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Van Der Feltz-Cornelis, Christina Maria orcid.org/0000-0001-6925-8956, Sweetman, Jennifer orcid.org/0000-0003-1969-4586, Allsopp, Gail et al. (19 more authors) (2022) STIMULATE-ICP-Delphi (Symptoms, Trajectory, Inequalities and Management:Understanding Long-COVID to Address and Transform Existing Integrated Care Pathways Delphi): Study protocol. PLoS ONE. e0277936. ISSN 1932-6203

https://doi.org/10.1371/journal.pone.0277936

STIMULATE-ICP-Delphi (Symptoms, Trajectory, Inequalities and Management: Understanding Long-COVID to Address and Transform Existing Integrated Care Pathways Delphi): Study protocol.

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Word count: 3,541

Metadata

Financial disclosure statement

This research is funded by NIHR (COV-LT2-0043) as part of the STIMULATE-ICP study. The views expressed in this publication are those of the author(s) and not necessarily those of the National Institute for Health Research or the Department of Health and Social Care.

Competing Interests statement

EA is clinical lead in a Quality Improvement Support Team for Central Camden PCN. MG is funded in part by NIHR Applied Research Collaboration NWC. TH received travel and accommodation in UK to facilitate a talk for Multiple Sclerosis Debating Society and an honorarium payment related to the Acute and General Medicine Conference. GL is Consultant and speaker for BMS/Pfizer, Boehringer Ingelheim and Daiichi-Sankyo; no fees are received personally. HM has received funding from AstraZeneca related to use of monoclonal antibodies in acute COVID-19 treatment, from Millfield Medical in relation to the development of a new CPAP machine for use in hypoxic ventilatory failure, and from Axcella Health Inc about possible new therapeutics. He has delivered paid lectures to legal groups about Long Covid, received support to attend meetings as part of consultancy for AstraZeneca, participated on advisory boards for AstraZeneca and Axcella Health. HM has been involved as Chair, UK National Covid Critical Care Committee; Trustee, UK Intensive Care Society and has stock options with Millfield Medical Ltd. WDS has received research grants from AstraZeneca, Bayer, Novartis, Novo Nordisk and Takeda, and speaker and/or advisory board honoraria from AstraZeneca, Bayer, Boehringer Ingelheim, Bristol-Myers Squibb, Eli Lilly, Janssen, Merck, Mundi-Pharma, Napp, Novartis, Novo Nordisk, Pfizer, Sanofi Aventis, Servier and Takeda. DJC has received investigator-initiated research funding, conference and/or consultancy fees from NovoNordisk, Astra Zeneca and Ipsen. CW

has had recent involvement with nine UK-based grants, has contributed to five advisory boards and been involved with six project groups or committees in a leadership or fiduciary capacity. CW has been involved with six NIHR collaborations/projects, of which STIMULATE-ICP is one. NW is a member of NIHR HTA Programme Funding Committee (commissioned research). DGW is supported by an NIHR Advanced Fellowship; University of Liverpool receives an NHS hourly rate for his consultancy work with an NHS Advancing Quality Alliance programme; he has no conflicts of interest. All other authors have no conflicts of interest to report.

Data availability statement

This article describes a study protocol and as such does not report data. The data availability policy is therefore not applicable to this article.

Abstract

Introduction

As mortality rates from COVID-19 disease fall, the high prevalence of long-term sequelae (Long COVID) is becoming increasingly widespread, challenging healthcare systems globally. Traditional pathways of care for Long Term Conditions (LTCs) have tended to be managed by disease-specific specialties, an approach that has been ineffective in delivering care for patients with multi-morbidity. The multi-system nature of Long COVID and its impact on physical and psychological health demands a more effective model of holistic, integrated care. The evolution of integrated care systems (ICSs) in the UK presents an important opportunity to explore areas of mutual benefit to LTC, multi-morbidity and Long COVID care. There may be benefits in comparing and contrasting ICPs for Long COVID with ICPs for other LTCs.

Methods and analysis

This study aims to evaluate health services requirements for ICPs for Long COVID and their applicability to other LTCs including multi-morbidity and the overlap with medically not yet explained symptoms (MNYES). The study will follow a Delphi design and involve an expert panel of stakeholders including people with lived experience, as well as clinicians with expertise in Long COVID and other LTCs. Study processes will include expert panel and moderator panel meetings, surveys, and interviews. The Delphi process is part of the overall STIMULATE-ICP programme, aimed at improving integrated care for people with Long COVID.

Ethics and dissemination

Ethical approval for this Delphi study has been obtained (Research Governance Board of the University of York) as have approvals for the other STIMULATE-ICP studies. Study

outcomes are likely to inform policy for ICPs across LTCs. Results will be disseminated through scientific publication, conference presentation and communications with patients and stakeholders involved in care of other LTCs and Long COVID.

Registration

Researchregistry: https://www.researchregistry.com/browse-the-registry#home/registrationdetails/6246bfeeeaaed6001f08dadc/.

Introduction

Despite major reductions in acute COVID-19 hospitalisation and mortality,[1] the persistence of symptoms over one year later is notable in the 45% of the 1.5 million individuals who had symptoms four weeks post-COVID in the UK.[2-4] Unlike some long-term conditions (LTCs), individuals with Long COVID (i.e. those with post-COVID symptoms >12 weeks) may still fully recover. However, new care pathways for Long COVID attempt to manage it akin to a LTC, given the increasing recognition of chronic symptoms.[4, 5]

Care pathways for LTCs have tended to be disease- or specialty-specific, an approach which fails to accommodate the heterogeneity of symptoms occurring in Long COVID. ICPs are structured, multi-disciplinary plans of the whole care pathway from primary care to specialist services and rehabilitation services, which may be better suited to Long COVID.[6-8] They offer coordination of investigation, treatment and rehabilitation, as well as opportunities for real-time iterative improvements in service design and delivery, quality and access to care, patient experience and satisfaction, while reducing complications and non-elective admission rates.[9-11] Evolution of integrated care systems (ICSs) in the UK provide opportunities to improve care across LTCs, multi-morbidity or multiple health conditions,[12] and Long COVID.

Long COVID encompasses a broad array of symptoms and symptom clusters. It is unlikely to reflect a single condition or pathology; rather it reflects a multi-faceted condition with numerous contributory factors: some identifiable, and others not yet understood.[13] Trajectory and recovery after SARS-CoV-2 infection are poorly defined and there is overlap with medically not yet explained symptoms (MNYES), referring to symptoms which do not represent a known medical condition, yet contribute significantly to lesser quality of life and treatment need.[14] Multi-organ complications,[13, 15-18] including neuropsychiatric sequelae (up to 20%), are well-documented.[19-24]

Table 1 shows current models that can potentially be applied to Long COVID ICPs. Depending on setting, expectations and provisions regarding treatment may differ. It can be argued that some current models for managing LTCs require improvement[25] as they cannot cover the whole range of patient presentations; episodic care is not appropriate for unpredictable exacerbating conditions, for example heart failure and COPD.[26, 27] An effort should be made to explore how to achieve integrated care from the perspective of individual conditions, but also from the perspective of how health services and settings can inform each other, and work together, to deliver optimal care for LTCs. The current pandemic and effort to set up Long COVID clinics[28] offers a unique opportunity to explore this from the perspective of Long COVID, and then to translate back to ICPs for other LTCs. For example, model 2 could also be based in primary care with better integration of GPs, primary care nurses and therapists. Model 3 could be more of a shared care arrangement between primary and secondary care with two-way data flow between these two sectors. In other words, one of the solutions for Long COVID care could be better working arrangements between community services, primary care and specialty care and ICSs might offer the perfect space for this in England.

79 **Table 1: Potential models for ICPs managing recovery in Long COVID and other LTCs**

Model	Example condition(s)	Recovery time	Managed by	Approach
Model 1	Community Acquired Pneumonia (CAP)	This may take 6 months to fully recover in terms of fatigue (NICE guideline)[29]	Primary care teams and community General Practitioners (GPs). There is a NHS CAP CQUIN aiming to support discharge from the hospital and safe follow up of these patients. Follow up imaging is usually arranged by secondary care.	Currently there is no well-developed integrated care pathway but there could be a chance to identify how to identify CAP follow up better based upon Long COVID care experiences. They support the patient through their recovery with the length of complete recovery and the ramifications for work often underestimated.
Model 2	Post myocardial infarction, significant musculoskeletal injury	Taking a medium course to resolution, e.g., 1-2 years.	Multi-disciplinary team (MDT) driven and mostly provided in rehabilitation clinics.	Rehabilitation approach, personalised to the individual including a biopsychosocial approach to care, with physiotherapy and medical attention to address anxiety and depressive symptoms
Model 3	A chronic disease like type 2 diabetes or stroke	It is managed but often recovery is not complete.	Usually managed in primary or community care, by GPs and diabetes nurses, or in the hospital setting.	Escalation of a small proportion with complex needs being managed in a specialist setting[30]
Model 4	COPD Rheumatoid Arthritis	A chronic condition that may have high disability with tendency for relapses/ exacerbations.	Limited care provision, mostly based in primary care with exacerbations increasingly managed in hospital in later stages. Growing emphasis on need to improve community diagnostics and	COPD is a condition that shares breathlessness as an important symptom with Long COVID, where pulmonary rehabilitation is a key evidence based treatment and supporting self-management is a key goal. Impact on function, breathlessness and psychological wellbeing as in Long COVID. Both conditions have a relapsing

			where pulmonary rehabilitation is a key evidence-based treatment.	course of symptoms that may benefit from prompt intervention. There is growing emphasis on the need to improve community diagnostics.
Model 5	Comorbid mental disorders and other LTC. For example, COPD in patients with mental disorders, often related to smoking. Or, depression in diabetes patients.	These are in general chronic conditions with high disability. There is an unmet clinical need here.	Mental disorders have case management, crisis teams, psychiatry follow up, but they do not identify physical health needs of their patients, such as respiratory issues. And clinics for somatic conditions can have short-term treatments available for psychological treatments but there is a lack of available long-term integrated treatment.	There are pilot playgrounds for dedicated respiratory clinics for patients with mental illness across the country. Similar pilots exist for diabetes and depression - either community-based or hospital-based.
Model 6	Encompassing multi-morbidity (i.e. more than two LTCs) as well as a spectrum of symptoms that do not fit into a usual pattern for diagnosis of a single disease i.e. MNYES,[14] or both, crossing the mental health and physical health divide.	The perceived burden of disease is high. These are conditions requiring a multisystem approach.	No current consistent pathway of care exists. Consultation, collaborative care and decision aids supporting health care providers to provide ICP would be possibilities to link primary, community and specialist health care settings	These patients are highly likely to benefit from an ICP. This would be best served with a flag up system approach which is for people who don't quite meet full diagnostic criteria in one condition but almost meet it in many conditions. This would be labelled as MNYES but disease burden is high and there is a need to integrate physical and psychological health care provision.

Acronyms: Community Acquired Pneumonia (CAP), National Institute for Health and Care Excellence (NICE), General Practitioner (GP), National Health Service (NHS), Commissioning for Quality and Innovation (CQUIN), Multi-disciplinary team (MDT), Chronic Obstructive Pulmonary Disease (COPD), Long term condition (LTC), Integrated care pathway (ICP), Medically not yet explained symptoms (MNYES).

Even in well-defined entities such as community acquired pneumonia (CAP), symptoms such as fatigue[31] may take up to six months to resolve, even in young, physically fit people, fuelling fears that their symptoms will not abate, which may be biologically, psychologically, or socially driven, or depend on treatment setting. Learning from other LTCs, optimal Long COVID management may require a biopsychosocial model, rather than consideration of these components separately.[32]

Research question

What are effective ICPs for individuals with Long COVID and how can they be transferred to other LTCs including mental disorders, multi-morbidity and the interface between known medical disorders and MNYES[14] as well as newly developed conditions?

Materials and Methods

Aims

In a Delphi study using a biopsychosocial approach, we will investigate:

1. (a) Key enabling elements for effective ICPs for individuals with long COVID, based on user experience, and (b) Strengths of existing ICPs for other LTCs.
2. Which (part of an) ICP model for Long COVID can be transferred to other LTCs for which care pathways were not yet developed sufficiently, and how.
3. Variations in uptake and adherence to treatment in Long COVID and LTCs.

Study design and setting

This STIMULATE-ICP-DELPHI is a sub-study of the STIMULATE-ICP project (Symptoms, Trajectory, Inequalities and Management: Understanding Long COVID to Address and Transform Existing Integrated Care Pathways).[33] (**Figure 1**)

[Figure 1]

STIMULATE-ICP is funded by the National Institute for Health Research (NIHR: COV-LT2-0043)[34] and combines clinical epidemiological studies, a complex randomised trial exploring the benefit of an ICP for Long COVID (IRAS: 1004698), and mixed methods studies exploring inequalities of care and transferability of the ICP to other LTCs (IRAS: 303958).

The STIMULATE-ICP-DELPHI study will follow a Delphi process to establish consensus agreement on statements relating to ICPs and the transferability of ICP models between Long COVID and LTCs. The Delphi approach is a structured method for collecting opinions of experts concerning a subject of their expertise, reaching consensus over a number of rounds.[35] Since its development in the 1950s[36] a commonly used variation of the Delphi method is the *estimate-talk-estimate Delphi method* that combines assembling of expert opinions on an anonymous basis during surveys with open exchange during workshops moderated by a facilitator.[37] This Delphi method will be followed in this study,[38] aiming for stepwise consensus through three rounds of expert panel meetings involving exploration, prioritization, and as a final step attaining consensus(**Figure 2**).

[Figure 2]

The meetings will be interwoven by two online surveys, with addition of qualitative interviews. After a “knowledge check”, an information package based on the survey and interview outcomes will be provided to the panel. The expert panel will then discuss outcomes and provide policy recommendations in a final meeting.[39]

This study will depart from the theoretical framework of Goldberg and Huxley's filter-model of access to care[40, 41] that describes four filters; three of which a patient has to navigate to enter a primary care treatment pathway, and a fourth to access specialist treatment. This model was originally developed for access to care for mental disorders, but it would be a good fit for exploring barriers and facilitators to entering Long COVID services and other LTCs not only for psychological symptoms but for physical symptoms as well. This extended model spans multiple healthcare challenges and extends the existing inequalities in health such as limited access to healthcare, incomplete pathways across community and hospital care, inadequate research translation to practice, and overall insufficient healthcare resources (**Figure 3**).

[Figure 3]

People with Long COVID and those with LTCs frequently present to healthcare services with multiple symptoms.[42-44] Therefore, this study will take account of competing demands to determine how people seeking support prioritise their symptoms when seeking help, and how healthcare providers deal with multiple symptoms reported when making decisions about appropriate care.[45, 46]

Study management

This work will involve a research team (n=3), a moderator panel (MP) (n=3) and an expert panel (EP)(n=25). The research team will prepare, distribute and analyse all information for the project. The MP will meet regularly, providing advice and guidance to the research team to ensure scientific quality. The EP will include people with expertise in academic and clinical research in addition to lived experience of Long COVID, other LTCs such as

cardiovascular disorders, type 2 diabetes, mental disorders and MNYES, or multi-morbidity; 5 of each group with a minimum of 25.

EP members will be selected by the MP building on suggestions from the Royal College of General Practitioners and national charities following a snowballing method. Patients with illness experience of Long COVID and other LTCs will be identified by clinics, medical trusts, patient networks and charities following a snowballing method. As part of the invitation process, the research team will inform prospective EP members about their role within the study. The EP will provide information and advice relating to their experiences of living with, or supporting people with Long COVID or LTCs.

Sample size, participant characteristics, inclusion and exclusion criteria

Recruitment for Survey 1 will involve collecting quantitative and qualitative data from two purposive samples selected from community, primary care, and specialist settings. Sampling will seek to achieve sufficient numbers (minimum of N = 50 per group) in order to have a representative sample. Sample 1: patients/carers and clinicians with experience of Long COVID and other post COVID morbidity across England. Sample 2: patients/carers and clinicians involved in other LTCs. Participants in both samples will be recruited via the study website, with support from relevant online forums, associations and charities. As personalised care is now a specific NHS workstream which is intended to touch on all the LTC pathways, we will seek the opinion of ICS stakeholders (commissioners and those involved in the clinical networks) as to how personalised care should be delivered.[47-52]

The selection of interviewees for the qualitative study will be nested in the surveys. Participants from Survey 1, willing and able to provide informed consent, will be invited

(using a separate survey link) to express interest in participating in an interview to discuss their experiences of healthcare relating to Long COVID and/or LTCs. Using details from the expression of interest form, the research team will select a purposive sample of people (minimum N=10-15) to interview. Within those volunteers, a maximum variation approach to participant selection will be adopted to ensure a wide range of experiences are reflected (accounting for experience of Long COVID and/or LTC(s), patient/clinician). Sampling will stop once saturation is reached. Both patients and clinicians will be interviewed as to how they deal with multi-morbidity or multiple symptoms and competing demands when accessing or providing healthcare, and the barriers and facilitators to providing or receiving ICP.[53-60]

Data saturation

Interviews conducted for this research aim to supplement and provide context to the statements made by Survey 1 participants. For each group of interview participants (patients/clinicians with experience of Long COVID or LTCs), saturation will have been achieved when interviews stop providing new topics/themes which relate to ICPs.

Patient and public involvement

The parent study STIMULATE-ICP has been enriched by robust patient and public involvement (PPI) using multiple channels, including regular updates and webinars, surveys, social media. The STIMULATE-ICP DELPHI study has been informed by existing engagements with people with experience of Long COVID/ LTCs in research, and PPI co-applicants who will contribute to methods and outputs. In addition, people with relevant disease experience will be involved in the EP and will be involved in the selection of other LTCs for comparison. Public and patients will be involved as stakeholders for this project,

increasing awareness with relevant groups and promoting research activities. PPI will be involved in drafting the recommendations and their contributions through the EP and the wider STIMULATE-ICP team will shape our ultimate policy recommendations and the dissemination of this work. PPIE leads and co-applicants will contribute to the management and conduct of Delphi and qualitative interviews, the analysis plan and dissemination of the findings.

Study processes

Round 1

During the initial EP meeting, the scope of this work will be agreed. This work will focus on adults (18 and over); outcomes will include confirming the list of relevant LTCs and those considered out of scope. As an inclusive approach, a variety of LTCs including mental disorders, multi-morbidity and the interface with MNYES will be considered. Fatigue, as a symptom, will be in scope, myalgic encephalomyelitis or chronic fatigue syndrome (ME/CFS) will be considered out of scope for this survey. Cognitive limitations will be in scope, non-capacity will be out of scope for the survey. Following confirmation of the scope, EP members will discuss and agree on questions to ask in Survey 1. The survey will include questions about:

1) Demographic factors (age, gender, ethnicity), relevant disease experience as patient or clinician, and clinical and work functioning profile of participants.

2) Experiences of Long COVID which prompted help-seeking with a focus on the process of seeking treatment, referrals, treatment(s) offered and received and whether there were any barriers or facilitators to that.

3) Challenges and advances for clinical care, knowledge gaps and policies, possible improvements to services, transferability of care models to other conditions will be explored for Long COVID and for other LTC ICPs.

Survey 1

This will be an anonymous, online survey (using the Qualtrics[61] platform) to establish demographic information and to explore the topics by open questions. Participants will also be invited to give a first indication of what their priorities to improve integrated care would be.

Round 1 Interviews

Qualitative semi-structured interviews will be used to examine the experience, and needs for treatment, of people living with Long COVID and other LTCs.

Examples of good practice will also be sought. Interview topic guides will be developed with guidance from the MP. Interviews will be offered over the telephone or a secure video-conferencing platform (zoom). Interviews are expected to last 40-50 minutes, but no longer than one hour, to reduce participant burden. With consent, they will be audio-recorded to allow verbatim transcription.[62-64] Where respondents appear fatigued, they will be given the option for the interview to take place over two time-periods, to have a family member present, or to shorten the length of the interview. The researcher will stop the interview at any point if participants indicate discomfort or distress.

Round 2

The EP will use data from Survey 1 and the interviews to create a list of statements about

1) Current Long-COVID clinics and future recommendations.

2) Current care models for LTCs.

Statements are likely to relate to how symptoms impact on general and social functioning and service use. Statements will also explore treatment and service need for people across different disease / condition profiles, in order to inform the recommendation phase.

Survey 2

There will be a second anonymous online survey seeking to explore for which statements consensus exists. Participants will review and respond to each of the statements using a 7-point scale (1. Totally disagree, 7, Totally agree).

Round 3

In a final meeting, the expert panel will use the findings to finalise a series of consensus-based recommendations about optimal care models for Long COVID and how these can be applied to other LTCs. These recommendations will be shared with healthcare professionals, policy makers and healthcare commissioners with the potential to influence future care.

Data analysis and outcomes

Data analysis will provide descriptive statistics to outline the demographic characteristics of the two samples. Item response frequencies provide information about the current services offered. Open-ended questions will capture individual experiences of services and suggestions for future improvements. Responses will be organised into themes, with the research team adopting a pragmatic approach to provide feedback for the second expert panel meeting.

Thematic analysis will be conducted on data transcripts for round 1 interviews.[65] Theme development will be derived deductively from the topic guide. However, we will also allow for inductive theme development and will actively seek to identify new themes or topics within our data.[66] Following initial deductive and inductive coding, analysis will be set in the context of relevant theoretical concepts from the experience of chronic illness, such as, for example, the adapted Goldberg and Huxley's filter model;[40] competing demands in primary care;[46] biographical disruption;[67] and illness careers.[68] Emergent patterns and early analysis will be discussed at regular research and moderator panel meetings for comment. Data from Survey 1 and Interviews will be combined and presented to the EP for consideration during round 2 of this study.

Data analysis will collate responses to Survey 2. Then consensus of opinion about each statement will be assessed using interquartile deviations (IQD). For this calculation, at least 50% of individuals will have responded using the same category. IQD ≤ 1 is considered to indicate consensus. Findings from survey 2 will be combined with an information pack based upon input from other STIMULATE-ICP sub studies as lined out in Figure 1, and shared with the EP members.

Data management plan

This study will produce online survey data and qualitative interview data. Online surveys will be anonymous and therefore a survey ID code will be created for participants (for example, S146 would be the code given to Survey 1 participant number 46). Data will be downloaded from Qualtrics to Microsoft Excel. Qualitative interview data will be audio recorded via Zoom (for virtual interviews or telephone interviews). Participant ID codes will

be provided to all participants (for example, DI07 would be the code given to Delphi Interview participant number 7). A password-protected Microsoft Excel file will be used to track the status of data preparation for each interview; this document will contain participant names and ID codes. Audio recording will be transcribed verbatim into Microsoft Word documents. Transcripts will then be anonymised ready for analysis.

All data will be stored electronically on the University of York secure server with access restricted to the research team involved with this project. Analysis will be conducted in Microsoft Excel, SPSS and NVivo. Anonymous data (such as Survey 1 original responses) will be shared with MP and EP members to enable discussions and decisions about the organisation of data and the development of statements.

Ethics

This Delphi study was reviewed and approved by the University of York Department of Health Sciences Research Governance Committee in December 2021 (HSRGC/2021/478/A:STIMULATE).

Informed consent

SURVEY

Regarding the survey, following the presentation of participant information, consent for anonymous data to be collected, analysed and disseminated as part of this project will be required before survey questions are displayed for Surveys 1 and 2.

INTERVIEW

Regarding the interview, a separate survey link will be embedded at the end of Survey 1 to enable participants to express an interest in participating in a subsequent qualitative interview

without linkage to their survey answers. All individuals who express an interest in being interviewed will be contacted to confirm whether they have been selected to contribute to the interviews. Individuals who are selected for interview will then receive full interview study information and will be required to provide consent if they wish to participate in an interview.

Data handling

The study is compliant with the requirements of General Data Protection Regulation (2016/679) and the UK Data Protection Act (2018). All investigators involved in the study will comply with the requirements of the General Data Protection Regulation (2016/679) with regards to the collection, storage, processing and disclosure of personal information, and will uphold the Act's core principles. For this STIMULATE-ICP Delphi sub-study, survey data will be downloaded and stored/archived at the University of York. All interviews will be recorded. Interview data will be transcribed and coded by JS and will be identified and stored/archived at the University of York. Information provided to survey and interview participants will outline their right to withdraw at any point during this research. Data collected up to the point of withdrawal will be used unless there is an expressed request for withdrawal of all data.

Safety considerations

There are not considered to be any safety concerns for participants involved with this project. EP and MP members will be informed of the project aims, the focus of their role and the project timescales prior to joining the study. These are voluntary roles and individuals can withdraw from the study at any time. Likewise, Survey participants' data will be shared anonymously with basic demographic details being collected to enable researchers to describe the sample. Survey participants will be able to ask questions to the research team, provide consent and withdraw at any point. Interview participants will provide contact details to the research team to enable interviews to be organised and conducted. Transcribed

data will be anonymised, and interview participants can stop or pause interviews at any point should they wish to. All data collected will be online, virtually or using the telephone to minimise any burden for participants. The anticipated time to complete each research activity will be shared with potential participants to enable them to make informed decisions about whether to participate in each element of the study.

Status and study timeline

Jan-Feb 2022 – Recruitment of Expert Panel members

March 2022 – Initial Expert Panel meeting

April 2022 – Survey 1 launched online

May 2022 – Interviews started

June 2022 – Survey 1 closed

July 2022 – Interviews completed, Survey 1 data cleaning and analysis

August 2022 – Survey 1 data analysis, Interview data transcription, small groups of Expert Panel members discuss preliminary organisation of data from Survey 1

September 2022 – Second Expert panel meeting, Interview data analysis

October 2022 – Launch of Survey 2 online, Interview data analysis

November 2022 – Interview data analysis

December 2022 – Survey 2 closed, Interview data analysis

January 2023 – Survey 2 data cleaning and analysis

Feb/March 2023 – Final Expert Panel meeting

March 2023 – Key recommendations finalised and disseminated

Discussion

Dissemination

We will publish the findings from this Delphi study in peer reviewed journals and will present the findings during conferences. Table 2 provides an overview of the proposed deliverables for stakeholders during the study.

Table 2 Dissemination to stakeholders

Early deliverables	**Early read out and contact with stakeholders (NHS England, the Royal College of GPs, AHSNs, other Royal Colleges, RCP, RCPsych, patient groups and NICE)**		
What should integrated care look like? What should be integrated for Long COVID, other LTCs and multimorbidity?			
How can ICPs integrate primary and specialty health care, as well as somatic and mental health care?			
Patient and clinician experiences in ICPs and variety in Long COVID and other LTCs regarding funding and structure of their care pathways.			
Inform care pathways for other LTCs that are unheard or under-served.			
What are facilitators and barriers to integrated care pathways?			
Final deliverable	**Contact with stakeholders (NHS England, the Royal College of GPs, AHSNs, other Royal Colleges, RCP, RCPsych, patient groups and NICE)**		
Outputs	Webinar contact with stakeholders	Report with summary of findings for stakeholders	Policy recommendations
Novel models of provision across sectors, addressing biological, psychological and social components as a matter of routine, new multi-disciplinary groups in settings such as primary care.			

Conclusions

The pandemic and the legacy of Long COVID will alter the landscape of the UK NHS forever, and possibly health care systems in other countries as well. This Delphi study can support a novel way of developing integrated models of care. It will inform the beginning of

390 a change in NHS integrated care systems across diseases and the primary and specialty health

391 care divide, while putting the patient first.

Authors' Contributions

Conceptualisation and methodology: CFC, JS, GA, EA, MG, AB, STIMULATE-ICP team. Funding acquisition: all authors. Ethics: CFC, AB, PM. Project administration: CFC. Original manuscript drafting and preparation: CFC, JS. Review and editing of manuscript: all authors. Patient and public involvement: LH, EA. All authors approved the final version of the article.

Acknowledgements

This paper has been published on behalf of the STIMULATE-ICP Consortium: Professor Amitava Banerjee (Chief Investigator), Professor Paula Lorgelly, Professor Elizabeth Murray, Dr Hakim-Moulay Dehbi, Professor Hugh Montgomery, Dr Yi Mu, Sarah Clegg, Dr Mel Ramasawmy–University College London; Dr Melissa Heightman (Co-Chief Investigator), Dr Toby Hillman, Dr Emma Wall, Dr Michael Zandi—University College London Hospitals NHS Foundation Trust; Professor Dame Caroline Watkins, Denise Forshaw, Dr Gordon Prescott–University of Central Lancashire; Dr Gail Allsopp—Derbyshire NHS Foundation Trust/Royal College of General Practitioners; Professor Mark Gabbay, Professor Gregory Lip, Professor Dan Cuthbertson, Dr Dan Wootton, Professor Nefyn Williams—University of Liverpool; Dr Michael Crooks—University of Hull; Dr Angela Green—Hull University Teaching Hospitals Trust; Professor Christina van der Feltz-Cornelis, Dr Jennifer Sweetman, Dr Han-I Wang, Natalie Smith—University of York; Professor Kamlesh Khunti—University of Leicester; Dr David Strain—University of Exeter; Dr Emily Attree, Jasmine Hayer, Rachel Hext, Lyth Hishmeh, Kim Horstmanshof, Mag Leahy, Antony Loveless, Clare Loveless, Rita Mallinson Cookson, Andrew Williams, Rachel Williams–PPI Representatives; Dr Nisreen Alwan, Dr Donna Clutterbuck—University of Southampton; Dr Marija Pantelic—University of Sussex; Chris Robson—Living With COVID Recovery; Professor Sir Mike Brady, Dr Rajarshi Banerjee, Dr Cat Kelly–

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References

1. Gerotziafas GT, Catalano M, Theodorou Y, Van Dreden P, Marechal V, Spyropoulos AC, et al. The COVID-19 pandemic and the need for an integrated and equitable approach: an international expert consensus paper. Thrombosis and Haemostasis. 2021;121(08):992-1007.
2. The King's Fund. Long-term conditions and multi-morbidity 2022 [Available from: https://www.kingsfund.org.uk/projects/time-think-differently/trends-disease-and-disability-long-term-conditions-multi-morbidity#:~:text=Long%2Dterm%20conditions%20or%20chronic,pulmonary%20disease%2C%20arthritis%20and%20hypertension.
3. NICE. COVID-19 rapid guideline: managing the long-term effects of COVID-19 2022 [Available from: https://www.nice.org.uk/guidance/ng188/resources/covid19-rapid-guideline-managing-the-longterm-effects-of-covid19-pdf-51035515742.
4. World Health Organization. A clinical case definition of post COVID-19 condition by a Delphi consensus, 6 October 2021 2021 [Available from: https://www.who.int/publications/i/item/WHO-2019-nCoV-Post_COVID-19_condition-Clinical_case_definition-2021.1.
5. NHS England, NHS Improvement. National Guidance for post-COVID syndrome assessment clinics: NHS England and NHS Improvement; 2021 [updated 26.04.2021. Version 2:[Available from: https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2020/11/C1248-national-guidance-post-covid-syndrome-assessment-clinics-v2.pdf.
6. Evans RA, McAuley H, Harrison EM, Shikotra A, Singapuri A, Sereno M, et al. Physical, cognitive, and mental health impacts of COVID-19 after hospitalisation (PHOSP-COVID): a UK multicentre, prospective cohort study. The Lancet Respiratory Medicine. 2021;9(11):1275-87.

7. ONS. Prevalence of ongoing symptoms following coronavirus (COVID-19) infection in the UK: 3 March 2022 2022 [Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/prevalenceofongoingsymptomsfollowingcoronaviruscovid19infectionintheuk/3march2022.
8. Campbell H, Hotchkiss R, Bradshaw N, Porteous M. Integrated care pathways. British Medical Journal. 1998;316(7125):133-7.
9. Plishka CT, Rotter T, Penz ED, Hansia MR, Fraser S-KA, Marciniuk DD, et al. Effects of clinical pathways for COPD on patient, professional, and systems outcomes: a systematic review. Chest. 2019;156(5):864-77.
10. Baxter S, Johnson M, Chambers D, Sutton A, Goyder E, Booth A. Understanding new models of integrated care in developed countries: a systematic review. Health Services and Delivery Research. 2018;6(29).
11. Mitchell GK, Burridge L, Zhang J, Donald M, Scott IA, Dart J, et al. Systematic review of integrated models of health care delivered at the primary–secondary interface: how effective is it and what determines effectiveness? Australian Journal of Primary Health. 2015;21(4):391-408.
12. Whitty CJ, MacEwen C, Goddard A, Alderson D, Marshall M, Calderwood C, et al. Rising to the challenge of multimorbidity. British Medical Journal; 2020; 368: l6964.
13. Sykes DL, Holdsworth L, Jawad N, Gunasekera P, Morice AH, Crooks MG. Post-COVID-19 symptom burden: what is long-COVID and how should we manage it? Lung. 2021;199(2):113-9.
14. James Lind Alliance. Medically Not Yet Explained Symptoms 2022 [Available from: https://www.jla.nihr.ac.uk/priority-setting-partnerships/medically-not-yet-explained-symptoms/.
15. Stefano GB. Historical insight into infections and disorders associated with neurological and psychiatric sequelae similar to long COVID. Medical Science Monitor. 2021;27:e931447-1.

16. Miskowiak K, Johnsen S, Sattler S, Nielsen S, Kunalan K, Rungby J, et al. Cognitive impairments four months after COVID-19 hospital discharge: pattern, severity and association with illness variables. European Neuropsychopharmacology. 2021;46:39-48.
17. Theoharides TC, Cholevas C, Polyzoidis K, Politis A. Long-COVID syndrome-associated brain fog and chemofog: Luteolin to the rescue. Biofactors. 2021;47(2):232-41.
18. Graham EL, Clark JR, Orban ZS, Lim PH, Szymanski AL, Taylor C, et al. Persistent neurologic symptoms and cognitive dysfunction in non-hospitalized Covid-19 “long haulers”. Annals of Clinical and Translational Neurology. 2021;8(5):1073-85.
19. Varatharaj A, Thomas N, Ellul MA, Davies NW, Pollak TA, Tenorio EL, et al. Neurological and neuropsychiatric complications of COVID-19 in 153 patients: a UK-wide surveillance study. The Lancet Psychiatry. 2020;7(10):875-82.
20. Ellul MA, Benjamin L, Singh B, Lant S, Michael BD, Easton A, et al. Neurological associations of COVID-19. The Lancet Neurology. 2020;19(9):767-83.
21. Taquet M, Luciano S, Geddes JR, Harrison PJ. Bidirectional associations between COVID-19 and psychiatric disorder: retrospective cohort studies of 62 354 COVID-19 cases in the USA. The Lancet Psychiatry. 2021;8(2):130-40.
22. Khan S, Gomes J. Neuropathogenesis of SARS-CoV-2 infection. Elife. 2020;9:e59136.
23. Woo MS, Malsy J, Pöttgen J, Seddiq Zai S, Ufer F, Hadjilaou A, et al. Frequent neurocognitive deficits after recovery from mild COVID-19. Brain Communications. 2020;2(2):fcaa205.
24. Mandal S, Barnett J, Brill SE, Brown JS, Denneny EK, Hare SS, et al. ‘Long-COVID’: a cross-sectional study of persisting symptoms, biomarker and imaging abnormalities following hospitalisation for COVID-19. Thorax. 2021;76(4):396-8.
25. Royal College of Physicians. Outpatients: the future - adding value through sustainability. London: RCP; 2018.

26. Martínez-González NA, Berchtold P, Ullman K, Busato A, Egger M. Integrated care programmes for adults with chronic conditions: a meta-review. International Journal for Quality in Health Care. 2014;26(5):561-70.
27. Goodwin N, Smith J, Davies A, Perry C, Rosen R, Dixon A, et al. Integrated care for patients and populations: improving outcomes by working together. London: King's Fund. 2012.
28. NHS. Long COVID patients to get help at more than 60 clinics 2020 [Available from: https://www.england.nhs.uk/2020/12/long-covid-patients-to-get-help-at-more-than-60-clinics/.
29. NICE. Scenario: Community-acquired pneumonia 2021 [Available from: https://cks.nice.org.uk/topics/chest-infections-adult/management/community-acquired-pneumonia/.
30. Seidu S, Davies M, Farooqi A, Khunti K. Integrated primary care: is this the solution to the diabetes epidemic? Diabetic Medicine. 2017; 34(6):748-750.
31. Wootton DG, Dickinson L, Pertinez H, Eneje O, Keogan L, Macfarlane L, et al. A longitudinal modelling study estimates acute symptoms of community acquired pneumonia recover to baseline by 10 days. European Respiratory Journal. 2017;49(6).
32. Engel GL. The need for a new medical model: a challenge for biomedicine. Science. 1977;196(4286):129-36.
33. STIMULATE-ICP. STIMULATE-ICP 2022 [Available from: https://www.stimulate-icp.org/.
34. NIHR. £19.6 million awarded to new research studies to help diagnose and treat long COVID 2021 [Available from: https://www.nihr.ac.uk/news/196-million-awarded-to-new-research-studies-to-help-diagnose-and-treat-long-covid/28205.
35. Adler M, Ziglio E. Gazing into the oracle: The Delphi method and its application to social policy and public health: Jessica Kingsley Publishers; 1996.
36. Dalkey N, Helmer O. An experimental application of the Delphi method to the use of experts. Management Science. 1963;9(3):458-67.

516 37. Wykes T, Haro JM, Belli SR, Obradors-Tarragó C, Arango C, Ayuso-Mateos JL, et al. Mental
517 health research priorities for Europe. The Lancet Psychiatry. 2015;2(11):1036-42.
518 38. Rowe G, Wright G. Expert opinions in forecasting: the role of the Delphi technique. Principles of
519 Forecasting: Springer; 2001. p. 125-44.
520 39. de Meyrick J. The Delphi method and health research. Health Education. 2003.
521 40. Goldberg D, Huxley P. Mental illness in the community: the pathway to psychiatric care London.
522 New York, Tavistock. 1980.
523 41. Simon GE. Improving the filter between primary and secondary care for mental disorders. World
524 Psychiatry. 2003;2(3):158.
525 42. Scordo KA, Richmond MM, Munro N. Post–COVID-19 syndrome: theoretical basis,
526 identification, and management. AACN Advanced Critical Care. 2021;32(2):188-94.
527 43. Fernández-de-Las-Peñas C, Palacios-Ceña D, Gómez-Mayordomo V, Florencio LL, Cuadrado
528 ML, Plaza-Manzano G, et al. Prevalence of post-COVID-19 symptoms in hospitalized and non-
529 hospitalized COVID-19 survivors: A systematic review and meta-analysis. European Journal of
530 Internal Medicine. 2021;92:55-70.
531 44. Menchetti M, Murri MB, Bertakis K, Bortolotti B, Berardi D. Recognition and treatment of
532 depression in primary care: effect of patients' presentation and frequency of consultation. Journal
533 of Psychosomatic Research. 2009;66(4):335-41.
534 45. Nutting PA, Rost K, Dickinson M, Werner JJ, Dickinson P, Smith JL, et al. Barriers to initiating
535 depression treatment in primary care practice. Journal of General Internal Medicine.
536 2002;17(2):103-11.
537 46. Jaen CR, Stange KC, Nutting PA. Competing demands of primary care: a model for the delivery of
538 clinical preventive services. Journal of Family Practice. 1994;38(2):166-74.
539 47. NHS England. Long COVID: the NHS plan for 2021/22 2021 [Available from:
540 https://www.england.nhs.uk/coronavirus/wp-content/uploads/sites/52/2021/06/C1312-long-covid-
541 plan-june-2021.pdf.

542 48. NHS. The NHS Long Term Plan 2019 [Available from: https://www.longtermplan.nhs.uk/wp-
543 content/uploads/2019/01/nhs-long-term-plan-june-2019.pdf.
544 49. NHS. NHS England's work on stroke [Available from:
545 https://www.england.nhs.uk/ourwork/clinical-policy/stroke/.
546 50. NHS. Long term conditions 2022 [Available from: https://www.england.nhs.uk/ourwork/clinical-
547 policy/ltc/.
548 51. NHS. Cardiovascular disease (CVD) [Available from:
549 https://www.england.nhs.uk/ourwork/clinical-policy/cvd/.
550 52. NHS. Respiratory disease [Available from: https://www.england.nhs.uk/ourwork/clinical-
551 policy/respiratory-disease/.
552 53. EQ-5D. EQ-5D-5L User Guide, 2019 2019 [Available from: https://euroqol.org/publications/user-
553 guides.
554 54. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure.
555 Journal of General Internal Medicine. 2001;16(9):606-13.
556 55. Lam RW, Lamy F-X, Danchenko N, Yarlas A, White MK, Rive B, et al. Psychometric validation
557 of the Perceived Deficits Questionnaire-Depression (PDQ-D) instrument in US and UK
558 respondents with major depressive disorder. Neuropsychiatric Disease and Treatment.
559 2018;14:2861.
560 56. Michielsen HJ, De Vries J, Van Heck GL. Psychometric qualities of a brief self-rated fatigue
561 measure: The Fatigue Assessment Scale. Journal of Psychosomatic Research. 2003;54(4):345-52.
562 57. Mundt JC, Marks IM, Shear MK, Greist JM. The Work and Social Adjustment Scale: a simple
563 measure of impairment in functioning. The British Journal of Psychiatry. 2002;180(5):461-4.
564 58. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety
565 disorder: the GAD-7. Archives of Internal Medicine. 2006;166(10):1092-7.
566 59. Ware JE, Kosinski M, Turner-Bowker D, Gandek B. How to score version 2 of the SF-12 (r)
567 health survey. Lincoln, RI: Quality Metric. Inc, October. 2002.

60. Broadbent DE, Cooper PF, FitzGerald P, Parkes KR. The cognitive failures questionnaire (CFQ) and its correlates. British Journal of Clinical Psychology. 1982;21(1):1-16.
61. Qualtrics. Qualtrics. Provo, Utah, USA2020.
62. DiCicco-Bloom B, Crabtree BF. The qualitative research interview. Medical Education. 2006;40(4):314-21.
63. Britten N. Qualitative research: qualitative interviews in medical research. British Medical Journal. 1995;311(6999):251-3.
64. Archibald MM, Ambagtsheer RC, Casey MG, Lawless M. Using zoom videoconferencing for qualitative data collection: perceptions and experiences of researchers and participants. International Journal of Qualitative Methods. 2019;18:1609406919874596.
65. Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Research in Psychology. 2006;3(2):77-101.
66. Braun V, Clarke V, Hayfield N. 'A starting point for your journey, not a map': Nikki Hayfield in conversation with Virginia Braun and Victoria Clarke about thematic analysis. Qualitative Research in Psychology. 2019:1-22.
67. Williams S. Chronic illness as biographical disruption or biographical disruption as chronic illness? Reflections on a core concept. Sociology of Health & Illness. 2000;22(1):40-67.
68. Kelly MP, Field D. Medical sociology, chronic illness and the body. Sociology of Health & Illness. 1996;18(2):241-57.

Figures

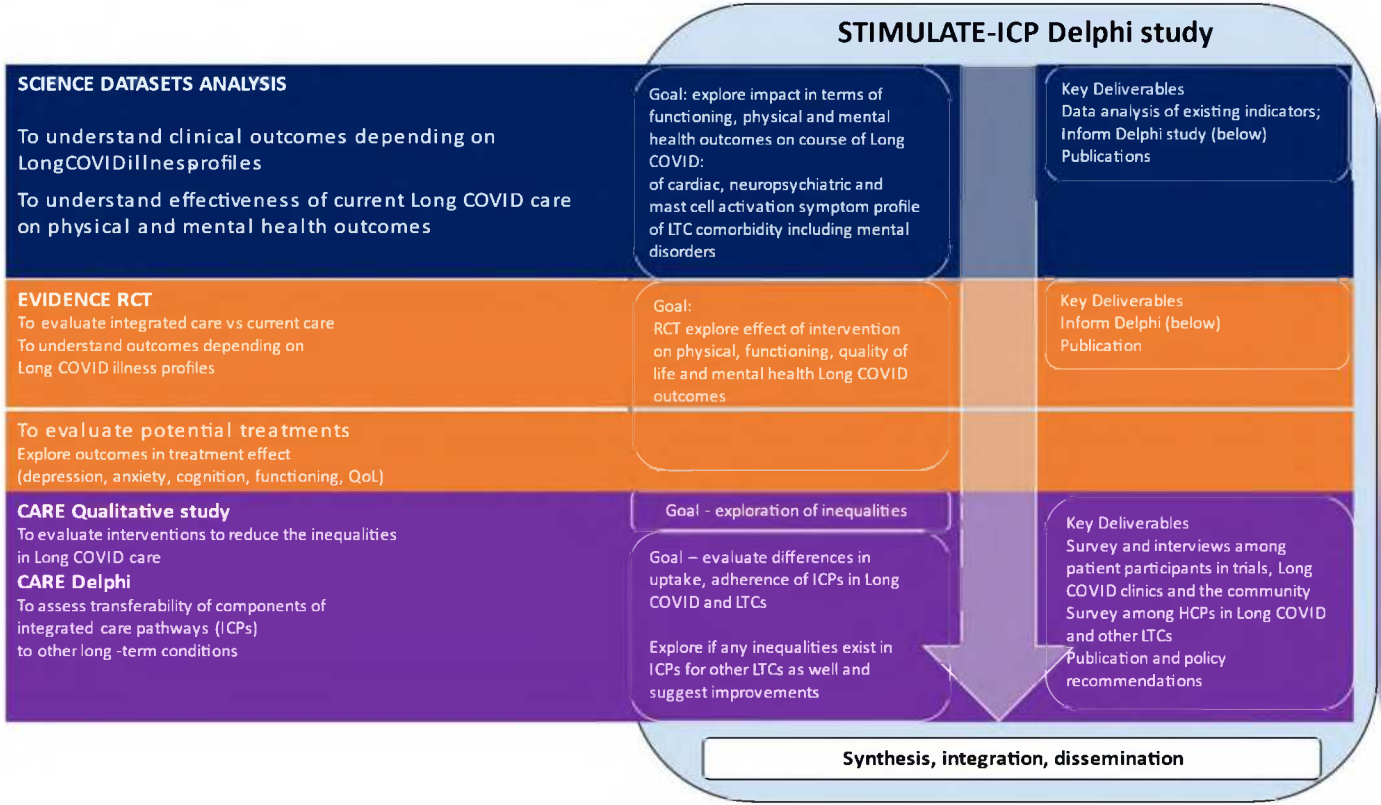
Figure 1: Flow chart showing the integration of STIMULATE-ICP DELPHI within overall STIMULATE-ICP

Figure 2: Outline of Delphi Process

593 Figure 3: Filter model, expanded to conceptualise access to care for Long COVID or other

594 long-term conditions (LTCs) including medically not yet explained symptoms (MNYES) and

595 multi-morbidity



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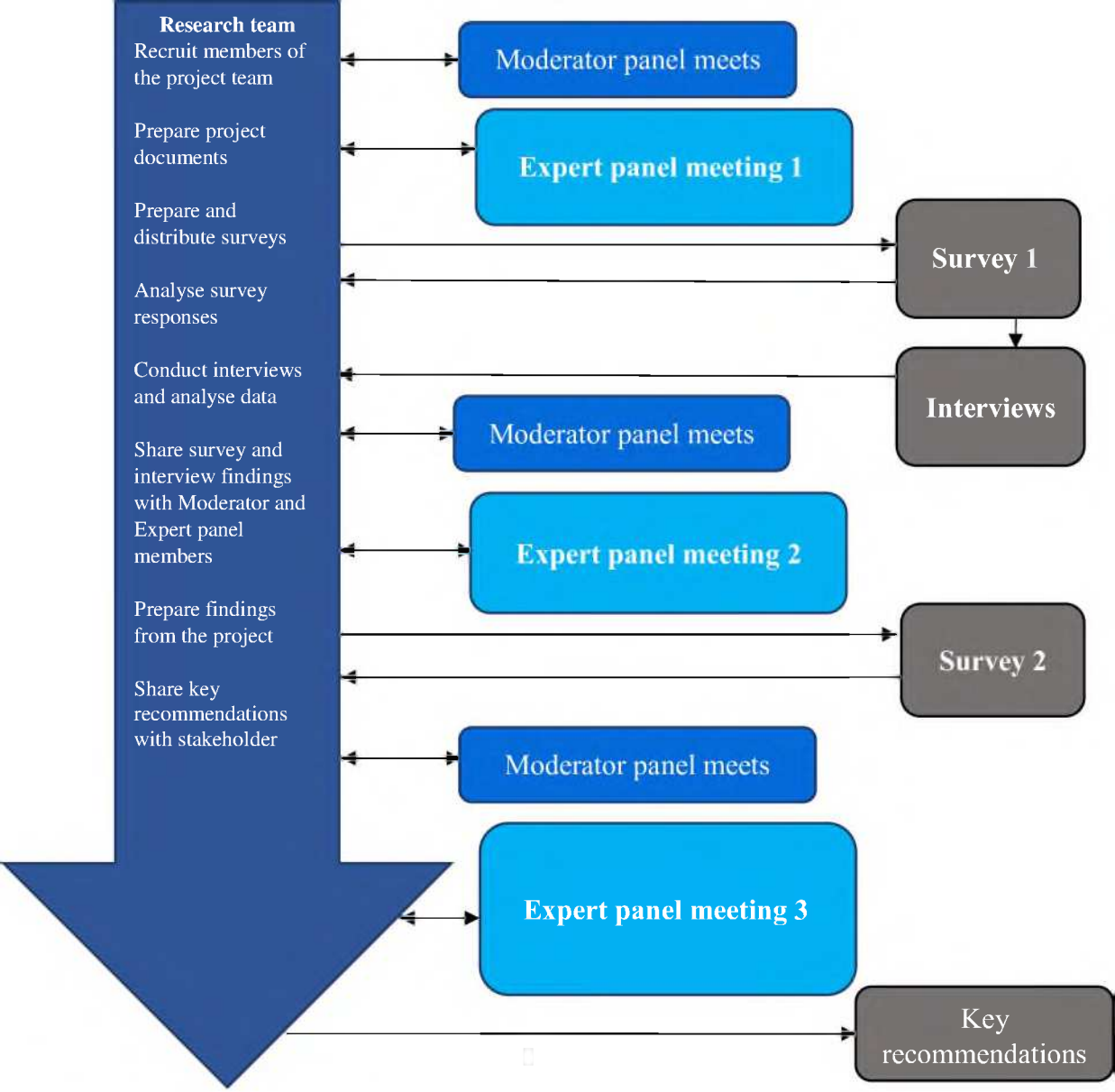

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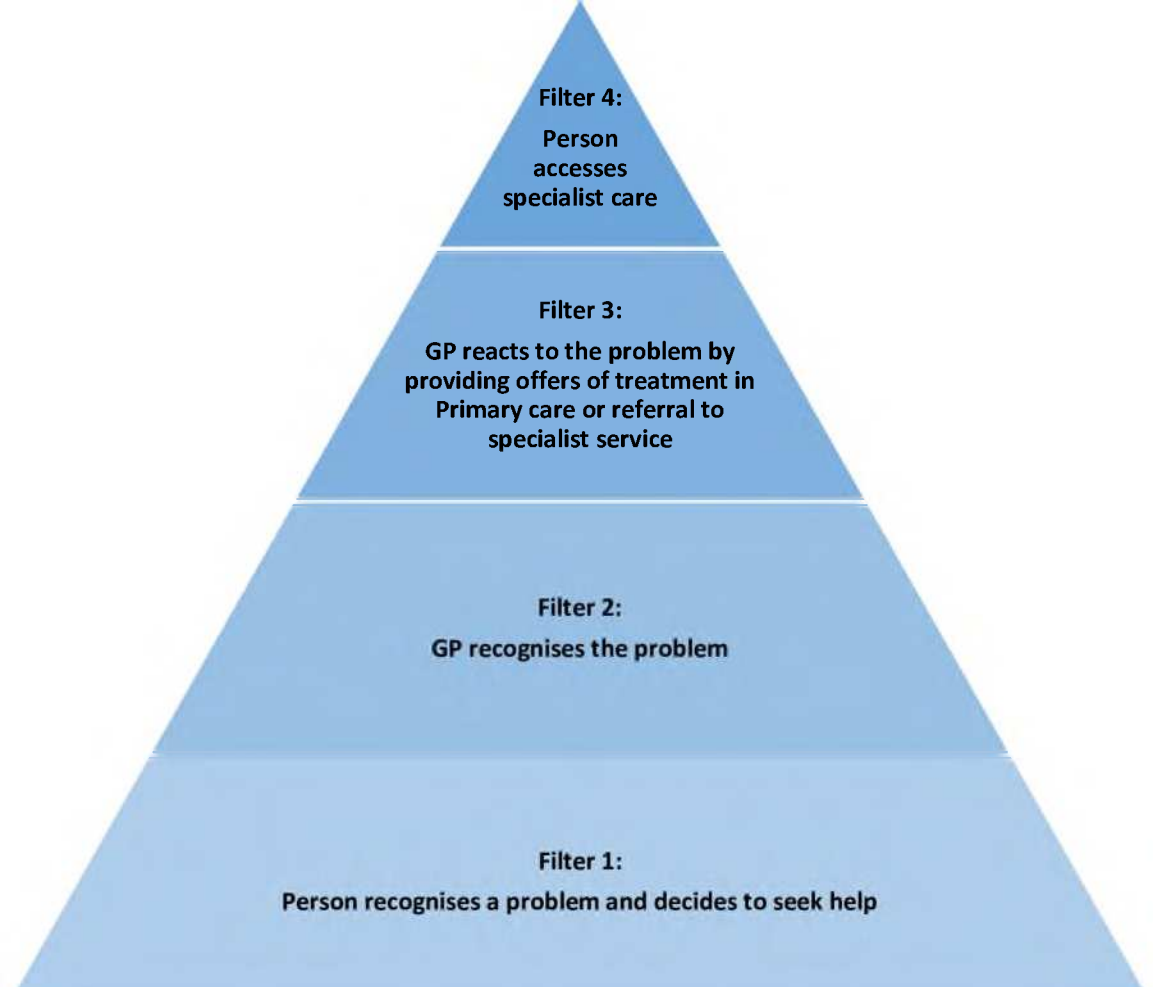

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