action plan, and that lack of time can restrict more meaningful conversations from taking place. Healthcare professionals stated that patients are often signposted to other services to address further issues such as anxiety, or stop smoking discussions, as there is not enough time to support with these issues within a standard review, which prevents a holistic review that collaboratively addresses all the patients concerns for their asthma management.

However, analysis of the observational study (Chapter 5) showed that on average, healthcare professionals spend around 34 minutes conducting a routine asthma review, and spend on average 53.13% of the consultation time discussing supported self-management components (ALFA analysis). Additionally, the observational recordings (Chapter 5) and PCOF/BECCI analysis suggests that healthcare professionals are delivering higher levels of patient-centred care in areas such as creating and maintaining relationships with patients, and scores from the BECCI analysis suggested that healthcare professionals are delivering empathetic care to patients. However, PCOF/BECCI findings suggest healthcare professionals are not collaboratively discussing individualised approaches for ways in which a patient can proactively change their behaviour. This may be due to the lack of time within scheduled reviews to conduct behavioural conversations. This
suggests that healthcare professionals are discussing supported self-management strategies during routine reviews, but may need further training/support in how to ensure these conversations can take place in a timely but equally meaningful manner.

Another barrier stated by healthcare professionals was that supported self-management delivery can be affected by their workloads (delivering care for a number of other LTCs), and trying to stay up to date with developing guidance and treatment was a challenge. As primary healthcare professionals who deliver asthma care often specialise in other conditions (e.g., diabetes, heart conditions), healthcare professionals felt delivery of care can be strained by having to be aware of all the varying management approaches, which are often updated.

This finding was most challenged by the results of sub-group analysis within the observational study (Chapter 5), which found that healthcare professionals within the IMP²ART implementation group spent a higher percentage of time delivering and discussing supported self-management components. This finding highlights that IMP²ART strategies may enable healthcare professionals to overcome the barrier of lack of time within routine reviews to embed supported self-management strategies. Findings suggest healthcare professionals are spending time on supported self-management strategies, however, may need support in how to use time within asthma reviews more effectively. Additionally, the IMP²ART implementation programme provided educational and training resources to facilitate healthcare professionals to stay up to date with current asthma management approaches. Findings from
the systematic realist review (Chapter 4) partially disagreed with some of the barriers stated, as results suggested supported self-management can be effectively delivered via remote consultations. However specific healthcare professional barriers were not assessed during this review.

7.3.1.3 Triangulation Key Theme 3: Healthcare professional and patient education is an effective supported self-management strategy:

The third finding that was identified in all three phases of the PhD study was that both healthcare professional and patient asthma education is an effective strategy for supported self-management. Within the qualitative interviews (Chapter 6), healthcare professionals stated that due to the dynamic nature of asthma management, they are willing to attend training and learn about new approaches to treatment to stay up to date with asthma management, which they understood to be key for delivering patient-centred care to patients.

Healthcare professionals stated they continuously follow recommended guidance, and engage in training and learning opportunities to stay current with research/healthcare professional development. This enables healthcare professionals to transfer their education to patients for effective supported self-management. Healthcare professionals of the qualitative interviews (Chapter 6) also suggested the most effective tool for delivering effective asthma supported self-management is patient education. When patients understand their asthma (e.g., educating patient by explaining the inflammatory process and what each inhaler is specifically used for) they can then manage it more effectively. Healthcare professionals reflected that often patients will say ‘I’ve
never had it explained to me like that before’ and patients can then understand why they are undertaking certain steps to manage their condition.

In agreement, the systematic rapid realist review (Chapter 4) findings suggested that remote consultations were a safe and effective mechanism to facilitate the delivery of individualised information and personalised asthma education, resulting in increased patient understanding of their condition, improved health outcomes, and improved overall asthma control. Similarly, the qualitative analysis of the semi-structured interviews (Chapter 6) revealed healthcare professionals engaged in the IMP²ART online education modules which highlight healthcare professional engagement in learning, education strategies and resources. This engagement was further evidenced in the findings of the observational study (Chapter 5) which found that healthcare professionals of the IMP²ART implementation group delivered supported self-management strategies more effectively compared to those of the control group. Highlighting healthcare professional knowledge retention from training (possibly due to the IMP²ART educational strategies).

7.3.1.4 Triangulation Key Theme 4: IMP²ART implementation strategies support healthcare professional delivery of supported self-management for asthma:

IMP²ART implementation strategies may influence the effective delivery of supported self-management for asthma. Within the quantitative, observational recording phase (Chapter 5), healthcare professionals from the IMP²ART intervention group spent a higher percentage of time delivering supported self-management strategies during routine reviews, delivered a more patient-
centred review, and discussed more behaviour change strategies with patients than healthcare professionals of the IMP²ART control group. Concluding that IMP²ART implementation strategies may be successful for improving the delivery of supported self-management strategies during routine asthma reviews.

This finding was further strengthened by the themes identified in the qualitative, semi-structured interviews (Chapter 6), which found that healthcare professionals from the IMP²ART implementation group regarded the IMP²ART programme as a positive experience which encouraged them to deliver and communicate supported self-management strategies with patients. Findings suggested the IMP²ART programme reemphasised healthcare professional’s knowledge, skills and confidence on supported self-management delivery rather than initiated new ways to deliver care. The asthma review template was also seen to be a positive resource provided by the programme, where healthcare professionals stated it helped guide and structure asthma reviews to ensure important components of a review are discussed and delivered. The possible mechanisms for healthcare professional behaviour change included in the IMP²ART implementation strategies are discussed in section 8.1.1.2 below. However, the finding that IMP²ART implementation strategies may influence the delivery of supported self-management was not explored during the systematic rapid realist review (Chapter 4), which exclusively investigated remote delivery of supported self-management, which may weaken the validity of this key triangulation theme.
7.3.1.5 Triangulation Key Theme 5: Remote consultations devote similar proportion of time to face-to-face reviews for delivery of asthma supported self-management:

The final key finding identified through the triangulation process was that remote consultations may be an effective alternative to deliver supported self-management during routine asthma reviews. This exploratory factor of whether the mode of consultation influences the delivery of supported self-management was introduced into the PhD thesis due to the shift to remote primary care delivery during the COVID-19 pandemic, and to ensure the research and findings produced were relevant to current practice. Findings from the systematic rapid realist review (Chapter 4) provided evidence for positive benefits associated with remote asthma care including; increased convenience, improved access (including for some vulnerable groups) and attendance at reviews, ability to conduct the core content of an asthma remotely, completion of asthma action plans, and continuity of care. Overall, these positive findings overrode any challenges associated with technological challenges imposed by remote consultations. The data suggested that overall, remote consultations are more highly accepted than in-person consultations for the studies I included, and suggested there were safe and effective elements of supported self-management delivery.

In line with the triangulation process, this finding agreed with the results of the quantitative, observational phase (Chapter 5). Results from the video recording study suggests that there are no significant differences between the delivery of supported self-management between face-to-face and remote
asthma consultations. Healthcare professionals spent similar amounts of time delivering supported self-management strategies (ALFA), patient-centred care (PCOF), and discussing behaviour change (BECCI) in both the face-to-face and remote consultation groups, providing evidence that remote asthma reviews can be an effective alternative for supported self-management delivery.

There was additional agreement from the qualitative, semi-structured interviews phase (Chapter 6), where the findings from the thematic analysis suggests that healthcare professionals acknowledged there is a place for remote asthma reviews in primary care asthma management, and regarded remote reviews as a useful alternative to see specific groups of patients. However, there were levels of disagreement within this finding. Although healthcare professionals stated remote reviews may be effective alternative mode of asthma care, they would prefer to see a patient face-to-face to deliver a more holistic asthma review, and to be able to notice more non-verbal communication. Additionally, healthcare professionals stated they feel unable to assess patient’s inhaler technique during a remote review, and that telephone consultations can be difficult with some patients to assess their understanding and engagement. To conclude this finding, there was general agreement that remote reviews may be an effective alternative to face-to-face reviews, although healthcare professionals still value the interpersonal opportunities associated with face-to-face care, and feel more confident to discuss certain self-management strategies during a face-to-face review.
7.4 Conclusions and Next Steps

The use of the Triangulation Protocol method (Farmer et al., 2006) has allowed for the systematic integration of findings throughout all phases of the thesis to be compared, contrasted and amalgamated. Five key findings were identified from the approach. The next chapter will discuss the thesis as a whole, and will explore the triangulation findings further in relation to both overarching thesis objectives and existing research. Thesis strengths and limitations will be discussed, in addition to reflections of the impact of the COVID-19 pandemic on this research.
8. Discussion Chapter

In this discussion chapter, I will summarise the findings from the triangulation protocol process in relation to the PhD objectives, discuss the findings within the context of existing published literature and highlight the strengths and limitations of the overall thesis.

8.1 Summary of Findings

As outlined in the previous summary of findings chapter, the findings of all three stages of the PhD study have been triangulated to create an overall evaluation of; how supported self-management is delivered in routine primary care, differences between the IMP²ART implementation and control groups, and explores the delivery of supported self-management via remote care.

Five key themes were produced from the Triangulation Protocol process (Farmer et al., 2006):

1. Healthcare professional confidence, motivations and general practice culture are facilitators of effective healthcare professional delivery of supported self-management,
2. Lack of time and large, challenging workloads are perceived as barriers to healthcare professional delivery of supported self-management,
3. Healthcare professional and patient education is an effective supported self-management strategy,
4. IMP²ART implementation strategies support healthcare professional delivery of supported self-management for asthma,
5. Remote consultations devote similar proportion of time to face-to-face reviews for delivery of asthma supported self-management. To reiterate these findings, a schema is presented below (Figure 36). Triangulation findings are then presented in relation to the overarching PhD thesis objectives and critically discussed within the context of existing research.
**Phase 1:** Systematic Rapid Realist Review exploring the safety, clinical effectiveness and acceptability of the delivery of supported self-management via remote asthma reviews.

**Phase 2:** Observational recordings of routine asthma reviews in IMP²ART practices to explore the delivery of supported self-management strategies in general practice.

**Phase 3:** Semi-structured interviews with IMP²ART healthcare professionals to explore experiences, attitudes and opinions of self-management delivery (thematic analysis).

**5 Key findings from Triangulation**

1. HCP confidence and motivations and General Practice culture are facilitators of effective HCP delivery of supported self-management.
2. Lack of time and large, challenging workloads are perceived as barriers to HCP delivery of supported self-management.
3. Healthcare professional and patient asthma education is one of the most effective supported self-management strategies.
4. IMP²ART implementation strategies are associated with increased HCP delivery of asthma supported.
5. Remote consultations devote similar proportion of time to face-to-face reviews for delivery of asthma supported self-management.

*Figure 36: Schema of summary of findings*
8.1.1 Summary of Findings in Relation to Thesis Objectives and Existing Research

Through a systematic rapid realist review exploring remote consultations and delivery of supported self-management (Chapter 4), an in-depth, observational analysis of healthcare professional supported self-management delivery in routine primary care (Chapter 5), and semi-structured interviews with healthcare professionals (Chapter 6), the overall PhD project aimed to (as stated in Chapter 3);

1. understand how supported self-management is delivered during routine primary care asthma reviews.
2. explore differences (if any), between healthcare professional delivery of supported self-management within both IMP²ART implementation and control groups, and any differences between the delivery of supported self-management between face-to-face and remote asthma consultations.

The sections outlined below will address the findings of the PhD thesis in relation to both objectives and existing literature discussed throughout this programme of work.
8.1.1.1 PhD Thesis Objective 1: To understand how supported self-management is delivered during routine primary care asthma reviews:

The findings from this PhD thesis provide a comprehensive overview of how supported self-management is delivered by healthcare professionals in a UK primary care context, including details of which supported self-management components are regularly discussed and delivered, and provides evidence and practical recommendations for areas of healthcare professional supported self-management delivery improvement.

Firstly, findings from the observational study (Chapter 5) has provided an understanding of how supported self-management is delivered in clinical practice. Analysis of the ALFA framework showed that on average healthcare professionals spend around 34 minutes conducting an asthma review, and spend around 53.13% of consultation time discussing supported self-management techniques and components. Delivery of patient-centred care and behaviour change counselling (PCOF/BECCI) analysis suggests that healthcare professionals were able to create and maintain relationships with patients, as well as discuss asthma action plans and medication needs. The PCOF findings also identified areas for future patient-catered care delivery improvement, such as the need to conduct behavioural change discussions and upfront agenda setting. Scores from the BECCI analysis found similar results, and suggested that healthcare professionals are delivering empathetic conversations and care to patients, however, are not then collaboratively discussing individualised approaches for ways in which a patient can proactively change their behaviour.
Healthcare professional confidence, motivations and general practice culture were found to be facilitators of effective healthcare professional delivery of supported self-management. This finding highlights how future interventions should aim to influence these individual healthcare professional behaviours to further enhance healthcare professional delivery of supported self-management. As discussed in section 2.2.3 by Keyworth et al. (2018), bringing evidence into clinical practice is an ongoing challenge due to the organisational and healthcare professional barriers in primary care. However the findings of this thesis support existing research which suggests use of theory and evidence-based models (COM-B; Michie et al., 2011 and TDF; Michie et al., 2005) may increase healthcare professional’s confidence and motivations to implementation.

Another understanding which stemmed from the results of this thesis suggests that healthcare professional lack of time and large challenging workloads are barriers to delivering supported self-management. This conclusion supports the existing research, that despite the overwhelming and robust evidence base for supported self-management’s effectiveness, it is not yet routinely delivered in routine clinical practice due to barriers to implementation; such as time, workload, lack of training or managerial support (Elwell et al., 2013; Keyworth et al., 2018; Dineen-Griffin et al., 2019; McArthur et al., 2021). Healthcare professionals expressed that there is not enough time to discuss certain supported self-management techniques in enough detail, such as the personalised asthma action plan, and that lack of time can restrict more meaningful behavioural conversations from taking place. Healthcare
professionals stated that patients are often signposted to other services to address other issues associated with their asthma such as anxiety or stop smoking discussions, which prevents delivering a holistic review and collaboratively addressing all of the patient’s concerns for their asthma management. Lack of time during routine reviews was perceived to be a core barrier to asthma patient care. Despite these findings, analysis of the observational study (Chapter 5) showed that on average, healthcare professionals spend around 34 minutes conducting a routine asthma review, and spend on average 53.13% of the consultation time discussing supported self-management components. Highlighting that healthcare professionals may need more support/training on how to implement timely and meaningful supported self-management strategies into routine care, and more support/guidance must be implemented to alleviate competing agendas that primary healthcare professionals face when delivering asthma care.

When conceptualising the findings of this PhD thesis in relation to the COM-B model (Michie et al., 2011), the findings outlined above suggest that healthcare professional capability and motivations to deliver effective supportive self-management were apparent during routine review delivery, however healthcare professionals lacked physical and social opportunity to incorporate certain supported self-management approaches e.g. individualised behavioural discussions (as discussed in Chapter 5). This finding suggests future research and areas of intervention development should aim to increase healthcare professional opportunities to deliver effective supported self-management components and discussions into routine asthma reviews.
Individual general practice culture can also be influenced by targeting the whole practice team (triangulation theme one). Recommended by Kennedy et al., (2013), the IMP²ART programme is a whole systems intervention, which targets all members of primary care to integrate supported self-management at the level of the patient, healthcare professional and organisations, which has proven effective in improving outcomes for patients. By identifying these key facilitators of healthcare professional delivery of supported self-management, future training and development opportunities for primary healthcare professionals should incorporate these evidence-based approaches to influence the delivery of supported self-management.

Another key theme of the triangulation process suggests that asthma education for both healthcare professionals and patients is a core component of supported self-management delivery. All three phases of the PhD study identified asthma education as an essential pre-requisite to delivery of supported self-management, and asthma education was found to be as equally important for both patients and healthcare professionals. Healthcare professionals reflected that once patients understand their condition(s) (e.g., educating patient by explaining the inflammatory process and what each inhaler is specifically used for), they are then able to manage the symptoms and treatments more effectively. Healthcare professionals reflected that often patients will say ‘I’ve never had it explained to me like that before’ and once educational discussions have taken place, patients are then able to understand why they are undertaking certain steps to manage their condition. However, this PhD study did not explore patient perceptions of asthma
education, which would further strengthen this finding. Patient education of their individual asthma should be prioritised as a discussion point within routine asthma reviews, and even incorporated into review templates to ensure education is discussed within all interactions.

8.1.1.2 PhD Thesis Objective 2: To explore differences (if any), between healthcare professional delivery of supported self-management within both IMP²ART implementation and control groups, and any differences between the delivery of supported self-management between face-to-face and remote asthma consultations:

Differences between IMP²ART implementation and IMP²ART control groups delivery of supported self-management:

The second objective of this thesis was to explore if the IMP²ART implementation strategies influenced healthcare professionals to communicate and deliver supported self-management for asthma more effectively during routine asthma reviews. One key finding which emerged from the triangulation protocol process was that IMP²ART implementation strategies may improve healthcare professional delivery of supported self-management for asthma. Both the observational recording phase (Chapter 5) and qualitative, semi-structured interviews (Chapter 6) findings suggested that healthcare professionals within the IMP²ART implementation group spent more time delivering and incorporating supported self-management strategies into routine reviews. Specifically, results of the observational study found that
IMP²ART healthcare professionals spent a higher percentage of time delivering supported self-management strategies during routine reviews, delivered a more patient-centred review, and discussed more behaviour change counselling with patients, compared to healthcare professionals of the IMP²ART control group. Healthcare professional’s personal views and experiences of supported self-management delivery (Chapter 6) suggested the IMP²ART programme was a positive experience and encouraged them to deliver and communicate supported self-management strategies with patients, reemphasising their knowledge, skills and confidence.

These findings could be due to a number of reasons; individual differences and personalities of healthcare professionals and patients when taking part in the research, purposefully sampled participants, sample size of groups and bias of individual coding (as discussed in section 5.5.4 and further in section 8.3). However, it is important to reflect on the IMP²ART implementation strategies which may have functioned as mechanisms towards the significant changes in IMP²ART implementation group healthcare professional’s communication styles and behaviours.

*Implementation Strategies:*

As stated in Chapter 1 & 2, the IMP²ART implementation strategies were developed by embedding both individual behavioural and organisational theories into implementation approaches. The IMP²ART implementation strategies delivered to healthcare professionals included healthcare professional education (two education modules). The online modules included
an introductory module which aimed to raise awareness of the benefits of supported self-management and increase engagement, motivation and commitment to supporting self-management so that it became a priority across the whole practice team. The second module was an in-depth theoretically informed module (developed using the TDF framework (Michie et al., 2005)), completed by healthcare professionals in the practice most involved with delivering asthma care. Module two aimed to enable healthcare professionals to use behaviour change counselling in clinical practice to promote effective supported self-management. On completion of the course, it was expected that learners were able to; understand the concept of supported self-management, identify the barriers to effective supported self-management, know a range of techniques to support individual behaviour change, reflect on various approaches to supported self-management, and be motivated to adopt the IMP²ART resources identified in their practice implementation plan.

In addition to the completion of the online educational modules, general practice staff of implementation practices received facilitation training sessions provided by nurse specialist facilitators to facilitate implementation of IMP²ART within practices. The facilitator guided the practice to develop their ‘team implementation plan’ for implementing IMP²ART, discuss how core strategies can be adopted/adapted to suit the practice routines, and identify additional strategies that might help individual practice. Facilitators observed progress offering additional support and, if necessary, visits to practices struggling to implement supported self-management.
**Theory Development:**

As discussed in Chapter 2 (section 2.5.3), central to the IMP²ART programme theory are underlying theories and models used to develop the intervention implementation strategies:

1) The iPARIHS (Harvey & Kitson, 2016)

2) COM-B Behaviour Change Theory (Michie et al., 2011)

3) Theoretical Domains Framework (Michie et al., 2005) for healthcare professional educational module development,

4) Motivational Interviewing strategies (Miller & Rollnick, 2012),

Extensive research states that effective communication is imperative in clinical interactions (Ali, 2017; Van Den Muijsenbergh & Van Weel, 2019). Within primary care, the value of effective communication in nurse-patient clinical interactions can enhance greater patient engagement in decision making, improve patient adherence to medication and treatment plans, increase social support, safety, and patient satisfaction in care (Henly, 2016; Kwame & Petrucka, 2021). Additionally, there is an increasing need for primary healthcare professionals to deliver a patient-centred review, which facilitates skills for patient self-management. However, there is a gap in healthcare professional education of any theoretical framework to effectively support self-management and facilitate patient behaviour change (Dineen-Griffin et al., 2019).

During the development phases of the IMP²ART programme, a systematic review was conducted by McCleary et al., (2018) to identify features of
effective interventions for healthcare professional education to effectively deliver supported self-management for asthma. The Theoretical Domains Framework (TDF) (Michie et al., 2005) acted as a framework to structure and synthesise the evidence for effective education strategies. The TDF domains were associated with effective asthma education for healthcare professionals (McClatchey et al., 2022) and were therefore priorities for inclusion in the IMP²ART education modules for IMP²ART implementation healthcare professionals (e.g. TDF Domain ‘Goals’ was implemented into education modules through module content such as identifying actions that can be used to support patients to self-manage their asthma. The TDF domain ‘social/professional role and identity’ was addressed by clearly defining potential roles of various staff/professionals in general practice).

As stated by Dineen-Griffin et al., (2019), there is a gap in healthcare professional education of any theoretical framework or evidence-based structure for providers to support self-management and facilitate patient behaviour change. Additionally, how to effectively implement supported self-management interventions into primary care has previously been identified as a gap in asthma care (Pinnock, 2015; Pinnock et al, 2017). Use of the combined theories within the IMP²ART implementation development process suggest that the intervention strategies and theory development were associated with a change in healthcare professional behaviour to deliver supported self-management. The findings of this thesis has created evidence that theoretical underpinnings of the IMP²ART programme may address the gap of finding effective ways to encourage healthcare professionals to
routinely embed behaviour change interventions into their everyday work (Keyworth et al., 2018; Dineen-Griffin et al., 2019).

**Differences between face-to-face and remote delivery of supported self-management:**

Due to the shift to remote asthma care during the COVID-19 pandemic, an important, additional objective of this PhD thesis was to explore the between-group differences of healthcare professionals delivery of supported self-management delivery, communication styles and behaviours within remote and face-to-face asthma consultations. The additional objective was incorporated into the research to explore the delivery of supported self-management within the existing context of UK asthma care, and to ensure findings were relevant to current practice and a post-COVID-19 era of healthcare delivery. Findings from all three phases of this PhD thesis agreed that remote reviews may be a clinically effective alternative to face-to-face reviews, and were safe and accepted by both patient and healthcare professionals (Chapter 4). Results from the observational study (Chapter 5) revealed that healthcare professionals spent similar amounts of time delivering supported self-management strategies, patient-centred care and discussing behaviour change in face-to-face and remote consultation groups.

However, healthcare professionals may still value the interpersonal, holistic communication opportunities associated with face-to-face care (Chapter 6). Healthcare professionals acknowledged that there is a place for remote
asthma reviews in primary care asthma management, and may be a useful alternative to see specific groups of patients (e.g., those with well controlled asthma and who have an existing relationship with their primary healthcare professional). However, this finding emphasised the need for patient choice regarding the mode of their consultation, and are consistent with existing research that healthcare professionals must use advanced communication skills to identify patient’s views and preferences, and engage the patient in partnership to manage their health to arrive at shared goals and plans (Maghul et al., 2022).

Since the shift to remote consultations due to the COVID-19 pandemic, concerns have been raised about the impact that these modes of consultations may have on the interaction with the patient, compared to standard face-to-face reviews (Mann et al., 2021). However, the finding that asthma supported self-management can be delivered effectively during remote reviews may provide opposing evidence to research where doubts remain about if and when remote asthma consultations are a safe and effective alternative to being seen face-to-face (Kew & Cates, 2016). This theme is particularly strengthened by being apparent within all phases of the PhD study, concluding that investigating remote delivery of supported self-management from existing research (Chapter 4), observations of healthcare professionals in clinical practice (Chapter 5), and exploring healthcare professionals views and experiences (Chapter 6), has created a substantial evidence base for this finding.
8.2 Strengths of the Thesis

The strengths and limitations of the systematic rapid realist review (Chapter 4), observational video recordings (Chapter 5), and qualitative semi-structured interview phases (Chapter 6) are discussed in detail in the corresponding chapters in this thesis. This section will consider broader strengths and limitations of the overall PhD programme of work.

8.2.1 Mixed Methods Methodology

Firstly, a major strength of this thesis, is the mixed methods approach. As outlined in the methods chapter (Chapter 3), a mixed methods approach allows researchers to explore diverse perspectives and uncover relationships that exist between the intricate layers of multifaceted research, providing data which is more comprehensive and a more complete understanding of the problem and potential solutions (Vedel et al., 2019). By using systematic realist review, observational and qualitative interview methods in this thesis, some of the limitations of each individual approach may have been minimised. The mixed methods approach enabled an in-depth exploration of broader healthcare perspectives of routine supported self-management delivery, as well as developed an understanding of how supported self-management is delivered in routine clinical practice in primary care. Additionally, the triangulation approach provided a comprehensive understanding off all methodologies, and produced an evidence-based framework of the overall findings, which can only be achieved when combining and comparing findings of mixed methods data.
An additional strength of the methodology chosen within this thesis is the high level of correlation between the quantitative tools chosen to measure the delivery of supported self-management in Chapter 5. As outlined in the Correlation Matrix (Table 26), there was a positive correlation between all measures (ALFA, PCOF & BECCI). This analysis provides evidence that all three measures have an overlap and are linearly related, which suggests use of all three measures together may be an effective tool to observe the delivery of supported self-management, including delivery of patient centred care and behaviour change counselling discussions.

8.2.2 Patient and Public Involvement (PPI)

As stated in section 3.3, a major strength of this thesis is the incorporation and partnerships of AUKCAR’s Patient and Public (PPI) members. Central to projects of AUKCAR and the IMP²ART programme, is undertaking research that improves the lives of people affected by asthma, and involves collaboration throughout every stage of the project (e.g. PPI involvement in the design of the research study, as well as research activities such as attending steering group meetings, data collection, analysis and dissemination). For this thesis, lay representatives were involved throughout the whole project, including providing feedback on participant facing documents such as patient information sheets and consent forms. All feedback was acknowledged and valued, and relevant updates were made. PPI members were also involved in the external reference group of the systematic rapid realist review, where findings of the review were presented to members, who provided feedback on
whether findings aligned with their experiences in current primary care practice.

After completing the PhD’s data collection and analysis (during October 2022), I presented the results to a group of PPI representatives who were positive about the study and the findings. During the meeting, PPI representatives provided feedback and possible implications during a discussion session. Members especially noted the importance of patient choice during remote asthma reviews, and that although face-to-face and remote reviews were found to have comparable results for delivery of supported self-management, patients should be able to decide what mode of consultation they wish to have.

I also presented my research at international and national conferences, where PPI members were in attendance. I was able to interact and engage with people with asthma to discuss how my research may benefit the management of their condition. Collaborating with PPI representatives throughout my PhD has enabled me to produce relevant research and findings which acknowledge the opinions, and experiences of people affected by asthma.

**8.2.3 Healthcare Professional, Multi-Disciplinary Team Involvement**

Similarly to PPI involvement, aspects of this PhD study have been supported by the IMP²ART research team and Professional Advisory Group (PAG) (including professionals such as primary care clinicians, academics, public health specialists, psychologists and researchers). During monthly IMP²ART meetings, I provided the group with regular updates of the PhD progress, and asked for any support or advice where necessary. As the central project aim was to explore healthcare professional delivery of asthma supported self-
management, the feedback and guidance provided by healthcare professionals during these occasions were invaluable to ensure the project aligned to current practice, and was reflective of how healthcare professionals view and experience the delivery of asthma care in primary care.

8.2.4 Dissemination

Another strength of the PhD project was the number of research outputs associated with the research, which allowed the project to gain regular feedback and a broader perspective of findings which was considered throughout the whole lifespan of the project. Throughout my time conducting the PhD, and despite restrictive challenges presented by the COVID-19 pandemic, I have presented my PhD work at numerous international and national conferences (both oral presentations and poster presentations, in person and remotely). I was able to utilise peer-reviewed comments and feedback at conferences into my PhD, specifically through questions which came from presenting at different speciality conferences (e.g. oral presentations at the European Health Psychology Society Conference (August 2022) and the European Respiratory Society Conference (September 2022)). Undertaking these discussions, and receiving feedback allowed me to think critically about the different implications of my project and its findings, which I have aimed to incorporate and discuss throughout this thesis. I have published 2 research papers associated with this PhD (1 first author and 1 co-author), and currently have 3 co-authored publications under review (details provided in Contributions to Science section).
8.3 Limitations of this Thesis

8.3.1 Sample Sizes

To determine the amount of data needed for the quantitative and qualitative approaches used within the research, a sample size calculation was considered. As the study was conducted as an observational approach to explore the delivery of supported self-management through individual healthcare professional behaviour and communications, a smaller number of healthcare professionals were recruited to take part to allow for an in-depth analysis. If the research were to be evaluated solely quantitatively, a much larger sample size would have been needed to achieve a given power and effect size. However, due to the methodologies and timeframes of the research, a large sample size of data would not have been achievable to complete within the PhD study’s timeframe.

Observational data of 64 individual asthma reviews, including 12 healthcare professionals, from 10 general practices across the UK was collected to explore how supported self-management is delivered in primary care (Chapter 5). However I acknowledge how these numbers may have limited the conclusions made from the second thesis objective (to explore differences between groups: IMP2ART implementation versus control groups and face-to-face versus remote delivery of supported self-management), and therefore caution for these comparisons have been made. However, the fact that significant differences were found between the groups gives some reassurance that the findings were robust, although future work on a larger sample size, derived from a power calculation, would be desirable.
8.3.2 Methodology

Although individual methodological limitations have been discussed in their retrospective chapters, it is important to consider the limitations of conducting the mixed methods research as a whole, and how the separate findings may have been interpreted.

Firstly, conducting the systematic rapid realist review during the first stage of the thesis provided substantial evidence for the context and mechanisms which contribute to the clinically effective, safe and acceptable delivery of remote supported self-management for asthma. However, the use of realist methodology and interpretations was not then continued throughout the rest of the thesis. Continuing the realist approach or using the generated CMO’s to inform the subsequent stages of the research may have led to more context specific findings for how supported self-management is delivered in primary care. However, this may have led to an overly strong emphasis on remote delivery of supported self-management as the systematic realist review focused on remote delivery, compared to whole PhD programme which aimed to explore both remote and face-to-face delivery of supported self-management. Continuing the realist approach throughout the thesis may have provided additional evidence and theories which could have been tested in the observational or qualitative study. However, a realist approach was not used throughout the PhD thesis, as the systematic rapid realist review was chosen as a time and context specific methodology due to the shift to remote care and COVID-19 pandemic, to address the specific objectives of the review process, and would also not have allowed for the subsequent mixed methods
approaches of the programme. The mixed methods approach of the observational and qualitative study, strengthened by the triangulation process allowed for an overarching summary of how supported self-management is delivered in practice by UK primary healthcare professionals. Future research could use a realist synthesis or realist evaluation approach to test the generated theories from a rapid realist review which may produce different outcomes.

The tools used for the observational study analysis; ALFA (de Lusignan et al., 2008), PCOF (Makoul, 2001) and BECCI (Lane, 2002), may be regarded as outdated in the current technologically advanced healthcare system we use today. As stated in Section 5.5.5, there have been various advances in technology in primary care provision (Kew & Cates, 2016), and although these three tools were chosen to analyse the delivery of supported self-management collectively, there may be more novel approaches to data analysis. However, this limitation aimed to be addressed through the thorough literature review which was conducted to understand which tools and measures may be best to mutually analyse supported self-management delivery (see section 5.2).

Additionally, data collected from the observational study (Chapter 5) did not include any remote data in the form of video consultations. Although this was discussed with practices who took part, healthcare professionals conducted their routine reviews using the means of remote technology they implemented during standard care. For all practices and healthcare professionals, this was the telephone. However, data collected within the systematic rapid realist review (Chapter 4) drew conclusions from existing research which investigated
supported self-management delivery from both telephone and video consultations. Conducting the observational research without capturing video consultations may have led to a different outcome for the whole thesis, and may not be reflective of all remote supported self-management delivery in practice. However, video consultations are rarely used in primary care. In a recent study by Greenhalgh et al., (2020), video consultations were found to be either never adopted or soon abandoned in general practices despite strong advocacy for use. The relative advantage of video was perceived as minimal as many presenting problems can be addressed adequately and safely by telephone and face-to-face.

Additionally, healthcare professionals who took part in the observational video recordings (Chapter 5), may have scheduled longer asthma reviews than their usual appointment system. For example, healthcare professionals mentioned that they would only usually have a 20 minute asthma review scheduled for each patient. However, practices had organised an afternoon or morning of scheduled recordings, sometimes lasting up to over 30 minutes per patient. This format of conducting asthma reviews may not have been reflective of how asthma reviews are delivered in standard practice (usually delivered on an ad-hoc basis between other LTC reviews). This change to the routine of asthma care delivery, may have influenced the healthcare professionals to communicate or behave differently due to the number of asthma reviews they were conducting that day (e.g., remembering more components to discuss/deliver) or have more time to discuss supported self-management components due to longer scheduled routine reviews. It was also noted that
often healthcare professionals would ask what I was looking for when analysing the collected video recordings. To answer this question, I would respond to healthcare professionals by explaining I was exploring how asthma reviews were conducted in practice. I was aware that healthcare professionals may have behaved differently if I emphasised the importance of their delivery of supported self-management.

An important methodological limitation of this thesis is the subjectivity in approach to data analysis. Although recommended training to undertake individual components of the study were completed (e.g., training in realist research and use of quantitative coding scales for observational video analysis), it is important to recognise that all analysis has been completed on the interpretations and subjectivity as a single researcher. I aimed to minimise these limitations by seeking regular support and feedback from my supervisory team, the Professional Advisory Group and Patient and Public Involvement groups. I understand the importance for duplicate coding to ensure validity of results, and that results may have been subject to bias due to being a part of the IMP²ART team, however duplicate coding was not possible in the given timeframes of the research. When results are being produced for publication in research journals, I will collaborate with experienced researchers to blind code the data for increased validity of findings.

A methodological recommendation for the qualitative phase of the study (Chapter 6) could be to conduct similar interviews using a different qualitative approach. On reflection, the context in which the interviews were conducted for this study varied considerably as COVID-19 rules and restrictions were
introduced and eased at the time of data collection (e.g., less restrictions to face-to-face delivery). Therefore some responses to interview questions could have been influenced by the impact of COVID-19 in that moment in time, and specifically how asthma reviews were being conducted. Using a more flexible qualitative approach where questions could have been more easily adapted (e.g. Grounded Theory approach) could have allowed learning from previous interviews to build and adapt on different questions and responses to build a more contextual overview of findings.

Additionally, qualitative interviews were often conducted in between observational recordings, or after a scheduled asthma review recording clinic. The timing and context of conducting the interviews may have influenced both the delivery of asthma care captured within the recordings (interview questions may have influenced healthcare professionals to think differently about their delivery of care, or aided their memory to include other supported self-management aspects into the review), or influenced the responses to interview questions due to being conducted in-between conducting asthma reviews.

8.4 Impact of the Coronavirus (COVID-19) Pandemic

The coronavirus (COVID-19) pandemic forced a dramatic shift to remote consulting for routine primary care. Novel strategies for supporting self-management for asthma became important as both acute consultations and routine reviews shifted to remote delivery (Pinnock et al., 2022). The data for this PhD study were collected in the midst of the COVID-19 pandemic.
Collecting rich, observational data during this time had many challenges due to physical restrictions and barriers, however by following all safety guidance, data was able to be collected, and therefore reflective of asthma care during the COVID-19 era.

As discussed within the systematic rapid realist review chapter (Chapter 4), previous research has suggested that support for people living with asthma encompasses clinical and practical information and social support, much of which can be delivered remotely (Pinnock, 2017). A Cochrane review by Kew & Cates (2016) which included 18 individual randomised control trials, found that when comparing health outcomes (including acute attacks, healthcare resource use and asthma control), remote interventions had similar outcomes with usual face-to-face care. These findings are consistent with the results of this PhD thesis, where remote asthma reviews have found to be as equally effective as face-to-face reviews for supported self-management delivery. However, there are some limitations in these assumptions. As the data were collected during the COVID-19 pandemic, this may have not been an accurate representative sample of the population. Some patients were still unwilling and hesitant to visit general practices for face-to-face reviews, and therefore the less vulnerable patients may have been those visiting their practices and in turn having more controlled asthma.

Although there still remains the question of how remote healthcare will evolve post-COVID-19, this PhD thesis highlights new knowledge through the use of realist methodology, observational routine data and healthcare professional perspectives of supported self-management delivery for asthma. The findings
of this thesis can inform the conduct of remote asthma reviews, implementation of supported self-management techniques into asthma care and provide evidence-based guidance for what is clinically safe for remote consulting (Sinha et al., 2020). While the exact balance of remote versus face-to-face consulting, and the specific role of digital health in different clinical and healthcare contexts will evolve as we have emerged from the pandemic, remote technologies in one form or another will be part of the ‘new normal’ of LTC care across the UK (Pinnock et al., 2022).

8.5 Summary and Next Steps

This chapter has provided a discussion of the complete PhD thesis, including the findings in relation to each thesis objective and existing research, strengths and limitations. The next chapter will outline the implications of the findings in relation to healthcare policy, practice, primary healthcare professionals, people living with asthma, and discuss recommendations for future areas of research.
9. Implications and Conclusions

Asthma is one of the most common LTCs in the UK (NHS, 2020; Asthma and Lung UK, 2021; NICE 2022a), and now more than ever due to the COVID-19 pandemic which has heavily impacted those with respiratory diseases, research exploring how healthcare professionals can support patients to manage their respiratory conditions is imperative. This chapter will outline how the findings of this PhD thesis can be applied to influence healthcare policy and practice, healthcare professional’s delivery of supported self-management, people living with asthma and will provide recommendations for future areas of research.

9.1 Implications for Policy and Practice

This PhD programme of work is the first to explore healthcare professional delivery of supported self-management during routine asthma reviews, both face-to-face and remotely, whilst being embedded in a large complex intervention (IMP²ART) which has created important implications for policy and practice.

A key issue needing to be addressed in primary healthcare is how healthcare professionals can support self-management in an evidence-based, structured way, and how self-management processes can be integrated into clinical practice, as models of care evolve to deliver a patient-centred approach (Dineen-Griffin et al., 2019). Due to the preliminary positive findings associated with the IMP²ART implementation strategy on healthcare professional
communication, behaviour and supported self-management delivery, the findings from this PhD study provide evidence that healthcare professionals should be provided with specific training in supported self-management delivery. The training should be developed and embedded with the theoretical underpinnings of health psychology and behaviour change theories and models to increase effectiveness, which have been explored and critically evaluated within this thesis.

This implication also stems from the finding that healthcare professional education of asthma management is key to change and develop patient education due to the translation of knowledge, skills and confidence during routine asthma review communications and behaviours. Findings suggest that higher levels of healthcare professional confidence and motivations are key drivers in effective supported self-management delivery. This thesis provides evidence that there is a lack of behavioural discussions in supported self-management delivery during routine asthma reviews. This area should be focused on for future healthcare professional training opportunities, and this thesis has also provided the formulation to such intervention, by outlining that this training should focus on increasing healthcare opportunities (COM-B model, Michie et al., 2011) to deliver supported self-management (discussed in section 8.1.1.1).

Additional implications for policy and practice from this thesis suggest that remote asthma technologies should be incorporated into routine asthma management strategies. Remote asthma reviews (synchronous communications which include real-time interactions by telephone and video
consultations) were found to be a safe, clinically effective alternative, accepted by both patient and healthcare professionals, compared to face-to-face reviews. However policy makers should be aware of the specific groups of asthma patients which remote technologies may benefit (e.g., as suggested from the findings of this thesis, people with well controlled asthma, or those with an existing relationship with their healthcare professional (Chapter 4) to ensure care is targeted). Policy makers should also be aware of the limitations remote tools may have on some people with asthma (e.g., access to remote devices, patient literacy levels, and the divide these remote technologies may play in increasing socioeconomic inequalities). Consequently, remote asthma reviews should be provided according to the preference of the patient, and therefore coinciding with the patient-centred nature of primary care LTC reviews, patients and professionals should work together to reach an agreed decision about the mode of delivery for a patient’s care (NICE, 2021).

Another implication for policy is the need to explore the ever increasing workloads of UK NHS primary healthcare staff. Although the work pressures of all NHS staff are increasing, the role of the primary healthcare professional is multi-faceted and complex, where healthcare professionals are faced with the challenging tasks of being the first contact for individual patients with a number of health conditions, whilst simultaneously delivering care for an entire community (Keyworth et al., 2018). Conflicting patient agendas, combined with short scheduled patient reviews, result in healthcare professionals often finding it challenging to have effective and meaningful LTC supported self-management discussions. As stated in Chapter 6 (semi-structured interview
phase), healthcare professionals expressed that there is not enough time to discuss certain supported self-management techniques in enough detail (such as the personalised asthma action plan), and that lack of time can restrict more meaningful conversations from taking place. Patients are often signposted to other services to address other issues they are facing whilst trying to manage their asthma (such as anxiety, or stop smoking discussions). Healthcare professionals expressed lack of time allocated to asthma reviews prevents delivering a holistic review and collaboratively addressing all the patients concerns for their asthma management. This major finding of the thesis, when conceptualised with the COM-B model (Michie et al., 2011), highlights how increasing healthcare professional opportunity may positively influence effective delivery of supported self-management.

9.2 Implications for Primary Care Practices

The findings of this thesis may be helpful for primary care practices to understand the most appropriate mechanisms for supported self-management delivery. The findings suggest that general practices which prioritise creating a positive practice culture (e.g., engaging in staff training opportunities, providing team members with a sense of purpose and belonging, helping ensure everyone is aligned in their efforts to deliver high-quality patient care and continuous patient feedback and learning), are most effective in translating supported self-management strategies to patients. It is also important that staff members have a clear understanding of the organisation’s values, mission,
purpose, and goals, and are empowered to share them. Primary care practices’ endeavour for positive organisational culture is also reemphasised by the positive findings associated with the IMP²ART implementation strategies, which aimed to create a whole team approach to implementation. All members of general practice (e.g., GP’s, practice nurses, pharmacists and admin staff) were included in the engagement of IMP²ART strategies which aimed to raise awareness of the benefits of supported self-management and increase engagement, motivation and commitment to supporting self-management, so that it became a priority across the whole practice team.

Additional implications for general primary care practices include the findings associated with remote delivery of asthma care. As stated throughout the findings and discussion of this thesis, remote modes of consultations (telephone and video consultations) were seen to be clinically effective, safe and accepted by both patient and healthcare professional for the delivery of supported self-management for asthma. These findings suggest primary care practices should aim to have the resources and technologies to be able to offer patients effective remote consultations for routine asthma care, should the patient wish to receive care through this mode of delivery. Practices should also provide IT support for healthcare professionals to be able to engage in remote technologies without any barriers for use.
9.3 Implications for Healthcare Professionals

The implications of this thesis for healthcare professionals highlights the importance of ensuring that primary healthcare professionals have the knowledge, skills and confidence to effectively communicate and prioritise supported self-management strategies into routine asthma care. The findings of this thesis provide evidence that healthcare professional training in supported self-management delivery can increase these individual abilities (through use of theoretically informed training), and healthcare professionals should therefore aim to engage in training opportunities. Healthcare professionals should also be aware of the transition of knowledge which has been a main theme throughout this programme of work; healthcare professional education of asthma and asthma management is key to translate such knowledge, skills and confidence to their patients during routine reviews through effective communication strategies.

Healthcare professionals should also be aware of the benefits (and limitations) which remote technologies may offer during routine asthma reviews. The findings of this PhD suggest remote telephone and video consultations may be an effective mode of consultations for certain groups of patients (see systematic rapid realist review, Chapter 4). Healthcare professionals should endeavour to create meaningful relationships with their patients to understand which patients may benefit from remote delivery of care. However it should be emphasised that shared decision making and patient choice is of optimal importance to ensure patients are leading in their own care and self-management.
9.4 Implications for People with Asthma

The findings from this thesis provide evidence for people with asthma to become partners in their own care. As discussed in Chapter 2, during routine asthma reviews, patient care includes a shared decision process to ensure discussions about the patient’s individual asthma goals are considered (Pinnock et al., 2017). By aligning the patient’s goals (moving away from a symptom to treatment process towards a more holistic approach to healthcare), healthcare professionals are able to work with patients to create shared aims, developed and incorporated into the patient’s individualised self-management plan (Gruffydd-Jones & Hansen, 2020). This thesis provides evidence for patients of the positive outcomes associated with effective supported self-management, including how patient education was found to be one of the most effective supported self-management strategies, and the positive findings associated with the IMP²ART implementation strategies.

Additional implications stem from the findings associated with remote consultations. Patients should be aware of the possible benefits remote consultations may offer when considering their own care and should (in partnership with their healthcare professional), decide which mode of consultation they feel would benefit their asthma care. This implication was discussed with the AUKCAR PPI members during a meeting held in October 2022, where members acknowledged the findings of this PhD study and the benefits of remote consultations, however communicated the importance of patient choice for which mode of asthma consultation they wish to receive. PPI members expressed that this PhD research has been helpful for patients to
understand what components of supported self-management should be included and discussed during an asthma review. Members feedback stated that the understanding of supported self-management components (e.g. PRISMS components; Taylor et al., 2014) may give patient's the confidence to understand their asthma, management approaches and the expectations of what should be discussed during routine asthma reviews.

Future research should explore further implications of remote tools for supported self-management delivery and asthma care. Although findings of this PhD suggest remote consultations are a safe and clinically alternative to face-to-face care, this was found to only be for specific groups of patients, and questions of continuity of care still remain. There is a need to further explore how remote delivery of care may influence the risk of increasing social health inequalities and if the ‘digital divide’ excludes those most in need of care.

**9.5 Implications for Future Research**

In order to further explore the area of healthcare professional delivery of supported self-management for asthma, there are a number of possibilities for future studies, which could strengthen this area of research.

The findings from this PhD project suggests that dedicated time and resources are needed during the development stages of intervention strategies, and should be considered for future complex interventions targeted at changing healthcare professional behaviour. It could be argued that the effectiveness of the IMP²ART implementation strategies were due to the strong theoretically
informed, evidence-based development stages of the programme, which used existing evidence, models and theories to ensure the intervention was grounded in possible effective strategies. Future research should endeavour to use a similar approach to complex intervention development, and in light of the small sample sizes of this PhD research, a larger scale, randomised study could be conducted to ensure results are generalisable to UK general practice.

There is no universal approach to measuring the delivery of supported self-management in a primary care context. Although guidance and evidence-based frameworks exist (GINA, 2020; NICE, 2021), and may influence delivery of care, there is no inclusive approach of measurement of supported self-management. Although every effort was made to ensure a systematic and comprehensive approach to data collection and data analysis was taken (literature review of tools and measures in Chapter 5, and use of the PRISMS taxonomy (Taylor et al., 2014) throughout the whole PhD to structure supported self-management delivery components explored), aspects of supported self-management delivery may have been missed during this explorative study. However, it could be suggested that due to this gap in research, a more comprehensive tool should be developed, with the possibility of including the components stated within this PhD study. For example, future studies could explore whether providing healthcare professionals with the PRISMS taxonomy framework (Taylor et al., 2014) during routine asthma reviews would benefit the delivery of supported self-management. In contrast, providing this tool may limit the amount of patient-centred care delivery due to a ‘checklist’ approach to routine care, which as discussed in section 2.3, can
limit opportunities to discuss individuals’ concerns about living with their condition and function as a barrier to providing patient-centred care (Morrisey et al., 2021).

The findings have also provided insights for future work in the area of primary care healthcare professional training and feedback. Within the observational study (Chapter 5), healthcare professionals communication and behaviour was coded using the ALFA (de Lusignan et al., 2008), PCOF (Makoul, 2001), and BECCI (Lane, 2002) measures. All of these tools offer the opportunity to provide individualised feedback to the healthcare professionals who have been observed. Future research could complete a similar observational study, or use a video stimulated recall methodology (where participants watch their recorded data), and provide participants with feedback on their scores for each individual measure, and in turn, an encompassed overview of their supported self-management delivery. By providing individualised feedback, healthcare professionals would be able to learn and reflect on areas of their patient care which could be improved. For example, by providing feedback on the ALFA toolkit, healthcare professionals would be able to recognise which aspects of asthma care they could spend more time on e.g., ‘talking about asthma triggers (A6)’. This type of research would benefit those healthcare professionals who may learn more effectively during individualised, in-depth training.

The findings from the semi-structured interviews with healthcare professionals (Chapter 6) produced recommendations for future research. The theme of ‘Barriers and Facilitators of supported self-management delivery’ and subtheme of ‘Practice culture’ highlighted the positive work environments
healthcare professionals worked in to facilitate supported self-management delivery. However, this area could be further explored to discover the particular mechanisms within practice culture, and its effect on supported self-management delivery. This could be conducted with further in-depth interviews, focus groups or a realist evaluation including general practices employees to explore the underlying context and mechanisms which contribute towards an effective practice culture, which inspires supported self-management delivery.

The findings of this PhD thesis suggests healthcare professionals prefer to see a patient face-to-face to deliver a more holistic review, and discuss individualised behaviour change strategies. Within the observational study (Chapter 5), on average delivery of behaviour change counselling (BECCI) within the remote consultations were lower compared with the face-to-face group. This finding highlights the need for all healthcare professionals to be provided with training (to increase knowledge, skills and confidence) and resources for how to have effective behaviour discussions during remote asthma consultations. Asthma consultations include opportunities for healthcare professionals to engage in behaviour discussions due to the varied behaviours associated with improving asthma care (e.g., engaging in exercise to improve lung health, quitting smoking etc.). However, explored recently by Maghul et al., (2022), evidence-informed training is needed to improve the capability and confidence of healthcare professionals to use remote consultation methods to have behaviour change discussions in primary care. Whilst the exact balance of remote versus face-to-face consulting will
evolve as we emerge from the COVID-19 pandemic, what is clear is that remote technologies in one form or another will be part of the ‘new norm’ of asthma care (Pinnock et al., 2022).

The findings of this PhD support the suggestions from Dixon & Johnston (2010) & Maghul et al., (2022), who state that remote primary care conversations are often missed chances for promoting good health and well-being in general practice. Healthcare professionals should view each individual patient, and each individual contact with a patient as an opportunity for health improvement. In the long term, losing the opportunity for behaviour change conversations may impact on patient populations, especially for those with LTCs, where the potential for positive change may be greatest, and subsequently negatively burden primary care services and systems. This requires ongoing evaluation as remote consulting becomes more established in primary care services. In addition to the findings that behaviour change conversations are less frequent in remote consultations, primary healthcare professionals (nurses, clinical pharmacists etc.) who deliver asthma reviews (both face-to-face and remotely) stated they often do not have the time to explore the psychosocial concerns of patients associated with their condition (e.g., stop smoking discussions or weight management advice). As time was found to be one of the obstacles to supported self-management delivery, future interventions should explore if shorter, time-sensitive, tailored interventions are appropriate within asthma care (e.g., how to effectively discuss an asthma management plan in minutes). If these interventions were seen to be effective, training for healthcare professionals in these shorter, more timely interventions
could provide targeted delivery of specific supported self-management strategies. These suggestions would hope to combat time as a barrier to effective supported self-management delivery which has been continuously stated in previous literature (Moffat et al., 2007; Morrow et al., 2017) and a main theme which was discovered within this thesis.

The findings from the observational study BECCI analysis, suggested that healthcare professionals are having empathetic discussions with patients, which are sensitive to patient understanding, however, are not collaboratively discussing individualised approaches for ways in which a patient can proactively change their behaviour. To combat the issues found within this thesis, that lack of time and possible nurse confidence and capabilities to conduct behaviour change conversations may be influencing the delivery of behavioural discussions, another recommendation for future research is to explore the possible intervention of health psychology services and referrals embedded in primary care settings. As outlined in Chapter 2, health psychology is a specialty area of research, knowledge and theory that focuses on how biology, psychology, behaviour, and social factors influence individual health and illness. The field of health psychology is focused on promoting health, as well as the prevention and treatment of disease and illness by understanding how people react to, cope with, and recover from illness (Barley & Lawson, 2016). Health psychologists are experts in the area of behaviour change interventions and have the skills and knowledge to collaborate with individuals, including healthcare professionals, to help people deal with the biopsychosocial aspects of health and illness. The services which a health
psychologist is able to offer in primary care could integrate and encourage behaviour change interventions to those most in need through direct primary care referrals.

Embedded health psychology services in primary care has been recently explored by Lee & Dale (2019), whose integration of two health psychologists in a general practice setting helped to support patients holistically as part of the wider practice team to better manage LTCs. The intervention reduced demand for GP services, healthcare professionals regarded the service as positive, as 30% of staff stated they noticed a difference in patients as a result of working with a health psychologist, and patient comments suggested the ability to access psychological and behavioural interventions quickly within the GP practice helped to prevent problems from worsening. A health psychology referral system embedded within routine primary care, may alleviate pressures for healthcare professionals and lead to positive patient outcomes.

9.6 Conclusions and Reflections

This thesis has made an important, novel contribution to the research areas of asthma, supported self-management, evaluations of large, complex interventions and healthcare professional communication and behaviour research. I have published 2 research papers associated with this PhD (1 first author and 1 co-author), have 3 co-authored publications under review and have presented my PhD work at international and national conferences. Throughout this thesis, I was able to utilise a mixed methods approach to data
collection and analysis to provide an in-depth exploration and understanding of healthcare professional delivery of supported self-management in practice, whilst also embedded within a large NIHR randomised cluster control trial (IMP\textsuperscript{2}ART programme).

The findings of all three stages of the study; 1) systematic rapid realist review, 2) observational study and 3) qualitative semi-structured interviews, were triangulated to develop key findings and recommendations. The PhD project included support and input from multi-disciplinary teams including academics and healthcare professionals, and importantly from members of the AUKCAR Patient and Public Involvement (PPI) group throughout. This support ensured this PhD was constantly grounded in views and experiences of both healthcare professionals and people living with asthma. Five key findings were produced which addressed the thesis objectives, and were explored critically in relation to existing research. Recommendations were produced for asthma care guidelines, policy, practice, healthcare professionals delivery of care, people with asthma and future research.

Conducting this PhD research and completion of this thesis has developed my research skills to be an independent researcher, and also as a member of large multi-disciplinary teams (IMP\textsuperscript{2}ART and AUKCAR). I have grown in skills, knowledge and confidence, which I hope to take forward into my future career. The PhD experience has been extremely rewarding and I hope the implications of conducting this research will lead to healthcare professionals feeling more supported and able to deliver supported self-management effectively, and thus lead to positive outcomes for people with asthma.
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Appendices:

Appendix 1: Certificate of Winning Poster Presentation at Primary Care Respiratory Society Conference (PCRS) September 2021
Appendix 2: Example of PhD Poster Presentation: Core PhD Project

Delivery of Supported Self-Management in Asthma Reviews: A Mixed Methods Observational Study Nested in the IMP\^2\textsc{art} Programme of Work

**Background**

5.4 million people in the UK are currently receiving treatment for asthma. 1.1 million children and 4.3 million adults.

Supported self-management for asthma reduces attacks and improves asthma control.

**PhD Project**

Nested within the IMP\^2\textsc{art} Study, this PhD project aims to explore how supported self-management is delivered during asthma consultations using motivational and patient-centred strategies. The project will investigate between-group differences of IMP\^2\textsc{art} implementation and control groups, and face-to-face versus remote delivery of supported self-management.

**Primary Research Questions**

To explore the between-group differences, the following research questions will be addressed throughout the project:

1. What proportion of time within a consultation is spent on self-management related tasks?
2. How are patient-centred & behaviour change techniques used in asthma consultations?
3. How do health professionals view the delivery of supported self-management within asthma reviews?

**Methods**

A mixed-method, observational study will be conducted. Video recordings of a sub-sample of the IMP\^2\textsc{art} UK-wide cluster-RCT practices (implementation n=10; control n=10), collecting both face-to-face and remote (telephone/video-conference) reviews.

Analytical methods will include: ALFA Toolkit\textsuperscript{2}, Patient Centred Observation Form (PCOF) \& The Behaviour Change Counselling Index (BECCP), followed by follow-up semi-structured interviews.

**Preliminary Results**

Initial analysis suggests that HCPs in IMP\^2\textsc{art} implementation practices deliver a more patient centred review, use more behaviour change techniques, and spend more time within consultations discussing supported self-management related strategies. There is no significant difference between HCPs delivery of supported self-management strategies discussed between face-to-face and remote asthma reviews.

**Questions to Discuss**

We anticipate that the IMP\^2\textsc{art} strategies will enable HCPs to embed supported self-management more effectively within asthma consultations, adding to the evidence that HCPs should be provided with specific training to implement a motivating and patient-centred asthma review. Findings will contribute to the IMP\^2\textsc{art} process evaluation.
Appendix 3: Example of PhD Poster Presentation: Systematic Realist Review

Delivery of Supported Self-Management in Remote Asthma Reviews: A Rapid Realist Review.
Nestled in the IMPACT Programme of Work

Emma Kinley,intree McCanney, Hillary Annon, Liz Seeb, Imogen Sane, University of Edinburgh, Queen Mary University London

Background
- The use of digital and remote consulting technologies can be seen as a partial solution to the growing challenge to health care, including those with long-term conditions and maximises opportunities to support patient self-management.
- Asthma results in 4.2 million UK primary care consultations each year. Supported self-management reduces the risk of acute attacks, improves asthma control and quality of life.
- Research regarding the delivery of supported self-management during remote asthma consultations suggests that people with asthma report high levels of satisfaction with remote consultations and improvements in overall asthma control have been reported.
- Due to the COVID-19 pandemic, health care systems globally have had to adapt quickly to models of remote health care delivery.

However, remote consultations were not commonly used as a tool within routine asthma care due to a variety of reasons and the technical, clinical, and organisational challenges.

Aims
Following standard methodology for rapid realist reviews, we aimed to explore the context and mechanisms for the outcomes (C-M-O) of:
- clinical effectiveness
- acceptability
- safety
of supported self-management delivery within remote asthma consultations.

PPI & Expertise
Patient and Public Involvement (PPI): Patients and public involvement was provided by a representative of the Asthma UK Centre for Applied Research (LUARC) PPI group. The PPI representative reviewed the findings, and feedback and comments were considered as an aid to further interpretations of the data which were included in the final manuscript.

Expertise: An External Reference Group (EMR) (respiratory and primary care expert, asthma and health care researcher) provided expert advice and guidance throughout the study.

Results
Main Findings: The data extraction process was completed for the 18 included articles (10 Cochrane configurations). The PRISMA supported self-management taxonomy was used as a framework to synthesise the data.
- They were one goal from the data. The findings supported that supported self-management for asthma patients via remote consultations can:
  1. Increased regular patient attendance and improved monitoring of patient
  2. Increased patient confidence in self-management and adherence
  3. Provided an opportunity to promote individualised information about asthma and self-management
  4. Provided information for access to advice and support
  5. Increased healthcare professionals’ patient relationship and communication
  6. Increased patient confidence and self-efficacy

Conclusions
Even when the COVID-19 pandemic reduces, remote technologies will remain in everyday healthcare. Our rapid review has explored the context and mechanisms by which asthma self-management can be delivered during video and telephone consultations. These are a broad range of contexts, remote consultations are highly accepted by both patients and professionals, and are as clinically effective and safe as face-to-face reviews to provide self-management support. Specific groups advantage of remote consultations include those living in rural communities, or who had to fit their healthcare around work or domestic responsibilities, and those with reduced mobility. The findings of this rapid realist review can inform the conduct of remote asthma reviews and implementation of supported self-management techniques into asthma care.

PhD Study funded by the Chief Scientist Office, Scotland & Supported by Asthma UK Centre for Applied Research
Appendix 4: Systematic Rapid Realist Review Publish paper (Kinley et al., 2022)

KINLEY

ET AL. 2022

Delivery of supported self-management in remote asthma reviews: A systematic rapid realist review

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Elizabeth Steed PhD, Lecturer² | Hilary Pinnock MD, Professor¹ |
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Funding information Chief Scientist Office, Grant/Award Number: AUKCAR/19/01

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Abstract

**Background:** The COVID-19 pandemic forced health care systems globally to adapt quickly to remote modes of health care delivery, including for routine asthma reviews. A core component of asthma care is supporting self-management, a guideline-recommended intervention that reduces the risk of acute attacks, and improves asthma control and quality of life.

**Objective:** We aimed to explore context and mechanisms for the outcomes of clinical effectiveness, acceptability and safety of supported self-management delivery within remote asthma consultations.

**Design:** The review followed standard methodology for rapid realist reviews. An External Reference Group (ERG) provided expert advice and guidance throughout the study. We systematically searched four electronic databases and, with ERG advice, selected 18 papers that explored self-management delivery during routine asthma reviews.

**Setting, Participants and Intervention:** Health care professional delivery of supported self-management for asthma patients during remote (specifically including telephone and video) consultations.

**Main Outcome Measures:** Data were extracted using Context-Mechanism-Outcome (C-M-O) configurations and synthesised into overarching themes using the PRISMS taxonomy of supported self-management as a framework to structure the findings. Results: The review findings identified how support for self-management delivered remotely was acceptable (often more acceptable than in-person consultations), and was a safe and effective alternative to face-to-face reviews. In addition, remote delivery of supported self-management was associated with; increased patient convenience, improved access to and attendance at remote reviews, and offered continuity of care.

**Discussion:** Remote delivery of supported self-management for asthma was generally found to be clinically effective, acceptable, and safe with the added advantage of increasing accessibility. Remote reviews could provide the core content of an asthma review, including remote completion of asthma action plans.

**Conclusion:** Our findings support the option of remote delivery of routine asthma care for those who have this preference, and offer healthcare professionals guidance on embedding supported self-management into remote asthma reviews.

Patient and Public Contribution: Patient and public contribution was provided by a representative of the Asthma UK Centre for Applied Research (AUUKCAR) patient and public involvement (PPI) group. The PPI representative reviewed the findings, and feedback and comments were considered. This lead to further interpretations of the data which were included in the final manuscript.
INTRODUCTION

There are 339 million people living with asthma worldwide. Asthma is a variable condition and evidence-based guidelines (e.g., GINA; BTS/SIGN) highlight the importance of supporting people to recognize when their condition is deteriorating and to know how to adjust their treatment and/or seek medical advice in a timely and effective manner. Supported self-management is an approach that facilitates patients with long-term conditions (LTCs; such as asthma) to have the knowledge, skills, and confidence to manage the physical, emotional and social impact of their condition(s). The ‘overwhelming’ conclusion of evidence syntheses is that supported self-management for asthma improves asthma control, reduces exacerbations and hospital admissions, and improves patients’ quality of life. Despite this robust evidence, implementation in routine clinical care is challenging.

Remote consulting, already promoted as a partial solution to growing challenges of healthcare delivery, was rapidly expanded in response to the worldwide COVID-19 pandemic. Within the United Kingdom general primary care, there was a dramatic shift away from face-to-face consultations to telephone, video and on-line consultations. In the months following UK COVID-19 lockdown in early 2020, only 11% of primary care general practice appointments were conducted face-to-face, suggesting that nearly 90% of patient provider interactions took place via remote means. Remote consultations can potentially provide both benefits and challenges for patients and health professionals. Suggested advantages of remote consulting include improving access to care for LTCs, maximizing the potential for supporting self-management, overall acceptability, safety and effectiveness and improvements in asthma control. However, critics have raised concerns about the use of remote delivery of routine primary care due to variable evidence of suitability and the associated technical, clinical and organisational policy challenges.

1.1 Rationale for review

Published research regarding the delivery of supported self-management during remote asthma consultations is sparse and the speed of technological advance means it needs frequent updating. Given the changing clinical context and national/international recommendations for implementing supported self-management, providing guidance on this new approach to delivery is timely. Informing a UK-wide cluster randomized controlled trial, evaluating the implementation of supported self-management (IMPlementing IMProvied Asthma self-management as RouTine [IMP²ART]), this study uses a rapid realist review approach to explore the clinically effective, safe and acceptable delivery of supported self-management of asthma via remote routine reviews. Conducting a rapid realist review will enable understanding not only about whether an intervention/approach works
but how and in what clinical, demographic or organisational context.

1.2 | Study objectives

Using realist methodology, we aimed to:

1. Identify and synthesize studies that evaluated and/or explored remote asthma consultations and the delivery of supported self-management.
2. Explore the context and mechanisms that have contributed to clinically effective, safe and acceptable delivery of supported self-management during remote asthma consultations.
3. Produce recommendations for best practices in the delivery of supported self-management during remote consultations for people with asthma.

2 | METHODS

2.1 | Study design

Following Realist Review methodology\textsuperscript{18-21} to identify Context–Mechanism–Outcome (C–M–O) configurations within existing research, our review explored how supported self-management is delivered during routine remote asthma reviews. The study is reported in line with the RAMESES Publication Standards for Realist Synthesis and Realist Reviews.\textsuperscript{22} We registered our protocol on the PROSPERO database (Registration No.: CRD42020207543).

2.2 | Realist methodology

Devised by Pawson and Tilly,\textsuperscript{18,20,21} realist methodology is a theory driven review process that focuses on understanding the interplay of an intervention’s Context (C), Mechanisms (M) and Outcomes (O) and whether the intervention works (or not). Conducting realist research aims to answer the question ‘what works, for whom, in what contexts, to what extent and most importantly how and why’.\textsuperscript{18} Realist methods are increasingly used within healthcare research due to their ability to support the understanding of complex interventions. Within realist methodologies, a programme theory is a specific hypothesis about how an intervention causes the intended or observed outcomes and should be the central aspect of any realist evaluation or synthesis.\textsuperscript{23} Several varied theories are identified initially using a broad scope of existing literature to refine the purpose of the review and identify review questions. Programme theory formulation is subsequently an iterative process that progresses as the evidence is identified, assessed and synthesized, until an evidence-based saturation and conclusion have been reached.\textsuperscript{20} Pawson differentiates between realist evaluations—an approach used when conducting primary research, and realist synthesis—an approach used to synthesize secondary data.\textsuperscript{20}

2.3 | Rapid realist review

For this review, we used the rapid realist review approach described by Saul et al.\textsuperscript{19} (displayed in Figure 1) to apply a realist
synthesis approach in a timely manner where there is an emerging evidence base for the subject area under review, while still preserving the core elements of realist methodology. An important feature of a rapid realist review is to engage an External Reference Group of experts, who provide informed direction to the data identification and theory development throughout the entirety of the review, and ensure the review is grounded in the local context. We convened a multidisciplinary External Reference Group, including researchers, clinicians (nurses and GPs) and primary care respiratory experts. Members met twice during the review process, initially to provide feedback on the project scope and the full-text articles proposed for inclusion. The group met again to review findings from the data extraction and advise on data synthesis.

2.4 | Scoping the literature

The review took place between August 2020 and March 2021. One reviewer (E. K.) initially scoped relevant literature exploring the delivery of routine asthma reviews via remote consultations. From this initial broad search, the research group created a preliminary programme theory. This process defined the scale of the research and ensured that the review focussed appropriately on the research questions. Although not an essential element of a rapid realist review, the creation of programme theory is a recognized step in realist approaches.\(^{18-21}\) We, therefore, decided to adopt this approach within this review: The initial programme theory formed the basis of the iterative data collection, data extraction, data synthesis and subsequent theory development stages, and the concluding programme theory allowed a final statement of the evidence to be produced.

2.5 | Search process

The following databases were searched in October 2020 by E. K.: MEDLINE, Embase, PsychINFO and the Cochrane Library. Key search terms that were likely to identify studies relevant to the research questions and to address the purpose of the review were used (File S1). We searched for qualitative, quantitative, mixed method studies and grey literature published after 2000, to reflect contemporary remote consultation technologies, and the introduction in the UK of the Quality Outcomes Framework in 2004 (which incentivized regular reviews for LTCs including asthma).\(^{24}\) Using the PICOS Framework,\(^{25}\) eligibility criteria were developed (Table 1), and studies that did not meet the inclusion criteria or were not published in the English language were excluded. Consistent with a realist synthesis approach, it was still possible for data beyond this framework to be included in the review if the article contributed to the development of the review’s programme theory. Documents were assessed collectively by the study team to determine whether the evidence provided was ‘good enough and relevant enough’,\(^{21}\) to inform the creation of appropriate C–M–O configurations within the data. In line with the iterative approaches of realist methodologies, we used snowballing techniques (such as searching companion
papers and citation tracking) for all included articles to ensure that important texts were not overlooked. We also searched for additional relevant grey literature (e.g., policy documents, opinion pieces) from a variety of sources (including any suggested by the External Reference Group). The search process was iterative, overlapped with data extraction and analysis, and was directed towards the evidence gaps and finding explanatory information.

**FIGURE 1**  
Rapid Realist Review approach described by Saul et al.\(^1\)

**TABLE 1**  
Inclusion and exclusion criteria for the rapid realist review systematic database search, following the PICOS Framework\(^\text{25}\)

<table>
<thead>
<tr>
<th>Inclusion</th>
<th>Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td></td>
</tr>
<tr>
<td>Adults or children with a diagnosis of asthma</td>
<td>Participants with other long-term health conditions (unless the study presented data for people with asthma separately)</td>
</tr>
<tr>
<td>Healthcare professionals who regularly deliver asthma care</td>
<td>Patients receiving care under severe asthma clinics (because they have specialist needs which may be different to the majority of primary care patients)</td>
</tr>
<tr>
<td>Intervention</td>
<td></td>
</tr>
<tr>
<td>Remote consultations (e.g., telephone/video consultations)</td>
<td>Studies that use automated telehealth interventions (e.g., mobile apps or email consultations) and do not include personalized contact with a healthcare professional in real time</td>
</tr>
<tr>
<td>Includes delivery of supported self-management</td>
<td>Interventions targeted at people under a severe asthma clinic</td>
</tr>
<tr>
<td>Comparison</td>
<td></td>
</tr>
<tr>
<td>Trials that compare remote asthma care consultations</td>
<td>Trials that do not compare remote asthma care consultations versus standard face-to-face (in-person) reviews</td>
</tr>
<tr>
<td>Before and after studies, assessing the implementation of remote reviews</td>
<td>standard face-to-face (in-person) reviews</td>
</tr>
<tr>
<td>Outcomes review</td>
<td></td>
</tr>
<tr>
<td>Delivery of a standard primary care asthma review</td>
<td>Studies that do not present any form of self-management support</td>
</tr>
<tr>
<td>Study design method studies</td>
<td></td>
</tr>
<tr>
<td>Quantitative, qualitative and mixed-method studies</td>
<td>Studies that do not meet the study design inclusion criteria</td>
</tr>
</tbody>
</table>
Selection and appraisal of documents

Titles/abstracts and potentially eligible full texts were independently screened by two reviewers (E. K. and I. S.), and disagreements were resolved by discussion.

It was during this stage, that the first External Reference Group Meeting took place (November 2020) to review the list of full-text articles and provide feedback on the importance of included papers and suggest any other publications or research that might contribute data to the review. During this stage, there was also an emphasis on grey literature or ‘difficult to find’ documents which may have not otherwise been identified. From the feedback provided by the group, any gaps in the literature were addressed by iteratively modifying the search terms/inclusion and exclusion criteria to capture any further relevant documents.

Data extraction

To begin the data extraction phase, a template was devised focusing on C–M–O configurations that explored components of support for self-management, as defined by the Practical Systematic Review of Self-Management Support (PRISMS). The PRISMS taxonomy was used as a framework during the data extraction phase by categorizing C–M–Os into one of the 14 components of self-management support, to streamline the subsequent data synthesis processes. Examples of these components include ‘A1. Information about condition and/or its management’ and ‘A2. Information about available resources’. PRISMS components are further explained within File S2. The data extraction template also allowed for recording as to whether each C–M–O related to the ‘acceptability, safety and clinical effectiveness’ of supported self-management delivery during routine remote asthma consultations, in line with the project’s aims and objectives.

C–M–O configurations were then extracted from all full-text articles. Quantitative, qualitative or contextual data could be extracted from any part of selected papers. We continuously considered the relevance and rigour of each included C–M–O, and regularly discussed within the core research team (E. K., K. M., H. P. and L. S.) how individual extracts should be used to ensure appropriate inferences were made. Data extraction was completed by E. K. (25% was independently extracted by I. S. to ensure consistency of approach, reliability and validity. The independent extraction of data by the two authors (E. K. and I. S.) resulted in the same C–M–O configurations being extracted by both authors, that is, each author identified the same outcome related to remote delivery of SSM in all papers and also connected the same context and mechanism to each outcome for all papers. How to optimally present the data (i.e., which data extract was used) and the interpretation of each C–M–O was discussed in detail until a consensus was reached.
We used the PRISMS taxonomy to structure our synthesis. The PRISMS meta-review highlighted the importance of supported self-management as a key component of high-quality care for people living with LTCs, concluding that healthcare providers should promote a culture of actively supporting self-management as a routine, expected and monitored aspect of care. Self-management is a broad concept applicable to different demographics of people living with a wide range of LTCs, and thus the support that can be provided is diverse. The use of the PRISMS taxonomy ensured we captured this breadth in a structured way.

To synthesise the findings, all extracted C–M–Os were mapped against the PRISMS taxonomy components. We considered C–M–Os for each component of self-management and identified key themes within and across each component. Further, we considered whether there was variance in the frequency of delivery of each component. Following this, we considered the association of C–M–Os to the outcomes of acceptability, clinical effectiveness and safety. Key themes were created from all C–M–O and taxonomy components until data saturation was reached. As External Reference Group members included clinicians currently delivering supported asthma self-management, their feedback ensured that the final findings and themes addressed any gaps in practice that the analysis had not represented.

**RESULTS**

### 3.1 Selection of included studies

A total of 1519 articles were identified in the search, of which 1512, 17, 27–39 met the inclusion criteria and were included in this rapid realist review. The External Reference Group identified an additional three papers.14,40,41 Although these papers did not meet the PICOS inclusion criteria (two papers had only recently been published so was therefore missed within the initial search, and the other paper...
focused on telemonitoring rather than in-person self-management delivery), they were still included due to their relevance to the review's aims. The PRISMA flow diagram42 illustrates the search strategy and results (Figure 2).

3.2 | Study characteristics

All 18 included studies were published between 2003 and 2020 and were undertaken in the United Kingdom (n = 10), the United States of America and Canada (n = 7) and Italy (n = 1). Eight of the included papers were systematic reviews (n = 5) or meta-reviews (n = 3), including data from a total of (n = 366) unique primary studies represented within these systematic reviews. Eleven papers had the primary aim of exploring the use of remote consultations in routine asthma reviews. Of the three papers provided by the External Reference Group, one was a feasibility study and two were systematic reviews. Detailed study characteristics can be found in File S2.

3.3 | Main findings

The data extraction process was completed for the 18 included articles (full C–M–O configurations can be found in File S3). The PRISMS supported self-management components most commonly informed by C–M–O configurations were:

1. A4: Regular clinical reviews.
2. A1: Information about the condition and/or its management.
3. A5: Monitoring of condition with feedback.
4. A3: Provision of/agreement on specific clinical action plans and or rescue medication.
5. A8: Provision of easy access to advice or support when needed.

These components, in addition to other self-management strategies, have been explored through the data synthesis stage. Six key themes were identified which are described below, with an overarching C–M–O to outline the key conclusions of each theme (Table 2). Each theme presents findings from both an asthma patient and healthcare professional perspective, in addition to differences between the use of telephone and video consultations. Data saturation was reached for all themes.

3.3.1 | Theme 1: Increased regular attendance and increased monitoring of patient

Patients: For patients with asthma, the increase in regular attendance at reviews conducted remotely was due to a number of advantages, including increased convenience, time and cost savings for patients.14,17,27,29,31,33 Remote reviews were perceived as better at meeting patient needs and preferences compared to a standard face-to-face review, as they reduced barriers to treatment and eased access to routine care.14,17,27,29,31,32,34–36,39,40 Regular attendance at remote reviews and supported self-management delivery led to an increase in patient confidence and enablement in their asthma care.33,36
Professionals: Symptoms could be monitored, reviewed, interpreted and acted on safely in remote consultations. Increased patient attendance at routine remote reviews created regular opportunities for healthcare professionals to provide feedback on monitored asthma symptoms to patients (e.g., monitoring peak flows and asthma triggers). Additionally, the opportunity to maintain contact and ongoing monitoring was one of the most commonly recognized advantages of remote consultations. Patients' medication and asthma action plans could be reviewed, reinforcing earlier detection of symptoms or deterioration and timely self-management.

Video consultations: In addition to enabling feedback on monitored asthma symptoms or behaviours, video consultations had particular advantages for monitoring a patient's condition through systems, such as ‘document camera’ or ‘picture-in-picture’ functions, which facilitated patients and professionals reviewing the contents of documents (e.g., asthma action plans) together.

Telephone consultations: A number of articles supported telephone reviews as an efficient way of maintaining contact with asthma patients. Telephone consultations facilitated regular discussions and met patients' needs and preferences due to increased convenience, facilitating attendance at routine telephone reviews.

3.3.2 | Theme 2: Opportunities to provide individualized information about asthma and asthma management

Patient: Video and telephone consultations were a safe and effective mechanism to facilitate the delivery of individualized information about asthma and its management, resulting in increased patient understanding of their condition and improved overall asthma control. Remote consulting provided opportunities for patients to learn about their condition and increased patient satisfaction with the mode of consultation.

Professional: Use of video and telephone consultations were both recognized as effective communication strategies for healthcare professionals to provide individualized information, instructions, education and signposting of other essential resources to patients.

Video consultations: Patients found video consultation technology visually appealing and engaging, enhancing understanding and asthma education (e.g., information about asthma triggers). Use of video technology-facilitated greater discussion between patients and professionals. Recording functions allowed patients to record their review then rewatch, consolidate and confirm the information discussed.

Telephone consultations: Several studies supported the use of telephone consultations as an effective tool to deliver individualized information to patients. More specifically, telephone reviews were recognized as a timely, effective and efficient means to provide information and
transfer instructions to patients to manage their asthma.

3.3.3 | Theme 3: Provision of convenient/flexible access to advice and support

Patients: Remote consultations provided more convenient and flexible access to advice and support for patients with asthma, compared to attending a face-to-face review.\textsuperscript{34,39} Particular groups who favoured the convenience and timeliness of remote consultations were patients who lived in rural communities,\textsuperscript{27,30} patients whose lives were structured around work, study or childcare,\textsuperscript{17} younger patients who were more familiar with the use of technology,\textsuperscript{29,33} and older, vulnerable patients with reduced mobility.\textsuperscript{14,33} Ease of access was particularly helpful for patients who noticed a change in symptoms or peak flow readings and were able to contact a healthcare professional promptly via remote consultation.\textsuperscript{29} Remote asthma consultations may potentially narrow socioeconomic inequalities in access to healthcare, by being more accessible to vulnerable groups.\textsuperscript{14,33}

Professionals: Healthcare professionals may have more availability to conduct a remote video or telephone review, enabling them to respond more promptly than a face-to-face appointment may have offered.\textsuperscript{12,27,29,35}

Video and telephone consultations: For some patients, telephone and video consultations were a preferred method of consultation, and patients were more likely to attend this type of review, leading to increased engagement.\textsuperscript{34,39}

3.3.4 | Theme 4: Enhanced healthcare professional–patient relationships and communication

Patients: Patients whose reviews were conducted with the same clinician each time (potentially facilitated by remote consultations), reported better health-related outcomes and greater satisfaction with the consultation.\textsuperscript{28,30,31,34,37,40} Benefits described included increased shared decision-making,\textsuperscript{17,33,40} more discussion of personal preferences\textsuperscript{17,33} and increased attendance at reviews.\textsuperscript{30} Reviews conducted with the same clinician were seen to be particularly important to young people,\textsuperscript{33} leading to more engagement and increased confidence in self-management strategies. The mechanism for this was the trust built during an existing relationship between professional and patient\textsuperscript{33}

Professionals: A number of studies suggested that when a relationship is already established between patient and professional, telephone and video technologies are a suitable platform to engage in shared decision-making and discussion of self-management strategies. The existing relationship ensures the professional recognizes changes in a person’s condition due to their prior awareness of personal circumstances.\textsuperscript{28,30,31,34,37,40}

Video consultation: Patients were able to discuss their asthma action plan with their health professional during remote reviews. Video-facilitated collaboration through technologies, such as ‘screening
sharing’ and ‘editing documents’, allowed the patient and professional to work together to personalize their action plan.\textsuperscript{30,40} Recording functions enabled patients to revisit their review and help consolidate the information delivered, to improve understanding of their asthma and how to manage their condition.\textsuperscript{30,40}

3.3.5 Theme 5: Appropriate provision of specific practical asthma self-management strategies (action plans and inhaler technique)

Patients: Specific practical asthma self-management strategies can be effectively communicated, delivered and discussed during remote asthma reviews. An individualized, written asthma action plan can be successfully discussed via telephone or video consultation. Remote provision/discussion of an action plan leads to positive patient outcomes, such as increased patient understanding,\textsuperscript{27,28,31,34,37,38,40} improved control of their condition,\textsuperscript{27,31,34,37,38} increased quality of life,\textsuperscript{28} greater patient self-efficacy\textsuperscript{27} and allows patients who may not regularly attend face-to-face reviews to have their action plan reviewed.\textsuperscript{34}

Professionals: The use of video and telephone consultations is an effective alternative for discussing a patient’s asthma plan compared to face-to-face reviews. Discussion of individualized action plan information and medications can be safely reviewed to increase patient understanding of their condition, medication adherence and how to recognize symptom deterioration. Professionals were able to demonstrate inhaler technique and provide education using the visual aids and tools of video consultation technologies effectively and safely.\textsuperscript{27,39}

Video consultation: When professionals are communicating and demonstrating practical strategies, such as inhaler technique via video consultation, patients were able to understand and learn from the instructions when the professional’s video camera was positioned from the waist up (allowing the demonstration to be fully visualized).\textsuperscript{27} Similarly, healthcare professionals could review patients’ technique. Online screen-sharing technologies allowed patients and professionals to collaboratively edit asthma action plans during video consultations.\textsuperscript{40} This led to improved communication and avoided misunderstandings, and enhanced shared decision making between the individual and professional. The improved attendance at remote consultations enabled these specific skills to be reviewed with more patients.\textsuperscript{39}

Telephone consultation: Telephone consultations are a safe and effective alternative to face-to-face reviews to discuss and provide practical self-management advice and support. Individual asthma action plans can be discussed over the telephone and then converted into written versions and sent to patients after the consultation. This technique of discussions and provision of action plans were seen to significantly improve asthma control.\textsuperscript{31,37}

3.3.6 Theme 6: Increased patient confidence and self-efficacy
Patient: Through the increased engagement with a remote consultation and prompt clinical input, patients felt more empowered and had up-to-date strategies to manage their condition.\textsuperscript{27,31,33,35,36,38,39,41} Patients also gained confidence to undertake self-management techniques from regularly attending remote reviews, which they may have missed from nonattendance at a face-to-face review. Overall, this led to increased confidence in their understanding of how to identify impending attacks and in their ability to act appropriately.\textsuperscript{12,38}

3.4 | Overarching synthesis

The overarching synthesis from the six key themes identified that, in relation to the review’s key aims (to explore the safety, clinical effectiveness and safety of supported self-management delivery in remote asthma consultations), remote consultations were overall, more highly accepted than in-person consultations by many patients and professionals, and were an equally safe and effective alternative to face-to-face reviews. In only one instance were concerns raised about remote consulting,\textsuperscript{29} in particular with regard to clinical effectiveness and safety. Specifically, uncertainties about the effectiveness and quality of interactions compared to face-to-face meetings were raised. One further study\textsuperscript{28} suggested there was no perceived improvement of control where telemedicine alone was received, although this is not suggestive of poorer results. An overview of all findings has been presented in Table 3.

4 | DISCUSSION

4.1 | Summary of findings

We identified six themes using data from 18 articles to describe how supported self-management is delivered during remote asthma consultations. We identified positive benefits associated with remote asthma care, including increased convenience, improved access (including for some vulnerable groups) and attendance at reviews, ability to assess the core content of asthma remotely (especially video reviews that enabled practical tasks such as checking inhaler technique), completion of asthma action plans (screen sharing or discussed with documents sent post consultation) and continuity of care. Typically, these overrode any challenges associated with distance imposed by remote consultations, and patient’s concerns about the quality of the interaction. Overall, our data suggest that for many patients and healthcare professionals, remote consultations are more highly accepted than in-person consultations, and were equally as effective and safe as face-to-face reviews.
### TABLE 3 Synthesis of findings

<table>
<thead>
<tr>
<th></th>
<th>Remote (video/telephone) versus face-to-face (in person) asthma consultations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acceptability</strong></td>
<td>(On average) higher levels of acceptability from both patients and professionals for remote delivery of asthma care</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td>Remote consultations were recognized as safe as providing a face-to-face review</td>
</tr>
<tr>
<td><strong>Clinical effectiveness</strong></td>
<td>Remote consultations were recognized as clinically effective as providing a face-to-face review</td>
</tr>
</tbody>
</table>

### 4.2 Interpretation of findings of this study in relation to current literature

Guidelines for asthma management recommend that asthma should be monitored (often in primary care) by routine clinical review on at least an annual basis. Every asthma consultation is an opportunity to review, reinforce and extend patient’s knowledge and skills. Regular professional review is a core component of supported self-management, with evidence of greater reductions in hospitalisations and emergency department visits in trials where the intervention includes regular review. The findings of this realist review show that using remote means to provide consultations can increase patient engagement and attendance at asthma reviews. Our realist synthesis suggests that one mechanism for the benefits of telehealth communications is the convenience of telephone or video consultations, which facilitates attendance at reviews.

Providing patients with information and guidance for self-management of their asthma is an essential aspect of all routine reviews. Our findings highlight that the use of telephone and video consultations is an acceptable, effective and safe alternative to face-to-face consultations for providing patients with this information. Importantly, the partnership between the patient and professional should enable information to be discussed, understood and agreed upon between both the patient and professional. Such ‘shared decision-making’ can improve clinical outcomes and quality of life by actively engaging them in managing their own health. We found that telephone and video consultations have the potential to be effective platforms that can facilitate shared decision-making.

Asthma is a variable condition and some people with asthma may be well controlled and need very little support for many months. However, when symptoms are triggered, access to professional care needs to be flexible in timing and mode of delivery. As an alternative to face-to-face consultations, the findings of this study highlight that remote asthma reviews can provide flexible and convenient access to professional support enabling patients to
be provided with appropriate and prompt clinical input. Such flexible access to their healthcare professionals promotes patients’ confidence in their ability to self-manage their condition.12,27,31,33,35,36,38,39,41

The provision of a personalized asthma action plan is an essential strategy in supporting people with asthma to take the right actions at the right time.2,3,6,47 People with asthma spend a matter of minutes in a routine review with their healthcare professional; the rest of the time, they are making their own decisions about their medications and when they should seek medical help. It is therefore essential that asthma reviews are used to agree on what they should do if their asthma control deteriorates and to empower them to take timely and appropriate action. Findings from this review highlight the acceptability, clinical effectiveness and safety of delivering action plans in remote routine reviews.

Kew and Cates34 in a Cochrane review concluded that there were no important differences between face-to-face and remote asthma reviews in terms of exacerbations, asthma control or quality of life, though there was insufficient information to rule out differences in efficacy or safety. Consistent with the ‘what/how/context’ aims of a realist synthesis,18–21 our findings extend the Cochrane review by identifying which aspects of supported self-management can be delivered via remote means, describing strategies that enable the provision of video- or telephone consultations, and for whom and under what circumstances remote reviews may be most beneficial.

Kearney48 reflects on the fast pace at which UK NHS services have moved to remote care when the COVID-19 pandemic demanded social distancing, concluding that it will be essential for future healthcare services to ‘do things differently’ in their approach to LTCs and the delivery of supported self-management. The report concludes that it is critical to plan carefully for the use of remote technologies and to identify the best practice of self-management delivery at scale and in a sustainable way. The findings of our review provide the context and mechanisms for effective remote asthma supported self-management delivery.
4.3 | Strengths and limitations

To our knowledge, we have conducted the first rapid realist review in the area of asthma supported self-management delivery via remote consultation. Our review is timely given the shift to remote care driven by the COVID-19 pandemic, and we explored the (rapidly expanding) use of video and/or telephone consultations, and systematically identified the perceived benefits and challenges of each mode of delivery in relation to each theme. Additionally, the findings are explored through the perspective of both the health professional and the patient. A final strength is that we utilized a robust realist methodology, which is gaining recognition for its contribution to healthcare research. A weakness of our study was the time constraints that we overcame by the use of a rapid realist review. By design, our review was ‘rapid’, and we recognize that a more detailed approach such as a traditional realist synthesis may have revealed, challenged or confirmed some of the themes presented in the findings of this study, due to its ability to test presented theories. However, we believe our findings have been systematically constructed, and all feedback provided by the multidisciplinary External Reference Group was considered and actioned. Additionally, the use of the PRISMS taxonomy as a framework for analysis allowed the structure and interpretation to be grounded in the existing evidence base. A weakness of realist methodology is the subjectivity of the data extraction and the challenge of extracting unbiased C–M–Os. The primary research studies are generally not reported in line with realist concepts (C–M–O configurations) and therefore data extraction requires the researcher to interpret data to explore the context and mechanistic features of the research. In addition, we also acknowledge some limitations in the interpretation of the findings. Although every effort was made to ensure a nonbiased approach to data extraction, we recognize that the included studies may be liable to publication bias with a focus on more successful components of their interventions, and favour reporting of positive or significant findings, resulting in an overly positive interpretation of the effects of remote consulting. To address this, we ensured our data extraction included all intervention outcomes (successful or not), and specifically highlighted where fewer positive findings were noted, although these were infrequent and insufficient to form a theme. For example, in Godden and King some professionals expressed concerns about the quality of remote consultations considering that they may not be as effective as face-to-face reviews. They described varied opinions on communicating key information remotely, as well as concerns about patient’s willingness to accept new technologies. Although these negative opinions, were outweighed by the potential advantages of remote consultations in empowering people to manage their condition and enabling timely management of exacerbations, in the studies included in this review, this study does however raise the point that patient preference is always important to consider.

To increase the reliability of findings, we involved a second reviewer in the data extraction phase. The research team regularly discussed potential findings to ensure different perspectives were considered and resulted in a balanced interpretation of the data. The aim was to reach a consensus in interpretation, and this was achieved for all findings.
This review was completed during the COVID-19 pandemic period, but all studies included in the data predated the pandemic. Post-COVID research may present different findings as healthcare adapts to new models of asthma care. Additionally, we were dependent on the completeness of the included studies, so some potentially important contexts may not have been evaluated. For example, we did not have evidence to inform the role of remote support for self-management in the context of people living with disabilities, or ethnic minority groups potentially with language barriers. Future research should specifically explore remote supported self-management delivery for such groups.

We also acknowledge that although the review findings indicate either equivalence or greater benefit of remote self-management delivery, there will be individuals for whom face-to-face reviews are a preferred mode of healthcare delivery and communication. Additionally, we recognize that the ‘safety’ variable measured within this review has not been tested within a controlled trial. Although we found no indication that remote delivery of supported self-management caused harm, we would recommend future studies to explore this further.

4.4 | Implications for future research and policy

Future research should explore how telecommunication can be implemented in ways that are most valued by patients and clinicians, to fit within the organisational and technical infrastructure of healthcare services and embrace the culture of delivering supported self-management. Asthma UK advocate that policy makers and innovators need to work together to develop a national effort towards delivering sustainable supported self-management and long-term implementation of improved patient-centred asthma care. The Asthma UK Centre for Applied Research (AUKCAR) is a collaborative network of applied asthma researchers, clinical and academic respiratory experts, as well as PhD students and asthma patient representatives. Supported self-management is a key theme within the AUKCAR and the IMP2ART programme of work has developed evidence-based, practical strategies to promote the delivery of supported self-management in routine primary care. This rapid realist review provides evidence-based findings of the underlying contexts and mechanisms in remote service provision that contribute towards effective supported self-management delivery during asthma reviews, which will be highlighted by the IMP2ART programme.

5 | CONCLUSIONS

Even when the COVID-19 pandemic recedes, remote technologies will remain in everyday healthcare. This paper highlights new knowledge through the use of realist methodology by understanding the existing mechanisms and the interplay within differing contexts, and has revealed how and why remote supported self-management for asthma can be effectively delivered. A core component of asthma care is supporting self-management, a guideline-recommended intervention that reduces the risk of acute attacks, and improves asthma control and quality of life. Across a broad range of contexts, remote consultations are highly accepted by both patients and professionals, and are as clinically effective and safe.
as face-to-face reviews to provide self-management support. Specific groups advantaged by remote consulting included those living in rural communities, or who had to fit their healthcare around work or domestic responsibilities, and those with reduced mobility. The findings of this rapid realist review can inform the conduct of remote asthma reviews, and implementation of supported self-management techniques into asthma care.

ACKNOWLEDGEMENTS

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

AUTHOR CONTRIBUTIONS

Emma Kinley undertook the data collection, extraction and synthesis. Imogen Skene independently screened the data search and extracted 25% of the data to ensure reliability and validity. All authors (Emma Kinley, Imogen Skene, Elizabeth Steed, Kirstie McClatchey, Hilary Pinnock) contributed to data interpretation and critically revised the manuscript. All authors read and approved the final manuscript.

DATA AVAILABILITY STATEMENT

All data generated or analysed during this study are included in this published article (and its Supporting Information Files).

ORCID

Emma Kinley http://orcid.org/0000-0001-5934-7023
REFERENCES


35. Pinnock H. It’s good to talk... but do I really need to see you? The potential of telephone consultations for providing routine asthma care. Prim Care Respir J. 2003;12(3):79-80. doi:10.1038/pcrj.2003.50


SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher’s website.

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Health Expect. 2022;25:1200-1214. doi:10.1111/hex.13441
**Appendix 5: Systematic Realist Review Data Search Strategy Including**

**Search Terms and Databases**

1) Database: Ovid MEDLINE(R) 1946 to September Week 4 2020

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4) Database: Cochrane Library, Date Run: 05/10/2020 16:17:50

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<td>Trials</td>
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## Appendix 6: Full C-M-O configurations from identified articles of systematic rapid realist review

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<tr>
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<th>Reference</th>
<th>Context – Mechanism - Outcomes Configurations</th>
<th>Safety/ Clinical Effectiveness / or Acceptability</th>
<th>PRISMS Taxonomy Component</th>
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<td></td>
<td>Brown, W., T. Schmitz, D. M. Scott and D. Friesner (2017). &quot;Is Telehealth Right for Your Practice and Your Patients With Asthma?&quot; Journal of patient experience 4(1): 46-49.</td>
<td><strong>Context</strong> - Background information e.g., setting and demographics to outline possible Contextual factors; <strong>Mechanism</strong> - Key workings that contributed to the design and functioning of a pathway to identify Mechanisms and resources; <strong>Resource</strong> - Introduction of telehealth technology (audio/video links) as a resource to conduct regular asthma reviews</td>
<td><strong>Outcomes</strong> - Information and evidence suggestive of the successes or failures of different aspects of an intervention</td>
<td>A1. Information about Condition and/or its management (asthma education)</td>
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<td>Brown, W., T. Schmitz, D. M. Scott and D. Friesner (2017). &quot;Is Telehealth Right for Your Practice and Your Patients With Asthma?&quot; Journal of patient experience 4(1): 46-49.</td>
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<td><strong>Outcomes</strong> - Information and evidence suggestive of the successes or failures of different aspects of an intervention</td>
<td>A1. Information about Condition and/or its management (asthma education)</td>
</tr>
</tbody>
</table>

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Participants with asthma in a rural, medically underserved community

Positive - Participants found the telehealth technology convenient

Telehealth resources are an acceptable and convenient means to deliver asthma education and regular routine reviews for patients in a rural, medically underserved community.

Positive - Acceptability

A1. Information about Condition and/or its management (asthma education)
<table>
<thead>
<tr>
<th>Participants with asthma in a rural, medically underserved community</th>
<th>Telehealth technology (video consultation) to review inhaler technique. (Camera should be positioned from waist up to recognise non-verbal cues)</th>
<th>Positive – increases patients' comfort and understanding</th>
<th>Patients and healthcare professionals were clearly able to see demonstration of inhaler technique when camera is positioned from waist up.</th>
<th>Positive – Clinical Effectiveness</th>
<th>A11. Training/Rehearsal for practical self-management (inhaler technique)</th>
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<td>Participants with asthma in a rural, medically underserved community</td>
<td>Telehealth technology (video consultation) to review documents provided by patients (Additional advantages of the system such as 'document camera' or 'picture-in-picture' functions)</td>
<td>Positive – increased collaboration and understanding between patient and professional</td>
<td>Healthcare professional is able to review documents provided patients e.g., asthma symptom diary and able to provide feedback to the patient.</td>
<td>Positive – Clinical Effectiveness</td>
<td>A5. Monitoring of Condition with Feedback</td>
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<td>Participants with asthma in a rural, medically underserved community</td>
<td>Telehealth technology (video consultation), use of graphics and pictures through video conferences to enhance instruction and understanding about asthma triggers</td>
<td>Positive – Patient finds the consultation more 'visually appealing' and engaging</td>
<td>Through use of graphics and pictures during the video consultation, patients facilitated greater discussion and perceived retention of information about common triggers.</td>
<td>Positive – Clinical Effectiveness</td>
<td>A1. Information about Condition and/or its management (asthma education)</td>
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<td>2</td>
<td>Chongmelaxme, B., S. Lee, T. Dhippayom, S. Saokaew, N. Chaiyakunapruk and P. Dilokthornsakul (2019). &quot;The Effects of Telemedicine on Asthma Control and Patients’ Quality of Life in Adults: A Systematic Review and Meta-analysis.&quot; The Journal of Allergy &amp; Clinical Immunology in Practice 7(1): 199-216.e111.</td>
<td>Adults with asthma receiving a routine review Use of ‘tele-case management’ approaches (healthcare professional interactions with patients) to conduct routine asthma review</td>
<td>Positive</td>
<td>This paper highlighted a significant improvement in patient quality of life when tele-case management was used, in comparison to all other tele-medicine approaches. The tele-case management study included: ‘collaborative patient’s self-management, monitoring patient’s health status, interactive communication and provision of an action plan’.</td>
<td>A5. Monitoring of condition with feedback A3. Provision of agreement on specific clinical action plans and or/ rescue medication</td>
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We found that the studies with telemedicine delivered for at least 6 months had higher proportions of patients with significant improvements in asthma control and patients' quality of life compared with the studies with less than 6 months (p16).

<p>| Adults receiving telemedicine review for asthma | Telemedicine review for asthma control (single) | No improvement in control | Improved quality of life | Tele-case management was the only effective single telemedicine for the improvement of patients' quality of life. We believe that this is because most tele-case management incorporated several medical supportive managements, including a collaborative patients' self-management, monitoring patients' health status, interactive communication, and an action plan provision. (p11) | Clinical Effectiveness / Acceptability | A1. Information about condition and/or its management | A3. Provision of/agreement on specific clinical action plans and/or rescue medication | A5. Monitoring of condition with feedback |</p>
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<td>3</td>
<td>Donaghy, E., H. Atherton, V. Hammersley, H. McNeilly, A. Bikker, L. Robbins, J. Campbell and B. McKinstry (2019). &quot;Acceptability, benefits, and challenges of video consulting: a qualitative study in primary care.&quot; British Journal of General Practice 69(686): e586-e594.</td>
<td><strong>Background information e.g., setting and demographics to outline possible Contextual factors;</strong> Background information e.g., setting and demographics to outline possible Contextual factors;</td>
<td><strong>Key workings that contributed to the design and functioning of a pathway to identify Mechanisms and resources;</strong> Key workings that contributed to the design and functioning of a pathway to identify Mechanisms and resources;</td>
<td>Information and evidence suggestive of the successes or failures of different aspects of an intervention (Outcomes)</td>
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<td></td>
<td>For patients with a long term condition, whose lives are structured around work, study or childcare</td>
<td>Resource</td>
<td>Reaction/Response</td>
<td>Acceptability</td>
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<td></td>
<td>The opportunity to have a routine review conducted via remote consultation</td>
<td>Positive patient convenience, time and cost savings</td>
<td>Increased attendance for patients to their regular review (easier access to advice and support).</td>
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<td>Patients with a long term condition</td>
<td>Routine review for condition conducted via remote consultation with a healthcare professional they have an existing relationship with (or have had previous consultations with)</td>
<td>Positive, patient feels more comfortable, rapport is already existing</td>
<td>Improved doctor-patient relationships results in better communication and shared decision making between patient and healthcare professional for self-management decisions.</td>
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<td>Person with asthma measuring their peak flow and notice a difference in reading</td>
<td>Availability of HCP via video or telephone consultation to review symptoms</td>
<td>Seeking help from a healthcare professional</td>
<td>Telemonitoring and conducting routine reviews (via telephone or video), can result in people with asthma being more proactive with their self-management as they are able to contact a healthcare professional for a more convenient and timely review (Identification of early exacerbations).</td>
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<td></td>
<td>A young person with asthma, who regularly uses technology</td>
<td>Routine asthma review conducted via remote consultation</td>
<td>Positive, comfortable with using the technology</td>
<td>Interacting with patients via different technologies which they are comfortable with, can work more conveniently for patients, and are therefore more likely to attend their routine review.</td>
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<td></td>
<td>Telehealth for adults</td>
<td>Telehealth appointment</td>
<td>Expedite appointments</td>
<td>The potential for telemonitoring to identify early exacerbations of disease was also noted</td>
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<td>5</td>
<td>Goodridge, D. and D. Marciniuk (2016). “Rural and remote care.” Chronic Respiratory GP practices in rural and remote communities</td>
<td>Providing telehealth care (remote monitoring and remote consultations) for asthma patients</td>
<td>Can promote patient-centred care by facilitating communication between patients and supporting self-</td>
<td>A5. Monitoring condition with feedback</td>
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Disease 13(2): 192-203.

**Use of Remote Consultations for a routine asthma review**

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<td></td>
<td>Prescribing medication using telemedicine technologies, (when a relationship is already established between patient and provider)</td>
<td>Increase in prescribing</td>
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<td></td>
<td>The American Medical Association supports prescribing medicine over remote consultations, provided that the patient and healthcare professional already have an existing relationship.</td>
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**Safety/ Clinical Effectiveness / or Acceptability**

A6. Practical Support with adherence (medication or behavioural)

A7. Provision of equipment

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<td>6</td>
<td>Greenhalgh, T., S. Shaw, J. Wherton, S. Vijayaraghavan, J. Morris, S. Bhattacharya, P. Hanson, D.</td>
<td>Patients with a long term condition, and a history of defaulting from appointments</td>
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Offered their routine review via video conference |

Improved patient engagement and attendance rates |

Patients showed greater engagement, improved self-management, overall control and a significant reduction in ‘did not attend’ rates. |

Clinical Effectiveness |

A4. Regular clinical review |

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**PRISMS Taxonomy Component**

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<tr>
<td>7</td>
<td>Gruffydd-Jones, K. and S. Ward (2005). <em>Targeted routine asthma care in general practice using the telephone</em></td>
<td>People with asthma attending their routine review (within a semi-rural GP Practice)</td>
<td>Significantly improving access to routine care. Patients are more likely to receive their annual review if conducted via telephone. (35%)</td>
<td>A4. Regular Clinical Review</td>
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<td>Availability of telephone consultations to conduct routine review in comparison</td>
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<td>Increased patient engagement</td>
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</table>
People with asthma whose routine review is conducted via telephone

Nurse and patient formulate the individualised asthma action plan and advice on what to do if asthma control deteriorated. Written version of the plan is then sent to patient

Increased patient engagement, understanding of their condition and how to recognise deterioration

Increased patient understanding of individual condition, shared decision making between patient and healthcare professional and provision of action plan.

Clinical Effectiveness

A3. Provision of/agreement on specific clinical plans and/or rescue medication

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<tr>
<td>8</td>
<td>Hanlon, P., L. Daines, C. Campbell, B. McKinstry, D. Weller and H. Pinnock (2017). “Telehealth</td>
<td>Patient with asthma Provided with a telehealth review (telephone or video consultation) for their routine asthma review (including face-to-face care for self-</td>
<td>Positive/Neutral – No differences in patient outcomes between telehealth and face-to-face care for self-</td>
<td>There are little or no significant differences in the provision of supported self-management components (PRISMS)</td>
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| | | | | | A1. Information about condition and/ or its management |

<p>| | | | | | A3. Provision of/ agreement |</p>
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<td>9</td>
<td>Ignatowicz, A., H. Atherton, C. J. Bernstein, C. Bryce, R. Court, J. Sturt</td>
<td>Background information e.g., setting and demographics to outline possible Contextual factors; Key workings that contributed to the design and functioning of a pathway to identify Mechanisms and resources; Resource</td>
<td>Information and evidence suggestive of the successes or failures of different aspects of an intervention (Outcomes)</td>
<td>A4. Regular Clinical Review A8. Provision of easy access</td>
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<tr>
<th>and F. Griffiths (2019). &quot;Internet videoconferencing for patient–clinician consultations in long term conditions: A review of reviews and applications in line with guidelines and recommendations.&quot; Digital health 5: 2055207619845831.</th>
<th>reduce barriers to treatment and increase convenience for patients.</th>
<th>A patient with asthma scheduled routine review</th>
<th>Review is conducted via videoconference and provision of patient education during review</th>
<th>Increased patient individualised understanding and knowledge of condition</th>
<th>Provision of patient education during routine video consultations can increase patient satisfaction and improve health outcomes.</th>
<th>A1. Information about condition and/or its management</th>
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<tr>
<td>A young person with a long term condition, scheduled for a routine review</td>
<td>Acceptability / Clinical Effectiveness</td>
<td>Review is conducted via videoconference with the same clinician each time</td>
<td>More personalised care tailored to the young person's preference and building of relationship with healthcare professional</td>
<td>Improved relationship between patient and professional, which lead to more frequent contact with the specific clinician who is known to the patient and likely to know particular young patient’s personal circumstances and what is important to them.</td>
<td>A4. Regular Clinical Review A8. Provision of easy access to advice or support when needed A9. Training/Rehearsal to communicate with healthcare professionals</td>
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<td>10</td>
<td>Kew, K. M. and C. J. Cates (2016). &quot;Remote versus face-to-face check-ups for asthma.&quot; Cochrane Database of Systematic Reviews(4).</td>
<td>Patients with asthma, attending a regular routine review Routine review conducted via remote consultation (telephone or video review, including personalised contact with a healthcare professional) Increased convenience and engagement of patients in attendance and self-management strategies</td>
<td>Provides an unobtrusive and efficient way of maintaining contact with patients. Remote check-ups may not disrupt a person’s life in the way a regular clinic visit might and may serve to enhance self-management behaviours such as keeping a personalised action plan up to date and adherence to medications.</td>
<td>Acceptability / Clinical Effectiveness</td>
<td>A5. Monitoring of Condition with Regular Feedback A3. Provision of/ Agreement on specific clinical action plans and/or rescue medication A4. Regular clinical review A6. Practical Support with adherence (medication or behavioural)</td>
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<td>11</td>
<td>Pinnock, H. (2003). &quot;It's good to talk... but do I really need to see you? The potential of telephone consultations for providing routine asthma care.&quot; Primary care respiratory journal 12(3): 79-80.</td>
<td>A patient with asthma scheduled for a routine asthma review: Provided with a telephone review instead of face-to-face review and discussed individual medication and self-management with healthcare professional. Patient is provided with knowledge and information of how to manage their individual condition.</td>
<td>Telephone reviews help overcome the barrier of access to care which may otherwise take up a lot of patient’s time to access a clinic. Patient can be provided with information regarding their asthma and management of their asthma (A1), are able to be signposted to supporting literature/websites for available resources (A2) and can be provided with advice and support around health and lifestyle (A14) e.g., stopping smoking, via telephone consultation.</td>
<td>A4. Regular Clinical Review A8. Provision of easy access to advice or support when needed</td>
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<td>12</td>
<td>Pinnock, H., L. Adlem, S. Gaskin, J. Harris, C. Snellgrove and A. Sheikh (2007). &quot;Accessibility, clinical effectiveness, and practice costs of providing a telephone option for routine asthma reviews: phase IV controlled implementation study.&quot; British journal of general</td>
<td>A patient with asthma scheduled for a routine asthma review</td>
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<td>Provided with a telephone review instead of a face-to-face review</td>
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<td>Increased confidence and enablement in individual asthma care</td>
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<td>Patients provided with a routine telephone review offer a stable ‘maintenance’ phase of monitoring, during which self-management assumes precedence. In turn, can increase patient’s confidence in managing their own condition.</td>
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<td>Adults with asthma for routine review (Asthma care was provided by five asthma-trained nurses across the two practice sites. Asthma clinics offered a</td>
<td>Telemedicine appointment with nurse</td>
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<td>Increase in update of appointment/ Increased confidence and self-management</td>
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<td>Cost-effective method.</td>
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<td>A1. Information about condition and/ or its management A4. Regular clinical review</td>
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Range of appointment times throughout the week and these were supplemented with opportunistic arrangements to suit patient availability.

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<td>13</td>
<td>Raju, J. D., A. Soni, N. Aziz, J. D. Tiemstra and M. Hasnain (2012). &quot;A patient-centered telephone intervention using the asthma action plan.&quot; Family medicine 44(5): 348-350.</td>
<td>Patients with clinically diagnosed uncontrolled asthma</td>
<td>Contacted by a healthcare professional via telephone, personalised asthma action plan discussed and developed to adjust medication</td>
<td>Individual asthma control improved (assessed by ACS)</td>
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### Table 1

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<tr>
<th>Adults with asthma - university-based family medicine residency clinic. Patients were contacted by phone, and an initial ACS was assessed. Patients with an ACS &lt;20 (uncontrolled asthma) had their medication adjusted and a new AAP implemented by phone. Uncontrolled patients were reassessed by phone monthly and management was adjusted until control was achieved.</th>
<th>Telemedicine appointments – triaged by ACS - with uncontrolled patients getting monthly assessments</th>
<th>Improved asthma control (ACS) (table 1 results)</th>
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<tr>
<td>1, targeted telephone care management programs can be successful in reducing medical costs and hospitalizations 2. constrained by the proportion of patients who are difficult to reach by telephone because they lack functioning message systems and/or seldom answer their phone when care providers try to call them. 3. From a practical standpoint, physicians would likely not have the time to call patients for the initial assessment.</td>
<td>1, targeted telephone care management programs can be successful in reducing medical costs and hospitalizations 2. constrained by the proportion of patients who are difficult to reach by telephone because they lack functioning message systems and/or seldom answer their phone when care providers try to call them. 3. From a practical standpoint, physicians would likely not have the time to call patients for the initial assessment.</td>
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<td>Clinical Effectiveness</td>
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<td>A1. Information about conditions and/or its management</td>
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<td>14</td>
<td>Van Gaalen, J. L., S. Hashimoto and J. K. Sont (2012). “Telemanagement in asthma: an innovative and effective approach.” Current Opinion in Allergy &amp; Clinical Immunology 12(3): 235-240.</td>
<td>People with asthma</td>
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<td>People with asthma</td>
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<td>Resource</td>
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<td>15</td>
<td>Vitacca, M., L. Comini and S. Scalvini (2010). &quot;Is teleassistance for respiratory care valuable? Considering the case for a 'virtual hospital'.&quot; Expert Review of Respiratory Medicine 4(6): 695-697.</td>
<td>Patients with asthma Providing the patient with a routine review using telemedicine (telephone or video consultation) and use of telemonitoring of respiratory measures (e.g., peak expiratory flow)</td>
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<td>Patients with asthma Providing the patient with a routine review using telemedicine (telephone or video consultation) and use of telemonitoring of respiratory measures (e.g., peak expiratory flow)</td>
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<td>16</td>
<td><strong>(Added by External Reference Group)</strong> Hamour, O., Smyth, E., &amp; Pinnock, H. (2020). Completing asthma action plans by screen-sharing in video-consultations: practical insights from a feasibility assessment. NPJ primary care respiratory medicine, 30(1), 1-5.</td>
<td>Patients with asthma, scheduled for a routine review; Review conducted via video-consultation and health professional uses the ‘edit document’ and screen sharing features during the video consultation to review asthma action plan.</td>
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<td></td>
<td>Patients with asthma, scheduled for a routine review; Review conducted via video consultation. Consultation is recorded via videoconferencing software.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Patients with asthma, scheduled for a routine review | Review conducted via video consultation and asthma action plan discussed via screen sharing | Patients found the approach to be comparable to live situations | Online screen-sharing is a practical approach to joint completion of asthma action plans. | Clinical Effectiveness / Acceptability | A3. Provision of/ agreement on specific clinical action plans and/or rescue medication

<table>
<thead>
<tr>
<th>No</th>
<th>Reference</th>
<th>Context – Mechanism - Outcomes Configurations</th>
<th>Safety/ Clinical Effectiveness/ or Acceptability</th>
<th>PRISMS Taxonomy Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>(Added by External Reference Group) Pare, G., K. Moqadem, G. Pineau and C. St-Hilaire (2010). Clinical effects of home telemonitoring in the</td>
<td>Patients with asthma, provided with the equipment and instruction to monitor their condition via telemonitoring</td>
<td>Offered a remote consultation to review condition</td>
<td>Feelings of empowerment &amp; improved feelings of security</td>
</tr>
<tr>
<td>No</td>
<td>Reference</td>
<td>Context – Mechanism - Outcomes Configurations</td>
<td>Safety/ Clinical Effectiveness / or Acceptability</td>
<td>PRISMS Taxonomy Component</td>
</tr>
<tr>
<td>----</td>
<td>-----------</td>
<td>---------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>18</td>
<td>(Added by External Reference Group) Thiyagarajan, A., C. Grant, F. Griffiths and H. Atherton (2020). &quot;Exploring patients' and clinicians' experiences of video consultations in primary care: a systematic scoping review.&quot; BJGP open 4(1).</td>
<td>Patients with asthma, (most specifically for older patients)</td>
<td>Patient benefits: increased patient convenience, reduced travel costs</td>
<td>Improved access to support.</td>
</tr>
</tbody>
</table>

Patients with asthma, provided with the equipment and instruction to monitor their condition via telemonitoring. Used an interactive tool via remote consultation to monitor condition and gain feedback from a healthcare professional. Fewer asthma related symptoms, and patient's asthma was better controlled.

Empowerment

Clinical Effectiveness

A5. Monitoring of condition with feedback

A9. Training/ Rehearsal to communicate with healthcare professionals

Patients with asthma, provided with the equipment and instruction to monitor their condition via telemonitoring. Used an interactive tool via remote consultation to monitor condition and gain feedback from a healthcare professional. Fewer asthma related symptoms, and patient's asthma was better controlled.

Empowerment

Clinical Effectiveness

A5. Monitoring of condition with feedback

A9. Training/ Rehearsal to communicate with healthcare professionals
Appendix 7: Research Ethics Committee Favourable Opinion Letter 02-11-2021: IRAS ID: 280392 REC REF: 20/NI/0177 Amendment Number: SA01

Office for Research Ethics Committees Northern Ireland (ORECNI)
Customer Care & Performance Directorate
Lissue Industrial Estate West
5 Rathdown Walk
Moira Road
Lisburn
BT28 2RF
Tel: 028 95361400
HSC REC B

02 November 2021

Miss Emma Kinley

Dear Miss Kinley

Study title: Delivery of Supported Self-Management in Asthma Reviews: A Mixed Methods Observational Study Nested in the IMP²ART Programme of Work
REC reference: 20/NI/0177
Protocol number: AC20153
Amendment number: SA_01 05Oct2021
Amendment date: 05 October 2021
IRAS project ID: 280392

The above amendment was reviewed at the meeting of the Sub-Committee held on 28 October 2021 in correspondence.
Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed Amendment Tool [Completed Amendment tool - PDF]</td>
<td>1</td>
<td>05 October 2021</td>
</tr>
<tr>
<td>Participant consent form [Patient Information Sheet and Consent Form (Online Survey) Version 2. 29-09-2021]</td>
<td>2.</td>
<td>29 September 2021</td>
</tr>
<tr>
<td>Participant consent form [Healthcare Professional Information Sheet and Consent Form (Online Survey) Version 2. 29-09-2021]</td>
<td>2.</td>
<td>29 September 2021</td>
</tr>
<tr>
<td>Research protocol or project proposal [Protocol of PhD Research Version 2.0 29-09-2021]</td>
<td>2.0</td>
<td>29 September 2021</td>
</tr>
</tbody>
</table>

Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

Working with NHS Care Organisations

Sponsors should ensure that they notify the R&D office for the relevant NHS care organisation of this amendment in line with the terms detailed in the categorisation email issued by the lead nation for the study.
Amendments related to COVID-19

We will update your research summary for the above study on the research summaries section of our website. During this public health emergency, it is vital that everyone can promptly identify all relevant research related to COVID-19 that is taking place globally. If you have not already done so, please register your study on a public registry as soon as possible and provide the HRA with the registration detail, which will be posted alongside other information relating to your project.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

HRA Learning

We are pleased to welcome researchers and research staff to our HRA Learning Events and online learning opportunities—see details at:

https://www.hra.nhs.uk/planning-and-improvingresearch/learning/

| IRAS Project ID - 280392: | Please quote this number on all correspondence |

Yours sincerely
Mr John Edward Mone Chair

E-mail: recb@hscni.net

Enclosures: List of names and professions of members who took part in the review

Copy to: Miss Emma Kinley

HSC REC B

Attendance at Sub-Committee of the REC meeting on 28 October 2021

Committee Members:

<table>
<thead>
<tr>
<th>Name</th>
<th>Profession</th>
<th>Present</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mrs Evelyn Melanophy</td>
<td>Solicitor</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Mr John Edward Mone (Chair)</td>
<td>Retired (Former Executive Director of Nursing)</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

Also in attendance:

<table>
<thead>
<tr>
<th>Name</th>
<th>Position (or reason for attending)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr Matthew Mills (Minute)</td>
<td>REC B Manager</td>
</tr>
</tbody>
</table>
Asthma Review Observations
(Learning from our asthma reviews)

Patient Information


PARTICIPANT INFORMATION SHEET - PATIENT PARTICIPATION

Delivery of Supported Self-Management in Asthma Reviews: A Mixed Methods Observational Study Nested in the IMP²ART Programme of Work IMP²ART (IMPlementing IMProved Asthma self-management as RouTine).

Dear Sir/Madam,

You are being invited to take part in a PhD research project, conducted by Asthma UK Centre for Applied Research. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Ask questions if anything is not clear or you would like more information. Take some time to decide whether or not you would like to take part.
WHAT IS IMP\(^2\)ART?

IMP\(^2\)ART (IMPlementing IMProved Asthma self-management as RouTine) is a funded research programme which aims to develop and test practical strategies to help practice staff deliver supported self-management for asthma patients as part of a routine care. Supported self-management is particularly important for people with asthma. Asthma self-management supported by regular professional review, improves asthma control, reduces exacerbations and admissions, and improves quality of life.

What is the purpose of the project?

This PhD study will contribute to the evaluations of the IMP\(^2\)ART project. The purpose of this project is to capture a number of asthma consultations via video recording face-to-face reviews or capturing video-consultations and telephone reviews. We hope to explore health professional’s behaviour during consultations and how nurses/GP’s deliver supported-self management to asthma patients.

Why have I been invited to participate?

Your GP practice is participating in the IMP\(^2\)ART study and has been selected to take part in this stage of the evaluations. You have been invited to participate as you have a scheduled routine asthma review.

Do I have to take part?

No. Taking part in the research is entirely voluntary. If you do decide to take part, you will be asked to sign an Informed Consent Form on the next few pages. If you decide to take part you are still free to withdraw from the study at any time, without giving a reason. Deciding not to take part or withdrawing from the study will not affect the healthcare that you receive, or your legal rights. Only the project team will have access to the research data which can be destroyed if you wish to withdraw at any stage throughout.
What does taking part involve?

If you agree to take part your scheduled asthma review will be video or audio recorded, depending on your preference of consultation. If you have a face-to-face consultation, there will be a video recorder set up within the consultation room which will be recording your consultation. If you have a telephone review, the conversation will be recorded using an audio device. If you have a video-consultation this will also be recorded. Recordings will be transcribed. Transcriptions are when the recordings are listened to and written copies are produced of what has been recorded. All transcripts will be anonymised and the audio/video recordings will then be deleted. Transcripts will be saved onto the researcher’s encrypted devices, only accessed by the researcher and the study team.

The purpose of the research is to observe the behaviour of the health professional conducting your review. There will be no change to how your clinician delivers your asthma review. Recording can be stopped throughout any point of the consultation if you should wish.

Are there any possible risks or disadvantages in taking part?

There are no significant risks anticipated from participation in this research project.

What are the possible benefits of taking part?

By sharing your experiences with us, you will be helping the researcher, Asthma UK and the University of Edinburgh to better understand asthma self-management. You will be helping health professionals to deliver self-management more effectively to asthma patients across the UK. The findings from the study will contribute to the overall evaluations of the IMP²ART study.

What If I Want To Withdraw From The Project?

You are able to withdraw from the project at any time. If you withdraw from the project all the information and data collected from you, to date, will be
destroyed and removed from all the project files. You should contact the researcher if you wish to withdraw.

**How Will My Data Be Looked After during the project?**

All the information we collect during the course of the research will be kept confidential and there are strict laws which safeguard your privacy at every stage.

**How will we use information about you?**

We will need to use some information from you and your asthma review for this research project. This information will include your name, contact details and name of GP Practice. People will use this information to do the research or to check your records to make sure that the research is being done properly. We will keep all information about you safe and secure. Once we have finished the study, we will keep some of the data so we can check the results. We will write our reports in a way that no-one can work out that you took part in the study.

**What are your choices about how your information is used?**

You can stop being part of the study at any time, without giving a reason, but we will keep information about you that we already have. If you agree to take part in this study, you will have the option to take part in future research using your data saved from this study.

**Where can you find out more about how your information is used?**

Data Protection Officer contact information:

<table>
<thead>
<tr>
<th>University of Edinburgh</th>
<th>NHS Lothian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Protection Officer</td>
<td>Data Protection Officer</td>
</tr>
<tr>
<td>Governance and Strategic Planning</td>
<td>NHS Lothian</td>
</tr>
<tr>
<td>Waverley Gate</td>
<td>Waverley Gate</td>
</tr>
</tbody>
</table>
University of Edinburgh
Old College
Edinburgh
EH8 9YL
Tel: 0131 651 4114
dpo@ed.ac.uk

2-4 Waterloo Place
Edinburgh
EH1 3EG
Tel: 0131 465 5444
Lothian.DPO@nhs.net

You can find out more about how we use your information

- at www.hra.nhs.uk/information-about-patients/
- our leaflet available from [www.hra.nhs.uk/patientdataandresearch
- by sending an email to

What will happen to my data after the end of the project?

At the end of the project all data will be stored for a minimum of 3 years and
may be used in future ethically approved research with your consent. Your
data will be stored on an encrypted University of Edinburgh Datastore Server.

What should I do if I want to take part?

If you would like to take part in the project, you should confirm by completing
the consent form at the end of this information sheet.

What will happen with the results of the research project?

The results of this study will be published in a PhD thesis and contribute to
the overall evaluations of the IMP²ART study within AUKCAR (Asthma UK
Centre Applied Research).

You will not be identifiable from any published results. Results of the study
can be made available upon request. Please contact the researcher if you
wish to receive this once the study is completed.
Who is organising and funding the research?

IMP²ART is an NIHR (National Institute Health Research) funded programme. This part of the research is led by PhD Student at the University of Edinburgh, Population and Health Sciences Unit, Emma Kinley. The PhD is funded by the Chief Scientist Office (AUKCAR/19/01) and carried out with the support of the Asthma UK Centre for Applied Research [AUK-AC-2018-01]. The study is Sponsored by University of Edinburgh and NHS Lothian.

Who has approved this project?

All research in the NHS is looked at by an independent group of people called a Research Ethics Committee. NHS Management Approval has also been given. Asthma UK Centre for Applied Research Patient and Public involvement team have also been involved in the study. They have reviewed these documents and the information we have provided to you.

Contact for Further Information

If you have any further questions about this project, please contact the lead researcher:

Emma Kinley, PhD Student, University of Edinburgh’s Population & Health Sciences, Asthma UK Centre Applied Research,

Usher Institute, The University of Edinburgh, Doorway 1 (Room 3.370)
Medical School, Teviot Place, Edinburgh EH8 9AG

You may contact the researcher’s supervision team by contacting: Dr Kirstie McClatchey, Health Psychologist and Research Fellow:

Usher Institute, The University of Edinburgh, Doorway 3, Old Medical School, Teviot Place Edinburgh, EH8 9AG

You may also contact an independent contact for the study. This is an individual who is not involved in the study team, by contacting: Bruce Mason, Research Fellow, University of Edinburgh:
Complaints

If you wish to make a complaint about the study please contact: Resgov@accord.scot

Thank you for taking time to read this Participant Information Sheet.
Asthma Review Observations (Learning from our asthma reviews)

Eligibility Criteria

Please state your Full Name (if you are completing this form on behalf a child, please state their name):

[Input field]

Please state your age group (if you are completing this form on behalf of a child please state their age):

- [ ] 15 or Under
- [ ] 16 or Over

Please state the name of your GP Practice:

[Input field]

Please state the name of the Nurse or Doctor who will be conducting your asthma review (Please put N/A if unsure):

[Input field]

Please state the date of your scheduled asthma review:

[Input field]

Dates need to be in the format "DD/MM/YYYY", for example 27/03/1980.

Please provide your email address:

[Input field]
Consent for 1) Asthma Review to be recorded

I confirm that I have read and understand the information sheet 18/11/2021 Version Number 3. for the above study. I have had the opportunity to consider the information, ask questions and have had these questions answered satisfactorily.

☐ Yes  ☐ No

I understand that my participation is voluntary and that I can ask to withdraw at any time without giving a reason and without my medical care or legal rights being affected.

☐ Yes  ☐ No

I give permission for my personal information (including name, address, date of birth, telephone number, email and consent form) to be passed to the University of Edinburgh.

☐ Yes  ☐ No

I understand that data collected about me during the study may be converted to anonymised data.

☐ Yes  ☐ No

I understand that my asthma review will not be conducted any differently due to the research taking place.

☐ Yes  ☐ No
I agree for my asthma review to be audio/video recorded:

- Yes
- No

I agree for the recording of my asthma review to be viewed and analysed:

- Yes
- No

I agree to take part in the above study

- Yes
- No

Please provide your name:


Please provide today's date:

Dates need to be in the format 'DD/MM/YYYY', for example 27/03/1980.


(dd/mm/yyyy)
Final page

Thank you for completing the consent process.

By sharing your experiences with us, you will be helping the researcher, Asthma UK and the University of Edinburgh to better understand asthma self-management. You will be helping health professionals to deliver self-management more effectively to asthma patients across the UK. The findings from the study will contribute to the researcher’s PhD project and the overall evaluations of the IMP2ART study.

If you have any further questions about the research please contact E.J.Kinley@sms.ed.ac.uk.
Appendix 9: Healthcare professional online information sheet and consent form

Asthma Review Observations
(Learning from our asthma reviews)

Healthcare Professional Information


Delivery of Supported Self-Management in Asthma Reviews: A Mixed Methods Observational Study Nested in the IMP²ART Programme of Work IMP²ART (IMPlementing IMProved Asthma self-management as RouTine).

Dear Sir/Madam,

You are being invited to take part in a PhD research project, conducted by Asthma UK Centre for Applied Research. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Ask questions if anything is not clear or you would like more information. Take some time to decide whether or not you would like to take part.

WHAT IS IMP²ART?
IMP²ART (IMPlementing IMProved Asthma self-management as RouTine) is a funded programme of work developing and testing practical strategies to help general practice (GP) staff deliver supported self-management for asthma as part of routine care.

What is the purpose of the project?

This PhD study will contribute to the evaluations of the IMP²ART project. The purpose of this project is to observe and record asthma consultations (both remote and face-to-face) to explore professional behaviours, usage of patient-centred and motivational strategies to promotion of asthma self-management.

Why have I been invited to participate?

Your GP practice is participating in the IMP²ART study and has been selected to take part in this stage of the evaluations. You have been invited to participate as you regularly deliver asthma reviews to patients.

Do I have to take part?

No. Taking part in the research is entirely voluntary. If you do decide to take part, you will be asked to sign an Informed Consent Form. If you decide to take part, you are still free to withdraw from the study at a later date, without giving a reason. Only the project team will have access to the research data which can be destroyed if you wish to withdraw at any stage throughout.

What does taking part involve?

You will be asked to conduct your usual routine asthma clinic within your practice. However, we ask that a full surgery will be video/audio recorded. Recordings would only take place for patients who have consented to take part. This will be a one-off occasion, in which the recordings can take place at the most convenient time and date for yourselves. We ask that the reviews take place in their standard locations and consulting rooms and that all forms of consultation are captured throughout the clinic; face-to-face recordings will be captured using a standard video recorder and tripod, video-consultations
will be captured by recording the full computer screen and telephone consultations will be recorded using an audio recording device. We ask if members of your practice (possibly admin staff) could inform the patient receiving a routine review that day, that this research will be taking place and to send information to the patient, prior to their review.

If COVID-19 restrictions will allow, I (the researcher) will be available on the day to set up the equipment and answer any further questions yourself or the patients may have. However, if social distancing is required, and I (the researcher) am unable to be present in the practice, we ask that we provide you with the devices to record the consultations and to set these up within your consultation room. Full support will be provided via video-consultation or telephone for this guidance.

After recordings, you will be asked to take part in a short interview with the researcher. This interview will be audio recorded and the researcher will ask questions about asthma self-management delivery in practice. Interviews will be transcribed by the researcher, or a dedicated transcriber at the University of Edinburgh. Transcriptions are when the recordings are listened to and written copies are produced of what has been recorded. All transcripts will be anonymised and audio files will then be deleted.

**Are there any possible risks or disadvantages in taking part?**

There are no significant risks anticipated from participation in this research project.

**What are the possible benefits of taking part?**

By sharing your experiences with us, you will be helping the researcher, AUKCAR and the IMP\(^2\)ART trial to better understand asthma self-management in UK primary care.

**What If I Want To Withdraw From The Project?**
You are able to withdraw from the project at any time. If you withdraw from the project all the information and data collected from you will be destroyed. You should contact the researcher if you wish to withdraw.

**How Will My Data Be Looked After during the project?**

All your data will be processed and stored in accordance with the General Data Protection Regulation (GDPR) along with the Data Protection Act 2018 (DPA). The project will be guided by and adhere to the University of Edinburgh’s data protection guidance and regulations. All personal details will be kept strictly confidential within the research team, stored on password-protected and encrypted devices and University secure servers.

**How will we use information about you?**

We will need to use some information from you. This information will include your name, contact details and name of the GP Practice which you work. We will keep all information about you safe and secure. Once we have finished the study, we will keep some of the data so we can check the results. We will write our reports in a way that no-one can work out that you took part in the study.

**What are your choices about how your information is used?**

You can stop being part of the study at any time, without giving a reason, but we will keep information about you that we already have. If you agree to take part in this study, you will have the option to take part in future research using your data saved from this study.

**Where can you find out more about how your information is used?**

<table>
<thead>
<tr>
<th>University of Edinburgh</th>
<th>NHS Lothian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Protection Officer</td>
<td>Data Protection Officer</td>
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<tr>
<td>Governance and Strategic Planning</td>
<td>NHS Lothian</td>
</tr>
<tr>
<td>University of Edinburgh</td>
<td>Waverley Gate</td>
</tr>
<tr>
<td></td>
<td>2-4 Waterloo Place</td>
</tr>
</tbody>
</table>
You can find out more about how we use your information:

- at www.hra.nhs.uk/information-about-patients/
- our leaflet available from www.hra.nhs.uk/patientdataandresearch
- by sending an email to

What will happen to my data after the end of the project?

At the end of the project all data will be stored for a minimum of 3 years and may be used in future ethically approved research with your consent. Your data will be stored on an encrypted University of Edinburgh Datastore Server.

What should I do if I want to take part?

If you would like to take part in the project, you should confirm by completing the consent form at the end of this information sheet.

What will happen with the results of the research project?

The results of this study will be published in a PhD thesis and contribute to the overall evaluations of the IMP²ART study within AUKCAR (Asthma UK Centre Applied Research). You will not be identifiable from any published results. Results of the study can be made available upon request. Please contact the researcher if you wish to receive this once the study is completed.

Who is organising and funding the research?

IMP²ART is an NIHR (National Institute Health Research) funded programme. This part of the research is led by PhD Student at the University
of Edinburgh, Population and Health Sciences Unit, Emma Kinley. The PhD is funded by the Chief Scientist Office (AUKCAR/19/01) and carried out with the support of the Asthma UK Centre for Applied Research [AUK-AC-2018-01]. The study is Sponsored by University of Edinburgh and NHS Lothian.

Who has approved this project?

All research in the NHS is looked at by an independent group of people called a Research Ethics Committee. NHS Management Approval has also been given. Asthma UK Centre for Applied Research Patient and Public involvement team have also been involved in the study. They have reviewed these documents and the information we have provided to you.

Contact for Further Information

If you have any further questions about this project, please contact the lead researcher:

Emma Kinley, PhD Student, University of Edinburgh’s Population & Health Sciences, Asthma UK Centre Applied Research, Usher Institute, The University of Edinburgh, Doorway 1 (Room 3.370) Medical School, Teviot Place, Edinburgh EH8 9AG

You may contact the researcher's supervision team by contacting:

Dr Kirstie McClatchey, Health Psychologist and Research Fellow: Usher Institute, The University of Edinburgh, Doorway 3, Old Medical School, Teviot Place Edinburgh, EH8 9AG

You may also contact an independent contact for the study. This is an individual who is not involved in the study team, by contacting: Bruce Mason, Research Fellow, University of Edinburgh

Complaints

If you wish to make a complaint about the study please contact: resgov@accord.scot

Thank you for taking time to read this Participant Information Sheet.
Page 2: Eligibility Criteria

1. Please state your Full Name:  *Required

2. Please state the Name of the GP practice you will be conducting the routine asthma reviews in:

Page 3: Consent for 1) Asthma Reviews to be recorded

3. I confirm that I have read and understand the information sheet (29/09/2021 - Version 2) for the above study. I have had the opportunity to consider the information, ask questions and have had these questions answered satisfactorily.

   - [ ] Yes
   - [ ] No

4. I understand that my participation is voluntary and that I can ask to withdraw at any time without giving a reason and without my medical care or legal rights being affected.

   - [ ] Yes
   - [ ] No

5. I give permission for my personal information (including name, address, date of birth, telephone number and consent form) to be passed to the University of Edinburgh for administration of the study.

   - [ ] Yes
   - [ ] No

6. I understand that data collected about me during the study may be converted to anonymised data:

   - [ ] Yes
   - [ ] No

7. I understand that I may be asked to take part in a short interview with the researcher after the recordings have taken place.

   - [ ] Yes
   - [ ] No
8. I agree for the asthma reviews which I am conducting to be audio/video recorded:
   - Yes
   - No

9. I agree for the recordings to be viewed and analysed:
   - Yes
   - No

10. I agree to take part in the above study.
    - Yes
    - No

11. Please Provide your name:
    

12. Please provide the date: *Required

   Dates need to be in the format "DD/MM/YYYY", for example 27/03/1980.
   
   (dd/mm/yyyy)

IMP2ART Recordings EK PhD Project - First Consent Health Professional

100% complete

Final page

Thank you for completing the consent process.

By sharing your experiences with us, you will be helping the researcher, AUKCAR and the IMP²ART trial to better understand asthma self-management in UK primary care.

If you have any further questions about the research please contact
Appendix 10: Health Research Authority (HRA) Approval Letter

HRA and Health and Care Research Wales (HCRW) Approval Letter

Professor Hilary Pinnock  
Usher Institute, Doorway 3,  
Medical School, Teviot Place  
Edinburgh  
EH8 9AGN/A

Email: approvals@hra.nhs.uk  
HCRW.approvals@wales.nhs.uk

Study title: Delivery of Supported Self-Management in Asthma Reviews: A Mixed Methods Observational Study Nested in the IMP²ART Programme of Work  
IRAS project ID: 280392  
Protocol number: AC20153  
REC reference: 20/NI/0177  
Sponsor: University of Edinburgh

I am pleased to confirm that HRA and Health and Care Research Wales (HCRW) Approval has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, in line with the instructions provided in the “Information to support study set up” section towards the end of this letter.

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland?  
HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.
If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report (including this letter) have been sent to the coordinating centre of each participating nation. The relevant national coordinating function/s will contact you as appropriate.

Please see IRAS Help for information on working with NHS/HSC organisations in Northern Ireland and Scotland.

How should I work with participating non-NHS organisations?
HRA and HCRW Approval does not apply to non-NHS organisations. You should work with your non-NHS organisations to obtain local agreement in accordance with their procedures.

What are my notification responsibilities during the study?
The standard conditions document “After Ethical Review – guidance for sponsors and investigators”, issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:
• Registration of research
• Notifying amendments
• Notifying the end of the study
The HRA website also provides guidance on these topics, and is updated in the light of changes in reporting expectations or procedures.

Who should I contact for further information?
Please do not hesitate to contact me for assistance with this application. My contact details are below.
Your IRAS project ID is 280392. Please quote this on all correspondence.
Yours sincerely,
Catherine Adams
Approvals Manager
Email: approvals@hra.nhs.uk
Copy to:
Ms Jo-Anne Robertson

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Appendix 11: Letter of Clinical Access (Research Passport) approval from NHS Lothian

NHS Lothian – University Hospitals Division

7 May 2021
Ms Emma Jane Kinley
Usher Institute, The University of Edinburgh
Old Medical School
Teviot Place
Edinburgh
EH8 9AG

Dear Ms Kinley,


The UK Policy Framework for Health and Social Care Research outlines the responsibilities of researchers who undertake research in a clinical setting. The framework has been compiled by the Scottish Executive Health Department to ensure all research meets high scientific and ethical standards.

This Letter of Clinical Research Access defines the requirements of Lothian Health Board (the “Board”), subject to which, you are granted rights of Clinical Research Access to carry out Approved Research in the course of your current PhD programme of study at the University of Edinburgh.
On signature of this letter, subject to the Board undertaking appropriate Disclosure Scotland checks, you will be granted the right of Clinical Research Access which will continue, until such time as permission is withdrawn by the Board, in the circumstances mentioned in the next paragraph, or such time as you cease to be involved in Approved Research activity or you current study programme mentioned above.

In the event that you are in material breach of the requirements regarding Clinical Research Access as set out in this letter, or the Board considers that it is in the best interests of its patients, then in either circumstance the Board may withdraw Clinical Research Access with immediate effect by giving you written notice of this.

1. **Definitions**

   “Approved Research” means research which has not only been approved by University of Edinburgh but has also received the approval of Lothian Health Board i.e. R & D Management approval, the necessary ethical approval and any further statutory approvals.

   “Confidential Information” includes all information which has been specifically designated as confidential by the Board and any information which relates to the commercial and financial activities of the Board, the unauthorised disclosure of which would embarrass, harm or prejudice the Board.

   “Principal Investigator” means, in relation to a specific unit of research undertaken in a specific location, the researcher responsible for the overall conduct of that research activity.
2. **Confidentiality and Disclosure of Information**
You must not divulge Confidential Information to any third party during the period of your research or any time thereafter without the proper authority having first been given.

All Confidential Information belonging to the Board, together with any copies or extracts thereof, made or acquired by you in the course of research shall be the property of the Board and must be returned to the Principal Investigator on completion of the research to which they relate or on the termination of your employment whichever is the earlier date. 
You will be entitled to retain any copies or extracts made or acquired by you in the course of research for references purposes only, provided that such copies or extracts are held and maintained in accordance with the provisions of the Data Protection Act 2018 and Caldicott principles.

3. **Protection of Intellectual Property**
The protection of intellectual property is an important matter, and you will abide by the requirements of the Board and the University of Edinburgh in relation to this matter. The Board and University of Edinburgh deal with intellectual property matters on a case-by-case basis.

4. **Obligations Arising from Data Protection Act 2018/IT Security**
Particular regard should be given to your responsibility to abide by the principles of the Data Protection Act 2018, a copy of which is available for reference in the Human Resources Department of the Board.

You must comply with the Board’s Information Technology Security Policy on computer security, which is available within the Board R & D Department and on the Board Intranet site. Failure to comply with this will be brought to the attention of the University for investigation/action under the appropriate procedures. In addition failure to comply may lead to temporary or permanent withdrawal of permission to carry out research within the Board.
**Patients**

In the course of your duties you may have access to Confidential Information regarding patients. You must not divulge such Confidential Information to anyone other than authorised persons, for example, medical, nursing or other professional staff as appropriate, who are concerned directly with the care, diagnosis and/or treatment of the patient. Where, in the course of your clinical research activity, new information comes to light that will or may impact on patient care, you will forthwith advise the relevant personnel within the Board.

**Staff**

You must not divulge Confidential Information concerning individual members of staff to anyone without the authority of the individual concerned and the appropriate Principal Investigator.

If you are in any doubt whatsoever as to the authority of a person or body asking for information on patients or staff, or your own authority to divulge information, you must seek advice from the Principal Investigator and/or the responsible person at your University.

These provisions are without prejudice to the NHS’s stated commitments in the NHS Code of Openness. Further information is available from the Board’s Human Resources Department.

5. **Disclosure of Concerns**

If you have any concerns about quality of service, health and safety, use of NHS money, or believe a colleague’s conduct, performance or health may be a threat to patient care or to members of staff, you have a responsibility to raise these concerns without prejudice, directly with the Principal Investigator, your line manager or the responsible person at the University. If you are unable to, or wish not to raise these concerns directly with your line manager / Principal Investigator, you are encouraged to seek the advice of the Human Resources Department or University of Edinburgh as appropriate.
You are protected against any harassment or victimisation resulting from such a disclosure. Therefore in the event that you are subjected to any form of harassment or victimisation, formal action will be taken against the perpetrators. Concerns related to any research misconduct or fraud should be addressed similarly.

6. **Conflict of Interest**

As a general principle, you should not put yourself in a position where your official and private interests conflict, nor must you make use of your official/research position to further your private interests.

7. **Research Governance**

You are required to observe those requirements of the Research Governance Framework which are applicable and binding on you. The Research Governance Framework is available in the R & D Department and on the Intranet under Organisational/R&D. The framework relates to the management and monitoring, ethics, science, finance, health and safety aspects of research.

8. **Health and Safety**

The Board has a written Health and Safety Policy. The Board has a duty to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all its employees/individuals who work on the site. As an individual who works on the site, you have a duty to observe safe systems of work at all times, to take reasonable care of yourself and others who may be affected by your activities at work and to co-operate with the Board and others in meeting statutory requirements. Additionally, you are required to report all accidents “near misses”/incidents to the responsible person at the University and to use any safety equipment provided for your protection.

Failure to comply with the provisions detailed above, without reasonable cause, will be brought to the attention of your employer for investigation/action under the appropriate procedures. In addition failure
to comply may lead to temporary or permanent withdrawal of permission to carry out research within the Board.

9. **Hepatitis B**

For your own protection, you are advised to maintain Hepatitis B immunity status throughout the period during which you have been granted Clinical Research Access rights if your work brings you into contact with blood, other body fluids or fresh tissue.

10. **Professional Registration**

If your programme of study requires professional registration you must be fully registered with the appropriate professional body and maintain this registration throughout the period during which you have been granted Clinical Research Access rights. Evidence of this must be produced upon request.

11. **Personal Property**

The Board accepts no responsibility for damage to, or loss of, personal property. You are, therefore, advised to take out an insurance policy to cover your personal property.

If you need any further advice or guidance on any of the paragraphs set out above you should contact the responsible person at the University in the first instance. If you agree to accept the conditions indicated above, please print this letter and sign the statement of acceptance and return to the Board’s R & D Department. Please retain a second signed copy of this letter for future reference as you will be required to provide this for evidence of clinical research access to each Principal Investigator with whom you work.

Yours sincerely,

Dr Heather Charles

Head of Research Governance cc Ms Kim Orsi, University of Edinburgh
Appendix 12: Example of Research & Development (R&D) approval document (NHS Lanarkshire)

NHS Lanarkshire Letter of Access for Non-NHS Researcher

Project ID. L21043

DECLARATIONS / SIGNATURES

LETTER OF ACCESS (NON-NHS) BETWEEN NHS LANARKSHIRE AND

Researcher Name: Emma Kinley
Employer / Place of Study: University of Edinburgh
Report to: General Practice Manager / GP
(Principal investigator / Head of Department)

PERIOD of ACCESS
From: 16.06.2021 To: 30.09.2022

1. EMPLOYER / PLACE OF STUDY REPRESENTATIVE (e.g. Line Manager / HR Department representative)
   
   • I confirm that the necessary pre-engagement checks have been carried out, are satisfactory, and that the Researcher is suitably trained and experienced to undertake the duties associated with the research activities outlined in their Research Passport Application.
   
   • As the Representative of the Researcher’s Employer / Place of Study I confirm that we retain responsibility for ensuring that the Researcher has appropriate Occupational Health Clearance for the research activities that they will undertake within NHS Lanarkshire, including, but not limited to, appropriate immunisation. Health clearance has been undertaken in line with Scottish Government Health Clearance document - Health Clearance for Tuberculosis, Hepatitis B, Hepatitis C and HIV for New Healthcare Workers with Direct Clinical Contact with Patients (2008) / or where relevant; Department of Health England Health Clearance document - Health Clearance for Tuberculosis, Hepatitis B, Hepatitis C and HIV: new healthcare workers (2007). Immunisation screening has been undertaken in line with Immunisation against Infectious Disease – The Green Book (2013).
   
   • As the Representative of the Researcher’s Employer / Place of Study I agree that we will inform NHS Lanarkshire if we become aware of any issues that impact on their suitability or
ability to carry out their agreed research activities within NHS Lanarkshire. This includes, but is not limited to, situations where PVG Scheme/Disclosure Scotland/CRB Disclosure vetting information suggests that the Researcher may have become unsuitable to do regulated work.

- I confirm that we retain full responsibility for ensuring compliance with all applicable clauses in the attached Letter of Access, and in particular for ensuring that your Employee is aware of, and agrees to comply with the terms contained therein.

Signature: Date: 17/06/2021

Name:
Dr Kirstie McClatchey Position: Research Fellow

2. RESEARCHER

- I accept the offer of a Letter of Access from NHS Lanarkshire, and agree to comply with its terms.
- I agree to ensure that my Employer / Place of Study and NHS Lanarkshire are made aware of any issues that impact on my suitability to carry out my role, in particular, but not limited to, any changes to my health or criminal records check status.

Signature: Date: 17/06/2021

Name: Miss Emma Kinley

3. ON BEHALF OF NHS LANARKSHIRE

Date: 21.06.2021

Name: Lorraine Quinn Position: Lead R&D Facilitator

Emma Kinley R&D Department
IMP2ART Programme Corporate Services Building
Asthma UK Centre for Applied Monklands Hospital
Research Monkscourt Avenue
Usher Institute AIRDRIE
The University of Edinburgh ML6 0JS

Dear Emma

Letter of Access (LoA) for a non-NHS researcher to carry out research

NOTE: Please complete sections 1 and 2 on Page 1 of this LoA and return it to the R&D Department at the above address. The R&D Manager will countersign and return Page 1 to you. The LoA becomes active only when you receive the countersigned Page 1, which you should attach to this letter as confirmation of your access to conduct research.

This letter confirms your right of access to conduct research through NHS Lanarkshire* for the purpose and on the terms and conditions set out below.

This right of access commences on 16.06.2021 and ends on 30.09.2022 unless terminated earlier in accordance with the clauses below.

* Note: Independent Contractors (GPs / GDPs) are responsible for the governance arrangements related to any staff working on their premises. If you will be working with an Independent Contractor you should discuss your proposed arrangements with them directly. You are free to copy this letter to individual Practices, which may help facilitate that process; individual practices may also wish to issue their own formal letter confirming your right of access to their premises.

You have a right of access to conduct such research as confirmed in writing in the NHS Lanarkshire R&D Management Approval letter for the above named research project. Please note that you cannot start the research until the Chief Investigator for the research project has received a letter from NHS Lanarkshire giving permission to conduct the project.

While undertaking research through NHS Lanarkshire you will remain accountable to your employer / place of study University of Edinburgh but you are required to follow the reasonable instructions of The General Practice Manager/GP in NHS Lanarkshire or those given on her/his behalf in relation to the terms of this right of access.

You must supply the appropriate member of staff in your Human Resources Department with a copy of this Letter of Access. Your Employer / place of study
must inform **NHS Lanarkshire** if it becomes aware of any issues that impact on your suitability or ability to carry out your agreed research activities within **NHS Lanarkshire**. This includes, but is not limited to, situations where PVG Scheme/Disclosure Scotland/CRB Disclosure vetting/criminal records check information suggests that you may have become unsuitable to do regulated work.

The information supplied about your role in research at NHS Lanarkshire has been reviewed and you do not require an honorary research contract with NHS Lanarkshire.

You are considered to be a legal visitor to NHS Lanarkshire premises. You are not entitled to any form of payment or access to other benefits or indemnity provided by NHS Lanarkshire to employees and this letter does not give rise to any other relationship between you and this NHS organisation, in particular that of an employee.

Where any third party claim is made, whether or not legal proceedings are issued, arising out of or in connection with your right of access, you are required to co-operate fully with any investigation by NHS Lanarkshire in connection with any such claim and to give all such assistance as may reasonably be required regarding the conduct of any legal proceedings.

You must act in accordance with NHS Lanarkshire policies and procedures, which are available to you upon request, and the Research Governance Framework.

You are required to co-operate with NHS Lanarkshire in discharging its duties under the Health and Safety at Work etc Act 1974 and other health and safety legislation and to take reasonable care for the health and safety of yourself and others while on NHS Lanarkshire premises. You must observe the same standards of care and propriety in dealing with patients, staff, visitors, equipment and premises as is expected of any other contract holder and you must act appropriately, responsibly and professionally at all times.
You are required to have the appropriate Occupational Health Clearance for the research activities that you will undertake within NHS Lanarkshire, including, but not limited to, appropriate immunisation; Health clearance has been undertaken in line with Scottish Government Health Clearance document - Health Clearance for Tuberculosis, Hepatitis B, Hepatitis C and HIV for New Healthcare Workers with Direct Clinical Contact with Patients (2008) / or where relevant; Department of Health England Health Clearance document - Health Clearance for Tuberculosis, Hepatitis B, Hepatitis C and HIV: new healthcare workers (2007). Immunisation screening has been undertaken in line with Immunisation against Infectious Disease – The Green Book (2013).

You are required to ensure that all information regarding patients or staff remains secure and strictly confidential at all times.

You must ensure that you understand and comply with the requirements of the NHS Confidentiality Code of Practice (http://www.dh.gov.uk/assetRoot/04/06/92/54/04069254.pdf) and the Data Protection Act 1998. Furthermore you should be aware that under the Act, unauthorised disclosure of information is an offence and such disclosures may lead to prosecution.

You should ensure that, where you are issued with an identity or security card, a bleep number, email or library account, keys or protective clothing, these are returned upon termination of this arrangement. Please also ensure that while on the premises you wear your ID badge at all times, or are able to prove your identity if challenged. Please note that NHS Lanarkshire accepts no responsibility for damage to or loss of personal property.

We may terminate your right to attend at any time either by giving seven days’ written notice to you or immediately without any notice if you are in breach of any of the terms or conditions described in this letter or if you commit any act that we reasonably consider to amount to serious misconduct or to be disruptive and/or prejudicial to the interests and/or business of this
NHS organisation or if you are convicted of any criminal offence. Your substantive employer / place of study is responsible for your conduct during this research project and may in the circumstances described above instigate disciplinary action against you.

NHS Lanarkshire will not indemnify you against any liability incurred as a result of any breach of confidentiality or breach of the Data Protection Act 1998. Any breach of the Data Protection Act 1998 may result in legal action against you and/or your substantive employer.

If your current role or involvement in research changes, or any of the information provided in your Research Passport changes, you must inform your employer through their normal procedures. You must also inform your nominated manager in NHS Lanarkshire.

Yours sincerely

---

**Raymond Hamill, Senior Research & Development Manager**

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<td>Ms Jo-Anne Robertson</td>
<td>Research Governance Coordinator</td>
<td><a href="mailto:resgov@accord.scot">resgov@accord.scot</a></td>
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<td>Professor Hilary Pinnock</td>
<td>Professor of Respiratory Medicine</td>
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<td>Academic Supervisor</td>
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<tr>
<td>Dr Kirstie McClatchey</td>
<td>Research Fellow</td>
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<td>Academic Supervisor</td>
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<tr>
<td>Dr Liz Stood</td>
<td>Lecturer in Health Psychology</td>
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Email template before changes:

Dear XXXX,

I hope this email finds you well. As you will know your practice has been randomised to the (control or implementation) arm of the IMP²ART trial, and we would like to invite you to take part in an IMP²ART PhD study.

Our PhD student, Emma Kinley, is working on exploring the professional’s uptake/implementation of behaviour change techniques and patient-centred care within the IMP²ART programme. Details can be found here: [https://www.ed.ac.uk/usher/aukcar/about/people/current-phd-students/emma-jane-kinley](https://www.ed.ac.uk/usher/aukcar/about/people/current-phd-students/emma-jane-kinley)

Essentially the study is looking to video-record a small routine sample of asthma reviews in your practice to look at communication between patients and clinicians.

If you are interested in your practice participating in this part of the IMP²ART trial, please let me know, and I can put you in touch with Emma.

Best wishes,

On behalf of the IMP²ART team
Email Template after changes:

Dear XXXX,

I hope this email finds you well. As you will know your practice has been randomised to the (control or implementation arm) of the IMP²ART trial, and we would like to invite you to take part in the IMP²ART PhD study. Our PhD student, Emma Kinley, is looking at how self-management works in practice within the IMP²ART programme. Details can be found here: [https://www.ed.ac.uk/usher/aukcar/about/people/current-phd-students/emma-jane-kinley](https://www.ed.ac.uk/usher/aukcar/about/people/current-phd-students/emma-jane-kinley)

Essentially the study is looking to record a small routine sample of asthma reviews in your practice.

Would it be possible to arrange a quick call to discuss the study?

Best wishes,

On behalf of the IMP²ART team
Appendix 14: Topic Guide for Qualitative, Semi-structured interviews

IMP²ART IMPlmenting IMProved Asthma self-management as Routine
‘Delivery of Supported Self-Management in Asthma Reviews: A Mixed Methods Observational Study Nested in the IMP²ART Programme of Work’

Topic Guide for Research Question 3 - How do healthcare professionals view the delivery of supported self-management within asthma reviews?

1. (Begin Recording) Introduction to Qualitative Semi-Structured Interview

Length of interview: 20-30 minutes

Primary goal: The aim of this interview is to explore how supported self-management is delivered within routine asthma reviews. The format of the interview will be more like a conversation, with a focus on your experience, your opinions and what you think or feel about supported self-management for asthma.

2. Consent

Do you consent to take part in this interview? Yes/No

Verbal and written consent confirmed and recorded: Yes / No

3. Collection of Participant Details

To start, could we first take some details of background information about yourself:

What is your gender? Male / Female / Prefer not to say / Other

Age: _______________

Place of work: ___________________

Number of year qualified Nurse/GP?: ________________
How long have you been within your current role?: ________________
Completed IMP²ART Module 1 or 2 (for implementation practices): ________

4. Great, so to get started, can you please tell me what supported self-management of asthma means to you?

5. What are your experiences of delivering supported self-management to asthma patients?

5. What are your motivations to deliver effective self-management support? How does it help a patient?

6. How confident are you in delivering supported self-management?

7. Are there in barriers in place which may prevent you from delivering supported self-management? How can these be overcome?

8. What self-management techniques do you feel patients find most useful?

9. Do you feel your practice prioritises supported self-management during routine asthma reviews? (For implementation practices, has IMP²ART influenced SSM?)

10. How do you feel about delivering supported self-management via remote consultation?

11. What are the main differences between delivering via remote consultation and face-to-face delivery?

Thank for taking part.
### Appendix 15: Coding Framework: Qualitative thematic analysis from interviews with IMP2ART control vs implementation healthcare professionals (Chapter 6)

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| 1) Defining Supported Self-Management: as empowerment, understanding the patient’s condition and using a collaborative approach | - Empowering the patient to take control of their asthma,  
- Using a collaborative approach to support patient’s management of their asthma,  
- HCP’s understanding the patient and the context of their asthma within their lives,  
- Ensuring the patient understands all aspects of their condition, | - Emphasis of patient’s understanding that it is ‘their asthma’,  
- HCP’s working together with patients to create a tailored plan, which the patients are in charge of,  
- Ensuring patients have a ‘toolkit’ to help manage their asthma,  
- Ensuring patients are in control and have the resources to make decisions about their health,  
- Ensuring the patient has support and resources should they need them to make informed, autonomous decisions, | ‘Empowering the patient’ HP1  
‘I think empower is the most important word actually.’ HP5  
‘understanding of their asthma and why it is the way it is and the toolkit they’ve got to help.’ HP1  
‘it’s about tailoring and empowering patients to fully understand their condition to feel that they’re in control of that, and that they have the resources to be able to make autonomous decisions about their health.’ HP5  
‘I think when we come up with a plan with what they want, what they think, what they agree with, we come up with the plan together’. |
### Data from IMP²ART Control Practice Professionals

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<td>• Collaboratively creating management plans so the understands and feels confident to use the plan effectively.</td>
<td>‘But it’s the patient taking control, because it’s their life, it’s their body and we’re just there to help them facilitate, but ultimately but it’s their asthma.’ HP6</td>
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<td>• Understanding the patient, the impact their asthma has on their lives, and how important asthma management is to them, is key to understand the context of the patient, then effective strategies can be further tailored to the patient.</td>
<td>‘So, in the past, years and years ago, it was as if we kept all the knowledge back to ourselves. Whereas now, the more you can impart on the patients, the more they can manage it.’ HP6</td>
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<td></td>
<td></td>
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<td>‘key thing is to see their chronic condition in context of their lives…’ HP5</td>
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<td>‘understanding patient goals, understanding the impact the condition has on a patient, impact on their life, understanding what they comprehend and what they feel capable to do. Some people don’t want to own it, they just want to be told. So, we want to make them feel capable to manage and provide them with the information, a framework to</td>
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<th>SUBTHEMES</th>
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| 2) Motivations to deliver Supported Self-management | • Internal, personal motivations  
• External motivations (e.g., health care pressures) | • HCP's would also like to be treated using supported self-management approaches, and want to ensure patients are treated how they would like to be.  
• HCP's were aware of the growing number of hospitalisations/deaths of asthma and felt this was an external motivation to ensure effective management from primary care. | 'Because it works better, and I like to be treated that way, and I believe in it'. HP6  
'There's also another more altruistic motivation to actually treat individuals in the way that I would want to be treated. I know I am a healthcare professional, but I would want to feel, that I owned, or was at least a partner in my care management.' HP5  
'I think I'm aware of that, I'm very much aware of how over the years, asthma may have not been correctly treated, whether it be medication wise or with all the other support services. And the hospitalisations for asthma, the deaths caused for asthma, untreated asthma, it's a lot and it's still quite high.' HP6 |

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<tr>
<td>3) Delivery of Asthma Education as most effective SSM technique</td>
<td>• Use of personalised asthma action plans (PAAP’s) • Providing the patient with education about their individual asthma and management,</td>
<td>• Use of a personalised asthma action plan was seen to be one of the most effective self-management strategies to discuss and implement during a routine review, • Asthma education was regarded as one of the most important supported self-management strategies to deliver during a routine review, ensuring the patient understands their asthma so they can then manage it more effectively themselves. E.g., explaining the inflammatory process and what each inhaler is specifically used for.</td>
<td>‘I think having the management plan. I think they just like having a clear plan of what to do when, when to increase, when to decrease and helping them to recognise their symptoms and pre-empt any problems.’ HP1 ‘Yeah, because I have found, that quite a few, they get their brown and their blue inhalers mixed up. ‘Well, it’s the reliever right okay, right. So do I take that one every day?’ So, they even get their words mixed up. And then when I try and explain the inflammatory process, and I try to get them to think of the process. And then even with the telephone consultations, I say, ‘does this help?’ and they say, ‘you’re the first person that’s ever explained this to me’. HP6</td>
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| 4) Practice Culture           | • Positive practice culture of HCP’s trying to empower patients to effectively manage their conditions,  
                                 | • Culture of HCP’s following guidance and continuously gaining patient feedback.            | ‘… following all the right guidance, and why it’s done and all the rationale behind it, and I think we all do.’ HP6  
                                 |                              | • Culture of continuous professional health care delivery improvement to deliver the best care for patients,                 | ‘Yes, it’s a very, very good practice this. It’s very positive. We’re always trying to do better and give the patient’s a good experience too. We value good patient feedback because it means we’re doing a good job.’ HP6  
<pre><code>                             |                              | • Culture of trying to empower patients through following the correct guidance, and fully understanding the rationale behind such guidance. | ‘I have to say there is a culture of trying to empower our patients in general. You know, like trying to raise awareness and helping patients to understand what they can do, what our role is and we’re always trying to promote that.’ HP1 |
</code></pre>
<p>| 5) Confidence in delivery of  | • HCP’s are overall confident in the delivery of SSM,                       | • HCP’s are overall confident in the delivery of SSM, however would value further training/education due to the dynamic nature of asthma  | ‘I think generally confident, I think you know, we get a new inhaler sometimes and it can take a while to work out how to work it yourself!’ |
| Supported Self-               | • HCP’s are willing to attend further training                             |                                             |                                                                                                                                                                                                       |</p>
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<td><strong>Management for Asthma</strong></td>
<td>and would value all learning/education on SSM delivery.</td>
<td>management (e.g., understanding new inhalers),</td>
<td>(laughs). But yeah, I would generally I’m pretty confident…” HP7</td>
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<td>• HCP’s acknowledge that staying up to date through training/education would allow them to provide more tailored care to patients,</td>
<td>‘So, we all try to keep ourselves up to date, and we do go on courses, during covid a lot, virtual ones. But yes we try, you know nobody knows everything we’re all on a big learning curve aren’t we with everything.’ HP6</td>
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<td>• Amount of time during a consultation is a barrier to effective delivery of SSM,</td>
<td>‘But I’m always up to learn new techniques or if there’s something that’s going to help… I kind of try and do that anyway, but yeah if there was programme or any kind of education I would sign myself up for it.’ HP1</td>
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<td>• Individual patient barriers: views and opinions of being partners in their health. (Biomedical</td>
<td>• Amount of time scheduled per patient for an asthma review was seen as a barrier to effectively incorporating SSM strategies into routine reviews,</td>
<td>‘So, I think they’re still a little bit dependant on us in taking ownership. We’re not really liberating them to maybe move forward because we’re not investing the time in their education to support them…” HP5</td>
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<td><strong>6) Barriers to effective delivery of Supported Self-Management for Asthma</strong></td>
<td></td>
<td>• Individual patient understanding: Some</td>
<td>‘we see them for a short period of time like you know…” HP6</td>
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|       | model: practitioner ‘fixes’ the patient) | patients still regard the HCP as the person who can ‘fix’ their asthma and do not take a collaborative view or ownership of their asthma management. | ‘They’re understanding, and how much information they want really. Some people don’t particularly listen as well as other people.’ HP7  
‘I don’t think patients understand it yet. Particularly when we’re working with an older generation, they haven’t adjusted the to the idea that they’re partners in their health.’ HP5  
‘So, I think they’re still a little bit dependant on us in taking ownership.’ HP5 |
| 7) Positive Experiences of Remote Delivery of Supported Self-Management | • Remote reviews are particularly useful to specific groups of patients: those with mobility problems who otherwise wouldn’t be able to be seen face-to-face, and those with well controlled asthma to act as a ‘check in’,  
• Understanding which patient remote delivery may be more appropriate for and the patient’s context and understanding of their asthma and management,  
• Remote reviews offer the opportunity to provide patients with digital resources which may be used to help them manage their asthma. | ‘...they work very, very well, particularly for patients who are struggling to come in’. HP6  
‘...those who can’t physically get in, you know mobility problems and things.’ HP6  
‘For some it works brilliantly because it is just a check in.’ HP1  
‘I’ve found it helps being able to send links across like text links to Asthma...’ HP6 |

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<td>Data from IMP²ART Control Practice Professionals</td>
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<td>more accessible and understandable to patients.</td>
<td>UK and things like that. Just so they’ve got a visual prompt as well.</td>
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<td>‘Digital resources are really helpful because they’re ever present.’</td>
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<td>HP5</td>
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<td>8) Differences between remote and face-to-face delivery of</td>
<td>• Some conversations with patients are more effectively delivered and</td>
<td>• Telephone reviews are difficult to gage patient understanding.</td>
<td>‘I definitely find the phone calls a bit repetitive,… and I’m</td>
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<td>supported self-management</td>
<td>understood during a face-to-face review,</td>
<td>• A major component of SSM delivery is inhaler technique,</td>
<td>discussing it again and it’s almost like it hasn’t really fully sunk</td>
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<td>• Difficulties around discussing inhaler technique during remote reviews,</td>
<td>HCP’s found it difficult to assess someone’s inhaler technique via</td>
<td>in.’</td>
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<td>• Patients with more severe asthma or uncontrolled asthma can be asked</td>
<td>remote reviews,</td>
<td>‘over the phone was difficult with some people…’</td>
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<td>to come in for a face-to-face review to discuss treatment further.</td>
<td>• Having the option to screen patients via telephone then ask the</td>
<td>‘you’re just guessing on inhaler technique. As it’s the main stay of</td>
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<td>patient to come in for a face-to-face review if necessary.</td>
<td>treatment, you’re really struggling on making decisions. I mean we</td>
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<td>have had one today haven’t we, were there’s a decision to not change</td>
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<td>the therapy because you think they’ll get some additional benefit</td>
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<td>from changing their inhaler technique, and you can’t judge that</td>
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### Data from IMP²ART Control Practice Professionals

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<td></td>
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<td>‘And more so it was helpful with patients because we’d asked them to do the asthma control test online, so we’d have a good basis to go from, and so there were patients that were really, really bad that we’d have to bring them in to see them’ HP6</td>
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### Summary of themes for HCP’s from IMP²ART Control practice interviews:

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<thead>
<tr>
<th>No.</th>
<th>Theme</th>
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<tbody>
<tr>
<td>1</td>
<td>Defining Supported Self-Management</td>
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<td>2</td>
<td>Motivations to deliver Supported Self-management</td>
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<td>3</td>
<td>Delivery of Asthma Education as most effective SSM technique</td>
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<td>4</td>
<td>Practice Culture</td>
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<td>5</td>
<td>Confidence in delivery of Supported Self-Management for Asthma</td>
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<td>6</td>
<td>Barriers to effective delivery of Supported Self-Management for Asthma</td>
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<td>7</td>
<td>Positive Experiences of Remote Delivery of Supported Self-Management</td>
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<td>8</td>
<td>Differences between remote and face-to-face delivery of supported self-management</td>
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<tr>
<td>1) Definition of Supported Self-Management for asthma</td>
<td>Developing a relationship between professional and patient, Empowering patients to manage their own condition, Patient choice, Creating a joint understanding.</td>
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</table>
| 2) Motivations to deliver supported self-management | • Internal motivations (a vested interest in asthma and self-management)  
• External motivations (to prevent hospital admissions etc.) | • Internal motivations: interest in asthma and asthma management, passionate about people taking ownership of their diseases.  
• External motivations: burden of asthma hospital admissions on the NHS/amount of asthma related deaths. | ‘.they have a great deal to say in the choices they have, there’s quite a lot they can interact with...’ HP3  
‘I have a vested interest in asthma, I’ve always enjoyed looking after asthma’. HP3  
‘But yes apart from that I am quite passionate about people taking ownerships for their diseases...’ HP4  
‘The interest in kind of the self-management is, if they can’t sort their asthma right before it even becomes a big problem, that almost saves the hospital admission.’ HP3  
‘Well, I think the biggest thing is the amount of asthmatics and deaths caused by asthma, that actually that’s what we want to prevent.’ HP8  
‘from a kind of a wider NHS point of view it’s to prevent hospitalisation.’ HP4 |
| 3) Delivery of effective supported self-management strategies | • Education/learning for asthma patients,  
• Personalised Asthma Action Plan (PAAPs) | • HCPs found educating patients on their condition, their symptoms, triggers and medications they are using, is one of the most effective strategies to ensure a patient fully | ‘so, if we explain why they’re taking that drug, they’re more like ‘ahh I get it now’. HP3  
‘quite often their unsure, and you’ll often find if they’ve got two inhalers, a preventative and reliever, the one that their taking as if it was their |
### Data from IMP³RT Implementation Practice Professionals

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<td></td>
<td>• Inhaler Technique and education of inhaler function.</td>
<td>understands their condition and how to manage it, • Ensuring patients are given a management plan and understand their plan is key to manage their asthma, • Inhaler technique is a main focus for some reviews to ensure patients are using their inhalers effectively.</td>
<td>preventative is actually their reliever, and not really understanding the difference.’ HP8 ‘ looking at the management plan is always there, so we’re looking at what their symptoms are, where their medication is, whether we can step down, whether we need to start stepping up…’ HP3 ‘…inhaler technique, because if they’re not doing that properly they’re going to get exacerbations, people aren’t necessarily going to think that’s down to inhaler technique, change to medication and what have you, when actually it’s just something very simple as how they are taking it.’ HP4</td>
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<tr>
<td>4) Confidence in delivery of Supported Self-Management for Asthma</td>
<td>• HCPs were confident in delivery of supported self-management • HCP’s felt they are always learning, and willing to engage in training. • HCPs confident in SSM delivery, but</td>
<td>• Full confidence from HCP’s and willing to learn/attend training, • HCPs who deliver asthma reviews, also specialise in a number of conditions, can be difficult to stay up to date, always trying to keep up to date, due to the dynamic nature of asthma management.</td>
<td>‘I think I’m fairly confident, but there’s always things you can learn.’ HP3 ‘I definitely would say it’s always worth reflecting and trying to keep up to date.’ ‘…there’s a lot to keep up to date.’ HP8 ‘There’s always tips you can pick up on from everyone else and I think that’s why nurses are always constantly trying to keep themselves</td>
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| 5) Time as a barrier to effective delivery of Supported Self-management | • Amount of time scheduled for an asthma review is restricting effective delivery of SSM, | • Amount of time scheduled for an asthma review should be increased to ensure all components are discussed in detail with patients,  
• Patients can often be signposted to other professionals to address other issues as there is not enough time to do so within a standard review (e.g., stop smoking, anxiety), which could prevent delivering a holistic | ‘Sometimes the time restricts you for how deep you can go, and it tends to be that you have to skirt and then send to other people that have got more time. So, I try and be as involved as I can be, but time is a really big issue.’ HP3  
‘So, things like the stop smoking, things like anxiety, that has to go elsewhere, because with the best will in the world we haven’t got that time...’ HP3  
’so, time is the biggest constraint because there’s an awful lot to get through in an asthma review. ‘Updated on all the varying things we have to come across every day.’ HP3  
‘I think when the other nurse has done her training, she has been dabbling, she’d done some online asthma training, but her confidence will grow, that will mean it can be shared, a bit like with the diabetics, she’ll see them, so will I. And it’ll be great, because she’ll obviously been updated and she can feedback to me, so we do work well together considering that we don’t work on the same site, we do support each other.’ HP8
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<td>review, collaboratively addressing all the patients concerns for their asthma management, HCPs feel they don’t have enough time to embed all SSM strategies into routine reviews (e.g., one nurse explained there is not enough time to go into the PAAP details)</td>
<td>So, we have half an hour allocated in a year which is not enough.’ HP3  ‘I think it’s just time.’ ‘but again, it’s that time. If I can have 30 minutes going forward…’ HP8  ‘…then I think that will be good because I really would want to do the asthma action plan and give that to them.’ HP8</td>
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<td>6) Practice Culture</td>
<td>• Practices have a positive culture of embedding SSM into long term conditions reviews, Practices value embedding a culture of training and students to stay up to date with health research.</td>
<td>• Culture of continuous professional health care delivery improvement to deliver the best care for patients, Culture of trying to stay up to date with health research and ensure continuous training, learning for all professionals of the practice.</td>
<td>‘I think our practices has been doing the self-management plans, we have been quite a proactive practice with asthma and with other breathing conditions.’ HP3  ‘Yeah I do think so, you know they’ll print off or they’ll refer them to NHS reputable sites and things to check things out, so I think, a couple of the doctors, senior partners do, we have medical students, second year, foundation doctors as well. So, we’re very much for training and we’ve been talking about having student nurses as well.’ HP8</td>
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<td>7) IMP²ART Programme</td>
<td>• The IMP²ART workshops/modules</td>
<td>• HCP’s feel they may not have learned anything new from the</td>
<td>‘The IMP²ART has really just consolidated what we’re already doing. Unfortunately, I don’t feel</td>
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<td>have emphasised the importance of SSM for asthma and how to effectively deliver, • HCP’s valued the IMP²ART template to structure/prompt the review.</td>
<td>IMP²ART programme, but it has been a positive experience, • IMP²ART has reiterated and emphasised HCP’s knowledge, skills and confidence on SSM delivery, • The asthma review template has helped guide and structure routine asthma reviews to ensure important components of a review are delivered.</td>
<td>that I have learned anything particularly new, but it’s been nice to know what we’re doing has been the right thing from day one.’ HP3 ‘I feel like I knew anyway but IMP²ART has just reiterated really, and gone over the basics.’ HP4 ‘Emphasised it yeah, what we need to do to try and keep these patients controlled, also the asthma control test, we were doing that any way, but that’s a really good way… and just generally the template. You know, we’re only human we can’t remember everything, so just having that template there as a prompt.’ HP4 ‘I just think for me, if I go through the template, that can actually help to try and sort of keep to that structure, otherwise it is very easy to… to steer off (laughs).’ HP8</td>
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<tr>
<td>8) Remote Consultations: A place for remote reviews in primary care</td>
<td>• HCP’s regarded remote reviews as an appropriate option to conduct asthma reviews for some patients,</td>
<td>• HCPs feel remote reviews have been an appropriate option and alternative for seeing patients face-to-face for asthma reviews and they have ‘not been a big issue’,</td>
<td>‘a lot of people are happy to do the telephone, so it hasn’t been a big issue, and if I have needed to see patients they’re quite happy to come in, so it hasn’t been a particular issue.’ HP3 ‘I do think for a lot of patients the remote reviews work perfectly well.’ HP8</td>
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<td>asthma management</td>
<td>• Emphasis of patient choice for mode of review,</td>
<td>• HCPs acknowledge that remote reviews are only appropriate for some patients.</td>
<td>‘So, I definitely think there is a place, and I think the doctors have found that especially with COVID a lot of the patients they can deal with quite nicely over the phone.’ HP8</td>
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<td>9) Differences between remote and face-to-face delivery of supported self-management</td>
<td>• HCP’s prefer to see a patient face-to-face for an asthma review,</td>
<td>• HCP’s feel they can see the person more holistically the context in which they are managing their asthma when conducting a face-to-face review,</td>
<td>‘I prefer face-to-face’s because on the phone you can’t pick up the non-verbal cues. So, when the patient comes in, I’m already assessing when they walk through the door. When they’re on the phone I can’t see them.’ ‘On the telephone you just can’t pick up the non-verbal’s.’ HP3</td>
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<td>• HCP’s feel remote reviews may come across more task orientated.</td>
<td>• HCP’s are able to pick up on more non-verbal communication during face-to-face reviews.</td>
<td>‘Oh yeah absolutely, I mean it’s looking at the whole person holistically isn’t it; you know it’s very task orientated if you’re doing it over the phone. But you know if they’re coming into the surgery you can see things more.’ HP4</td>
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<td>• Unable to see inhaler technique during a remote consultation.</td>
<td>• Unable to assess inhaler technique or provide demonstrations during remote review.</td>
<td>‘Over the telephone we wouldn’t be able to look at their inhaler technique.’ HP4</td>
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<td>‘I mean I would always much rather see someone face to face.’ HP8</td>
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Summary of themes for HCP’s from IMP²ART Implementation practice interviews:

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<td>Definition of Supported Self-Management for asthma</td>
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<td>Delivery of effective supported self-management strategies</td>
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<td>Confidence in delivery of Supported Self-Management for Asthma</td>
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<td>7</td>
<td>IMP²ART Programme</td>
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<td>8</td>
<td>Remote Consultations: A place for remote reviews in primary care asthma management</td>
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<tr>
<td>9</td>
<td>Differences between remote and face-to-face delivery of supported self-management</td>
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### Similarities & Differences between IMP²ART control and implementation group findings and themes

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<th>Similarities</th>
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<tr>
<td><strong>1) Defining Supported Self-Management:</strong> Both control and implementation group findings produced themes which defined what supported self-management (SSM) for asthma meant for health care professionals (HCPs) using similar terminology. For example, both groups highlighted SSM as;</td>
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<td>• empowerment, encouraging patients to take control of their asthma,</td>
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<td>• understanding the patient’s condition,</td>
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<td>• using a collaborative approach,</td>
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<td>• creating a relationship between professional and patient,</td>
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<td>• supporting patients to make informed decisions about their care (shared decision making),</td>
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<td>• ensuring patients have a ‘toolkit’ to manage their asthma, including resources and HCP support,</td>
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<td>• Understanding the patient, the impact their asthma has on their lives, and how important asthma management is to them, is key to understand the context of the patient, then effective strategies can be further tailored to the patient.</td>
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<td>These findings highlight that both groups have similar views of what SSM means for them, and what they hope to achieve/deliver during a routine asthma review.</td>
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Similarities & Differences between IMP\textsuperscript{2}ART control and implementation group findings and themes

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| **2) Motivations to deliver Supported Self-Management:** Both groups acknowledged two distinct differences in their motivations to deliver effective SSM for asthma. Firstly, both groups acknowledged their *internal, personal motivations*, including:  
  - a vested interest in asthma, asthma management and passion for people taking ownership of their conditions,  
  - and ensuring patients are treated in a way in which they would also like to be treated.  
Secondly, both group acknowledged their *external motivations* to deliver effective SSM for reasons such as:  
  - growing awareness of hospitalisations/deaths related to asthma acts as external motivation to ensure effective management from primary care,  
  and burden of treatment on the wider NHS. | Differences in effective SSM strategies: Although both groups acknowledged the importance of asthma education as a key SSM strategy, the implementation group also reflected on the importance of management plans and inhaler technique as necessary SSM components. This may be due to the IMP\textsuperscript{2}ART implementation strategy |

**3) Delivery of effective SSM strategies: Asthma Education:** When discussing effective SSM strategies, key to deliver during a routine review, both groups acknowledged the importance of patient education. Providing patients with education about their asthma and asthma management was regarded as one of the most important SSM techniques in both groups. Similar findings suggest that once patients understand their asthma (e.g.,
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<td>educating patient by explaining the inflammatory process and what each inhaler is specifically used for) they can then manage it more effectively themselves as they understand what is happening and how to manage it. HCP’s reflected that often patients will say ‘I’ve never had it explained to me like that before’ and can then understand why they are undertaking certain steps to manage their condition.</td>
<td>emphasising the importance of these components during the professional training sessions.</td>
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4) **HCP Confidence for the delivery of SSM:** Both HCPs of the control and implementation groups confirmed they are confident in the delivery of SSM for asthma. All professionals also stated due to the dynamic nature of asthma management, they are always willing to attend training and/or learn about new approaches to treatment to stay up to date with asthma management, which would in turn sustain their confidence.

**Differences in confidence for the delivery of SSM:** Although all professionals stated they are confident in SSM delivery, implementation group practices acknowledged that sometimes their confidence can be affected by their workloads and trying to stay up to date with guidance/treatment. As primary care HCP’s who deliver asthma care often specialise in other conditions (e.g., diabetes, heart conditions), professionals felt confidence can be strained by having to be aware of all the varying management approaches. Implementation professionals, however, did acknowledge that if they were unaware of any asthma management techniques, they can approach colleagues of the practice to support and learn from each other. This approach to collaborative working could be due to the ‘whole team’ approach which is embedded in the IMP²ART implementation strategies to positively impact practice views and culture on SSM.

5) **Barriers to effective delivery of SSM:** Both professionals from the control and implementation group regarded the main barrier to effective | **Differences in barriers to effective SSM delivery:** Although both groups acknowledged lack of time as the main barrier to effective SSM delivery, implementation group members highlighted the need for support and guidance to stay up to date with treatment and management strategies. |
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<td>delivery of SSM as lack of time allocated to a routine review. Professionals felt there is not enough time to go into certain SSM techniques in enough detail, such as the personalised asthma action plan. Professionals of both groups also stated lack of time can restrict more meaningful conversations from taking place. Patients are often signposted to other services to address other issues as there is not enough time to do so within a standard review (e.g., stop smoking, anxiety), which could prevent delivering a holistic review and collaboratively addressing all the patients concerns for their asthma management.</td>
<td>delivery, the control group also identified patient's themselves as a barrier to effective delivery. Control group findings suggest HCPs of that group view patients as a barrier in their own care. Professionals suggested patients still regard HCPs as the person who can 'fix' their asthma and do not take a collaborative view or ownership of their asthma management. This difference in views towards barriers may be due to the IMP²ART implementation strategies which have emphasised to professionals how to encourage a patient to be more collaborative in their own care.</td>
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