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An exploration of the development and effect of collaboration between community pharmacists and general practitioners
(Alternative Format Thesis)

Liaskou, Marianna

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Marianna Liaskou

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The material presented here for examination for the award of a higher degree by research has not been incorporated into a submission for another degree.

[redacted]

Declarations of authorship

I am the author of this thesis, and the work described therein was carried out by myself personally, with the exception of duplicate data extraction as explained in the Statement of Authorship form of the submitted manuscript (Chapter 2).

[redacted]

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Glossary and list of abbreviations

ADE	Adverse drug event (side effect)
ADR	Adverse drug reaction (unexpected/unknown side effect)
BP	Blood pressure
CCG	Clinical Commissioning Group
CP	Community pharmacist
DDI	Drug-drug interaction
DMP	Designated Medical Practitioner
DRP	Drug Related Problem
GP	General Practitioner
GPhC	General Pharmaceutical Council
HCP	Health care professional
IP	Independent prescribing
LTC	Long-term condition (i.e. chronic disease)
NHS	National Health Service
ONS	Office for National Statistics
OM	Operations Management
OSCM	Operations and Supply Chain Management
PCN	Primary Care Network
PSNC	Pharmaceutical Services Negotiating Committee
RCGP	Royal College of General Practitioners
RPS	Royal Pharmaceutical Society
SBP	Systolic blood pressure
SC	Supply chain
SCR	Summary Care Record
SR/SLR	Systematic Review/Systematic Literature Review

Abstract

Introduction

Over the last decade, several policies within the National Health Service (NHS) have called for increased integration of community pharmacists within the primary care team. Whilst several theoretical collaborative models exist, there is limited empirical evidence of collaborative working models between general practitioners (GPs) and community pharmacists. This doctoral research aimed to explore the development and operation of existing GP-community pharmacist collaborative models, and their effect on service provision and stakeholders involved, by adopting Operations and Supply Chain Management (OSCM) perspectives.

Methods

The research comprises two empirical studies: a systematic literature review, and a series of case studies. Findings were analysed by adopting a process perspective of service provision and buyer-supplier (GP-community pharmacist) relationship dynamics – both grounded in OSCM. The systematic review adopted standard systematic review methods. Multiple inductive and qualitative case studies were explored. Data were collected through semi-structured in-depth interviews and observations, and analysis followed the Gioia Methodology. Within and cross-case data analysis was mapped across micro (individual), meso (organisation), and macro (healthcare system and society) levels.

Results

The systematic review identified 43 articles corresponding to 37 studies. A narrative synthesis produced a typology of GP-community pharmacist collaboration, and a sequence of the steps in the collaboration process. Four types of collaborative models were identified based on the pharmacist's physical location and the collaboration's purpose (jointly planning patient care; pharmacy-based patient-facing services; pharmacists/pharmacy co-location with general practice; and interprofessional education to improve prescribing behaviour).

Four case studies explored five collaborative models in English primary care. At the micro-level, individual collaborators' persona was identified as crucial in establishing a collaboration. Interorganisational integration of existing resources was a key aspect of

collaboration at the meso-level. Finally, macro-level patient-orientated national policy encouraged collaborative working.

Discussion and Conclusion

Across both studies, key characteristics of the collaboration were the co-location of pharmacist/pharmacy and general practice; and having a pharmacy-based collaborative service. Stakeholders were generally positively affected by the collaborative working. Overall, the findings indicate a buyer-supplier relationship highly affected by institutional forces.

This is the first systematic exploration of GP-community pharmacist collaborative models in practice to adopt OSCM perspectives. Key contributions of this research include the evidence of community pharmacists-GPs' collaborative models in England. From a methodological point of view, this was new context for operations and professional services research, utilising the Gioia Methodology to explore collaborative relationships and their adoption through micro, meso and macro levels. In turn, this emphasised buyer-supplier relationship dynamics, which were highly affected by personal, organisational and institutional factors.

It was not possible to determine the sustainability of all included models (beyond the reported data in published literature and at the time of the case studies' data collection). Other limitations included the inability to generalise findings (due to the qualitative methodology) and the coronavirus pandemic's impact on recruitment.

The influence of institutional forces means that the existing policy framework ought to elaborate on resolving practical problems, which currently hinder system integration of community pharmacists and GPs. Moreover, competition between professionals requires community pharmacists demonstrating their capabilities. As such, further large-scale and longitudinal studies are needed to establish community pharmacists' value and the sustainability of collaborative working to inform wider implementation of policy encouraging primary care services' integration.

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Chapter 1 Introduction

1.1 Overview

This thesis focuses on collaborative working between community pharmacists and GPs. This chapter introduces the topics addressed within the thesis.

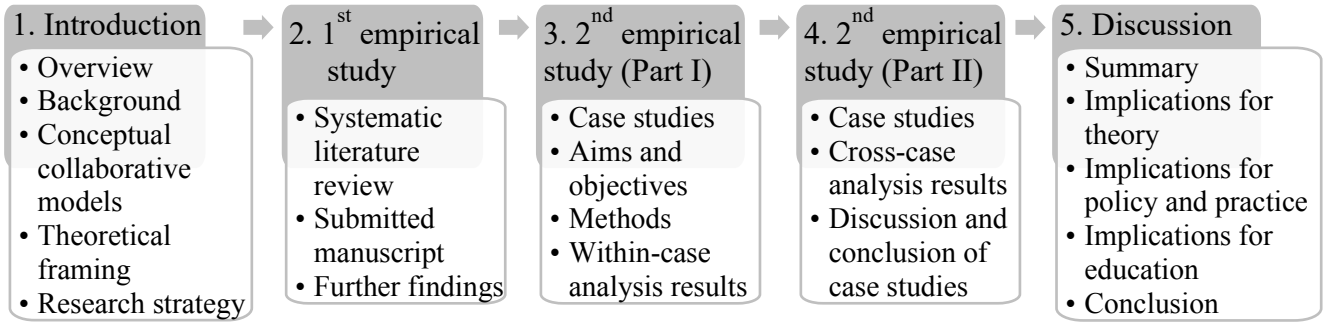
The NHS in the United Kingdom (UK) has been under pressure in various ways. Of particular importance have been the shortages of GPs (Buchan et al., 2019) in combination with a growing ageing population (Office for National Statistics (ONS), 2018). Although this has led to increased demand for healthcare services, it has created opportunities for service improvement. This included the developing clinical role of pharmacists within primary care and policy guidance calling for better integration of pharmacists within the NHS (Section 1.2.2). Closer exploration of extant collaborative relationships between GPs and community pharmacists could inform wider integration of community pharmacists with primary care. Mapping collaborative healthcare services, especially in relation to community pharmacy, could provide a clearer perspective of the primary care supply chain (i.e., professionals delivering services to patients within primary care). As such, this research aims to bridge healthcare, and Operations and Supply Chain Management (OSCM) by means of understanding the collaborative relationships between community pharmacists and GPs.

This thesis initially sets the background of the research topic, including the terminology used throughout the narrative, the relevant practice context, a description of the conceptual and theoretical framing, followed by the research strategy, including research questions, aims, objectives and methodology adopted to achieve these (Chapter 1).

The empirical aspects of this doctoral research are presented within Chapters 2 (Systematic Review), 3 (Case Studies Part I) and 4 (Case Studies Part II). Findings from the empirical components are discussed in Chapter 5. This includes contribution to existing literature; implications for theory; policy and practice; education; overall conclusions; strengths and limitations; and future research. Final thoughts summarise key messages from this doctoral thesis. Finally, the references used throughout the thesis, and appendices are presented. A summary of occasions where this research had been

disseminated is presented in Appendix 1. The flow of the thesis structure is shown below and is at the beginning of every chapter to indicate the reader's position in the thesis.

Figure 1: Thesis structure flow.



1.2 Background

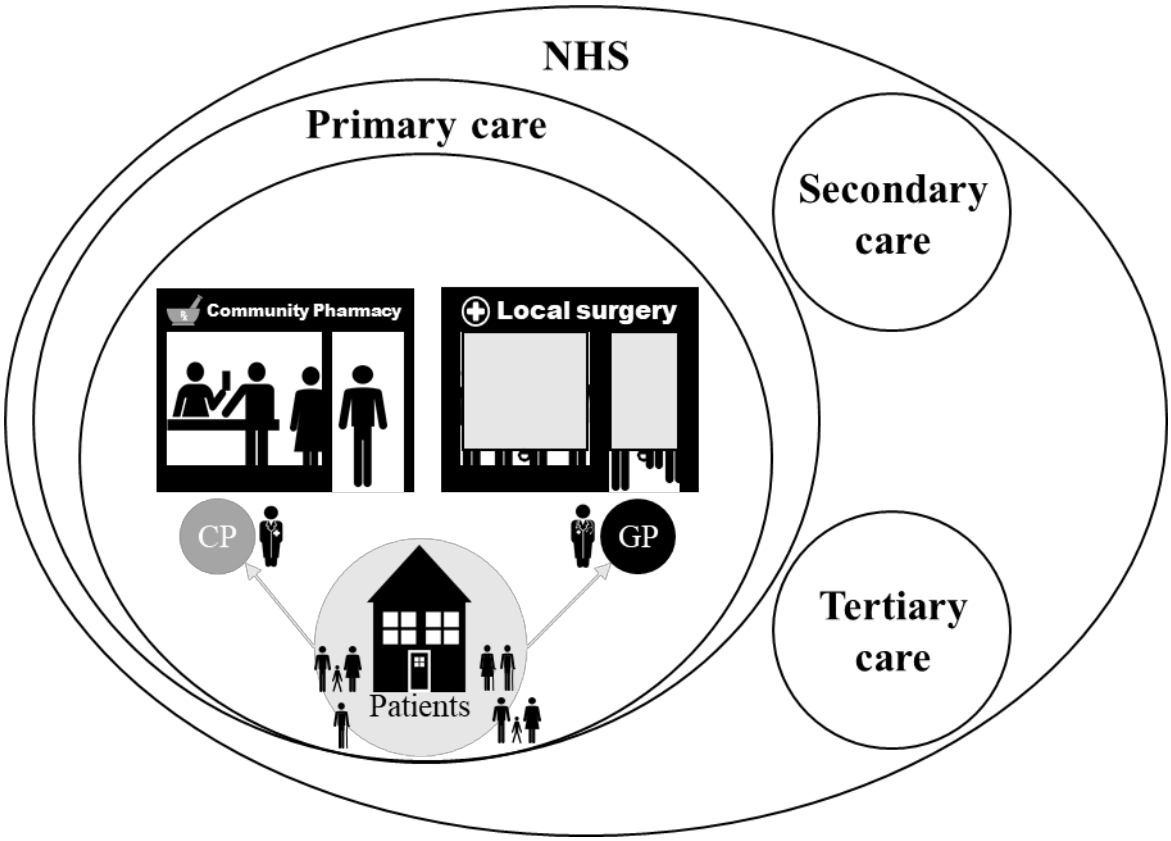
1.2.1 Primary Healthcare

The NHS, which is the largest employer in Europe, is the main organisation providing healthcare within the UK (NHS Jobs, 2019). It comprises three levels of care: primary (first point of contact), secondary (general hospitals) and tertiary care (speciality hospitals). Primary healthcare in the UK is provided by GPs, nurses, pharmacists and other healthcare professionals at general practices and community pharmacies (Figure 2). Both community (retail) pharmacies and general practices have contracts with the NHS that outline specific terms of services. There are other primary care provision settings, such as community hospitals (intermediary secondary-to-primary care) and district nurses providing care at patients' homes; these are outside the remit of this research and will not be discussed further.

1.2.1.1 Community Pharmacists and Pharmacies

Pharmacists are society's experts on medicines and as such can advise on health-related problems and promote healthy living (HEE, 2014). According to the most recent community pharmacy workforce survey in England, there are 23,284 qualified pharmacists (excluding foundation year trainee pharmacists) in England, equating to 17,691 whole-time equivalent (WTE) community pharmacists; while the total number of community pharmacies in England was 11,832 (Marketing Means (UK) Ltd. and Health Education England, 2018). Community pharmacists, who are based within pharmacies on

Figure 2: Summary of the primary healthcare context of this research.



Abbreviations: CP = Community Pharmacist; GP = General Practitioner

the high street or within medical health centres, are ideally placed and are the first port of call for the public (PSNC, 2018a). They are part of primary healthcare services, where they deliver NHS and private services according to the Community Pharmacy Contractual Framework (PSNC, 2018a), sell medicines over the counter (OTC), and offer healthcare advice to patients.

The Community Pharmacy Contractual Framework describes the services that can be delivered in pharmacies and for which they will receive remuneration. These are spread across three levels: "essential services" which are mandatory for all NHS pharmacies, such as dispensing and disposal of unwanted medicines; "advanced services" which can be provided following specified training and/or accreditation, such as the New Medicines Service and seasonal influenza vaccination; and "enhanced services" which are locally commissioned via a number of different routes and by different commissioners, including

local authorities (LAs), NHS England's Regions (local NHS teams) and Clinical Commissioning Groups (CCGs)[1] (PSNC, 2018a).

1.2.1.2 General Practitioners and General Practice

In the UK, each member of the public can be registered at a local general practice where they will have an assigned GP. There are 37,043 fully qualified GPs (excluding training GPs) in England, equating to 27,659 WTE GPs (Primary Care Workforce Team, 2021). GPs often have a more holistic view of the patients than community pharmacists because they consider physical, psychological, and social aspects as part of the care they provide (NHS HEE, 2014). They can screen, diagnose, and manage common health conditions. Furthermore, GPs can refer to other medical specialties when deemed appropriate, acting as the gatekeepers of secondary/tertiary care.

The most common contract between general practices and the NHS is the nationally agreed General Medical Services (GMS) contract. This covers essential services (management of patients with acute, chronic and terminal illness), additional services (the practice can opt out if preferred), enhanced and community-based services which are agreed based on local needs, and commissioned by NHS England or CCGs[1] respectively (PSNC, 2020).

Another aspect of the GMS contract is the Quality and Outcomes Framework (QOF), which aims to increase quality of care provided by financially rewarding general practices that achieve certain clinical, public health, quality and productivity, and patient experience targets. This voluntary incentive scheme includes specific indicators, for which practices provide data to showcase (e.g. through audits) "good practice" and good provision of care; as a result, they receive financial rewards (NHS England et al., 2016a; NHS Employers, 2018). Other types of contracts through which general practices offer services are the Personal Medical Services, which is agreed at a local level and is used by almost one third of practices, and the Alternative Provider Medical Services contract, which can also be used for service provision by other organisations such as not-for-profit organisations (PSNC, 2020).

[1] Clinical Commissioning Groups (CCGs), which have replaced Primary Care Organisations, are responsible for commissioning NHS services in localities according to their population needs. All general practices belong to a CCG, which gives its GPs and other primary care health professionals the opportunity to make decisions on budget spending and service provision in their area.(NHS England, 2020)

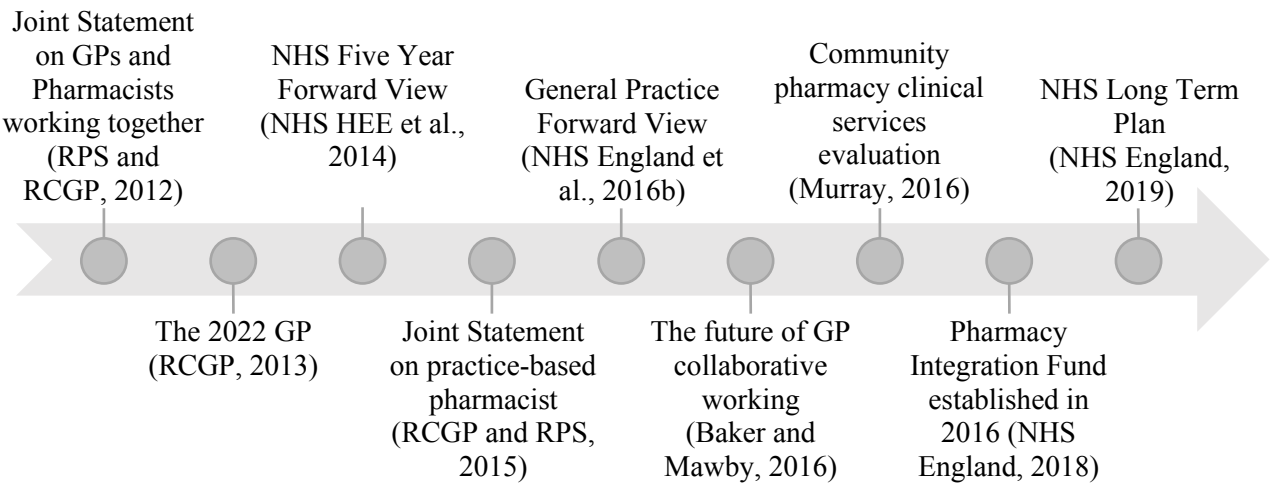
Various pressures on the NHS necessitate improving its operations. These include the increasingly ageing population (ONS, 2018) in combination with financial and workforce pressures (Baird et al., 2016). Workforce shortages have been problematic in various clinical specialities, especially GPs who are the main primary healthcare providers in the UK (Baird et al., 2016; NHS Digital and NHS England, 2018).

1.2.2 Policy context within primary care

Collaborative working between community pharmacists and GPs has been encouraged by public, government, and professional bodies since the early 2010s. The NHS Constitution for England stated as one of its core values "Working together for patients" (Department of Health & Social Care, 2015). Pharmacists are being increasingly embedded in wider primary care and more specifically in general practices, through the Pharmacy Integration Fund (PhIF), with a recent evaluation of this pilot demonstrating the value of this work (Mann et al., 2018; NHS England, 2018). However, such integration could pose risks for the pharmacy workforce. This relocation of pharmacists towards general practice could shift the workforce away from existing sectors (e.g. community and hospital pharmacy). Therefore, evidence would be required to inform the ideal involvement of pharmacists working with GPs.

To put this into perspective, it would be useful to examine the sequence of policies published by several organisations over the last decade aimed at improving primary care service provision through better integration of providers (Figure 3). These policies have created an opportunity to improve the interprofessional relationship between general practice and pharmacy by utilising community pharmacists' key position in the community and their skillset through close collaboration with GPs. This has been previously supported by professional bodies of both pharmacists and GPs, the Royal Pharmaceutical Society (RPS) and the Royal College of General Practitioners (RCGP) respectively. Their joint statement (2012) highlighted the importance and possibilities of community pharmacists and GPs working collaboratively in order to improve patient care. Furthermore, the RCGP supported the inclusion of community pharmacists in the general practice team within their vision of "The 2022 GP" (2013).

Figure 3: Timeline of policy documents supporting collaborative working between community pharmacists and GPs.



The NHS Five Year Forward View brought together different organisations to set a shared strategic vision of the NHS (NHS HEE et al., 2014). This aimed to improve services according to population needs through new models of care, which involved exploring service delivery and management of available funding. Increasing multidisciplinary work and better patient access to the appropriate service at the right time were important steps for the future of the NHS. This strategic document emphasised the importance of pharmacists within two care models: the "Multispecialty Community Providers (MCPs)" care model, where general practices could work closer with pharmacists to deliver care to their patients within the community, and the "Urgent and emergency care networks" model, in which community pharmacists could be involved (NHS HEE et al., 2014).

This encouragement for GP-pharmacist collaborative working was also supported in the General Practice Forward View (GPFV), which discussed detailed steps taken by NHS England, the RCGP and NHS Health Education England (HEE), with funding from NHS England and CCGs, to help practices struggling with workforce and workload pressures (2016b). The GPFV outlined the potential of employing additional non-physician healthcare professionals (HCPs) to alleviate pressures, such as integrating pharmacists within general practices to deliver services.

The role of general practice-based pharmacists, which was mentioned in the GPFV (NHS England et al., 2016b) was facilitated through the PhIF (NHS England, 2018). The purpose of this role was to manage and optimise medicine regimes in specific patient

groups (such as those with long-term conditions, e.g. diabetes, asthma) to reduce GPs' workload (RCGP and RPS, 2015; Baker and Mawby, 2016). Practice-based pharmacists also played a role in achieving targets such as within QOF (Section 1.2.1, p. 16) through clinical audits and other medicines and formulary-related activities (NHS Employers et al., 2010; RPS, 2014).

In response to the Five Year Forward View and the GPFV's proposed new models of care, an independent review was conducted to evaluate community pharmacy clinical services (Murray, 2016). Due to existing pressures on other NHS services and organisations, more effective use of existing resources (i.e. community pharmacists and pharmacy technicians) could improve patient care delivery according to the changing population needs. However, this required better integration of community pharmacy with general practices, amongst other steps, to be able to allow community pharmacists and their teams to deliver care according to the vision of the NHS.

More recently, the NHS Long Term Plan (NHS, 2019) and the accompanying five-year framework for GP contract reform to implement it (NHS England and BMA GPC, 2019) emphasised the importance of incorporating primary and community care[2], such as by utilising the existing position and skillset of community pharmacists in engaging with patients. This led to the establishment of GP-led Primary Care Networks (PCNs) with their funding being managed by the local CCG. All general practices had to become part of a PCN by June 2019 and their purpose was to improve communication and coordination of primary and social care services within the community. Funding for pharmacists within PCNs has replaced the "Clinical Pharmacists in General Practice Scheme" (which was triggered by the GPFV in 2016), with community pharmacists also being integrated within these networks.

Pressure on the NHS in England, more specifically on general practice and emergency services, has been increasing (Baird et al., 2016; NHS Digital and NHS England, 2018). In addition to pressures on general practice, funding for community pharmacies has been reduced (PSNC, 2018b). However, their integration within primary care, which was enabled by the NHS Long Term Plan (2019), could allow additional service provision at

[2] "Community care" comprises an extensive list of services commonly provided at the patient's home, community clinics, centres and/or schools; as such, it does not include services delivered by general practices, community pharmacies, dentists' and optometrists', which are referred to as "primacy care" (Charles, 2019)

pharmacies through PCN funding. This could prove valuable as services would be tailored to the local population needs. As such, implementation of these policy points could help address some of the challenges that the NHS is currently facing.

1.3 Conceptual models of collaborative working

Several conceptual models have been developed to represent collaboration between community pharmacists and (primary or secondary care) physicians. Seven of them have been discussed below to give an overview of extant literature most relevant to this research (McDonough and Doucette, 2001; Dey et al., 2011; Bradley et al., 2012; Van et al., 2012; Van et al., 2013; Bardet et al., 2015; Rathbone et al., 2016). These models provide insights on important characteristics of such collaborative working and success determinants based on factors related to the relationship's maturity. This refers to the influence of time, i.e. the period that the collaborators have known or have worked with each other, on the richness of their collaborative relationship and their behaviours (Autry and Golicic, 2010).

McDonough and Doucette (2001) produced the Collaborative Working Relationship (CWR) conceptual model, which was later revised (rCWR) by Dey et al. (2011). Both models emphasised the evolution of the physician-pharmacist relationship, which advances over time through stages. These stages progressed from professional awareness and recognition of each other to a committed collaboration. This was based on characteristics of the collaborators, the context and the interaction. The strength of these models was that there were distinct levels indicating the maturity of the relationship. However, McDonough and Doucette's work focuses on physician-pharmacist collaborative working rather than specifically on GPs and community pharmacists (2001).

Bradley et al. (2012) published a three-stage conceptual model on community pharmacists' "advanced services", providing care in collaboration with GPs. This captured additional factors that lead to relationship development, which provided input directly relevant to this research, as it specifically focused on community pharmacist-GP collaborative working. However, its applicability was limited to the services of the primary studies on which it was based. Those studies' services were part of the pharmacy

contractual framework at the time and as such were not necessarily based on the collaborative relationship between GPs and community pharmacists.

Although the above conceptual models captured the gradual stages and categorisation of collaborative relationships, Van et al. (2012; 2013) investigated how community pharmacists and GPs' attitudes towards working with each other affect their collaborative relationship. Their research revealed multiple environmental (e.g. community pharmacist's proximity to the general practice), interactional (e.g. mutual respect) and practitioner-related (e.g. expectations of the community pharmacist) aspects as being relevant when considering forming collaborations. These studies were fundamental in proposing success determinants for collaborative working between community pharmacists and GPs. As such, further insight on collaborative models in practice and their operation would be beneficial.

A systematic literature review of theoretical pharmacist-physician models and their determinants synthesised the above findings (in addition to other relevant evidence) into a "meta-model", which highlighted the complexity of the community pharmacist-GP relationship and the multiple factors that influence how it can be nurtured (Bardet et al., 2015). Another example of a conceptual model was specifically focused on improving patients' adherence to taking medicines as prescribed (Rathbone et al., 2016); this reiterated previously reported key aspects (Bardet et al., 2015), which contribute to successful collaborations. Similar to previous conceptual models, their common limitation was the theoretical aspect of their recommendations – i.e. characteristics that play an important role in having a collaborative working relationship.

In summary, the seven conceptual models described above were used to inform the areas of interest within the context of day-to-day practice when designing this research. They also highlighted gaps where further evidence is required in the tighter context of collaborative working between community pharmacists and GPs. It has been apparent that previous research has identified important factors leading to GP-community pharmacist collaborative relationships. However, there has been lack of how these could operationally work in practice, especially within English primary care. Therefore, the decision was taken to draw on OSCM to gain a deeper understanding on the organisation of service provision within primary care and on the (collaborative) relationship between community pharmacists and GPs. The next section presents the principles from the field

of OSCM that were applied in combination with existing conceptual models in this context.

1.4 Theoretical framing: Operations and Supply Chain Management

This research project drew heavily on perspectives found with the field of OSCM, with a particular consideration of the process perspective and buyer-supplier relationships. Operations Management (OM) has a strategic role at the process, operations, and supply chain level of every business, in this case, the NHS (Slack and Brandon-Jones, 2021). Applying such an approach within the context of collaborative working between community pharmacists and GPs in English primary care could provide insights on primary care operations. For example, "decoupling", i.e. breaking down processes and teams to undertake specific activities, has been previously described as a way to increase productivity (Chase and Tansik, 1983; Metters and Vargas, 2000; Broekhuis et al., 2009; Wikner et al., 2017). Here, adopting OM and OSCM principles could indicate how GP-community pharmacist collaborations can impact primary care services' operation and improvement, while considering NHS pressures, GP workforce shortages, and reduced community pharmacy funding.

One novel aspect of this research project is in the application of OSCM perspectives to a healthcare context that has traditionally received limited attention. Extant empirical OSCM healthcare research typically focuses on hospital care organisation and provision (Harvey, 1990; Tucker, 2004; Massey and Williams, 2006; Kuntz et al., 2014; Radnor et al., 2016; Wikner et al., 2017). As such, this study is a rare empirical application to the *primary healthcare* setting. Findings also contribute to the professional services literature (Harvey et al., 2016), especially where the supply chain requires cooperation and when there are competing interests during unpredictable demand. To put this into perspective, the following section illustrates the wider context of collaborations between community pharmacists and GPs in society and how such innovative practice becomes adopted.

1.4.1 Theoretical framework

Due to the research context's nature (healthcare services provided within the NHS), the theoretical framework used to interpret the findings was that of exploring innovation and its diffusion through micro, meso and macro dimension levels. This was based on Vargo and colleagues' work on exploring innovation and its diffusion (spread) through a service-

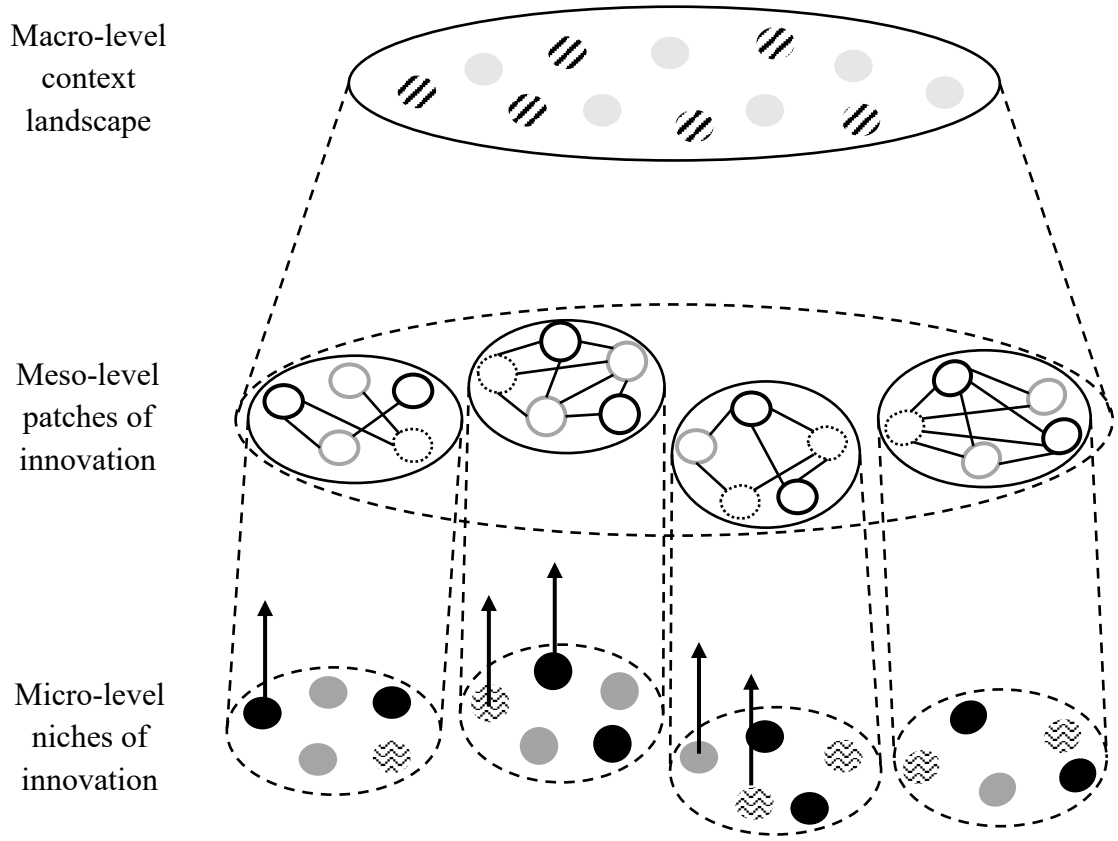
ecosystem and institutional lens (2015; 2016; 2020). This was chosen due to the institutional nature of healthcare services in England (i.e. because they are provided by the NHS). The framework allowed examination of GPs and community pharmacists' dyadic collaborative working relationship, factors affecting it and how such collaborative innovations might spread in society within and across three levels (Figure 4):

i. CPs, GPs and other healthcare staff are micro-level actors who innovate (by collaborating beyond standard practice requirements - "novel niche") and work within
ii. general practice and community pharmacy meso-level organisations ("patches of regimes") that are part of
iii. the NHS organisation umbrella, which in combination with other macro-level governmental, professional and regulatory bodies provide healthcare services to patients and members of the public ("landscape"); this is where feedback on innovative ideas (from micro/meso-levels) could lead to institutionalised changes within the healthcare services industry/market.

Previous studies have called for further research into concurrently exploring diffusion, innovation and actors to better understand the social aspects of how innovation and diffusion occur and their respective outcomes (Akaka and Vargo, 2013; Vargo et al., 2015 and 2020). Rogers' "Diffusion of Innovation" (2003) primarily focused on the communication channels which promote innovation, and classified actors based on their adoption of innovation over time (e.g. innovators, early adopters, laggards). Vargo et al. (2015) supported that actors' integration and operant (and operand[3]) resources' exchange led to the emergence of innovative solutions to cocreate value (for the actors involved and others). Vargo and Lusch (2016), based on Service-Demand logic within service ecosystems, also incorporated the institutionalisation aspect of innovation, where the institution facilitates the creation and adoption of new ideas across its members.

[3] *This refers to resources being "operant" human actors (e.g. community pharmacists, GPs) and "operand" physical "things" (e.g. technological systems) (Hunt, 2004; Madhavaram and Hunt, 2008).*

Figure 4: Levels where innovation occurs and through which it is diffused (adapted from Geels, 2002 and 2004; Vargo et al., 2020).



Legend: Community pharmacists; General practitioners; Other health and allied professionals (e.g. pharmacists in other sectors, physiotherapists, nurses); Patients; Other (e.g. government, professional and regulatory bodies); General practice; Community pharmacy; Other healthcare providing organisations

Following these, Vargo et al. (2020) presented a framework for interpreting how innovation spreads (diffuses), is adopted and improved through a lens that combines service-centred ecosystems and institutional changes across micro, meso and macro-levels of society. This distinguishes that innovation does not only depend on actors being innovators or adopters; it occurs through an iterative feedback process, where resources integrate to cocreate value (Vargo et al., 2015), while institutional changes are developed and implemented within micro-level "novel niches" that travel through to the macro-level societal acceptance (Geels, 2004), which in turn facilitates further adoption of innovative changes across each of the micro, meso and macro-levels (Vargo et al., 2020).

1.4.2 Buyer-Supplier Relationship (BSR)

Despite extant literature evaluating healthcare operations, the exploration of the GP-community pharmacist relationship has mostly been from a healthcare perspective (Section 1.3, p. 22, especially Bardet et al., 2015). Due to the Buyer-Supplier nature of this relationship, and during times with high interest in more integrated primary care services (Section 1.2.2, p. 19), there is a need for further exploration of micro-level dyadic Buyer-Supplier Relationships (BSRs) to understand the impact of collaboration on patient care within this setting. As such, this research focused on how the two most common primary care providers (GPs and community pharmacists) work together in a professional environment, where collaboration is continuously being encouraged by policy makers despite lack of evidence on why this is required and how, operationally, it could be achieved.

Primary care service provision forms part of the NHS Operations and Supply Chain; in the case of community pharmacies and general practices this is through contracts (Section 1.2.1.1, p. 16, and 1.2.1.2, p. 18, respectively). As such, adopting an OSCM perspective (Slack and Brandon-Jones, 2021), was an important aspect of this doctoral research because it could provide input on the buyer-supplier relationship between community pharmacists and GPs. Literature rooted in OSCM provided the theoretical background on collaborative working behaviour and service organisation within the NHS context. In particular, adopting a process perspective that would map service provision of pharmacist-GP collaborations could aid understanding of the supply chain relationships by following the patient journey. Such evidence could provide insights on the impact of the collaborative service on the stakeholders (i.e. GPs, community pharmacists, other staff involved in producing patient services) and the beneficiaries (i.e. patients who receive those services)[4].

Due to the practice-orientated phenomenon being studied (community pharmacist-GP collaboration in primary care), different theoretical lenses could aid its understanding. Principal-Agent Theory (Jensen and Meckling, 1976; Eisenhardt, 1989a) and Institutional Theory (DiMaggio and Powell, 1983), were the key theories that resonated with the

[4] The distinction between stakeholders and beneficiaries was made as they are at different points of service provision; e.g. patients are at the end-point, receiving services, hence referred to as beneficiaries. However, for ease of reading flow, from this point onwards, the term “stakeholders” includes beneficiaries.

phenomenon of this research. The common denominator was GPs and community pharmacists' (buyer-supplier) relationship, as competing contractors for NHS services, albeit having to co-operate within the NHS system ("*the Institution*"). Other relevant theoretical lenses related to GPs and community pharmacists as resources. They included (Extended) Resource-Based Theory (Lewis et al., 2010) and Flow-Resource Efficiency balance (Modig and Åhlström, 2018), both of which focused on the utilisation of available resources, which in this context would be primary care service provision. All of these have been explained below to help understanding of OSCM's role in this doctoral research.

Due to the (perceived) hierarchical position of GPs, their relationship with pharmacists could be considered as that of a buyer (GP) and a supplier (pharmacist). GPs are increasingly involved with how clinical services are commissioned in their area (Radnor et al., 2016), as such suppliers could be nurses, physiotherapists, pharmacists etc. As part of this, GPs may outsource such suppliers for specific duties; for example, practice-based pharmacists aiding the fulfilment of QOF targets (Section 1.2.1.2, p. 18) due to their expertise on medicines. However, such relationships can be complex, sometimes flourishing or competitive, while having the common goal of patient care (Hughes and McCann, 2003).

There is empirical evidence for general-practice-based pharmacists, which demonstrated the added value of pharmacists as suppliers when co-located with a GP (Mann et al., 2018). Although this can help workforce and workload pressures on general practice, there is an imminent risk of pharmacists relocating from traditional sectors (e.g. hospital or community) to undertake this role. As such, there remains the question of identifying the appropriate role for pharmacists based within community pharmacies. For this purpose, this research explores the GP-community pharmacist relationship within the BSR body of knowledge (Whipple et al., Johnston and Kristal, 2008; 2015).

An investigation of the evolving nature of GPs and community pharmacists' relationship as a BSR could yield beneficial insights to improving the patient journey and the organisation of primary care in the NHS. This could include different ways of collaborative working implementation, the different roles of key parties (GP, community pharmacist, patient, and others), and key care outcomes (clinical, financial, process) that may result from different approaches to collaboration.

BSRs in British primary care could also exist between commissioning groups (buyers) and health professionals (suppliers), who deliver NHS services. This could be represented as a buyer-buyer-supplier relationship or even as a buyer-supplier-supplier relationship (NHS-GP-community pharmacist, respectively), whereby the former follows the hierarchical notion discussed earlier in this section and the latter highlights the competition amongst HCPs for service provision.

1.4.2.1 Principal-Agent Theory

Agency theory, which lies within the buyer-supplier body of knowledge, focuses on the conflict between the principal (buyer) and the agent (supplier) when the latter does not fulfil the principal's expectations (Jensen and Meckling, 1976; Eisenhardt, 1989a). Principal-Agent Theory is another way of studying the community pharmacist-GP collaborations. This is due to the upper hierarchical position of GPs (principals) – and doctors in healthcare overall – who delegate tasks to pharmacists (agents) at times of increased workload pressures (Helmstaedter and Staiger, 2002; Hughes and McCann, 2003; Cooper, R. J., Bissell and Wingfield, 2009; Bradley et al., 2018). Evidence exploring the extension of community pharmacists' role has indicated some resistance from GPs globally (Moore et al., 2014; Rieck, 2014; Weissenborn et al., 2017).

There is periodic competition between GPs and community pharmacists, deriving from both being able to provide the same service as different legal entities. This can lead to problems on the intentions and motivations of both GPs and community pharmacists, and the lack of understanding pharmacists' role and capabilities. A highly relevant example within the UK is the flu vaccination service, which can be provided by both professionals and as such during that period there is conflict of interest. Such relationships are complex; in particular, despite sharing a common duty of care towards patients (Hughes and McCann, 2003), the two parties are competing businesses for certain services. As such, aspects of potential goal incongruence can be seen between principals (in this case GPs) and their agents (in this case community pharmacists) within this collaborative arrangement.

1.4.2.2 Institutional Theory

Whilst GPs and community pharmacists have always worked alongside one another within primary care, the more active encouragement for collaboration by policymakers

necessitates a deeper understanding of how they can be integrated appropriately in the provision of patient services (Bardet et al., 2015; Supper et al., 2015). Institutional Theory explains the adoption of changes in practice due to coercive (e.g. policy, regulation), mimetic (following others' way of practice) and normative (natural development) pressures (DiMaggio and Powell, 1983). This relates to the context being studied due to the position of GPs and pharmacists within the NHS and wider healthcare institution. There is substantial coercive pressure on HCPs to deliver well-integrated primary care services, which has encouraged the development of the pharmacists' role toward enhanced clinical practice (Adamcik et al., 1986; Gidman and Cowley, 2013; Bidwell and Thompson, 2015; Bergman et al., 2016; Hattingh et al., 2016; Bradley et al., 2018; Jacobs et al., 2018; Khaira et al., 2020; Nabhani-Gebara et al., 2020).

The phenomenon being studied could have also been affected by mimetic pressures. This could be in the means of primary care becoming better structured following the example of hospital care (secondary/tertiary care) (Royal College of Physicians et al., 2017). Another form of mimetic pressure of community pharmacists adopting new clinical roles within primary care could be due to nurses and other HCPs already collaborating with GPs (i.e. community pharmacists mimicking others) (Bradley et al., 1997; Cooper et al., 2011; Deslandes and Frazer, 2011; Nabhani-Gebara et al., 2020).

1.4.3 Resource-Based Theory

A firm's competitive advantage refers to the factors that make it able to compete with other firms. Resource-Based Theory emphasises the importance of a firm's internal resources in creating competitive advantage (which can also be dependent on external market factors). According to this Theory, such resources have a strategic role since they are scarce, imperfectly mobile, imperfectly imitable, imperfectly substitutable. However, these characteristics are limited to the firm's resources. This led to the notion of Extended Resource-Based Theory, which describes how resources beyond the firm can also contribute to creating competitive advantage (Lewis et al., 2010). Arya and Lin (2007) specifically explored the impact of collaboration networks in not-for-profit organisations through this lens. Their findings indicated that collaboration between the resources of the network can positively impact the organisation's effectiveness; this was due to these resources' characteristics and breadth of services provided.

In the context of this research, these resources refer to GPs, community pharmacists, practice-based pharmacists and other HCPs that deliver NHS services. As such, this doctoral research could investigate how collaborating GPs and community pharmacists' characteristics relate to their role as strategic resources (i.e. exploring their resource-based value in the NHS). Although this is a perspective that would benefit from wider network analysis of NHS service providers, it underpins the potential importance of utilising resources appropriately and collaboratively.

In summary, the theoretical framing of this research stems from Operations and Supply Chain Management. Firstly, identifying "innovative practice" of collaborative working relationships involving community pharmacists and GPs, mapping their operationalisation, and exploring their diffusion across the three levels of society's service ecosystem (micro, meso and macro levels). Secondly, this was accompanied by studying community pharmacist-GP collaborations as Buyer-Supplier Relationships, and more specifically exploring them through the Principal-Agent Theory and Institutional Theory (as they exist within the NHS/healthcare system context). (Extended) Resource-Based Theory played a role in assessing community pharmacists as an available resource in combating pressures within primary care; because this was not the primary focus of this research, this lens was used to a lesser extent.

1.5 Research Strategy

1.5.1 Aims and objectives

It is clear from the aforementioned policies that there is encouragement for collaboration by the NHS, which is supported by pharmacists and GPs' professional bodies (Section 1.2.2). It is also evident that there has been exploration of important relationship aspects within collaborations between physicians and pharmacists (Section 1.3). Although the extant literature provides insights into physician-pharmacist collaborative practice across the globe, empirical research on collaboration between GPs and community pharmacists is limited. As policymakers in the UK are currently promoting HCPs' integration within primary care, especially the utilisation of community pharmacists' position and skillset (NHS, 2019), there is no clear evidence to support how this can be achieved. OSCM literature has extensively explored relationships along the supply chain in the industry; as

such it can offer key insights on collaboration aspects, especially in the context of a healthcare system, here the NHS (Section 1.4).

The aim of this doctoral research was to explore collaborative models between community pharmacists and GPs by adopting OSCM perspectives. The setting for this research is in England due to the commissioning differences in health systems amongst the four British nations. The aim was achieved by:

- Identifying existing collaborative models between GPs and community pharmacists in published literature and in practice.
- Exploring the identified models' characteristics, which includes their drivers for development, purpose, impact on stakeholders (such as GPs, community pharmacists and patients) and, if they have been evaluated, their method of evaluation.
- Deriving recommendations for adopting evidence-based, relevant and appropriate collaborative models between GPs and community pharmacists.

1.5.2 Research questions

To fulfil the above objectives, the following questions guided this doctoral research:

RQ1: What collaborative models involving CPs and GPs currently exist in practice?

RQ2: How do these models impact primary care services?

RQ3: What recommendations can be made to CPs and GPs interested in forming collaborative relationships?

Answers to these research questions could provide the evidence required to illustrate the current, and support the development of future, community pharmacist-GP collaborative models. By applying widely used principles from the Operations and Supply Chain field to understand these collaborations, application of such type of working on a larger scale could in turn relieve pressures on GPs and the NHS. Furthermore, it could raise the profile of community pharmacists and pharmacy as integrated members of the primary care team, with the aim of improving the patient journey with continuity of care.

1.5.3 Methodology

This section describes the methodology followed during the doctoral research and explains the rationale behind the methods chosen to achieve the above aims and objectives. Initially, the philosophical perspective is presented, followed by the respective methodological aspects and research design.

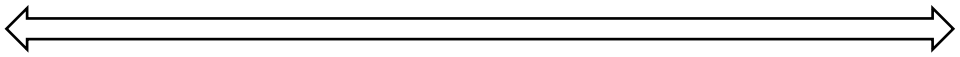
1.5.3.1 Philosophical perspective

The philosophical perspective adopted throughout this thesis was balanced between (physical) Science and Social Science's approaches (due to the nature of the researcher's disciplines, i.e. primarily pharmacy and secondarily management). Regarding ontology, from a purely Science point of view reality is objective and knowable, while from a Social Sciences' perspective it is subjective and not knowable (i.e. due to subjectivity, based on the individual's behaviour and beliefs) (Della Porta and Keating, 2008). As for epistemology, the relationship between researcher and object is separate or not, respectively, and knowledge is causal (i.e. follows natural laws) or impossible to be known (i.e. based on learning from others), respectively. Illustrated by Della Porta and Keating (2008), Geertz's definition of Social Sciences (1973) summarises the above: "not an experimental science in search of laws but an interpretative science in search of meaning".

The above perspectives are the two core ends of the ontological and epistemological spectrum (Figure 5) and, thus, not suitable to the nature of this research. On the contrary, this doctoral scholar sits between the post-positivist and interpretivist philosophical perspectives. This means that while leaning towards the post-positivist's "critical realism" (i.e. social factors can influence knowledge), the aim to understand subjective and contextual knowledge is the guide for identifying the conditions under which certain subjective experiences contribute to the objective reality (Della Porta and Keating, 2008). Here, this relates to conditions that lead specific examples of GPs and community pharmacists' collaborative models to work in practice. In essence, this is the neo-positivists' stance, especially when incorporating methodological aspects with this ontology and epistemology positioning. This is due to the more practical perspective in conducting research, as defined by Della Porta and Keating (2008): "there is more

emphasis on the particular and the local, and on the way in which factors may combine in different circumstances".

Figure 5: Ontological and epistemological spectrum (adapted from Della Porta and Keating, 2008, and O'Gorman and MacIntosh, 2014).



Ontology	**Objective**				**Subjective**
- Reality	Objective and knowable	Objective and imperfectly known		Objective and subjective and knowable to some extent	Subjective and not knowable
Epistemology	**Positivist**	**Post-positivist/ Critical realist**	**Neo-positivist**	**Interpretivist**	**Humanistic**
- Knowledge form	Natural laws (causal)	Probabilistic law/ knowledge develops		Contextual knowledge	Empathetic knowledge
- Scholar-object relationship	Separate; objective knowledge	Knowledge is influenced by the scholar		Understanding subjective knowledge	Not separate; subjective knowledge
- Methodology	Quantitative Deductive	Quantitative; mixed methods; qualitative Deductive; inductive			Qualitative Inductive

1.5.3.2 Research design

Considering the philosophical perspective, a qualitative inductive approach was adopted to achieve the research aim and objectives. There had been exploration of potentially relevant methods, which were ultimately decided upon based on the nature of evidence needed to fill gaps from pre-existing literature. As such, the first empirical project was a systematic literature review to establish through secondary data related research that has already been conducted in the field of collaborations involving community pharmacists and GPs. Findings from this played a key role in determining the design of the second empirical project, as it was deemed valuable to have inter-related stages throughout the PhD.

During initial research design planning, options for the following empirical project(s) were based on mixed methods to elaborate on findings from the systematic review within the context of GP-community pharmacist collaborations in English primary care. However, a more qualitative approach was adopted due to the lack of evidence in this context based on the systematic review. This was decided to gain a deeper understanding of current collaborative practice and to elicit characteristics and success determinants

based on existing collaborative models. Thus, this could aid practitioners in delivering national policy on better primary care services' integration (Section 1.2.2, p. 19). Ethnographic research was considered appropriate to identify current examples in practice (Britten et al., 1995). Standalone ethnography was not appropriate as the research topic involved two populations (community pharmacists and GPs) (Goffman, 1961) and the time required to immerse oneself as a researcher within the observed population deemed this approach impractical for the duration of the PhD degree. Research with ethnographic characteristics (e.g. observations of specific community pharmacists and GPs) was more suitable and as such case studies were conducted (Walters, 2007). Therefore, the second empirical project was case studies, including semi-structured interviews, observations and, where possible, documentary analysis of available documents related to the collaboration, and was completed in two parts:

- Part I: analysis within cases to elicit individual characteristics of each model), and
- Part II: cross-case analysis to identify patterns across cases that could inform future practice recommendations

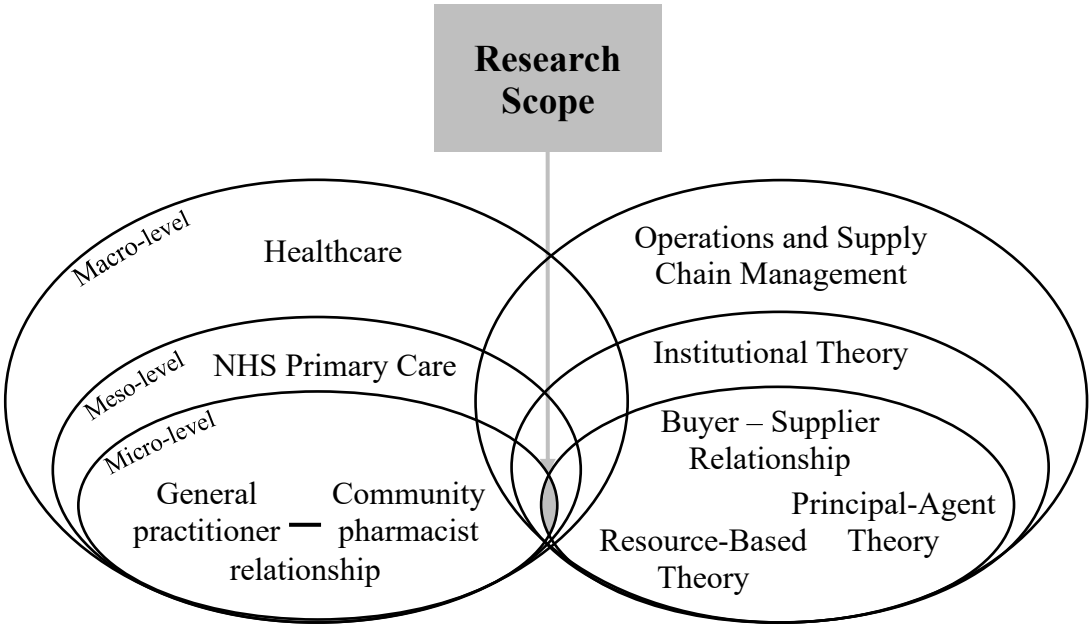
There had been considerations of using quantitative methods following qualitative findings to inform survey(s) or a Discrete Choice Experiment (Tinelli et al., 2010; Porteous et al., 2016), which would test practitioners' preferences towards identified model characteristics in larger samples across England (further information on this is presented in Appendix 2). However, these were eventually excluded as depth of understanding such models and relationship dynamics was deemed more valuable than hypothesis-testing within a larger sample size – especially following findings from the first empirical project.

1.6 Research scope summary

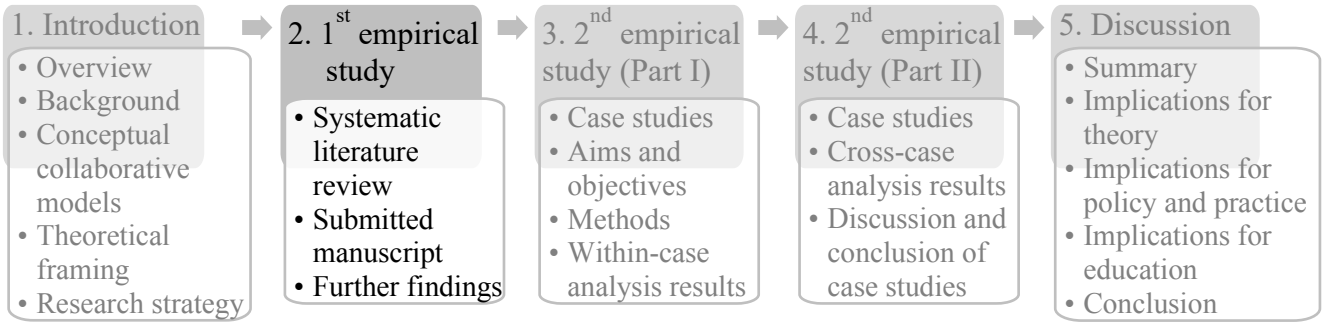
In summary, this doctoral research was set within the healthcare operations and supply chain management field. As explained in the sections above, the phenomenon being studied is GPs and community pharmacists' relationship when working collaboratively. This required exploration of the motivation behind working together (drivers), operational aspects of such collaborative activities (purpose, processes, mechanisms), the evolution process of such relationships, and the forces that impact the stakeholders involved and the collaborative relationship (outcomes, barriers, and facilitators). As such,

the buyer-supplier relationship body of knowledge could contribute keys insights on the GP-community pharmacist relationship, which sits within primary care of the NHS ("the institution"), especially by examining these through the micro, meso and macro levels (Figure 6).

Figure 6: Practical and theoretical scope of doctoral research.



Chapter 2 A worldwide view of collaborative working between community pharmacists and general practitioners: a systematic literature review



This chapter presents the first empirical study, which was a systematic review of the literature. This study aimed to respond to the research questions by establishing existing evidence on the phenomenon being studied (community pharmacist-GP collaborations). Following the completion of this, a manuscript was prepared for submission to an academic journal. As such, this chapter is formed by (a) the submitted journal article, (b) additional findings, which were outside of the manuscript's remit, and (c) a brief summary.

2.1 Submitted manuscript

Statement of Authorship

This declaration concerns the article entitled:									
Models of collaboration between community pharmacists and general practitioners: a systematic review									
Publication status (tick one)									
Draft manuscript		**Submitted**	✓	**In review**		**Accepted**		**Published**	
Publication details (reference)	Liaskou, M., Brandon-Jones, A., Rogers P. J., Alhusein, N., Watson, M. C. (in prep.). Models of collaboration between community pharmacists and general practitioners: a systematic review.								
Copyright status (tick the appropriate statement)									
I hold the copyright for this material	X	Copyright is retained by the publisher, but I have been given permission to replicate the material here							
Candidate's contribution to the paper (provide details, and also indicate as a percentage)	The candidate contributed to / considerably contributed to / predominantly executed the… Formulation of ideas: Marianna Liaskou considerably contributed to the formulation of ideas based on the original ideas of the supervisory team (70%). Design of methodology: Marianna Liaskou predominantly executed the methodological design under the guidance of the supervisory team (90%). Experimental work: Execution of the empirical work was predominantly executed by Marianna Liaskou (90%). This included the conduct of the study, data collection and analysis. For the purpose of methodological rigor, data extraction in-duplicate was conducted, which had to be completed by other team members (hence why the candidate was responsible for 90% of the experimental work). Presentation of data in journal format: Marianna Liaskou predominantly executed the presentation of the data in journal format and academic conferences under the guidance of the supervisory team (80%).								
Statement from Candidate	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature.								
Signed	[redacted]			**Date**	02/02/2022				

Title: Models of collaboration between community pharmacists and general practitioners: a systematic review

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Abstract

Background

There is limited empirical evidence of optimal conditions for collaborative working between general practitioners (GPs) and community pharmacists. This systematic review aimed to identify, describe and evaluate existing GP-community pharmacist collaborative models, in relation to clinical, process and financial outcomes.

Method

Standard systematic review methods were used. Electronic databases were searched (01/01/2009-15/03/2018) using a search strategy based on three concepts (*community pharmacists, general practitioners* and *collaboration*). No country or language restrictions were applied. Full primary empirical research papers were included. Findings were analysed by adopting a process perspective of service provision, and buyer-supplier relationship dynamics (GPs-community pharmacists respectively), grounded in Operations and Supply Chain Management.

Results

Of the 1955 records screened, 43 articles (37 studies) were included in a narrative synthesis. A typology of GP-community pharmacist collaboration was based on the pharmacist's location and the collaboration's purpose. Most included studies explored models where community pharmacists and GPs jointly planned patient care, and patient-facing services delivered within pharmacies; other studies focused on pharmacists/pharmacy co-location with general practice, interprofessional education to improve prescribing behaviour and wider implementation of models. Whilst some models were based on pre-existing collaborations, it was not possible to determine the sustainability of all included models (beyond the presented research studies).

Conclusion

This is the first international review to systematically examine established GP-community pharmacist collaborative models by adopting Operations and Supply Chain Management perspectives. Despite these models' complexity of processes and buyer-supplier relationships, perceived barriers could be overcome.

Keywords: General Practitioners; Pharmacists; Community Pharmacy Services; Cooperative Behaviour; Operations and Supply Chain Management

Introduction

The British National Health Service (NHS) is currently under increased financial pressure and faces shortages of general practitioners (GPs)[1]. These pressures amongst a general movement from policymakers' perspective have led to increased integration and collaborative working between healthcare professionals (HCPs) within the NHS throughout the patient's journey. These factors have created innovative solutions including greater collaborative working with pharmacists[1,2]. Most attention has focussed upon pharmacists based within general practices[3] with evidence to suggest their co-location derives added value[4]. There has been less exploration of the extent and nature of collaborative working between community pharmacists and GPs.

Professional and governing bodies support the greater use of community pharmacists, including enhanced collaboration with colleagues in general practice[2,3,5,6]. Reimbursement and contractual arrangements, however, can adversely impact collaboration by creating competition between community pharmacies and general practices. For example, the NHS contracts general practices and community pharmacies to offer flu vaccinations; this type of relationship resembles that of a buyer (NHS) that has different suppliers (GPs and pharmacists) to deliver patient care. The GP-pharmacist relationship is a dyadic buyer-supplier relationship, where GPs (buyers), who may be considered to be in a higher hierarchical position, delegate tasks to pharmacists (suppliers) at times of need[7]. In both cases, there are also aspects of competition between the two parties given the fact that such services can be (and are) delivered directly by GPs. Despite pharmacists and GPs working alongside each other within the primary care setting, a deeper understanding is required of how their roles can be efficiently integrated to deliver patient care.

Operations and Supply Chain Management is a field of practice and research that focuses on improving processes (within and across organisations) to optimise service delivery, with extensive literature on collaborative working behaviour and relationship dynamics[8]. Whilst this field has its empirical roots in the private sector, often

manufacturing-based settings, the last twenty years have seen its application to many other contexts, including healthcare operations[9-12].

Background

A recent evaluation of the first pilot of general-practice-based pharmacists demonstrated the added value of pharmacists when co-located with a GP[5]. Although this can help workforce and workload pressures on general practice, there is an imminent risk of pharmacists' relocating from traditional sectors (e.g. hospital or community) to undertake this role.

Previously published literature has explored collaborative working between pharmacists and physicians; this led to the development of conceptual models that highlighted determinants for successful collaboration[13-19]. These conceptual collaborative models were used in this study to inform areas of importance, as they explained the meaning and success determinants of such collaborations based on factors related to the relationship's maturity[13,14] and the actors' behaviours[15-19] (Supplementary Table 1).

This systematic review addressed the research question:

> *What are the existing collaboration models involving community pharmacists and GPs (including their drivers, purpose, impact on stakeholders and evaluation process)?*

Method

Electronic databases (Embase, MEDLINE, CINAHL Complete, Web of Science Core Collection, Business Source Complete and ABI/INFORM Global) were searched (on 14–15/03/2018) and reference lists of included studies screened for relevant references. No language or date restrictions were applied on the searches. The search strategy was based on three key concepts: *community pharmacists*, *general practitioners* and *collaboration* (Supplementary Box 1). The selection criteria included collaborative working involving physicians and pharmacists, who primarily worked in general practice and community pharmacies respectively. Full publications of primary studies were included.

Following the removal of duplicates and due to the large number of publications identified, a date limit was applied. As such, only publications from 2009 onwards were screened. The lead researcher (ML) screened titles and abstracts and assessed full text articles for inclusion/exclusion[20]. Corresponding authors were contacted where the

participation of community pharmacists and GPs (i.e. not specialists) was not clear. Data were extracted systematically according to Participants, Interventions, Comparisons, Outcomes and Study design (PICOS)[21] and success determinants identified from the conceptual models[13-19] according to a pre-defined pro-forma. Due to the heterogeneous nature of the studies, following data extraction a narrative synthesis approach was adopted. This involved process mapping of interventions (i.e. breaking down each study's collaboration) to distinguish common key steps of collaboration models and each step's collaborators. The purpose of the collaboration in combination with the identified key steps led to categorisation of the collaborative models.

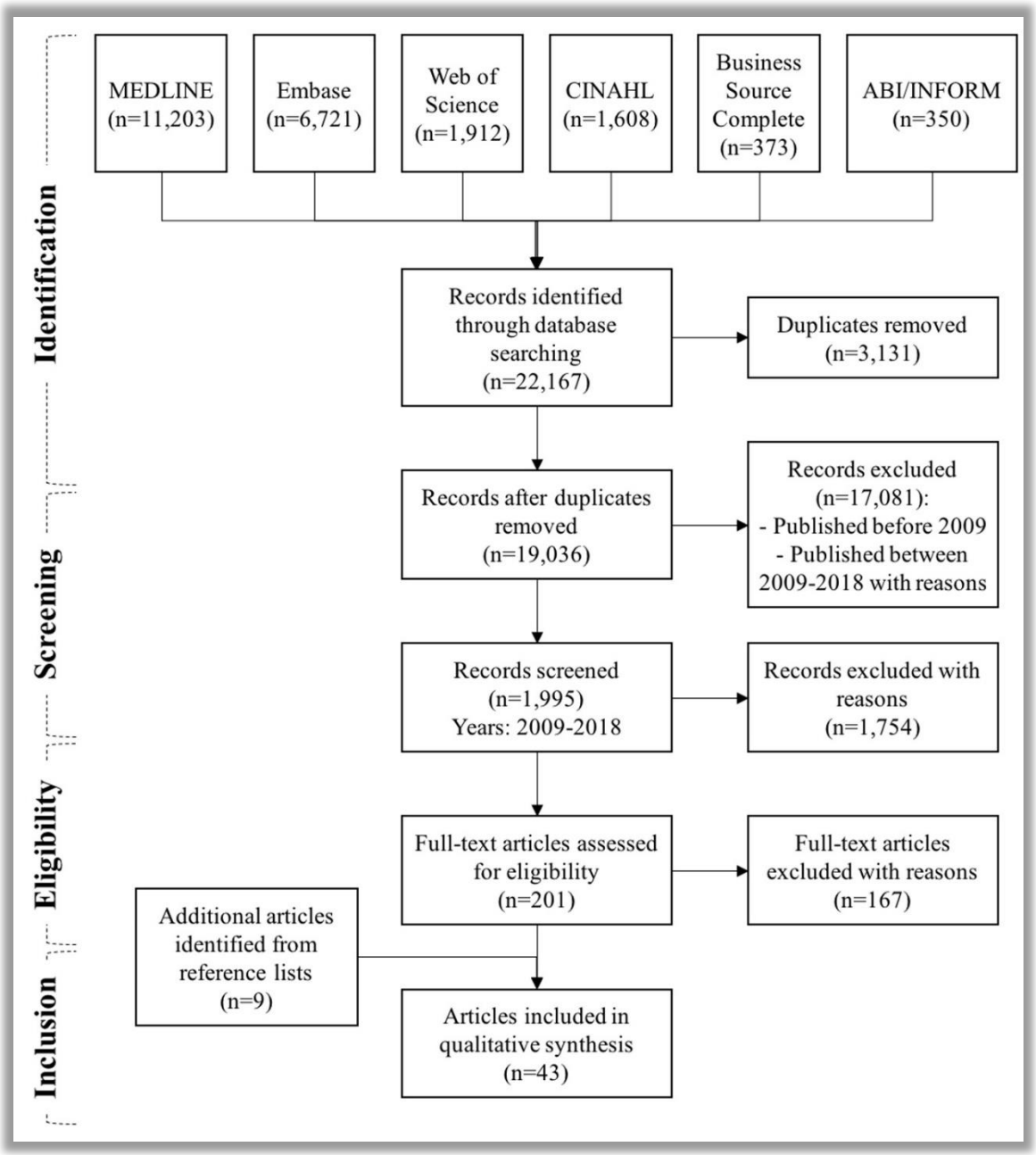
Duplicate independent title-abstract screening (ML, AM), full-text assessment (ML, ABJ, MW) and data extraction (ML, NA, MB) was conducted to ensure quality and validity of the data collection process. Risk of bias was assessed using validated tools where possible such as Cochrane's risk-of-bias tool for randomised trials (RoB 2)[22], otherwise the study was assessed and presented using a narrative summary. The review team discussed and resolved discrepancies. Due to the heterogenous nature of assessing risk of bias, these results are not presented here.

This systematic review complies with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement[21] and followed a pre-defined protocol[20].

Results

Electronic database searches yielded 19,036 articles. Following screening and full-text assessment, 43 articles, reporting 37 studies, were included in the analysis (Figure 1). The included studies were undertaken in 12 countries: Netherlands (n=10), Australia (n=5), Canada (n=4), United States of America (USA) (n=4), Germany (n=3), Switzerland (n=3), New Zealand (n=2), United Kingdom (UK) (n=2), Denmark (n=1), Finland (n=1), Hong Kong (n=1) and Slovakia (n=1) Detailed information about the included studies is presented in Supplementary Table 2.

Figure 1: Adapted PRISMA[21] flowchart.



Purpose of included studies

Most studies evaluated a collaborative service (n=25)[23-51]; nine specifically evaluated the influence of a collaborative model's characteristics on its performance[52-62], two explored the collaborative model's characteristics[63,64] and one identified pharmacists collaborating with GPs[65]. Ten studies investigated established collaborative working relationships[40-43,47,49,50,60,62,65].

Collaborators involved

In the majority of studies (n=27), members of the research teams played a key role as initiators or coordinators of the collaborative service[23-38,40-46,48,51-54,56-58,61,63]. Some studies also involved other HCPs such as nurses and pharmacists/physicians from other sectors (e.g. hospital pharmacists), specially trained personnel and volunteers.

Although all of the included studies involved community pharmacists and GPs, nine also included non-GP physicians[48,62] and/or pharmacists from other pharmacy sectors[47,49-51,61,64,65]. These nine studies were included for the purpose of eliciting model characteristics and not their performance due to the lack of sub-group analysis of the part-time community pharmacists/GPs' effect.

Collaboration evaluation and impact

The studies measured the performance of the models that they explored in terms of clinical patient outcomes (e.g. blood pressure, drug-related problems)[23-25,29-31,33-37,39-43,45,46,52,53,55,56,58-60], process[24,27,28,30-33,35,39,40,42,44,54-57,59,60,63] and financial[26,32,36,37,46,59] outcomes. Due to heterogeneity of presented data and study designs, it was not possible to determine the effectiveness of having a community pharmacist as a team member.

Collaborative models identified

Taking a process perspective on the collaborative models reviewed, a 'collaborative sequence' of seven distinct steps was developed (Figure 2). Not all models included every step although this sequence indicated each collaborator's role and level of involvement, and identified areas of improvement. Building on this idea, included studies were categorised in the following five groups.

Planning patient care

Most studies described models which focused on collaboratively producing care plans on the patient's therapy[23-34,52]. Community pharmacists typically collected and reviewed patient data, made recommendations to GPs, and conducted patient follow-ups. GPs were primarily involved in producing a joint care plan with community pharmacists, sometimes also involving patients[24,30,34]. In one study, GPs evaluated the community pharmacists' report and shared the evaluation with them[28]. Other collaborators included, trained practice assistants and nurses, who collected data from patients' homes[31,32,52], and study pharmacists, who reviewed CPs' collected data[23,27].

Figure 2: The 'collaborative sequence' of seven steps which form the collaborative working process (based on collaborative models identified in the systematic review) and collaborators' roles in each step.

	Service planning →	Data collection →	Data review →	Recommendations (care planning) →	Action (service delivery) →	Feedback on process (evaluation) and/or	Feedback of data to other providers
Community pharmacists	Inviting participants (GPs and/or patients)	Collecting patient data (records and/or interviews)	Reviewing patient data for drug- and/or cost-related issues (with/without help from mentor pharmacist)	- Discussing and producing a care plan with other healthcare professionals (with/without patient involvement) - Making recommendations to GPs on patient care	- Delivering patient-facing service (including intervention and follow-up) - Accessing GP-system to action patient medication requests - Supporting GP team and other collaborators		Sharing patient data with GPs (post-intervention)
General practitioners	Delivering patient consultations (as per usual care)		Reviewing patient data (collected by CP) or CPs' report/ recommendations	Making recommendations for patient care	Delivering mutually agreed patient-facing service (including intervention and follow-up)	***Sometimes*** providing feedback to CPs' report/ recommendations	Receiving patient data (pre- and post-intervention)
Joint steps	CPs-GPs' meeting (with/ without others) to jointly agree on service details			CPs-GPs' meeting (with/without others): GPs share experiences and receive training from CPs on improving prescribing		CPs-GPs' meeting (with/without others) to feedback and jointly agree on next steps	
Other collaborators	- Research team being "collaboration primers" (introducing and training CPs and GPs) - Contractors coordinating service or negotiating funding between insurers and service providers	Trained nurses/ practice assistants collecting patient data (interviews)	Study pharmacists reviewing patient data (collected by CPs)		- Nurses supporting other collaborators - Volunteers delivering patient-facing service (post-training)	Study evaluation by research team (including final patient follow-up)	

Abbreviations: CP = community pharmacist; GP = general practitioner

Pharmacy-based patient services

Six studies evaluated models where a patient-facing collaborative service was provided in the pharmacy[35,36,53-56,63]. GPs were involved at an early stage to establish transfer of care to community pharmacists, who delivered the mutually agreed service. This entailed a higher level of interaction between community pharmacists and patients. In two studies[35,56], patients were referred to them for education about their pharmacological treatment. These studies resembled typical cooperative buyer-supplier relationships, where a specific service was delegated to community pharmacists according to agreed specifications.

Co-location with general practice

There were also studies, where the community pharmacist or their pharmacy was co-located within the collaborating practice[37-39,57,58]. Part-time community pharmacists were based in general practice(s) between eight and twenty hours per week[37,38,57,58]. They underwent induction within the practice, provided administrative and educational support to staff and patient-facing services (e.g. overall medicines management patient consultations[57], or brief intervention[58]). Their frequent contact with members of practice staff was perceived to improve the collaborative relationship over time.

In one study, where the pharmacy was adjacent to the surgery[39], the community pharmacist had dedicated time to action patients' repeat medicine requests on the practice's prescribing system by reviewing the patient's pharmacy and medical record before approving the repeat, issuing a one-time prescription or forwarding the request to the GP.

Improving prescribing

Five studies focused on GPs and community pharmacists working together to improve prescribing through interprofessional education[40-43,59]. Based on pre-existing interprofessional networks, GPs and community pharmacists within localities held regular meetings (e.g. quarterly). These tended to focus on medicines optimisation within a clinical area (e.g. respiratory[43]). A key characteristic was the presence of bidirectional feedback discussion and training, which most other models lacked.

Wider implementation

Two studies described and evaluated their models' wider implementation[44-46,60]. They both involved multiple collaborators. In one model, the government provided centralised

funding and recruited local coordinators to organise the service (cardiovascular health awareness), which was delivered by volunteers in community pharmacies[44-46]. In the second model, a "care group" negotiated funding between insurance companies (funding source) and HCPs within each "care chain" (i.e. the care pathway delivered by HCPs to patients with a specific clinical group of conditions, e.g. diabetes)[60]. These studies were characterised by the macro-level details described (i.e. development and implementation) and multiple collaborators involved, resembling multitiered interorganisational buyer-supplier relationships.

Relevance to conceptual models

Characteristics of the included studies' models reflected determinants found within published conceptual collaborative models[13-19]. The complexity of the review models' characteristics made it difficult to determine how each characteristic contributed to the model's success despite the fact that there were common elements. Common success determinants included geographical proximity between GP(s) and community pharmacist(s), clarity on purpose of the collaboration and responsibilities, communication method, type and purpose (Table 1).

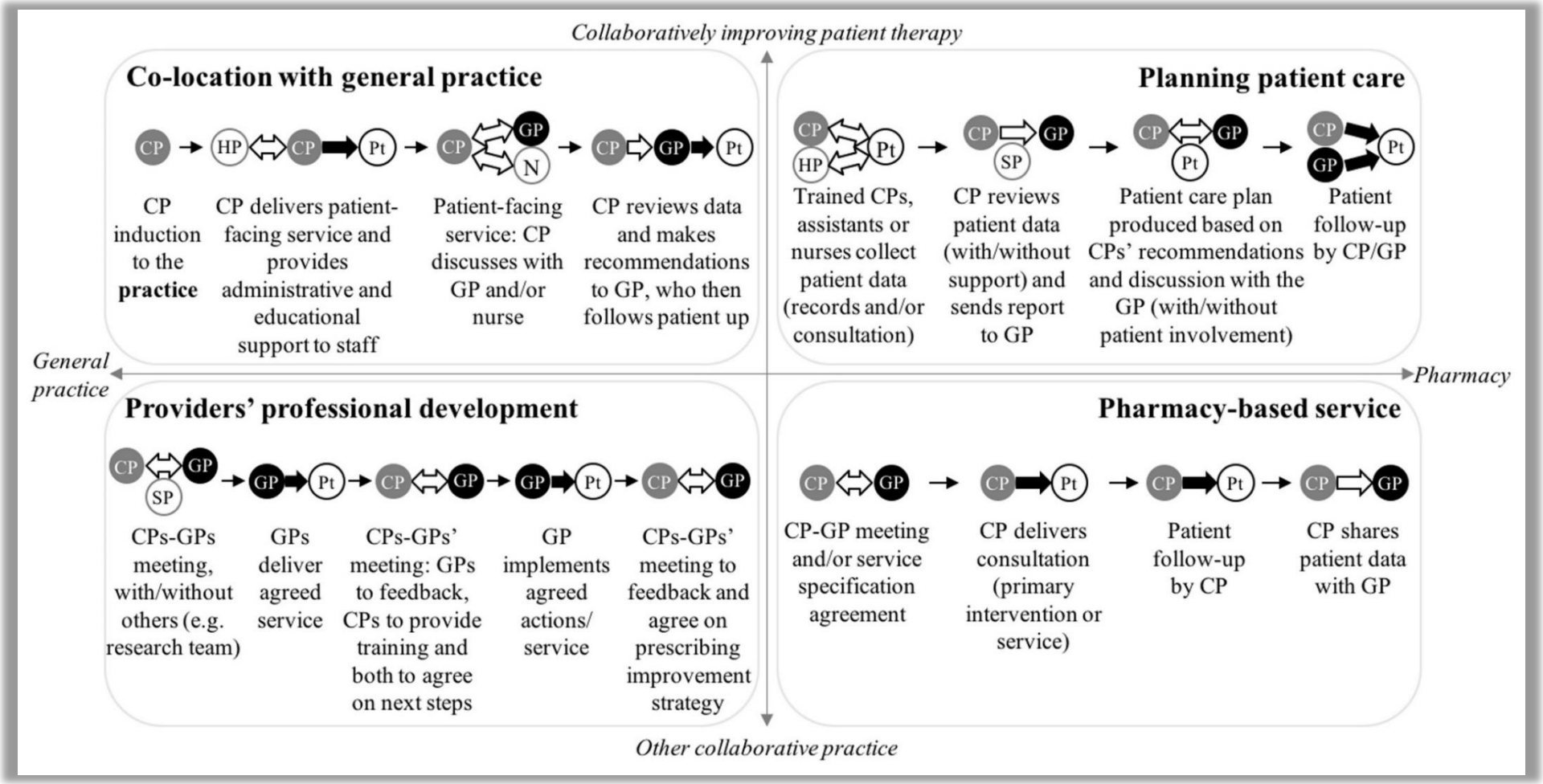
Table 1: Published conceptual models' success determinants identified in studies included in the systematic review.

Success determinant	**Systematic review studies (n=37)**
Pharmacist's location	Based in collaborating pharmacy (n=19)
Location of collaborative service	Service delivered in collaborating pharmacy (n=17), patient's home (n=11) or general practice (n=7)
Purpose of collaboration	Most often related to medicines (e.g. reviews, care plans, supporting patients with treatment) and/or educational and administrative support for other health providers
Collaborators' responsibilities	Clearly presented in most studies (n=23)
Communication	Method: mostly in writing (including shared patient records, reports, patient lists and prescriptions). Type: bidirectional (community pharmacist ⇔ GP) although in some cases this was constituted by multiple unidirectional instances (community pharmacist ⇒ GP, or GP ⇒ community pharmacist) at different time points throughout the study

GP-community pharmacist collaborative working typology

A typology of collaborative practice was developed based on the models of the included studies (Figure 3). This typology lies within two dimensions relating to the community pharmacists' role in the collaboration (y axis: improving patients' therapy by reviewing data and making recommendations, or involved in other collaborative practice), and the location where they delivered patient-facing services (x axis: general practice or community pharmacy).

Figure 3: Typology of collaborations involving general practitioners and community pharmacists based on models identified in the systematic review studies.



Abbreviations: ●CP = community pharmacist; ●GP = general practitioner; **O** Pt = patient; O Others (*HP*: health providers, e.g. specially trained practice staff, other healthcare professionals; *SP* = study pharmacist; *N*: nurse); ⇔⇨ direction of information transfer; → process flow; ➡ service/care delivery

Discussion

Summary

A typology of four forms of collaborative working between GP(s) and community pharmacist(s) was developed from the 37 studies included in this review. Despite their varied characteristics and performance levels, there are aspects which could be applied to relevant settings. The novelty of this research lies within drawing knowledge from the field of Operations and Supply Chain Management to explore the complex processes and professional relationships within a collaborative environment. Taking a process perspective in the analysis of the models allowed better understanding of the steps that contribute to producing primary healthcare patient services, how these are organised, and the motivations behind them.

Strengths and Limitations

To our knowledge, this is the first international systematic review of GP-community pharmacist collaborations in practice. Multi-stage screening minimised bias and ensured appropriate papers were included. Due to considerable heterogeneity of the data provided within each study, meta-analysis was not undertaken. Risk of bias assessment did not lead to exclusion of studies; thus, findings should be interpreted with caution. The synthesis of qualitative data, however, provided a deeper understanding of collaborative models.

Comparison with existing research

The review's models were found to have similar aspects to the conceptual models identified previously[13-19]. This included geographical proximity to the practice, which can facilitate certain types of collaborations (e.g. access to the practice's software to reduce workload)[39], having a clear purpose for collaborating and a specific role. Communication, a recurring theme within buyer-suppler studies, has been a key aspect of successful collaborative working in this primary care context, and was specified in the majority of the studies.

Previous research has explored the role of practice-based pharmacists and barriers and facilitators involved in such collaborations[4,66]. Recent research has explored stakeholders' perceptions of community pharmacy services[67] and community pharmacists' integration within the primary care team[68]. Common themes identified in our analysis included the variation in GPs' perception of pharmacists and their input, GPs' trust in delegating tasks to others, and pharmacists receiving feedback on their actions

(e.g. on recommendations). The latter has been found to be important for pharmacists undertaking a "new", more clinical role[18,66].

This was a very prominent finding from this review, as feedback, which was aimed at improving individuals' performance or the overall process, was present in a number of studies[24,27,28,41,43,56,59,63]. Collaborative models within the supply chain can be dependent on communication and cooperative behaviour[69], especially as communicating feedback between buyer and supplier has been shown to have positive impact on their relationship[70].

Some of the collaborations presented in this review resonate with buyer-supplier perspectives[7]. Although in most studies the research team initiated the collaboration, activities involved delegating certain GP tasks to community pharmacist(s) either for the purpose of relieving pressure from the general practice (e.g. approving patients repeat prescriptions[39]) or for ease of patient access (e.g. point-of-care influenza test[36]). Such buyer-supplier relationships are also characterised by competitive interests, which is a key perceived barrier in community pharmacist-GP collaborations[66].

Difficulty in engaging community pharmacists and GPs with the collaborative service was reported in some studies[27,55]; however, over time, the interprofessional collaboration and acceptance of the pharmacist's role was improved[30,51,61]. This could have been due to co-location of collaborators, which has been suggested to positively affect supplier's competence in their role[71].

Some of the review's models explicitly followed a service specification/protocol, which was agreed upon at the beginning of the collaboration[35,36,44-46,53-56,63]. Contractual and relational agreements is another aspect that could inform how maturity of collaborators' relationships influence the nature of contracts (i.e. written or verbal) and how these contribute to a model's performance. For example, it might be that positive outcomes during earlier stages of the collaboration could indicate success and thus encourage continuation/progression of collaborative working[72]. However, this can be dependent on communication and cooperative behaviour within the buyer-supplier relationship[69].

Conclusion

Implications for practice and research

The international scope of this review provided the current landscape of collaborative models, from which key findings could be adapted to primary care within the specific country settings and contribute to recommendations for future collaborative working models. The review revealed there has been exploration and evaluation of GP-community pharmacist collaborative working worldwide. However, despite substantial policy direction towards integration of pharmacists to improve primary care service delivery, there is lack of recent (i.e. within the last 10 years) empirical evidence in some nations (especially in the UK) that evaluates the community pharmacists' role in working collaboratively with GPs.

There is a need to clarify the ways in which the role of community pharmacists and their approaches to evaluation influence the success of collaborations with GPs. This would enable commissioners, and GPs as buyers, to appropriately assess and make informed decisions when choosing their collaborators[73] as well as improving the patient journey. In addition, it would contribute to a sustainable pharmacist workforce across all areas of practice where their expertise continues to be needed (e.g. hospital and community pharmacy).

Finally, an interesting observation in our analysis was the key role of research teams in most included papers (n=27). This makes it difficult to determine the viability of these collaborations beyond the research study period. However, there were a few evaluations of pre-existing models[40-43,59], which did not necessarily depend on the actions of the research teams. The importance of communication and pharmacists' enablement to proactively collaborate with local GPs (rather than as part of a research initiative) represent opportunities for further investigation.

Additional information

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Declaration of interest statement

No competing interests.

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Data availability statement

The authors confirm that the data supporting the findings of this study are available within the article and its supplementary materials.

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Table S1: Relevance of conceptual models involving pharmacists and physicians to this systematic review.

Publication	Model content
McDonough and Doucette, 2001 (CWR)[1] and Dey et al., 2011 (rCWR)[2]	Collaborative Working Relationship (CWR) and revised CWR (rCWR) conceptual models: Both of these emphasised the evolution of the physician-pharmacist relationship, which advances over time through stages (from professional awareness and recognition to a committed collaboration); this progression was based on characteristics of the collaborators, the context and the interaction.
Bradley et al., 2012[3]	Three-stage conceptual model capturing additional factors that lead to relationship development although its applicability was limited to the services of the primary studies on which it was based.
Van et al., 2012[4] and 2013[5]	The Attitudes Towards Collaboration for Pharmacists (ATC-P) and for GPs (ATC-GP) explored how community pharmacists and GPs' attitudes towards working with each other affect their collaborative relationship. This research revealed multiple environmental (e.g. community pharmacist's proximity to the general practice), interactional (e.g mutual respect) and practitioner (e.g. expectations of the community pharmacist) related aspects as being relevant when considering forming collaborations.
Bardet et al., 2015[6]	A systematic literature review of pharmacist-physician models and their determinants synthesised a "meta-model", which highlighted the complexity of the community pharmacist-GP relationship and the multiple factors that influence how it can be nurtured.
Rathbone et al., 2016[7]	This conceptual model specifically focused on improving patients' adherence to taking medicines as prescribed; this reiterated key aspects of the above models, which contribute to successful collaborations.

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Box S1: Electronic databases and search strategy

Multi-disciplinary databases were searched (healthcare- and management-orientated):

1. Embase (1973 onwards) and Embase Classic (1947-1973) on www.embase.com (human-indexed, healthcare-focused)[1]
2. MEDLINE (1946 onwards) on www.pubmed.com (human-indexed, healthcare-focused)[2]
3. CINAHL Complete (1937 onwards) on EBSCOhost (not human-indexed, healthcare-focused)[3]
4. Business Source Complete (1886 onwards) on EBSCOhost (not human-indexed, management-focused)[4]
5. Web of Science Core collection (1945 onwards) on Web of Science –© 2020 Clarivate (not human-indexed, multidisciplinary)[5]
6. ABI/INFORM Global (1971 onwards) on ProQuest (not human-indexed, management-focused)[6]

These sources were chosen following discussions with the university's subject librarians with regard to the content of the databases and factors in the replication of the systematic review. Other databases that were considered but not searched for the review were:

1. Scopus (not human-indexed; no additional benefit as it was initially built on Elsevier publications, e.g. Compendex, which is an engineering database, and Embase, which is healthcare-focused and human-indexed; later on, it included data from other publishers although Scopus was considered unnecessary to search due to the cross-coverage of the majority of publications on Embase-Embase Classic, MEDLINE and Web of Science)[7]
2. Emerald Insight (includes Emerald publications; due to technical problems with the online platform's search function and as the majority of Emerald publications are included in Web of Science Core Collection and ABI/INFORM Global, Emerald was not searched)[8]
3. International Pharmaceutical Abstracts (IPA) (primarily focused on drug discovery and design; relevant journals were included in other databases that were searched)[9]
4. Google Scholar (initially considered in order to include grey literature although due to time constraints it was not searched)[10].

Search strategy:

The systematic review comprised three concepts: *community pharmacists, general practitioners* and *collaboration*. Relevant keywords for the systematic review were identified using *MeSH on Demand 2018*[11], which is an online tool that identifies Medical Subject Headings (*MeSH*) based on the research title. *MeSH* terms are used by MEDLINE to index their records and as such using them as keywords aids the identification of the systematic review on non-human-indexed databases. The *MeSH* terms generated were*: pharmacists;*

general practitioners; cooperative behaviour; community pharmacy services; inter-professionalism.

A search strategy was then developed to guide the database searches using these terms. For this purpose, synonyms were identified using an online thesaurus tool (www.thesaurus.com) to ensure that relevant keywords were not omitted. Each synonym was entered in the PubMed *MeSH* browser[11] in order to identify related and/or previously used terms for each *MeSH*. For example, the term "general practitioners" was introduced as a *MeSH* in 2011 and prior to that it was indexed as "physicians, family" (1966-2010). This process was repeated on the equivalent index browser of Embase, (*Emtree)*.

Using the Boolean logic, the keywords for each concept were combined using "OR" and all three concepts were combined using "AND" as shown in the figure below, which is an example search strategy. The search strategy was adapted to each database's capabilities accordingly.

An example search strategy used on Web of Science database is shown on the next page.

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Search strategy used on Web of Science database:

Set	Results	Save History / Create Alert · Open Saved History
# 15	1,912	#14 AND #2 AND #1 *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 14	4,762,714	#13 OR #12 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 13	365	**TOPIC:** ("intersectoral collaboration" OR "inter-sectoral collaboration") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 12	9,665	**TOPIC:** ("public relations*" OR "community relations*" OR "interprofessional relations*" OR "inter-professional relations*" OR "interinstitutional relations*" OR "inter-institutional relations*" OR "primary care relations*") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 11	7,202	**TOPIC:** ("community network*" OR "community care" OR "community health service*") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 10	263	**TOPIC:** ("crosssector collaboration" OR "cross-sector collaboration" OR "crosssector cooperation" OR "cross-sector cooperation" OR "crosssector co-operation" OR "cross-sector co-operation" OR "crosssector integration" OR "cross-sector integration" OR "crosssector partnership" OR "cross-sector partnership" OR "crosssector interaction" OR "cross-sector interaction" OR "crosssector work*" OR "cross-sector work*" OR "crosssector care" OR "cross-sector care" OR "crosssector communication" OR "cross-sector communication") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 9	5,054	**TOPIC:** ("multidisciplinary collaboration" OR "multi-disciplinary collaboration" OR "multidisciplinary cooperation" OR "multi-disciplinary cooperation" OR "multidisciplinary co-operation" OR "multi-disciplinary co-operation" OR "multidisciplinary integration" OR "multi-disciplinary integration" OR "multidisciplinary partnership" OR "multi-disciplinary partnership" OR "multidisciplinary interaction" OR "multi-disciplinary interaction" OR "multidisciplinary behavio$r" OR "multi-disciplinary behavio$r" OR "multidisciplinary work*" OR "multi-disciplinary work*" OR "multidisciplinary care" OR "multi-disciplinary care" OR "multidisciplinary communication" OR "multi-disciplinary communication") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 8	6,467	**TOPIC:** ("interdisciplinary collaboration" OR "inter-disciplinary collaboration" OR "interdisciplinary cooperation" OR "inter-disciplinary cooperation" OR "interdisciplinary co-operation" OR "inter-disciplinary co-operation" OR "interdisciplinary integration" OR "inter-disciplinary integration" OR "interdisciplinary partnership" OR "inter-disciplinary partnership" OR "interdisciplinary interaction" OR "inter-disciplinary interaction" OR "interdisciplinary behavio$r" OR "inter-disciplinary behavio$r" OR "interdisciplinary work*" OR "inter-disciplinary work*" OR "interdisciplinary care" OR "inter-disciplinary care" OR "interdisciplinary communication" OR "inter-disciplinary communication") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 7	2,653	**TOPIC:** ("interprofessional collaboration" OR "inter-professional collaboration" OR "interprofessional cooperation" OR "inter-professional cooperation" OR "interprofessional co-operation" OR "inter-professional co-operation" OR "interprofessional integration" OR "inter-professional integration" OR "interprofessional partnership" OR "inter-professional partnership" OR "interprofessional interaction" OR "inter-professional interaction" OR "interprofessional behavio$r" OR "inter-professional behavio$r" OR "interprofessional work*" OR "inter-professional work*" OR "interprofessional care" OR "inter-professional care" OR "interprofessional communication" OR "inter-professional communication") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 6	10,039	TS=("collaborative behavio$r" OR "collaborative work*" OR "collaborative care" OR "collaborative communication") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 5	6,575	TS=("cooperative behavio$r" OR "co-operative behavio$r" OR "cooperational behavio$r" OR "co-operational behavio$r" OR "cooperative work*" OR "co-operative work*" OR "cooperational work*" OR "co-operational work*" OR "cooperative care" OR "co-operative care" OR "cooperational care" OR "co-operational care") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 4	14,882	TS=(cooperative NEAR/2 model*) OR TS=(co-operative NEAR/2 model*) OR TS=(cooperational NEAR/2 model*) OR TS=(co-operational NEAR/2 model*) OR TS=(collaborative NEAR/2 model*) OR TS=(collaboration NEAR/2 model*) OR TS=(interprofessional NEAR/2 model*) OR TS=(inter-professional NEAR/2 model*) OR TS=(interdisciplinary NEAR/2 model*) OR TS=(inter-disciplinary NEAR/2 model*) OR TS=(multidisciplinary NEAR/2 model*) OR TS=(multi-disciplinary NEAR/2 model*) OR TS=(crosssector NEAR/2 model*) OR TS=(cross-sector NEAR/2 model*) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 3	4,732,349	TS=(collaboration OR communication OR contracting OR cooperation OR co-operation OR differentiation OR integration OR interaction* OR interdisciplinarity OR inter-disciplinarity OR interprofessionalism OR inter-professionalism OR multidisciplinarity OR multi-disciplinarity OR partnership* OR teamwork* OR team-work*) *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 2	68,978	TS=("general practitioner*" OR "general practice physician*" OR "general physician*" OR "family practitioner*" OR "family physician*" OR "family practice physician*" OR "family doctor*" OR "general doctor*" OR "general practice doctor*" OR "family practice doctor*" OR "primary care doctor*" OR "primary care practitioner*" OR "primary care physician*") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*
# 1	147,190	TS=("community pharmacy service*" OR "pharmacy service*" OR "drugstore service*" OR "pharmaceutical service*" OR "community health service*" OR "community healthcare" OR "community health-care" OR "community care" OR "healthcare service*" OR "health-care service*" OR "health service*" OR "community healthcare service*" OR "community health-care service*" OR "pharmacist*" OR "community pharmacist*" OR "retail pharmacist*") *Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years*

Table S2: Characteristics of included studies presented within six categories in order of the year when the study was conducted.

Four of these categories (*models involving care plans, pharmacy-based services, general practice co-location and improving prescribing*) contributed to the typology of collaborative working between general practitioners (GPs) and community pharmacists (CPs) presented in the main article (Figure 3); one category includes models describing wider implementation of such collaborations and the last category describes studies which did not include sub-group analysis of GPs and CPs' impact.

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Models involving care plans						
Bryant 2011[1], New Zealand 2001	Evaluation of CP-GP collaboration on CP-led clinical reviews	Parallel randomised controlled trial	Community pharmacies	17 CPs (familiar with completing care plans); 57 GPs (working ⩾16 hours per week) from 52 different general practices; 257 patients (analysed at 12-month follow-up; ⩾65 years old on ⩾5 drugs).	Using an existing CP-led service ('*Comprehensive Pharmaceutical Care*'), GPs were approached to recruit patients, who then had an initial medicines review with a CP (not necessarily their regular one). CPs produced a standardised care plan (based on review and medical record) with recommendations, which was forwarded to the GP and updated during follow-ups. CP-GP case conference was expected after patient's consultation.	Control group parallel to intervention group (first 6 months); then received intervention parallel to intervention group (to test sustainability).

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Saastamoinen 2009[2] Finland 2002-03	Development of repeat prescribing service	Open-label randomised controlled trial	Kuopio University Pharmacy, Kuopio Health Services main health centre	23 CPs; two study pharmacists; 31 GPs; 238 patients with repeat prescription requests (125/238 in intervention and 113/238 in control group; no age difference between the intervention group and the control group: 65.5 years vs. 66.3 years, p=0.683).	CPs interviewed patients when they requested repeat prescriptions, recorded this on a form (including pharmacy-held patient medicines' history). After the GP received these, they issued the repeat, recorded drug-related problems and possible resolutions. Study pharmacists also reviewed CPs' data and recorded issues.	Control patients who were not interviewed; their GPs received the request form and pharmacy-held patient record.
Vinks 2009[3] Netherlands 2002-03	Assessing pharmacy-based intervention on reviewing older people's medicines	Controlled follow-up study	Primary care	CPs from 16 participating pharmacies (number not reported); GPs (number not reported); 87/174 patients in intervention group.	Following training, CPs reviewed patients' medicines and made appropriate recommendations; these were firstly discussed with the GP and then involved the patient. After mutually agreeing on next steps, CPs reviewed patients' medicines four months post-study start and implemented actions.	87/174 matched patients within usual care

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Richmond 2010[4, 5] UK 2003-05	Joint care plan intervention.	Randomised multiple interrupted time-series trial[4] Economic evaluation of randomised trial[5]	Primary care (community pharmacies and general practices)	CPs working at 62 community pharmacies recruited across the five participating regions (number not reported); GPs working at 24 practices that were part of the trial (number not reported); 551/760 patients (⩾75 years old receiving repeat prescriptions for ⩾ 5 medicines).	CPs were trained on pharmaceutical care and working with GPs, patients and carers. They interviewed patients on their medicines at the pharmacy; CPs and GPs discussed findings, produced and implemented a pharmaceutical care plan. CPs then followed up the patient monthly.	CPs, GPs and patients acted as their own control.
Fiss 2010[6, 7] Germany 2005-07	Implementation and evaluation of community-based medicines review service to support GPs	(One) prospective non-randomised feasibility and (two) implementation cohort studies[6]. Economic evaluation of cohort studies[7].	Rural area	GPs (number not reported). Feasibility study: one trained practice/nurse assistant; one study pharmacist; 20/18 patients (mean age: 74.8 years; SD = 10.7). Implementation studies: two trained practice/nurse assistants; two general practices; CPs working in nine participating pharmacies (within 5-10km of the study region; number not reported). First implementation study: 23/28 patients (mean age: 70.8 years; SD = 9.7; 22/23 patients received ⩾1 follow-up). Second implementation study: 37/39 patients (mean age: 75.5 years; SD = 7.5; 7/37 received ⩾1 follow-up).	Trained assistants visited patients at their home to collect data on their medicines, which they forwarded to trained CPs. CPs then analysed this data at their pharmacy and sent a standardised report to the patient's GP, who reviewed both the data and the report.	N/A

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Fiss 2013[8] Germany 2006-08	Impact of collaborative service on drug-related problems	Prospective non-randomised implementation field studies with pre-post evaluation	Rural areas in seven different federal states.	CPs with additional training working at the pharmacy chosen by each participating patient (number not reported); GPs (number not reported); trained practice assistants with minimum five years' experience (number not reported); 408/779 elderly patients (mostly multi-morbid with limited mobility; 393/408 patients, who received the intervention and ⩾1 follow-up, had complete drug data at both points.	Five field projects involving home medicines review, pharmaceutical care and follow-up visits; other procedures did not differ. Trained assistants visited patients at their home to collect data on their medicines, which they forwarded to trained CPs. CPs analysed the collected data at their pharmacy and sent a standardised report to the patient's GP, who reviewed the data and the report.	N/A
Kwint 2011[9] Netherlands 2007-08	Medication review in patients using automated systems	Pragmatic randomised controlled trial	Primary care	Six CPs (from participating community pharmacies); two GPs invited to participate by each CP (i.e. 12 GPs although not clearly reported in the paper); five pharmacist independent reviewers; 55/108 elderly patients (⩾ 65 years, living at home, using ⩾5 medicines with ⩾1 of them dispensed via an automated system; 108 intervention and control patients had complete medication records at t=6 months).	CPs approached eligible patients' GPs, collected patient data (pharmacy and medical records). Pharmacist reviewers analysed it on behalf of CPs, who then met with the patient's GP to discuss their care plan within four weeks. The waiting-list group received the intervention six months after the study began. CPs checked for changes between the start and at six months (considered to be due to usual care) and then met with the GP.	53/108 patients in waiting-list group, which acted as control during first 6 months

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Niquille 2010a[10] Switzerland [not reported]	CP-led review to improve prescribing quality and cost-effectiveness	Cross-sectional pilot study	Primary care	11/14 trained CPs; two study pharmacist reviewers; 61/224 GPs provided patient clinical data to CPs but 28/61 evaluated the CPs' patient reports; 85 cardiovascular patients (56-75 years old) seen by CPs (8/85 patients didn't require contact with their GPs, 47/85 patients' reports were evaluated by GPs).	Following training, CPs invited eligible patients' GPs to participate. GPs confirmed patients' eligibility and shared required data with CPs, who then interviewed patients. They analysed written and verbal available data and prepared a report for GPs, which outlined drug- and cost-related issues. GPs returned the evaluated the report to CPs.	N/A
Niquille 2010b[11] Switzerland 2007	CP-led review with additional support to improve prescribing quality and cost-effectiveness	Qualitative survey	Primary care	27/78 CPs respondents (12/60 CPs who were aware of but didn't participate in a relevant study[10], 4/4 trained pharmacists who initially agreed to participate in a relevant study but didn't complete it[10] and 11/14 CPs who completed it[10]).	Similar to a relevant study[10], trained CPs could opt to receive additional support for planning the service, to allow them more direct contact with patients and GPs. A mentor pharmacist could aid logistics (collection of patients' medical and pharmacy records and mailing initial paperwork to patients) and, if requested by CPs, support/complete patient data analysis and the report for GPs.	N/A

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Geurts 2016[12] Netherlands 2009-11	Evaluation of cardiovascular patients' review service	Randomised controlled trial	Eight primary care settings	Eight CPs; GPs (number not reported); 248/512 elderly patients (on min. five chronic medicines and ⩾1 of which is for cardiovascular disorder; 178/248 received intervention, 70/248 did not receive intervention due to time restrictions).	CPs invited GPs with whom they had a good working relationship and who shared patient data. CPs conducted a medicines review with patients; using a web-based application, which contained patients' pharmacy and medical records, CP, GP and patient jointly produced a care plan. Follow-up was after one year.	264/512 elderly patients randomly allocated to usual care.
Leendertse 2013[13] Netherlands [not reported]	Evaluation of medicines review aimed to prevent hospital admissions	Open controlled multi-centre study	42 primary care settings	CPs (number not reported); GPs (number not reported); 364/674 patients (⩾65 years, using ⩾5 chronic medicines based on a non-adherence measure).	CPs conducted medicines reviews (based on patient interview, practice and pharmacy record) to identify problems, and optimise medicines, adherence and monitoring. Key points were then discussed with GPs to develop a joint pharmaceutical care plan (implemented by both). CPs had at least two patient follow-ups after three and six months and discussed with GPs any further issues.	310/674 usual care control patients

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Models with pharmacy-based patient services						
Villeneuve 2010[14, 15] Canada 2005-08	Trial to Evaluate an Ambulatory primary care Management program (TEAM)	Open cluster randomised controlled trial[14]. Qualitative study (semi-structured interviews with GPs; focus groups with pharmacists and patients)[15].	Primary care in Montreal (Quebec)	8/15 collaborative care clusters with 28/49 CPs working in 20 community pharmacies (within 5km of participating clinics); 27/51 GPs working in 10 closely located clinics (two conventional clinics with ≤3 physicians and one with >3 physicians; five family medicine groups; two combined); 108/225 patients; one research nurse (responsible for baseline and final follow-up data collection).[14] 12/20 CPs (12/20 female; 6/12 with 5-15 years and 6/12 with >15 years since graduation; 7/12 pharmacy owners, 5/12 salaried pharmacists; 8/12 pharmacies within and 4/12 outside a medical clinic); seven physicians (4/7 male; 1/7 with 5-15 years and 6/7 with >15 years since graduation); 12/66 patients (11/12 male; mean age 60.8, SD 5.3; 11/12 with high coronary heart disease risk; 4/12 with previous cardiovascular disease, 5/12 with diabetes, 9/12 with hypertension; at the end of pharmacist follow-up 8/12 were ≤lipid target, and 4/12 > target).[15]	Following CPs' training, GPs initiated statin treatment and provided CPs with a prescription form containing the patients' condition, therapy and given advice. Taking these into consideration, the CPs prepared a pharmaceutical care plan and had follow-ups with patients to monitor tolerance, adherence, lifestyle changes and optimise treatment.	7/15 usual care clusters with: 21/49 CPs in 18 pharmacies located within 5km of the participating clinics; 24/51 GPs working in eight closely located clinics (one conventional clinic, one with >3 physicians, and four family medicine groups, two combined); 117/225 patients.[37]

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Harris 2013[16] Canada 2006-2010	Evaluation of collaborative service to improve insulin uptake	Parallel randomised controlled trial (stratified group)	Primary care (mostly urban in both intervention and control groups)	107 CPs (based on their geographic proximity to the postcodes of consenting physicians, their diabetes education training, pharmacy services and resources); 15 specialist sites; 73/151 GPs; 11,380 patient charts' data (with HbA1c ⩾7.5% and oral anti-diabetes drug score ⩾1.5).	After training on insulin therapy, CPs and GPs received a 12-month *insulin initiation strategy*. GPs could access diabetes-specialist support (who initially contacted GPs fortnightly; for the remaining 10 months, GPs could contact them if needed) and CPs' support (GPs could refer patients to CPs for an insulin initiation educational consultation).	78/151 GPs
Shaw 2014[17] New Zealand 2010-11	Evaluation of collaborative warfarin management service	Pilot mixed methods study: survey and interviews	Urban and rural areas	35/41 CP survey respondents (24/35 CP interview respondents); 28/115 GP survey respondents from 21/52 practices and linked with 12/15 pharmacies in the study (7/28 GP interview respondents); 24/89 practice nurse survey respondents from 16/52 practices and linked with 12/15 pharmacies (5/16 nurse interview respondents); 430/693 patient survey respondents (62.4% male, 70.6% aged ⩾65 years, 73.8% receiving preventative warfarin treatment; median of 47 (range: 26-75) patients enrolled at each pharmacy; 7/430 patient interview respondents).	Following training, CPs approached GPs to participate. Recruited patients were provided with written materials and a referral to the CP. GPs also supplied a "standing order delegation" (confirming transfer of care to the CP; GPs remained responsible and could intervene at any point). CPs reviewed patients at the pharmacy (incl. international normalised ratio testing and treatment management using an online decision aid) and provided them with a calendar with their daily dose and next visit. Data were shared on the GP records.	N/A

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Klepser 2016[18] USA 2013-14	Evaluation of pharmacy-based program to manage influenza-like illness	Prospective multi-centre cohort study	Primary care across three states of USA	CPs (number not reported) at 35 pharmacies (chain and independent); six physicians (collaborating physicians at 47 sites and patients' physicians at eight sites); 75 adult patients (who presented at the participating pharmacies with signs and symptoms consistent with influenza-like illness, i.e. fever, cough, sore throat).	CPs approached physicians to form '*Collaborative Practice Agreements*', under which CPs checked presenting patients' general health, vitals, conducted a rapid influenza detection test, initiated flu treatment in eligible patients and signposted the patient where appropriate. If there was not an agreement, CPs consulted the patient's physician on testing and treatment. For negative tests CPs recommended symptomatic relief products. The CP then forwarded collected patient data (symptoms, presentation, test outcome and actions taken) to the collaborating/patient's physician within 24 hours. CPs followed up all patients that visited them within 24-48 hours to check recovery, additional care required and referred accordingly.	N/A

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Dubán 2017[19] Slovakia 2016	Evaluation of collaborative model on preventative statin therapy	Case-series	Primary care in central Bratislava	16 CPs; 18 GPs; 309 adult non-adherent patients with dyslipoproteinaemia and on atorvastatin for five months (same strength and dose).	GPs identified eligible patients and referred them to collaborating CPs to review their atorvastatin therapy (management and treatment education). CPs marked the consultation as successful (where there was mutual agreement or satisfactory patient responses) or unsuccessful (if consultation was rejected or there was disagreement).	N/A
Krabbe 2013[20] Denmark [not reported]	Exploration of CP-GP collaboration, following a project where CPs encountered communication challenges	Pilot study based on a case study and meeting minutes' analysis	Primary care (rural and urban areas)	Three CPs from pharmacies affiliated with three practices (one partnership practice, one solo practice in a rural area and one solo practice in an urban area); 5/15 patients per GP (type 2 diabetics taking ⩾5 medicines); one medical consultant from the Capital Region; one consultant from the Danish Pharmacy Association.	CPs and GPs were introduced at a project team meeting, where they formed a cooperation agreement (incl. patient selection; task delegation; consultation logistics, structure, outcome and follow-up; CP-GP-patient communication). CPs had medicines reviews with patients (based on practice and pharmacy records) to identify and resolve problems. Discrepancies between patient records and consultation were discussed with GPs.	N/A

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Models based on co-location with general practice						
Kozminski 2011[21] USA 2009-10	Evaluation of pharmacist's role in general practices	Qualitative study: interviews; observations and written logs (CPs); patient survey.	Four family medicine practices in a suburban area (Pittsburgh)	Two CPs; 21 GPs (full- and part-time); patients (13 patients interviewed and 16 patient responses to surveys); 26 clinical staff interviews; nine non-clinical staff interviews; four office managers (two interviews per office manager).	Following initial transitional support from the research team, CPs were responsible for patients' medication therapy management, admin and educational support for the practice staff.	N/A
Billups 2013[22] USA 2011-12	Evaluation of pharmacist-managed medication refill and laboratory monitoring program for patients on chronic medicines	Quasi-experimental study	Co-located pharmacies in primary care clinics (organisation provides primary and outpatient care at 25 outpatient sites in Colorado).	Seven CPs from pharmacies (approx. 17,000 to 22,000 prescriptions per month) within the two participating clinics; 38 GPs (22/38 in intervention group; 26/38 GPs responded to job satisfaction survey); patients with repeat medicines' requests on antihypertensives, antihyperlipidemics, antiepileptics, thyroid replacement, and antihyperglycemics (exact number of patients not reported; intervention clinic normally serves about 35,000 patients).	Following CP and staff training, CPs actioned outstanding requests on the GPs' software. CPs were expected to action all patient requests whose medicines required lab and vitals' monitoring. CPs issued the request following a checklist. In case of outstanding monitoring, CPs issued a single refill, arranged appropriate monitoring (e.g. blood test) and informed the patient. In case of concerns, they digitally forwarded the request to the GP explaining the problem(s).	Usual care control clinic with five CPs, 16/38 GPs, patients with repeat requests (exact number not reported; control clinic normally serves about 28,000 patients).

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Tan 2013[23, 24] Australia 2011-13	Evaluation of pharmacist consultations in general practice clinics	Prospective before-after intervention[23] Qualitative study[24] (semi-structured interviews, periodic narrative reports; focus groups)	General practice (one private practice and one community health centre) in Melbourne	Two review-accredited part-time experienced pharmacists (⩾8 hours at each practice and at community pharmacy the remaining working week); nine GPs from two practices. 62/82 patients (on ⩾5 medicines with 1-2 requiring monitoring; treatment for ⩾3 diagnoses; recently hospitalised or visited the emergency department; with other risk factors for drug-related problems, e.g. non-adherence)[23]. Four practice nurses, one practice manager, 18 patients (mean 72.6 years old, range: 52–85 years; median of 11 medicines, range: 6–16; 12/18 patients from the private practice and 6/18 from the community health centre).[24]	Following induction to the practices, the pharmacist collated the patient's history (based on GP/nurse discussion, patients' practice and pharmacy records and an interview aimed at identifying and resolving drug problems and treatment counselling). Pharmacists contacted the patient's GP, CP and/or practice staff, if required, and then sent a report to the responsible GP (outlining the issues and recommendations). GPs followed up the patient to address issues and produce a management plan. Pharmacists also provided educational support to staff and quality assurance through an osteoporosis drug-use evaluation.	N/A

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Wong 2013[25] Hong Kong [not reported]	Evaluation of pharmacist-led drug counselling on improving hypertension treatment	Case-control randomised study	Primary care (representative of the population of Hong Kong)	One CP; four GPs (one weekly clinic); 92/231 patients included in primary analysis (adults taking ⩾1 long-term antihypertensive, with suboptimal adherence to the antihypertensive); one research assistant.	Following usual care GP appointments, CP conducted medicines use reviews with patients. Then they were provided with a summary and encouraged to improve adherence. The research assistant, who was blinded to the patient's group, measured vitals and adherence during follow-ups at three and six months.	139/231 patients, who received brief 2-3-minute drug advice as per usual care
Models aimed at improving prescribing						
Niquille 2010c[26] Switzerland 1999-2007	Longitudinal effect of Physician-Pharmacist Quality Circles (PPQCs)	Economic evaluation: retrospective comparison between intervention PPQCs' prescription data (e.g. costs per treated patient, generic proportion) and control group over 9 years	Primary care in Fribourg, (approx. 250,000 inhabitants)	Six trained CPs; 24 GPs. *NB: PPQCs normally involve 3-10 GPs and ⩾1 CP. Following moderator accreditation, CPs voluntarily lead PPQCs, approach GPs and drive their participation; after two years of moderating, they can become PPQC-specialists*	A collaborating organisation provided CPs with illustrations of intervention GPs' comparative prescription data. CPs were responsible for the meetings' content and logistics. Their role involved medicines optimisation education, mutually agreeing on local prescribing guidelines, annual process appraisals, tailored feedback to GPs to encourage continuous prescribing behaviour improvement.	Average data from matched practices providing usual care (no input from CPs)

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Van de Steeg-van Gompel 2009[27] Netherlands 2005-06	Service to reduce long-term benzodiazepine use	Cluster randomised trial	Pharmaco-Therapy Audit Meetings (PTAMs) within primary care	CPs (number not reported); 47 intervention pharmacies (follow-up data from 79/89 intervention and control pharmacies were available); GPs from whom CPs regularly received benzodiazepine prescriptions and who regularly participated in PTAMs (number not reported); patients on long-term benzodiazepines (number not reported).	Within pre-existing CP-GP meetings, CPs received support (written manual, training on reducing benzodiazepine use and working with GPs). CPs identified eligible patients, who were confirmed by GPs. A joint letter was sent to patients, outlining advice on reducing and stopping treatment and available support.	43 control pharmacies which received a written manual only.
De Vries 2010[28] Netherlands 2006-07	Improving adherence to asthma prescribing guidelines	Cohort study	Primary care	Nine CPs (nine pharmacies); GPs (number not reported); paediatric patients (identified and selected from a database; 0–14 years old, registered with participating pharmacies).	CPs approached GPs to arrange joint meetings, where a research team member would be present, to improve adherence to paediatric asthma prescribing guidelines.	Children registered with 36 non-participating pharmacies
Van de Steeg-van Gompel 2012[29] Netherlands 2006-08	Service implementation aimed at improving preventative statin use	Cluster randomised trial	Pharmaco-Therapy Audit Meetings (PTAMs) within primary care	CPs from 27/52 intervention pharmacies (number not reported); GPs who were part of PTAMs (number not reported); 1426 patients with a potential indication for a statin [944 intervention patients (19.7%) reviewed by the GP, 482 patients (10.8%, p=0.023) in the control group].	CPs received a written manual, attended training and received reminder calls about the study. Within pre-existing CP-GP meetings, CPs provided GPs with a list of eligible patients and discussed the cardiovascular risk guideline; CPs approached absent GPs afterwards. GPs confirmed patients' eligibility and prescribed statin therapy. CPs made reminder calls to GPs throughout the study.	CPs from 25/52 control group pharmacies, which received a written manual only

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Vervloet 2016[30] Netherlands [not reported]	Evaluation of a peer-group-based intervention to reduce antibiotic prescribing	Cluster randomised controlled trial	Eight Pharmaco-Therapy Audit Meetings (PTAMs) within primary care in North-Limburg	CPs from a local pharmacy cooperation (number not reported); 39/77 GPs within four intervention groups from a local GP-cooperation.	Pre-existing CP-GP meetings focused on improving prescribing for respiratory tract infections. GPs had access and technical support for the electronic prescribing system. When they diagnosed respiratory infection, the system initially 'suggested appropriate advice and not issuing a prescription'; if GPs deemed this inappropriate, eligibility criteria for a 'delayed prescription' were suggested. At that point, if the patient was not eligible, GPs issued the prescription. Within the pre-existing joint meetings, which then focused on the two most-presented symptoms, CPs trained GP on therapeutic guidelines, communication skills and implementing mutually agreed prescribing guidelines on the system. A feedback meeting on antibiotic prescribing behaviour was arranged three months later.	38/77 GPs within four matched control PTAM groups

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Wider implementation models						
Carter 2009[31-33] Canada 2006-08	Cardiovascular Health Awareness Programme	Qualitative study[31] Economic evaluation[32] Community cluster randomised controlled trial[33]	Mid-sized communities (Ontario)	CPs from 129 pharmacies; 16 champion pharmacists; 358 GPs; 13,379/15,889 elderly patients; 577/595 trained volunteers; two regional coordinators; community nurses and local lead organisations (number not reported).	Programme provided by volunteers in participating pharmacies, where allocated nurse and on-duty CP provided input when required. An intervention summary was sent to each patient's regular pharmacy and practice.	Patients in 19 communities not receiving the Programme.
Busetto 2015[34] Netherlands 2013-14	Evaluation of collaborative model providing care to diabetic patients	Embedded single case study	Diabetic care-chain (health service providers within diabetic care pathway) in two primary care settings	One CP; other healthcare professionals (e.g. GPs, internists, diabetes nurse specialists, practice nurses, dieticians, optometrists, podiatrists and pedicurists; numbers not reported); care group managers and staff (numbers not reported); care purchasers (numbers not reported)	Based on the existing contractual multidisciplinary collaboration (incl. task distribution and patient involvement), type-2 diabetic patients received evidence- and protocol-based services. Care groups (legal entities) had to form contracts between health insurers and service providers, and then pay the latter the contracted fees (provided by the insurers). The CP provided direct patient services or advised GPs.	N/A

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Other included studies (without sub-group analysis of CPs and GPs' impact)						
Roughead 2011[35] Australia 2004-06	Home medicine reviews' impact on delaying next hospitalisation	Retrospective cohort study	Primary care	Pharmacists accredited for reviews (including CPs; number not reported); GPs (number not reported); 816 elderly patients matched to 16,320 controls (veterans, war widows and their dependents aged ⩾ 65 years, on warfarin; average age of 81.5 years, and 6-7 co-morbidities)	GPs referred eligible patients to be reviewed at home by accredited pharmacists. This focused on treatment, pharmaceutical issues (use, adherence, side-effects, knowledge and stockpiling). A report was forwarded to the GP for follow-up.	16,320 matched control patients
Lowrie 2012[36] UK 2004-07	Evaluation of service to improve outcomes in left ventricular systolic dysfunction	Cluster event-driven randomised controlled trial	Primary care practices	27 primary-care-based pharmacists (3-16 years post-qualification, with experience in polypharmacy medication review clinics; some were part-time CPs, numbers not reported); GPs from 87/174 intervention practices (number not reported); 1,090/2,164 adult patients with left ventricular systolic dysfunction (55% ⩾70 years)	Following training, pharmacists had 30-minute medicines-optimisation reviews with patients and then agreed on changes involving their GP. These were implemented by pharmacists during 3-4 weekly/fortnightly follow-ups; following that, care was transferred back to the GP.	1,074/2,164 usual care patients (not receiving pharmacist intervention)

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Stafford 2011[37] Australia 2008-09	Evaluation of a post-discharge service on warfarin treatment management	Prospective non-randomised controlled cohort study	Post-discharge primary care	62 pharmacists accredited for reviews (part-time working in other sectors such as community, hospital and academia; numbers not reported); GPs (number not reported), 129/268 adult hospital-discharged patients on warfarin across the eight included hospital sites (129 were recruited and completed the post-discharge phase of the study but 90-day follow-up data were available for 108/129 patients).	Based on pre-existing home medicines review service, the discharge summary with specific warfarin-related details was shared with the patient's primary care providers. An accredited pharmacist and the GP discussed tailored follow-up arrangements. All patients were visited for the first review within 2-3 days from discharge. After that, they either received next visits at 7-8 days post-discharge, or 4-6 and 7-8 days post-discharge. A standardised report was then sent to GPs, indicating transfer of care. Final follow-up was held at 90 days post-discharge.	139/268 patients receiving usual care (139 were recruited and completed the post-discharge phase of the study but 90-day follow-up data were available for 128/139 patients).

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Kruger 2011[38] Germany 2009-10	Evaluation of diabetics' home medicine reviews	Pilot qualitative study: interviews	Primary care (community pharmacies and general practices)	CPs (number not reported) working at two pharmacies; two GPs (one responsible for 20/47 patients and the other for 21/47 patients); one specialist physician (responsible for 6/47 patients); 47/70 patients (mean age: 72 years, insulin-dependent diabetes living at home, with nine chronic medications and seven diagnoses on average; 46 were type 2 diabetics; most common comorbidities included hypertension, lipid metabolism disorders, coronary heart disease and osteoarthritis).	CPs introduced the project to two general practices and a medical centre; they identified eligible patients from pharmacy and practices' records. They were responsible for medicines reconciliation, review (based on records and a structured patient consultation), a final report on identified problems and a management plan. GPs evaluated these and arranged relevant follow-ups; CPs arranged medications' appointments. CPs conducted a final review six months after the first one (± 4 weeks) and discussed their report with GPs.	N/A
Pottie 2009[39] Canada [not reported]	Integration of pharmacists within general practices	Qualitative study (analysis of narrative reports)	General practices in urban, suburban and semirural areas (Ontario)	Part-time pharmacists (2.5 hours per week at practices; rest of working week at community/hospital sites; numbers not reported); pharmacist mentors (number not reported); 44 GPs; seven physician-led group family practices (without interdisciplinary teams formally in place); patients received pharmacist services but were not participants.	Pharmacists provided medicines information, educational and medicines optimisation support to general practices.	N/A

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Roughead 2009[40] Australia [not reported]	Home medicine reviews' impact on delaying next hospitalisation	Retrospective cohort study	Primary care	Pharmacists accredited for reviews (including CPs; numbers not reported); GPs (number not reported); 273 elderly patients (veterans, on bisoprolol, carvedilol, or metoprolol for heart failure; average age in both groups was 81.6 years).	GPs referred eligible patients to be reviewed at home by accredited pharmacists. This focused on treatment, pharmaceutical issues (use, adherence, side-effects, knowledge and stockpiling). A report was forwarded to the GP for follow-up.	5,444 matched control patients
Snyder 2010[41] USA [not reported]	Identifying successful CP-physician collaborations	Mixed methods (interviews and survey)	Primary care in mostly small communities	Five CPs (from three independent and two chain community pharmacies); 47/178 community pharmacy experts (helped to identify potential CPs collaborating with physicians); two GPs; two non-GP physicians (1/2 internal medicine, 1/2 other); five CP-physician pairs participated in interviews, four of which also responded to the survey.	Although specific collaborative activities were not reported, factors contributing to successful working between CPs and primary care physicians were identified based on existing collaborative models.	N/A

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Mast 2010[42] Netherlands [not reported]	Pharmacist and physicians' collaborations involving medication review	Survey	Primary and secondary care	Collaborating pharmacists and physicians (numbers not reported) in nine out of 16 total projects and 12 primary care projects;16 project leaders (12/16 in primary care, 4/16 in secondary care). Patients (numbers in each project not reported); within nine primary care projects involving CPs and GPs, there were: • >60 year-olds (1/9 project) • >65 year-olds (3/9 projects) • >70 year-olds (1/9 project) • >75 year-olds (1/9 project) • on >5 medicines (7/9 projects) • on >6 medicines (1/9 project) • on medication roller (1/9 project) • polypharmacy patients with diabetes mellitus or cardiovascular disease (1/9 project) • nursing home residents (1/9 project) • discharged from hospital (1/9 project). 4/9 projects involved the patient (3/4 projects) or the patient representative (1/4 projects).	Identifying projects aimed to provide collaborative medication reviews [based on three components: medication, treatment (involving prescriber and their patient records), usage analysis] and any tools that were used to conduct the reviews. In primary care projects, where both pharmacists and GPs were involved, all three components of medication review were present (4/9 projects) and the patient/their representative was also involved in the review. In the rest of the projects that involved pharmacists and GPs (5/9), 2/5 focused on medication analysis only, 2/5 on medication and usage analysis and 1/5 on medication and treatment analysis.	N/A

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

Publication Country Study years	Purpose	Study Design	Setting	Participants	Intervention	Comparators
Freeman 2014[43] Australia [not reported]	Identifying pharmacists based in general practices	Survey	General practice	26 pharmacist respondents overall (15/26 working in other settings concurrently: 7/15 independent consultants, 6/15 academics, 6/15 CPs).	Collaborations were initiated by the practice or the pharmacist (based on contact network, historical relationship with GPs or other health professionals). On average pharmacists worked 18 hours per week (range: 3-50 hours). Most common roles were medicine reviews and reconciliation, professional input to practice staff, educating staff and patients, supervising students, research and audits, disease-specific clinics.	N/A

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; SD = Standard Deviation

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2.2 Further systematic review results

This section summarises the impact of the models that were identified in the systematic review. It expands on findings presented in the above manuscript (Section 2.1, p. 38). These models were evaluated based on their impact on clinical patient outcomes such as changes in blood pressure, drug-related problems (Table 1), process and financial outcomes (Table 2). It was not possible to directly compare these outcomes between studies due to heterogeneity of data and study designs of the included articles. However, a summary of their positive, negative or neutral outcomes has been presented below.

2.2.1 Clinical outcomes

Clinical outcomes were evaluated by 24 studies (Carter et al., 2009; Saastamoinen et al., 2009; van de Steeg-van Gompel et al., 2009; Vinks et al., 2009; de Vries et al., 2010; Fiss et al., 2010; Niquille et al., 2010c; Richmond et al., 2010; Villeneuve et al., 2010; Bryant et al., 2011; Kwint et al., 2011; van de Steeg-van Gompel et al., 2012; Billups et al., 2013; Fiss et al., 2013; Harris et al., 2013; Leendertse et al., 2013; Wong et al., 2013; Shaw and Harrison, 2014; Tan et al., 2014; Busetto et al., 2015; Geurts et al., 2016; Klepser et al., 2016; Vervloet et al., 2016; Dubán et al., 2017). These included treatment management, clinical investigations management, patient outcomes, adverse drug reactions or events, drug-related problems, hospital admissions, and survival or mortality. Overall, management of treatment and clinical investigations improved for patients. Patient outcomes referred to improved treatment adherence and lifestyle changes, however quality of life was not affected by collaborative activities. Ability to recognise or reduce drug-related problems at follow-up were other outcome measures which improved. Generally, multi-morbid and older patient populations were mostly found to be positively affected by the interventions of included studies.

Table 1: Effect of community pharmacist and general practitioner collaboration on clinical outcomes (n=24 studies; excluding those without subgroup analysis of community pharmacists and/or GPs, n=9).

Study \ Outcome measures	Treatment management	Clinical investigations management	Patient outcomes	Drug-related problems	Adverse drug reactions/ events	Hospital admissions	Survival/ mortality
Carter 2009	++					++[1]	0
Saastamoinen 2009				++			
Van De Steeg-Van Gompel 2009	++ (at 0-3 months)[2]						
Vinks 2009	+[3]			++[4]			
Fiss 2010				+[5]			
Richmond 2010	0[6]		0[7]				
De Vries 2010	+[8]						
Niquille 2010c	+						
Villeneuve 2010	+	+[9]	+[10]				
Bryant 2011	++[11]		0[7]				
Kwint 2011				++			
Van De Steeg-Van Gompel 2012	0						
Fiss 2013				+ (self-reported DRPs); ++ (adherence support)	+		
Billups 2013		+[12]					
Wong 2013		+	+[13]				
Harris 2013	0 (insulin prescribing rate); ++ (mean daily dose of insulin in intervention)						
Leendertse 2013			0[7]	0	0	++[14]	0
Shaw 2014		+[15]	+[13]				
Tan 2014			++[13]	++[16]			
Busetto 2015			0[17]				
Geurts 2016		++ (decreased DBP)		++			
Klepser 2016		++	+[18]				
Vervloet 2016	++[19]						
Dubán 2017			+				

Legend: +: positive impact (not significant); ++: significant positive impact (based on $p<0.05$); 0: no impact observed; ADRs/ADEs: adverse drug reactions or events; DBP: diastolic blood pressure; DRPs: drug-related problems

1. Significant impact was found on composite mean annual myocardial infarction (MI), congestive heart failure (CHF) and stroke and annual MI, CHF hospital admission although no significance was found on stroke hospital admissions.
2. There were no significant differences between intervention and control groups in any of the clinical or process outcomes measured; 66% of intervention pharmacies sent letters. When comparing data at pharmacy-level (rather than cluster), there was significant difference in the number of users who completely stopped benzodiazepines, the mean reduction of the Defined Daily Doses and the percentage of patients on at least 50% less benzodiazepines' use within the first 3 months of mailing the letter (++), favouring these pharmacies. However, this was not a significant difference for any of these measures within 4–6 months after the letter was sent (+).
3. For example, 156/275 of community pharmacists' recommendations were on stopping a medicine.
4. Significant reduction from 0 to 4 months in mean number of DRPs favouring intervention, esp. in those with chronic disease score 8-9.
5. Improved recognition of DRPs.
6. Medication appropriateness index (adapted to UK).
7. Quality of Life.
8. Improved adherence in the intervention on two out of three asthma prescribing guidelines; community pharmacists can support asthma care but more research was needed.
9. Targets achieved faster.
10. Lifestyle changes.
11. Medication appropriateness index.
12. Easier monitoring.
13. Improved adherence to treatment.
14. The intervention was found to have a significant impact only when provided to multi-morbid patients with at least five diseases.
15. Improved monitoring procedures.
16. Reduced number of DRPs at follow-up.
17. Quality of care.
18. 59/75 patients were followed up within 1-2 days post-pharmacy visit; majority felt improved (46/59), while some felt no difference (11/59) or worse (2/59); 7/8 influenza-positive patients were followed up, six of whom reported improvement and one felt indifferent.
19. Number of prescriptions was reduced in all intervention and two control Pharmaco-Therapy Audit Meetings (PTAMs) although there was significant reduction only in prescriptions for patients older than 12 years old between intervention (-27.8 per 1000 patients) versus control (-7.2 per 1000 patients) $p<0.05$

2.2.2 Process and financial outcomes

Table 2 presents additional process and financial outcomes measured in the included studies of the systematic review. Process outcomes were explored by 17 studies (van de Steeg-van Gompel et al., 2009; Vinks et al., 2009; Fiss et al., 2010; Niquille and Bugnon, 2010 ["Niquille, 2010a"]; Niquille et al., 2010b and 2010c; Villeneuve et al., 2010; Kozminski et al., 2011; Kwint et al., 2011; van de Steeg-van Gompel, C.H., Wensing and De Smet, 2012; Billups et al., 2013; Harris et al., 2013; Krabbe et al., 2013; Leendertse et al., 2013; Shaw and Harrison, 2014; Tan et al., 2014; Dubán et al., 2017). Process outcomes included patients and providers' satisfaction; job satisfaction; change of professional role; relationships; interprofessional collaboration; turnaround time; and workload. Overall, there was positive impact on these outcomes, with patients reporting satisfaction with community pharmacists and their additional time (Villeneuve et al., 2010) and collaborators wanting wider implementation (Shaw and Harrison, 2014).

However, there were some exceptions, where there was no or negative impact on stakeholders. For example, a few patients reported feeling uncomfortable sharing private issues with community pharmacists (Tan et al., 2014). Moreover, community pharmacists encountered difficulty in engaging GPs to initiate and carry on the agreed collaborative activity (Niquille et al., 2010, i.e. "Niquille 2010c" in Table 2; Kwint et al., 2011). In fact, based on van de Steeg-van Gompel et al.'s work (2012), an existing good relationship with GPs could overcome this barrier. Finally, in one study pharmacists' workload increased due to the requirements of the collaborative activity (Leendertse et al., 2013). Conversely, GPs' workload and turnaround time for seeing patients improved as activities were being undertaken by collaborating pharmacists (Niquille and Bugnon, 2010, i.e. "Niquille 2010a" in Table 2; Billups et al., 2013; Harris et al., 2013).

Seven studies measured financial outcomes (Carter et al., 2009; Fiss et al., 2010; Niquille and Bugnon, 2010 ["Niquille 2010a"]; Niquille et al., 2010c; Richmond et al., 2010; Tan et al., 2014; Klepser et al., 2016). These included health utility, which was not affected, and cost of the service, as shown in Table 2. Although some of these collaborative models were deemed cost-effective, this was not found to be significant.

Table 2: Effect of community pharmacist and general practitioner collaboration on process and financial outcomes (n=20 studies; excluding those without subgroup analysis of community pharmacists and/or GPs, n=9).

Outcome measures / Study	Process and financial outcomes									
	Patients' satisfaction	Providers' satisfaction	Job satisfaction	Change of professional role	Relationships	Interprofessional collaboration	Turnaround time	Workload	Health utility	Cost
Carter 2009									0	$20, +
Van De Steeg-Van Gompel 2009						+				
Vinks 2009						+				
Fiss 2010	+									~ €26
Richmond 2010										+
Niquille 2010a					+	+[20]		+[21]		+
Niquille 2010b					0[22]	0				
Niquille 2010c						+				+
Villeneuve 2010	+[23]									
Kozminski 2011	+	+	+		+	+				
Kwint 2011						+[24]				
Van De Steeg-Van Gompel 2012					+[25]	++[26]				
Billups 2013	+	+	+				+[27]	+		
Krabbe 2013		+				+				
Harris 2013				+[28]			++[29]			
Leendertse 2013								-[30]		
Shaw 2014	+	+[31]	+	+	+[32]	+				
Tan 2014	+[33]								0	
Klepser 2016									0[34]	
Dubán 2017					+	++				

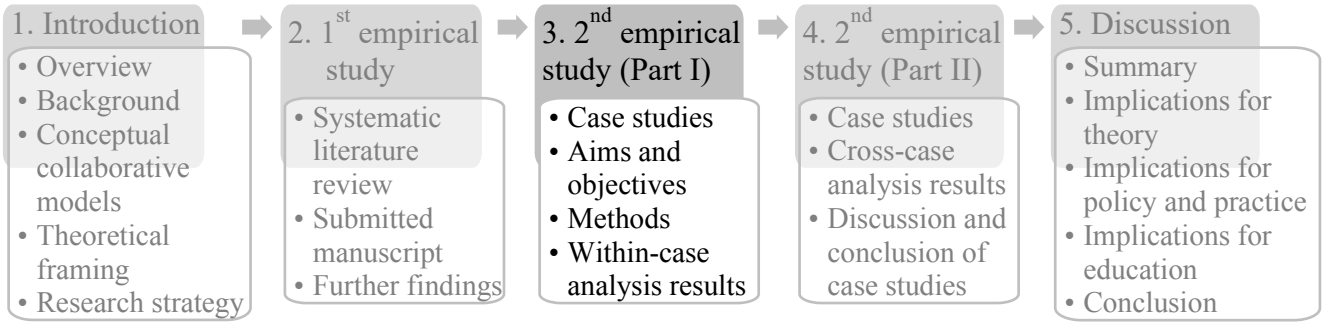
Legend: +: positive impact (not significant); ++: significant positive impact (based on $p<0.05$); 0: no impact observed; -: negative impact (not significant)

20. Almost 70% of community pharmacists' recommendations were considered by GPs as applicable to reinforce.
21. Less work for GPs as patients were identified from pharmacy records.
22. Community pharmacists encountered difficulty in engaging GPs and keeping them up to date with the service requirements.
23. Patients reported good rapport and most prefer community pharmacist and their dedicated time.
24. There was low acceptance of community pharmacists' recommendations by GPs; community pharmacists' encountered difficulty in meeting and discussing recommendations with GPs.
25. The baseline relationship with GPs, which was rated good or very good by under two thirds of the pharmacists across intervention and control, may have influenced the GPs' participation. Community pharmacists were able to persuade GPs to participate in the service although there was no impact on the GPs' prescribing behaviour.
26. Number of selected patients that GPs reviewed: 19.7% intervention vs 10.8% control; Odds Ratio: 4.9, 95% Confidence Interval: 1.2-19.2; p=0.023.
27. GPs had one less task to complete and thus had quicker turnaround time for patients.
28. Intervention and GPs' knowledge attitude and self-efficacy on insulin initiation, titration and glycaemic control.
29. Intervention patients seen sooner by GP than in control.
30. Extra work to document drug-related problems etc.
31. 100% GPs and nurses agreed to wider availability.
32. Difficult at the beginning although progressively improved throughout the study.
33. Well received overall by patients although there were some who felt uncomfortable sharing private issues with community pharmacists.
34. Emergency department and urgent care facilities were used by patients who were referred by community pharmacists (4/75).

2.3 Summary of systematic review findings

The systematic review provided insight on existing models reported in international literature. This aided understanding of their operational characteristics, their impact on stakeholders and their collaborators' relationship. These findings could then be translated or adapted to primary care needs in the UK. The manuscript was written for submission to a healthcare academic journal to inform those interested in community pharmacist-GP collaborations in practice. As such, the implications for operations and supply chain management might have been limited. The findings presented in the manuscript and the additional clinical, process and financial outcomes that followed, aimed to inform the research design of the second empirical project. In particular, limited available evidence within English primary care was the key driver for further qualitative research to establish such collaborations in this context.

Chapter 3 Collaborative working between community pharmacists and general practitioners in England: a case study approach



This and the following chapter (Chapters 3 and 4) present the second empirical project of the doctoral research. For this, case studies, which were conducted with collaborating GPs and community pharmacists in England, have been divided in two chapters: Part I presents the background, relevance to the systematic review, methodology, and within-case findings. Part II presents findings from cross-case analysis, discussion on Part I and II, and overall conclusions on the case studies.

This case study was undertaken because despite the systematic review (Chapter 2) identifying GP-community pharmacist models of working (Liaskou et al., 2020), they had variable characteristics and outcomes, or they were not well described, or not analysed in depth in terms of their operation and impact on performance. Quantitative trials primarily explored clinical outcomes, with limited data on collaborative relationships' structure and other qualitative data (e.g. attitudes). Furthermore, it was evident that there has been minimal exploration of such collaborative working, specifically between community pharmacists and GPs within the UK (2/37 studies). As such, further evidence was needed to identify the value of community pharmacists, the relationship they have with collaborating GPs and the impact of that on the patient's primary care journey.

3.1 Aims and objectives

The overall aim of this study was to explore the following question:

- How do collaborative models, involving community pharmacists and GPs, impact primary care services in England?

The objectives were to:

- Identify and describe the individual collaborative models' characteristics, ways of operating, and means of evaluation.
- Analyse purpose, drivers, enablers, and barriers evident in the individual collaborations.
- Explore the impact of each collaboration on stakeholders (especially community pharmacists, GPs, and patients).
- Identify patterns across individual cases to make recommendations for effective community pharmacist-GP collaborations.

3.2 Methods

There has been little empirical investigation of collaborative working between community pharmacies and general practices. As such, the collaborations investigated in this study adopted a rigorous inductive (theory-building, and not theory-testing) approach, derived from grounded theory (Eisenhardt, 1989a). Exploratory case studies of community pharmacist-GP collaborative models were conducted (Yin, 2018), informed by best-practice advice within OSCM. Barratt et al. (2011) conducted a review of published OM case studies from 1992 to 2007, illustrating key methodologies and outcomes. Findings indicated the need for improvement in the reporting and methods of deductive case studies (testing theory), while inductive case studies (theory building) were more rigorous.

The case studies approach was used to gain a better and deeper understanding of the stakeholders' experiences and satisfaction with the model; factors that led to the collaboration; and barriers and facilitators during the implementation process. Multiple case studies at different sites were undertaken to maximise the variety of models identified.

3.2.1 Sampling

Previous published literature of conceptual models between (community) pharmacists and (general) physicians has indicated the variety of determinants for success. For example, important aspects in collaborative models within primary care include maturity of relationships or of those involved due to their years of experience in practice; co-location of community pharmacy with general practice; and attitudes (McDonough and Doucette, 2001; Dey et al., 2011; Bradley et al., 2012; Van et al., 2012; Van et al., 2013; Bardet et al., 2015; Rathbone et al., 2016). As such, various characteristics were taken into account during the selection process of the case studies sample.

3.2.1.1 Eligibility Criteria

This study was open to staff who worked within primary care in some form of community pharmacist-GP collaboration within England.

Inclusion criteria

Pharmacists whose primary role was within community pharmacies AND either:

1. Worked within a community pharmacy, while collaborating with GP(s) on a part-time basis, i.e. specific day(s) per week or specific period(s) in a year, OR
2. Worked within a community pharmacy, while collaborating with GP(s) on full-time basis, e.g. based on a verbal or written agreement that outlines the conditions of the collaboration/collaborative service, OR
3. Worked within a general practice on a part-time basis, i.e. specific day(s) per week or specific period(s) in a year, OR
4. Any of the above (1-3), where the collaboration involved other collaborators in addition to GP(s)

GPs whose primary role was within general practice AND either:

1. Worked within a general practice, while collaborating with community pharmacist(s) on a part-time basis, i.e. specific day(s) per week or specific period(s) in a year, OR

2. Worked within a general practice, while collaborating with community pharmacist(s) on full-time basis, e.g. based on a verbal or written agreement that outlines the conditions of the collaboration/collaborative service, OR
3. Worked within a community pharmacy on a part-time basis, i.e. specific day(s) per week or specific period(s) in a year, OR
4. Any of the above (1-3), where the collaboration involved other collaborators in addition to community pharmacist(s)

The following groups of people were also included: adult English-speaking patients receiving services that were provided based on the community pharmacist-GP collaboration; other staff working at the community pharmacy, where the community pharmacist was primarily based and/or which was associated with the collaboration; other staff working at the general practice, where:

1. the GP was primarily based and/or which was associated with the collaboration, and/or
2. the community pharmacist worked as part of the collaboration

Exclusion criteria

Pharmacists who were based within general practice(s) for most of their working week were excluded. Vulnerable patients or those unable to give consent were also excluded. Moreover, collaborations which were based purely on community pharmacist-GP interaction were excluded. This referred to non-co-operative relationships, which were not based on mutual verbal or written agreement(s) between collaborators involved, and did not aim to achieve a common goal (e.g., patient care services). Examples which were not considered as "collaborations" included interactions based on routine communication between community pharmacists and GPs regarding amending prescription items; and when pharmacists and GPs were fulfilling their standard role as healthcare professionals. Conversely, "collaboration" was considered if there had been communication (verbal or written) between the community pharmacist and GP (or their staff), which had led to extra steps being taken to improve delivery of patient care.

Size of sample

The number of case studies was planned to be between four and 10 (Eisenhardt, 1989a) and aimed to demonstrate a range of different models of collaborations. Each case had to comprise at least one community pharmacist, one GP and one patient.

3.2.1.2 Recruitment and consent

A purposive sampling approach was employed to reflect as many different models of collaborations as possible. The sample was derived from collaborating community pharmacists and GPs who responded to an Expression of Interest (EoI) call for this project. The selection of participants and their respective models aimed to represent different types of cases. This meant having cases with similar characteristics to identify common success determinants as well as cases with different characteristics to indicate potential contingent factors. For example, one case's model could include a community pharmacist delivering a service on behalf of a general practice in a rural setting in the north of England. A second case could include the same model in an urban setting in the south of England, while a third case could be based on a pharmacist working part-time in community and part-time in general practice in similar contexts as the former two cases.

The recruitment strategy, which was initiated through the EoI call, was based on a "Strengths, Weaknesses, Opportunities and Threats (SWOT)" analysis, which considered the:

- aim (understanding community pharmacists-GPs' collaborative relationship)
- potential number of collaborating community pharmacist-GP dyads in England (based on the total number of registered pharmacists, excluding full-time practice-based pharmacists)

The chosen recruitment strategy aimed to be inclusive and targeted, while minimising bias (Table 3). As such, the EoI call was circulated to community pharmacists and GPs' local professional bodies' teams (Table 3, Recruitment Approach 3; more inclusive and less biased option) and directly to community pharmacists and GPs who were part of the University of Bath's Department of Pharmacy and Pharmacology professional network (Table 3 Recruitment Approach 4: more targeted and personal option).

Table 3: *Strengths, Weaknesses, Opportunities and Threats (SWOT)* analysis for recruitment strategy.

Recruitment approach	*Strengths*	*Weaknesses*	*Opportunities*	*Threats*
1. Direct contact with pharmacies and general practices	- Quick response - More personal - More inclusive - Less biased	- Time-consuming (for CP/GP and researcher)	- Tailored explanation of the study - Feasible in a specific geographical area (e.g. South West region of England)	- Receptionists or pharmacy staff "gate-keepers" - Miscommunication of the study concept on the phone - No response/unreturned calls
2. EOI call dissemination via professional bodies (i.e. RPS for pharmacists and RCGP for GPs)	- More inclusive - Less biased approach - Professional bodies' support strengthening study's status	- Slow response (via third party) - Less personal - Membership to professional bodies is not mandatory for CPs; additional pharmacy organisations would have to be contacted[5]	- Engagement of larger organisations with the project - Local representative groups and their online platforms can be used if the call is not centrally disseminated (see approach 3 below)	- GDPR limitation (organisations unable to disseminate third-party emails) - Emails could be considered as "spam" or "junk" - No response or unreturned follow-up emails
3. EOI call dissemination via professional bodies' regional groups[6]	- More targeted - Less biased approach - Professional bodies' support strengthening study's status	- Slow response (via third party) - Less personal - Currently low uptake and LPFs not very active - Membership to professional bodies is not mandatory for CPs; LPCs would have to be contacted	- Engagement of larger organisations' local teams with the project - Direct contact with groups' leaders could encourage promotion of EOI call	- Emails could be considered as "spam" or "junk" - No response or unreturned follow-up email - Low response due to participants' low interest in involvement with local teams
4. EOI call dissemination via professional network of contacts	- More targeted - More personal - Quick response	- More biased approach	- Using social networks (e.g. twitter) to make EOI call more inclusive and less biased - Tailored explanation of the study	- Potentially slow response (via third party) - No response/unreturned calls/emails

Abbreviations: CCGs = Clinical Commissioning Groups; CPs = Community Pharmacists; GDPR = General Data Protection Regulation; GPs = General Practitioners; LPCs = Local Pharmaceutical Committees; LPFs = Local Practice Forums; NPA = National Pharmacy Association; PCNs = Primary Care Networks; PDA = Pharmacists' Defence Association; PSNC = Pharmacy Services Negotiating Committee; RCGP = Royal College of General Practitioners; RPS = Royal Pharmaceutical Society

[5] Additional pharmacy/pharmacists' organisations include: PSNC, NPA and PDA
[6] RPS' LPFs, PSNC's LPCs, RCGP's Faculties or managers supporting GPs/CCGs in establishing PCNs

Once ethical approval by the "NHS North of Scotland Research Ethics Committee (1)" (REC reference: 19/NS/0184) and the Health Research Authority (IRAS project ID: 265760) was received (Appendix 3), eligible community pharmacists and GPs, who had responded to the EoI call, were approached to confirm their participation in the study. They were provided with the participant information sheet (Appendix 4) and were given the opportunity to discuss any queries. If they agreed to participate, they were asked to complete a consent form (Appendix 5). This was the recruitment process for patients, who had received services as a result of the collaboration and, as such, were asked to participate in interviews. Similarly, community pharmacy and general practice staff were also asked to participate in interviews to explore their perspectives on how they were affected by the collaborative models. The data derived from the above activities formed a case study that described the community pharmacist-GP collaborative model at each site.

3.2.2 Data collection

One researcher (ML) undertook data collection using observation and interviews at each participating site. Direct observations of community pharmacists and GPs were conducted when they were working together - which could be based on an oral or written collaborative agreement. For example, this included patient consultations and staff meetings at participating general practices and community pharmacies. Verbal consent was obtained from those present at the time of the observations (e.g. from the patients receiving a collaborative service or staff members attending a meeting). Observations were used to understand workplace processes (i.e. the practicalities of collaborative working), to capture interactions and relationship dynamics between participants (i.e. community pharmacists, GPs and staff). As such, the observations were unstructured.

In-depth interviews were conducted with collaborators involved within the model and other stakeholders impacted by the collaboration. These included community pharmacist(s); GP(s); patients (who had received the collaborative service, if there was one); general practice; and community pharmacy staff. In-person interviews were conducted on the day(s) of observations or, if that was not possible, by phone at a suitable time for the participants. An interview guide (Appendix 6) was used to gain a deeper understanding of the participants' roles and how they were affected by the collaboration. It was piloted by members of the supervisory team and an ad-hoc patient and public

involvement group consisting of a patient representative, a trainee doctor, and a pharmacist. This topic guide was informed by the literature, the systematic review findings, and evolved throughout the study in response to study findings. The combination of observations and interviews with multiple stakeholders allowed triangulation of collected data (Eisenhardt, 1989a; Yin, 2018).

Data collected during observations was hand-written in a notebook and then typed into Microsoft® Word (ML). Interviews were recorded using a digital audio recorder and then transcribed (ML) on Microsoft® Word; the lead supervisor accuracy checked the first two interviews (PJR). All files were anonymised and stored in a password-protected folder. Hard copies of data (i.e. original notes and consent forms) were stored in a locked office. The hard copies of the hand-written notes were retained until the end of the PhD; digital anonymised copies of handwritten notes will be archived for at least 10 years (as per University of Bath Policy). Any identifiable information and its linked data (using unique participant ID numbers) was stored in a separate password-protected Microsoft® Excel file (saved within a password-protected folder); any files used during analysis only contained unique participant ID numbers. These ID numbers were coded as profession-years of experience (in current role or since qualifying)-case study reference number (e.g. GP-12-01 was for a GP who had been practicing for 12 years and was part of the first case study).

3.2.3 Data analysis

The Gioia Methodology (Gioia et al., 2012), which provides a structure for building theory, was the theoretical framework employed to data analysis. This approach was chosen because it reflected real practice, was based on participants' experience and views, and highlighted relationship dynamics. This resonated with the healthcare field as community pharmacist-GP collaborations are highly affected by their professional duty for patient care provision and fluctuating daily workload and pressures. The Gioia Methodology (Gioia et al., 2012) was based on the grounded theory approach for research design and data collection (Glaser and Strauss, 1967). It also provided a stepwise two-level analysis of data; firstly, analysis of what participants said, which was then interpreted by the researcher as part of theory development.

As per research protocol (Appendix 7), thematic analysis (Britten et al., 1995; Pope et al., 2000) and the Gioia Methodology (Gioia et al., 2012) were used as mechanical frameworks. Analysis within each case was undertaken by applying these frameworks (Table 4). This enabled the assessment of links between the model's characteristics and its impact on stakeholders. Identified themes were then mapped within the theoretical framework of micro, meso and macro levels of innovation adoption (Section 1.4.1, p. 24).

Table 4: Mechanical framework used during within-case analysis (adapted from Gioia et al., 2012).

Step	*Key features*
Research design	• Defined phenomenon being studied and research questions. • Establishing relevant literature (conceptual models and systematic literature review), with the view of expanding knowledge and evidence.
Data collection	• Participants in interviews and those present during observations were the key informants on the phenomenon ("knowledgeable agents"); their voice preserved throughout data collection and analysis. • Interview guide was adjusted when necessary based on informants' responses and circumstances (e.g. impact of coronavirus pandemic). • Where possible (e.g. within the same case study), "backtracking" to previous participants to explore information that arose from subsequent interviews/observations.
Data analysis	• Data from interviews and observations used for process mapping each case study collaborative model. • Each case study's interviews and observations coded using thematic analysis principles (Britten et al., 1995; Pope et al., 2000). • Coded data organised in 1st order concepts ("informant-centric terms"), using informants' words to preserve their voice. • 1st order concepts grouped into 2nd order themes ("theory-centric"). • 2nd order themes grouped into overarching aggregate (theoretical) dimensions
Grounded theory articulation	• Analysed data presented according to research aims and objectives within micro, meso, and macro level. 1st order concepts, 2nd order themes and aggregate dimensions summarised in a "data structure" for each case study. • Dynamic relationships emphasized between participating actors and amongst 2nd order themes and aggregate dimensions. • Cross-case analysis informed by within-case findings to identify patterns of these relationships.

Cross-case analysis was then undertaken by adopting a Qualitative Comparative Analysis (QCA) approach to identify patterns of the relationship between participants, context, nature of collaboration and its performance (this is presented in Chapter 4). Inferences were made based on Levi-Feur's strategy (2006) of "Most-Similar System Research Design (MSSD) and Mill's Method of Difference (MMD)". This allowed comparisons between cases with similar context, which in this research was primary care (MSSD), to detect factors influencing performance, while taking into account the variable outcome of different levels of performance/success (MMD).

Levi-Faur's heuristic (2006) of comparative analysis was used to maximise internal validity. This was applied in the context of the case studies (collaborating community pharmacists and GPs), which were set in similar systems (primary care in England). MMD maximised external validity, due to the case studies' variable outcome (i.e. performance/success of the collaboration) (Levi-Feur, 2006). It allowed identification of key aspects contributing or hindering the collaborative models' success. Although findings from such qualitative research may not be widely generalisable, there may be contingent factors which could be adopted by practitioners in settings with similar characteristics. However, the principles of "most-similar-systems" and "Mill's Method of Difference" were used as a framework to qualitatively distinguish causal pathways, i.e. starting from a cause, which led to a certain outcome through different mechanisms). Data were analysed using QSR International's qualitative data analysis software NVivo 12 (2018) and, later, NVivo Release 1.0 (2020). As noted above, the Gioia Methodology (Gioia et al., 2012) guided analysis of the data collected within each case. As part of this method, qualitative data from observations and interviews was transcribed and coded. Dual coding of the initial three interviews (one with a community pharmacist, one with a GP and one with a patient) were completed by a member of the supervisory team (ABJ, PJR and MW, respectively). The developing coding framework was discussed with the supervisory team. A reflective research diary was maintained to record the researcher's standpoint and to capture key decisions made during the data collection phase.

3.3 Results of case studies' within-case analysis

In total, four case studies were conducted. The first three included all the minimum required participants (i.e. one community pharmacist and one GP). In Case Study IV, a GP could not be interviewed due to the Covid-19-pandemic-related workload (Appendix 8). A summary of the participants of each case study is presented in Table 5 and participant identification codes are shown in Table 6. The case studies are presented in descending order of the richness of collaborative relationship, starting with the deepest collaborative relationship (Figure 7, p. 107). This positioning was based on the conceptual pharmacist-physician collaborative models presented in Section 1.3 (p. 22).

Specific details regarding the collaborative models of each case study are presented in the relevant sections below (3.3.1-3.3.4, pp. 109-162), each of which is structured as follows:

- Description of participating sites, participants and the collaborative working within that case study.
- Key themes identified relevant to the aim and objectives of this research (i.e. the collaborations' drivers, purpose, barriers and facilitators, evaluation measures) and aligned to the three levels of analysis: micro (individual staff and collaborators), meso (collaborating organisations) and macro (wider society, including patients) levels (Section 1.4, p.24).
- Summary of the impact on stakeholders involved, i.e. healthcare staff, patients and the public.

Table 5: Summary of each case study's participants and main collaborative activity description.

Case Study	Collaborative activity	Participants	Participant's role
I	Pharmacy: in the same building as the practice; owned by some of the GP partners; has access to the practice's software and patient medical records. CP delivers service on behalf of GPs.	General practice staff: GP Clinical pharmacist Pharmacy technician Receptionist manager Receptionist Community pharmacy staff: CP Pharmacy technician	 GP, practice partner, director of pharmacy Medicines optimisation; polypharmacy patient reviews Medicines reconciliation following discharges, prescription requests Manager of reception staff team Reception desk, phone queries; member of practice prescribing team Superintendent community pharmacist, Independent Prescriber Managing pharmacy dispensary, staff rotas and other delegated tasks by CP
II	Pharmacy and practice located approximately 2 miles apart; CP contracted part-time to mostly work remotely for practice (accessing practice's software from within the pharmacy)	General practice staff: GP Clinical pharmacist Community pharmacy staff: CP Patient	 GP working in and out-of-hours Line manager for CP's part-time role; medicines reviews, quality improvement Superintendent CP, IP, and part-time work for general practice Single cardiovascular condition
III	Small multiple pharmacy company seconding CP employees to general practices and offering services which in some branches involve remote prescribing (privately). Part-time CP's split working week in two general practices and his pharmacy (company branch and practices are approx. 1.5 miles and 20 miles apart)	General practice staff: GP GP trainee Reception manager Community pharmacy staff: Part-time CP Full-time CP Patient	 Long-term regular locum GP at practice co-located with pharmacy Doctor in final year of GP training Manager of reception staff team Pharmacy company director and superintendent CP, IP, split role in owned community pharmacy and two general practices as a clinical pharmacist Pharmacy company director and owner CP, IP Elderly patient who uses the practice and pharmacy with multiple chronic comorbidities
IV	Pharmacy adjacent to general practice; CP and practice manager and pharmacist working on improving the pharmacy-practice relationship	General practice clinical pharmacist Community pharmacist Patient carer	Medicines optimisation; polypharmacy patient reviews Pharmacy manager for 16 years; highly involved with LPC Carer of patient using the practice and pharmacy (multimorbidity, polypharmacy)

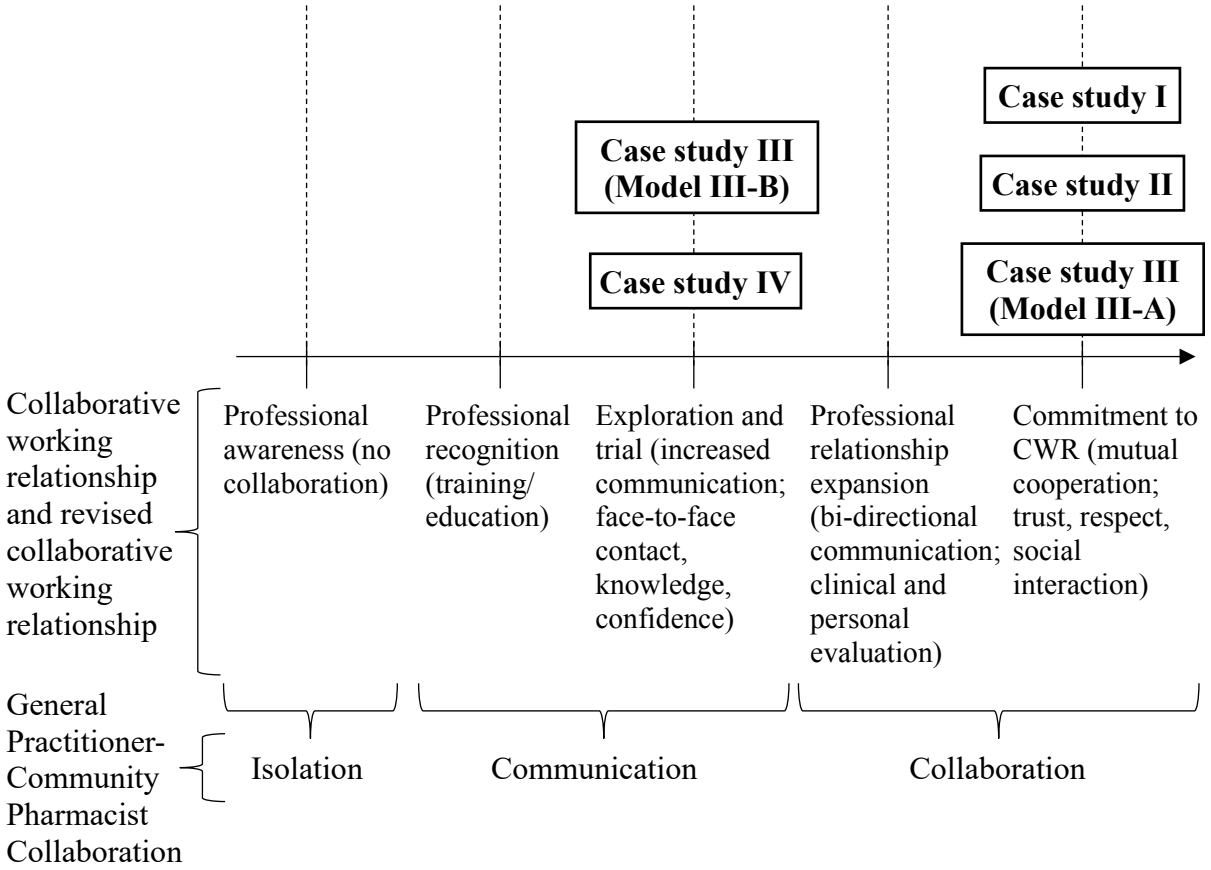
Abbreviations: CP = Community Pharmacist, GP = General Practitioner, IP = Independent Prescriber; LPC = Local Pharmaceutical Committee

Table 6: Participants' identification code.

Case Study / Participants	I (n=7)	II (n=4)	III (n=6)	IV (n=3)
General practice staff:				
GP	GP-20-01 (m)	GP-05-02 (m)	GP-03-03 (f)	-
GP trainee	-	-	GPReg-03-03 (f)	-
Clinical pharmacist	GPPcist-30-01 (m)	GPPcist-11-02 (m)	-	GPPcist-03-04 (m)
Pharmacy technician	GPTech-02-01 (m)	-	-	-
				-
Receptionist manager	GPRecMan-06-01 (f)	-	-	-
Receptionist	GPRec-04-01 (f)	-	GPRec-06-03 (f)	-
Community pharmacy staff:				
Part-time CP	-	CP-06-02 (m)	CP-29-03 (m)	-
Full-time CP	CP-10-01 (m)	-	CPDir-33-03 (m)	CP-16-04 (f)
Pharmacy technician	CPDispMan-05-01 (m)	-	-	-
		Patient-02 (m)		
Patient	-	-	Patient-03 (m)	-
Patient Carer	-		-	PatCarer-04 (m)

Abbreviations: CP = Community Pharmacist; GP = General Practitioner; f = female; m = male

Figure 7: Case studies' collaborative relationship spectrum.



Abbreviations: CWR = Collaborative Working Relationship (McDonough and Doucette, 2001);
rCWR = revised Collaborative Working Relationship (Dey et al., 2011);
GPCPC = General Practitioner-Community Pharmacist Collaboration (Bradley at al., 2012)

3.3.1 Case Study I

The first case study comprised one general practice (eight GP partners, serving a population of approximately 18,000 patients) and one independent community pharmacy (owned by four of the GP partners; approximately 15,000 items per month), which were co-located in the same building. The Whole Time Equivalent (WTE) was eight for GPs and one for the practice-based pharmacist.

Data were collected during three days of observations and six in-depth interviews (Table 7). One of the interviews was conducted with the receptionist and the reception manager in one session at their request due to staffing problems.

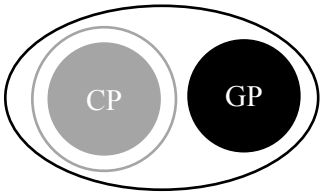
Table 7: Data collected during Case Study I.

Data collection method	Participant/location	Duration
Observations	Pharmacy - dispensary General practice Pharmacy technician Clinical pharmacist Reception	6 hours 4 hours 3.5 hours 5.5 hours
Interviews	General practice GP Pharmacy technician Clinical pharmacist Reception manager and receptionist Community pharmacy Community pharmacist Dispensary manager	 30 minutes 1 hour 30 minutes 30 minutes 1 hour 20 minutes

3.3.1.1 Collaborative working activities

The nature of collaboration identified in this case study included activities undertaken by the community pharmacist or other pharmacy staff on behalf of GPs and other practice staff. These included the contraceptive "pill check" (pharmacist), accessing the practice's software and patients' medical records (following consent) to directly request urgent prescriptions, synchronise medicines' quantities, and to respond to patient hospital discharge queries (pharmacist and other trained pharmacy staff). Requesting prescriptions did not include requesting outstanding monitoring (e.g., blood tests) – this was done by the practice-based pharmacy team. Figure 8 shows the arrangement of this case study's collaborative working.

Figure 8: Graphical representation of collaborative working - Case Study I.



Legend: O collaborating general practice (● GP partners co-own the co-located pharmacy); O community pharmacy, ● community pharmacist

The collaboration overall was characterised by the digital integration of the two organisations, and the pharmacy team (including the community pharmacist) acting as information resources. The purpose of establishing IT system integration was because the GPs believed that sharing patient data (following consent) could facilitate service provision for patients and allow the pharmacy team to provide patient care using up-to-date information. It should be noted here that community pharmacists do not normally have full access to patients' medical records, which are held by the patients' general practice (NHS Digital, 2020).

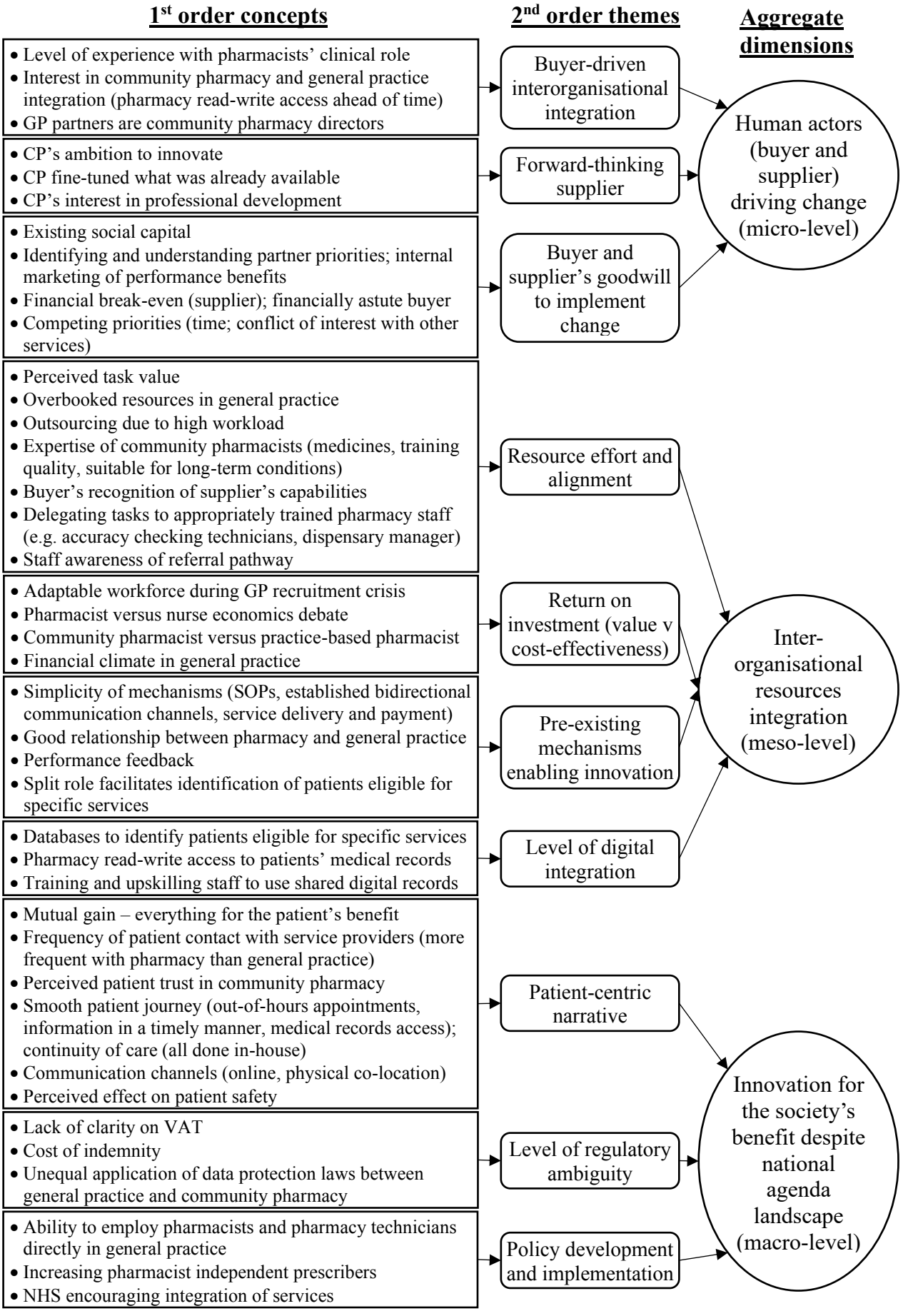
> *"pharmacy* [sic] *can look at blood test results, we can look at things on repeat, simple things […], to GPs maybe they don't see that it matters but to the patients […] when their meds are out of line, out of sync […] it actually causes confusion, […] it's a simple thing for us […]."* ***CP-10-01***

Asthma reviews also used to be delegated to the community pharmacist by the practice (similarly to the "pill check"). However, this service had discontinued three years prior to the time of data collection. Another discontinued collaborative activity included the community pharmacist's practice-based role (five years prior to the time of data collection). This involved a weekly clinic (three hours per week) to conduct reviews with patients suffering from asthma, chronic obstructive pulmonary disease and hypertension; and working towards the QOF (Section 1.2.1, p.16).

3.3.1.2 Key themes identified

The main themes arising from Case Study I are presented here and are summarised in the Data Structure of this section (Figure 9). This illustrates the aggregate theoretical dimensions, which were created based on participants' viewpoint using their words (1st order concepts) and then grouped into overarching conceptual themes (2nd order themes)

Figure 9: Data structure for Case Study I.



(Gioia et al., 2012). These were analysed in three levels of the research context: micro-level actors, meso-level (buyer-supplier) organisations and macro-level societal impact (Section 1.4, p.24).

Participants' responses regarding collaborative working included: human actors (buyer and supplier) driving change (micro-level); interorganisational resources integration (meso-level); and innovation for the society's benefit despite national agenda landscape (macro-level). The micro level 2nd order themes included buyer-driven interorganisational integration; forward-thinking supplier; and buyer and supplier's goodwill to implement change (Section 3.3.1.2.1, p.112). Meso-level themes focused on resource effort and alignment; return on investment (value versus cost-effectiveness); pre-existing mechanisms enabling innovation; and level of digital integration (Section 3.3.1.2.2, p.114). Macro-level referred to patient-centric narrative; the level of regulatory ambiguity; and policy development and implementation (Section 3.3.1.2.3, p.119).

3.3.1.2.1 Human actors (buyer and supplier) driving change (micro-level)

At the "micro level", the collaborative activities of this case study were primarily driven by the innovative organisations involved. In particular, this referred to the practice's GP partners having a "pro-pharmacy" attitude and the forward-thinking community pharmacist.

Buyer-driven interorganisational integration

The first 2nd order theme at the micro-level considers the individual actors' involvement in establishing and driving the collaborative activities. This played a key role in enabling integration of their organisations. The buyer's main driver for collaboration was his interest in better integration of pharmacy services; and his experience with education, training and working with pharmacists. Education itself enabled collaboration, as the GP was the community pharmacist's supervisor as part of the Independent Prescribing course (five years ago). Collaborative activities on behalf of the GP or the practice (e.g. pill check) were in place prior to the participating community pharmacist working at that pharmacy (nine years ago). The purpose of establishing IT system integration was because the GPs believed that sharing patient data (following consent) could facilitate service provision for patients, and allow the pharmacy team to provide patient care using up-to-date information.

"[…] so the owners of the pharmacy are the GPs and they are very pro pharmacy, actually. […] They want us to be involved in all the process. […] partially it comes from the doctors and partially from [CP's name]. I'd say quite a lot of it is the doctors." ***CPDispMan-05-01***

Forward-thinking supplier

The second 2nd order theme at the micro-level considers the community pharmacist as the forward-thinking supplier. The buyer's drivers were complemented by the supplier's enthusiasm for innovation and professional development, while utilising what was readily available. Three staff members were not aware of the collaboration drivers as they were not employed by either organisation at the time of the collaborative activities' establishment. However, they believed that the pharmacist was able to work towards what would be normal practice in the future.

"I think [CP] was kind of looking to the future, knowing that prescribing roles are going to become more common for pharmacists. So he did his [independent] prescribing fairly early." ***GPTech-02-01***

Buyer and supplier's goodwill to implement change

The final 2nd order theme at the micro-level highlights the existing social capital and both actors' goodwill to implement change. It is evident that the understanding of one another's priorities and financial negotiations were key enablers for collaboration. A facilitator for ongoing collaborative working was identifying the priorities for each partner. By experiencing both organisation's environments, the community pharmacy team was able to identify areas that they could help the surgery with. Similarly, general practice staff could improve their service by being more aware of pharmacy operations. This was achieved, for example, due to a part-time role in pharmacy and general practice, or through staff exchange.

"This is what we're trying to do on our side and if anything you can do to help towards that or understand why we do what we do then it makes the whole thing better for the patient." ***GP-20-01***

"[…] seeing how the other- how they work. And so then, you know, and sort of, adapting that to how we can work. So it's like, it always feels like we're working together and not necessarily in competition." ***CP-10-01***

Time was considered an important aspect for making changes in the way of working. There were competing demands on time for healthcare professionals due to the system creating time inefficiencies or due to competing priorities. These included conflict of interest with other services and unexpected demand for community pharmacists. Time was also identified as a barrier to progressing existing or developing new collaborative activities.

> *"I was looking before the end- 2017 to maybe find a way to get back to prescribing again in a clinic but then the cutbacks were announced […] I just put it all to the back of my mind. […] I think we've hit a bit of a brick wall in terms of advancing any services in the last couple of years."* ***CP-10-01***

Participants emphasised that personal introductions, being open-minded, and both parties being enthusiastic about working together remained key aspects of collaborating. Doctors' attitudes towards community pharmacists remain a substantial impediment. As such, this case study's rich relationship between the general practice and the co-located pharmacy might be isolated from the rest of standard practice.

3.3.1.2.2 Interorganisational resources integration (meso-level)

The impact of micro-level changes was obvious within the meso-level interorganisational integration of operant (i.e. human) and operand (e.g. technological) resources. This was achieved through: a close examination of workload pressures on the buying organisation; and balancing the required task effort (i.e. the type of activity that could be delegated to the supplier), the available suppliers (resource alignment) and their value added versus cost-effectiveness (return on investment). Key facilitators for continuing innovative collaborative activities included utilising pre-existing mechanisms, such as the rich practice-pharmacy relationship; exchange of operant resources between the organisations; and the level of digital integration.

Resource effort and alignment

The first 2nd order theme at the meso-level reports resource effort and alignment in general practice. Participants discussed this in the context of services delegated to the community pharmacist (i.e. "pill check"), and their trained staff members (i.e. access to patients' practice medical records). This was due to the low value perceived by GPs for that

service; lack of resources in the practice (staff, appointment availability); or high overall workload that led to outsourcing the service provider.

> *"[…] the nature of pill checks, a lot of women run out or are about to run out in a couple of days you know they can come in the night or in the morning and we just do them. […] Nurses don't have a lot of appointments, GPs don't really want to be seeing routine pill checks necessarily. So […] the surgery is sort of happy to source it out"* ***CP-10-01***

Pharmacy resources alignment primarily described the delegation of tasks to available operant resources in the pharmacy. In particular, the community pharmacist's expertise in medicines, their quality of training and adaptability, were considered crucial during the ongoing GP recruitment crisis. Other facilitators were the highly trained pharmacy team, which allowed the community pharmacist to dedicate time to patient consultations (in addition to routine services).

> *"I thought we've got somebody else, in our clinical workforce that we can adapt and use, which is in times of recruitment crisis in primary care really useful to know"* ***GP-20-01***

> *"So I think [the GP partners] identified, when […] they set up the pharmacy within the building […], that there were benefits to having [pharmacy team] […] in the building and using them for their expertise."* ***GPPcist-30-01***

All participants expressed their views on potential areas of improvement for this collaborative model. Fully integrated pharmacy and practice were supported by three participants (GP-20-01, GPPcist-30-01, GPRecMan-06-01). This "full integration" related to how independent prescriber community pharmacists should be able to have read-write access to patients' practice records to be able to directly fulfil medication requests and prescribe (on the NHS) within the pharmacy.

Shared education in practice with protected time for this was expressed as another area which could contribute to improving understanding of partner's operations. This in turn was believed to allow better engagement in collaborative activities as it would allow actors to identify areas that they could add value to. Other improvements focused on process (staff training and upskilling, patient education on visiting pharmacy first), and delegating more services to the pharmacy collaborator.

Return on investment (value versus cost-effectiveness)

The second 2nd order theme at the meso-level highlights the importance of financial aspects in driving collaborations. Financial barriers were also discussed by the majority of interviewees (4/7), who raised the issues of discontinuing a collaborative activity when neither side benefited financially anymore. One participant also discussed the financial climate as a barrier to collaborative working and benchmarking of financial incentives when choosing service availability.

> *"The biggest hurdle for community pharmacies is always payment, isn't it? What reimbursement is the pharmacy going to get out of that? Is that worthwhile to the pharmacy, the pharmacist time? Unfortunately, it does come down to that. It is a fact of community pharmacy."* ***GPTech-02-01***

> *"You have to sort of negotiate properly, understanding the finance from [the practice's] point of view and not just from my point of view, and I could see initially it was not going to work because […] financially neither side […]. It stopped, essentially!"* ***CP-10-01***

Four participants discussed logistical barriers such as community pharmacists' difficulty in demonstrating their value (under-reporting their work because they are busy or do not approach surgeries to discuss their capabilities). In terms of operant resources, barriers included lack of appropriately trained staff to signpost patients to the pharmacy service(s) or staff's lack of awareness of available services (e.g. due to change in personnel). Alternative service provision by other resources, such as reallocating clinical areas and tasks commonly occupied by nurses to other providers (e.g., pharmacists), was discussed as a potential issue that could lead to conflict between different suppliers.

Pre-existing mechanisms enabling innovation

The third 2nd order theme at the meso-level was the simplicity of the model's operation. It was centred on the easy and efficient communication (direct tasks to GPs via practice software or in-person resolution of problems); and patient access to the pharmacy services. This was particularly evident during the observations in this case. Individual participants mentioned the type of service being straightforward. This included the clear purpose and patient eligibility facilitating the delivery of the service, and the simplicity of the payment process.

"[…] they can task each other [on the practice IT software]. […] How would another pharmacy do that? It's tricky. They would have to come in and maybe write a note or make a phone call, but [this practice and pharmacy] have got back two-way communication. Which is invaluable I would say for our patients." ***GPRecMan-06-01***

"We do use pharmacy a lot, especially if we're at the front desk. It's easy for us to say, 'can you go and speak to them in the pharmacy' and [the patient] can refuse you'll be like 'oh, I'll go and speak to them'. So you go. And then they're like, 'Oh, [the pharmacy team] are waiting for you.' And they will fix it." ***GPRec-04-01***

The organisations' co-location and co-ownership allowed earlier steps in forming a collaboration to be bypassed, such as engaging collaborators and negotiating. The existing social capital between the pharmacy and the practice referred to the well-founded practice-pharmacy relationship, the "good team", and the in-house pharmacy, which offered out-of-hours services. Lack of existing social capital, including lack of trust, and inability to understand the benefits of a collaboration, were considered potential barriers to collaborative working.

"We are quite unique in that we've got the in-house hundred-hour pharmacy and we've always tried to keep the collaboration close" ***GP-20-01***

"But because we are the hundred-hour pharmacy downstairs, it's just so much more valuable because the patients don't have to take time off from work to come in and do it." ***GPTech-02-01***

"I think when you know, we know everyone in the pharmacy so well, so you know, there's trust there. Because you are dealing with people's health. But with other pharmacies, you don't know how they were, or what their attitudes are." ***GPRec-04-01*** *(****GPRecMan-06-01*** *agreed with this statement)*

As a result of collaborative working, it was apparent throughout this case study that there was improved system integration of the practice and the pharmacy (not only technological but also relational and operational). Key sub-themes here were increased understanding of partner's operations, streamlined processes due to the shared patient records, and easy bi-directional communication in the best interest of the patient.

"Although we work in separate organisations actually there's a joined up, shared understanding of what we're trying to achieve for the patient. […] So for me that was really powerful." ***GP-20-01***

"If you appreciate what their procedures and their protocols and what they have to deal with, you know, you end up tailoring, if you want to do the right thing, your systems and processes to kind of compliment that. […] And it's just by talking to each other […] you get to a point where they know what they can give to the pharmacy to, for us to help them out." ***CP-10-01***

Lack of communication was mentioned by participants in reference to standard practice within community pharmacies and general practices. This could lead to difficulties in patient care. However, on this site the relationship was perceived positively both between the patient and the pharmacy, as well as the pharmacy and the general practice. This also related to the perceived success of the service.

"And I think, um, [pharmacy name] is a particularly shiny example of how […] a close working relationship with the surgery can work really well. […] It was quite eye opening that there is a great deal of trust that patients give community pharmacy. And if they're happy for them to view the whole medical record, erm […] Yeah." ***GPTech-02-01***

There was lack of targeted evaluation of the services provided by the community pharmacist and the pharmacy team. The practice-based pharmacist's work on polypharmacy reviews with multimorbid patients, who were identified through the use of a database (ePACT2 data), was evaluated. However, that was outside of the remit of this research due to this pharmacist's full-time role at the practice. During observations and interviews some of the participants mentioned the importance of auditing activities. This allowed reimbursement, evaluation of value added by the community pharmacist and his team, and provided an audit trail of the patient's journey. The general practice communicated the frequency of collaborative activities to the community pharmacist monthly as a form of feedback on performance.

"Anything we do, sync meds, correct it to repeat template, stop med[icine]s [be]cause there's been a discharge with a tray or anything like that, we put a message about what we're doing under the [pharmacy name initials] query code [on the practice IT software]. So that re-code then is something that they can audit. […] Some months we can do like 90 events of those in a month." ***CP-10-01***

"And sometimes it's good for the GPs to see that we did signpost them there. And it wasn't us that booked them in because we can then put "advice by pharmacy". […] So it's good to have that back up." ***GPRecMan-06-01 and GPRec-04-01***

Level of digital integration

The final 2nd order theme at the meso-level specifically focused on digital system integration. The key points were technology and the co-located pharmacy. At this point it is important to bear in mind this form of collaboration was probably one of few, where the pharmacy's read-write access to patients' medical records was ahead of the national agenda. This facilitated communication and allowed the patient to be reviewed, collect their prescription and medicines during one visit.

"Again, the benefit for that is being open, open long hours and again, access to SystemOne being able to do all those things and deal with it there" ***GPTech-02-01***

3.3.1.2.3 Innovation for the society's benefit despite national agenda landscape (macro-level)

The macro-level context of this research examined adopting innovative practices (here, GP-community pharmacist collaborations) and how they influence changes in society. Despite ambiguity in regulatory aspects, participants recognised NHS' movement towards integration of healthcare services and more specifically in pharmacy. Examples of such regulatory ambiguities included payment of Value Added Tax (VAT) for healthcare service providers, and the gap from policy development to implementation.

Patient-centric narrative

The first 2nd order theme at the macro-level referred to patient-centred narrative, which was mentioned in all interviews. This has been shown in earlier quotes, where there is a strong feeling of working collaboratively towards what is best for the patient rather than financial gain. For example, participants referred to being able to interact with patients potentially more frequently in the pharmacy compared to the practice, caring about the community regardless of custom to that pharmacy and that generally *"everybody comes to work to try to do their best for their patients"* ***GPPcist-30-01***.

"[…] if a community pharmacist understands what we're doing in general practice it massively boosts your confidence in the overall care that patients get in between

the interface, between doctors seeing them and actually get, picking up their prescriptions." ***GP-20-01***

Patient satisfaction with general practice and community pharmacy services was explored through the yearly relevant patient surveys. However, these surveys did not include any specific questions on the collaborative activities discussed in this research. In addition to this, opportunistic mention of experiences with the collaborative services was not found during screening of the surveys' published findings.

Level of regulatory ambiguity

The second 2nd order theme at the macro-level focused on financial barriers. Participants reported these in terms of indemnity insurance and regulations on VAT. The increased cost of indemnity insurance was related to the community pharmacist's practice-based part-time clinic and was one of the reasons that model was discontinued. The GP and community pharmacist discussed the need for more clarity on services delivered by the community pharmacist on behalf of the general practice, as this could allow better service provision planning.

Moreover, the issue of equal data access was raised again regarding future services delegated to community pharmacies. This meant increasing trust in sharing patient data with community pharmacy/pharmacists. As a result, this would allow them to provide services using the most up-to-date information about the patient.

"If we're going to use community pharmacy to do some clinical roles, on behalf of the public within that PCN, they're going to have to have access to, read and write access, to the record." ***GPPcist-30-01***

Trepidation about opening read-write access to community pharmacists (by other healthcare professionals or patients) was acknowledged by most participants. The unequal application of data laws to GPs versus community pharmacists was viewed as a key barrier by most participants (5/7).

"When CQC [Care Quality Commission] first started doing inspections that was around the time we had started our pharmacy […]and when we had a pilot CQC inspection […] they[said] '[pharmacy access to patients' practice records] is like, outrageously bad and this is appalling' […]. That was a big barrier that we thought

was going to be a problem but… now everybody is sort of catching up and trying to do the same really." ***GP-20-01***

Policy development and implementation

The final 2nd order theme at the macro-level was predominantly discussed by three participants. They alluded to general collaboration initiation enablers. These enablers could contribute to improving the relationship between community pharmacists and GPs or practices. They suggested that the recent launch of PCNs, based on the NHS Long Term Plan (2019), could be a good opportunity for pharmacists to become more involved with their nearby practices.

The national agenda of pharmacists working with GPs was identified as both a facilitator and a barrier by participants. The success of the ceased collaborative activity (community pharmacist's part-time practice-based clinic) evolved into a full-time role. The practice-based pharmacist was recruited as part of this, to undertake that workload. Participants discussed how this coincided with the natural progression of pharmacy integration, i.e. the launch of national policy on practice-based clinical pharmacists (Mann et al., 2018).

"I do know that obviously me and [practice-based pharmacy technician's name] being here is just an evolution of what they'd already started." ***GPPcist-30-01***

Four participants discussed logistical barriers such as the lack of a platform allowing community pharmacist independent prescribers to prescribe (NHS prescriptions) from the pharmacy. This linked to the GP's suggestion on utilising patient activation as a potential facilitator. This referred to community pharmacist taking over management of well-activated patients, who are in good control of their medical condition and treatment.

"I would say my dream model would be to have linked fully integrated community pharmacy and practice with a fully running community pharmacy-led service with well-activated patients with single long-term conditions and I'd have my [practice-based] pharmacist doing the multimorbidity polypharmacy in practice." ***GP-20-01***

3.3.1.3 Collaborative models' outcomes and impact on stakeholders

All participants discussed how they and their patients have been affected by collaborative activities taking place between the practice and the pharmacy. It was not possible to recruit patient participants, as such this case study does not have direct evidence of the

patients' viewpoint. Table 8 summarises the impact on stakeholders in terms of clinical, process and financial outcomes.

Table 8: Impact on stakeholders affected by the collaborative activities in Case Study I.

	Clinical outcomes	Process outcomes	Financial outcomes
Pharmacy staff	Professional development Better decision making for patient care	Demonstrating value Staff satisfaction Increased workload	Business gain
General practice staff		Reduced workload Staff satisfaction Higher appointment availability	
Patients	Patient safety Continuity of care	Smoother patient journey Patient satisfaction	

3.3.2 Case study II

Case study II explored the collaborative model of a community pharmacist working part-time for a general practice. The two organisations were located in different areas; the community pharmacy (part of an independent company with four branches, dispensing approximately 6,000 items per month) was in a district of the same city, and the general practice was in the city centre (nine part-time GPs, with over 10,000 registered patients within young demographics due to central location). The WTE was four for GPs and two for practice-based pharmacists at the time of data collection.

The general practice was characterised by its flat hierarchy as it was not partnership-led and instead had a GP clinical lead. The practice was part of a limited company, which owned two practices and offered other community-based services (e.g. contracted to provide out-of-hours services). The practice's pharmacy team included three pharmacists: one was based across two practices of the company; the second one worked there on behalf of the CCG (focusing on medicines management); and the third one was the participating community pharmacist, who worked for the practice part time (initially 18 hours per week, which was later reduced to nine hours per week). Data were collected during eight and a half hours of observations and four in-depth interviews (Table 9).

Table 9: Data collected during Case Study II.

Data collection method	Participant/location	Duration
Observations	Pharmacy – dispensary	8.5 hours
Interviews	General practice GP Clinical pharmacist Community pharmacy Community pharmacist Patient	 1 hour 30 minutes 1 hour 45 minutes

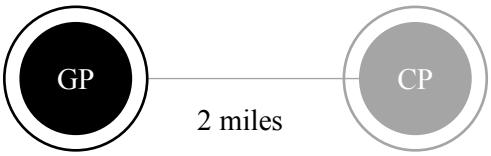
The participating patient had a chronic condition treated with two regular medicines. He used the community pharmacist's services in the general practice initially. Unknowingly of the community pharmacist's split role, he started using his pharmacy services too, and a year later he found out that the pharmacist was working across the two organisations. This did not affect the quality and safety of practice and pharmacy care provision. Notably, the patient changed to this pharmacy following unsatisfactory previous experience with two other pharmacies:

- the practice's co-located pharmacy (part of a large multiple pharmacy company group) lacked practice-pharmacy and pharmacy-patient communication, and
- an online pharmacy, where he was unable to use his exemption certificate

3.3.2.1 Collaborative activities

This case study explored a collaborative model where the community pharmacist has been employed by the general practice to relieve some of the GPs and practice-based pharmacist's workload (Figure 10). This was another example of commitment to the Collaborative Working Relationship (Figure 7, p.107), where the supplier was contracted by the buying organisation to provide clinical expertise. The difference of this to Case Study I was that the contract here was between the practice (buyer) and the individual community pharmacist (supplier) – whereas in the previous case study the collaborative agreement was between the two organisations (general practice and community pharmacy).

Figure 10: Graphical representation of collaborative working - Case Study II.



Legend: O collaborating general practice (● GP recruited community pharmacist); O community pharmacy, ● collaborating community pharmacist (working part-time for the practice, including remote work from within the pharmacy); — distance between community pharmacist's main place of work (community pharmacy) and collaborating general practice.

The supplier's role was clarified from the beginning, including putting in place safety nets for remote working. This was based on a risk assessment of the community pharmacy working environment. The community pharmacist was initially working 18 hours per week for the first two years (six hours were completed remotely, including some hours while working within the community pharmacy). However, in mid-2020 he reduced his working hours to nine per week (mostly remote to the practice).

The nature of the collaborative activities undertaken by the community pharmacist were primarily to share workload (on behalf of GPs and the practice pharmacist) and to improve the practice's performance in terms of quality improvement. Standardising prescribing was mostly the CCG pharmacist's responsibility although this was becoming incorporated within the practice software. Activities on behalf of the GPs and the practice-based pharmacist included: responding to staff and patients' queries; conducting patient

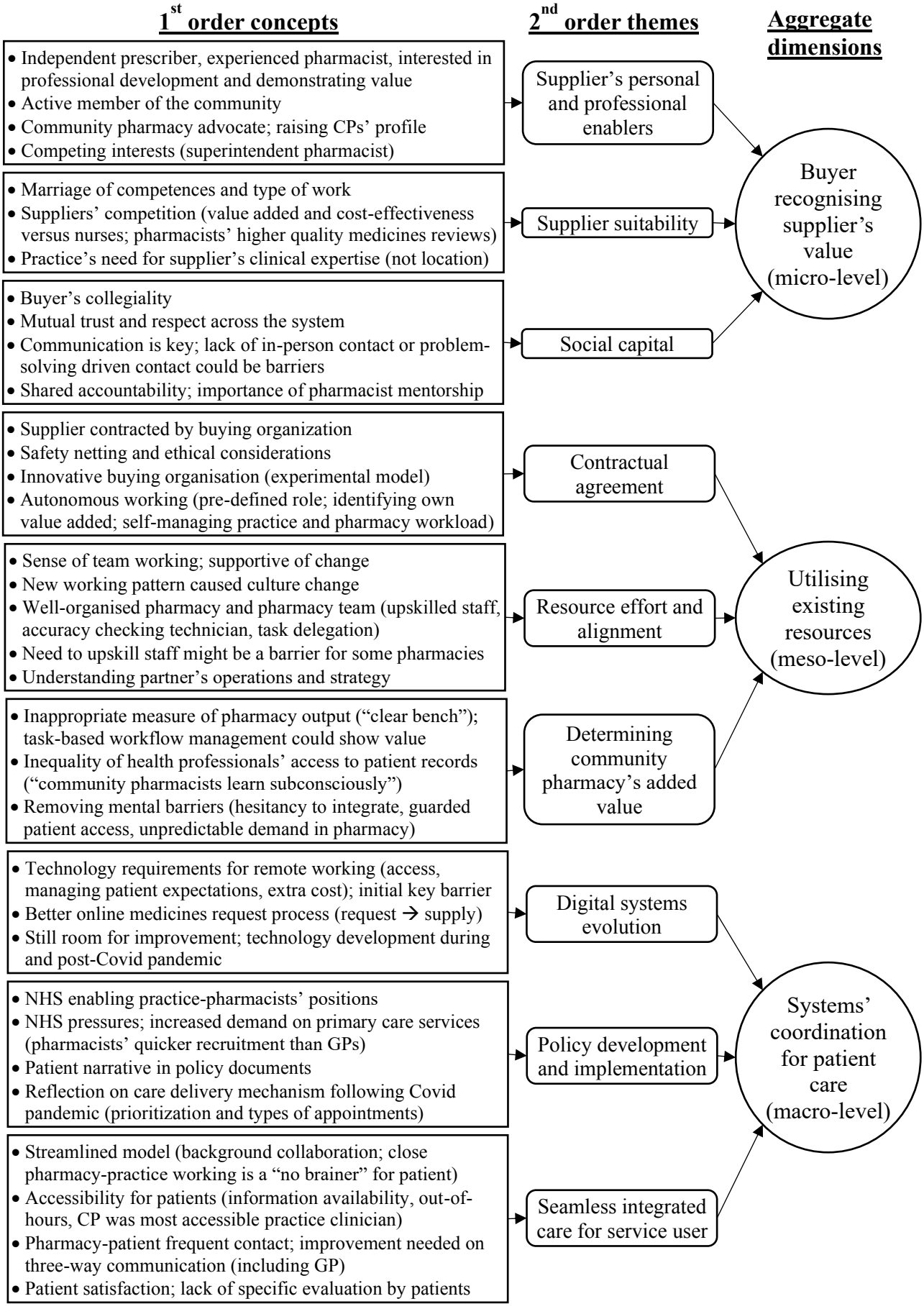
consultations (patient-facing role on medicines reviews), which could be on the phone or in-person at the practice or at the pharmacy (if more convenient for the patient); hospital documentation reconciliation; and supporting other members of the practice team as part of quality improvement projects.

An example mentioned by participants was the multidisciplinary project aimed at reducing use of hypnotic drugs within the practice's local population. This involved stakeholder engagement with providers and patients. The practice-based pharmacist and community pharmacist collaborator primarily led this. Following engagement, the GP had the initial patient consultation, with regular patient follow-ups conducted by the two pharmacists.

3.3.2.2 Key themes identified

This collaborative model was founded on mutual trust and respect towards the community pharmacist's clinical expertise. This was believed to be one of the reasons the community pharmacist was able to act autonomously from the beginning of his contract. The driver of this model was two-fold. Firstly, the general practice needed a prescribing pharmacist. Secondly, this was complemented by the community pharmacist's persistence on pursuing such a part-time role. This was because he was interested in a role that allowed application of his clinical skills without disrupting his ongoing commitment to the pharmacy superintendent role. In addition to this, he personally wanted to demonstrate community pharmacists' value. Technology advancements facilitating remote working and the background working nature of the model (i.e. patient finding out about the split role by coincidence) were other key elements of the data. The findings are presented below within the micro (buyer recognising supplier's value, Section 3.3.2.2.1, p. 127), meso (utilising existing resources, Section 3.3.2.2.2, p. 129), and macro levels (systems' coordination for patient care, Section 3.3.2.2.3, p. 132). These reflect findings on the individual, organisation, and wider society and systems' levels accordingly (Section 1.4, p.24). Figure 11 outlines the summary of key themes identified.

Figure 11: Data structure for Case Study II.



3.3.2.2.1 Buyer recognising supplier's value (micro-level)

During data analysis of interview data and observation notes, it became apparent that the supplier (community pharmacist) and the buyer (GP) were key individuals who enabled this collaborative model.

Supplier's personal and professional enablers

Enablers related to the personality of this supplier were reported within the first 2nd order micro-level theme. As mentioned previously, the pharmacist was experienced and felt confident in working within his area of competence. Participants described some of his characteristics as key facilitators of this model. These included his personality; expertise; drive to be involved with the community; and determination to raise the profile of community pharmacy.

> *"I think it's nice for people to have that sort of local person who is part of the local community to go to rather than just having to book a doctor's appointment."* ***Patient-02***

Supplier suitability

The second 2nd order theme within the micro-level focused on the supplier's suitability for this model. Although there were various suppliers to share the GPs' workload within primary care services (e.g. nurses, healthcare assistants, physiotherapists, paramedics), the practice wanted to specifically "buy in" the pharmacist's expertise irrespective of their physical location during their working hours. In reference to evolution of pharmacists' integration with general practice, participating service providers emphasised the balance of competence and work. This related to ensuring the tasks being delegated to pharmacists are corresponding to their competence. Part of this included the potential for pharmacists taking clinical ownership of long-term conditions.

> *"Community pharmacists have worked with GP practices, so far I'm looking at, erm, what's gone well and what hasn't gone well, what could've gone better. […] There needs to be a marriage of competency, er, and work [pause] that needs to be done."* ***GP-05-02***

However, the practice pharmacist expressed his concern over the current increase of practice-based pharmacists. He was referring to potential misjudgement of the practice

pharmacist's job description and person specification, which could lead to pharmacists returning to other sectors in the future.

Social capital

The last 2nd order theme within the micro-level reported the earlier stages of building social capital. The community pharmacist appreciated the buyer's collegiality. This concerned recognition of his interest in expanding clinical practice skills and utilising his position as a community pharmacist. As a result, the relationship was founded on mutual respect across the system. The GP added that the practice's organisation paid attention to involving its team members in making decisions and having daily meetings.

Communication was another key element in building social capital within this collaboration. Potential barriers for pharmacy's integration in general practice included not meeting in-person and having pharmacy-practice contact solely for the purpose of resolving problems. Communication within the community pharmacy team was also highlighted by the community pharmacist. Concurrently working for both organisations (for a few hours one day a week), required clear handovers and task delegation. This was also evident during observations and informal discussions with the team at the pharmacy. The working environment was busy, with workload being allocated to the team members according to their training and capabilities. Staff on site throughout the day included the participating community pharmacist, a provisionally registered and a trainee pharmacist, an accuracy checking pharmacy technician - a counter assistant and a dispenser were also present on other days.

> *"[…] leave better communications because I may not be you know, I may not be able to finish, finish some things that I want to do and I haven't got the time anymore"*
> ***CP-06-02***

The other practice pharmacist was the community pharmacist's line manager and mentor (as part of his practice employment). This helped in settling in the role; sharing experiences; and being offered reassurance during increased pressure periods of time (due to high workload and low task completion by the community pharmacist). There was an overall feeling of mutual trust amongst clinicians in the practice. This created a sense of shared accountability despite the fact that the community pharmacist was accountable to the practice pharmacist.

"[when working remotely] if it all goes wrong, we are going to explain why. […] [The practice] would have to explain what happened […] in my clinical environment and there is going to be a bit of mutual trust as well and bridge building" ***CP-06-02***

3.3.2.2.2 Utilising existing resources (meso-level)

This section includes findings on the operant resources of each collaborating organisation within this model. It was highly relevant to the rationale of this doctoral project, which focused on utilising existing resources (i.e. pharmacists already based in community) to improve service provision without having to move the workforce from one pharmacy sector to another.

Contractual agreement

The first 2nd order theme within the meso-level reported the model's contractual nature. The supplier was directly contracted by the buying organisation to deliver specific services. The remote working model, where a community pharmacist worked part-time for a general practice, was probably one of few. The contract defined the role and, following risk assessments, safety netting ensured the level of service was not compromised for either party. Examples included limitations on prescribing controlled drugs remotely, and disruption of community pharmacy operations. The buying organisation was described as innovative because they were willing to pilot this role with a community pharmacist.

Although the role was pre-defined, the community pharmacist found that he had to identify his own added value for the practice workload. Being able to work autonomously allowed him to manage his own workload for the practice as well as for the pharmacy. This was as a result of his qualifications, personality and experience working as a pharmacist.

"The other thing that happened was that we decided that for my remote days […] I will log on during the day, you know, intermittently, and address the issues, that come up on the system." ***CP-06-02***

Resource effort and alignment

Alignment of resources and their work ("resource effort") to fulfil buyer's needs was the second 2nd order meso-level theme. Both the GP and community pharmacist discussed

the feeling of working within one team. Due to his part-time remote working role, the community pharmacist had not had the opportunity to meet the whole practice team and vice versa. Especially at the beginning, the practice team was unfamiliar with this type of working which was challenging. However, over time, and following discussions on how the model works, they were able to identify the best way to work together (e.g. prioritisation of urgent tasks or queries).

> *"It's created erm, er, a feeling of working within a team. […] It's also useful to get an opinion from another, clinician. Er of a different training on how to how to go about prescribing."* ***GP-05-02***

The pharmacy team were also supportive of the new working model. Especially during observations, it was apparent that the pharmacy was well staffed and trained to accommodate for the various ongoing activities (i.e. normal pharmacy workload, and pharmacists' remote working for the practice). Pharmacy staff were upskilled, with one member becoming an Accuracy Checking Technician (ACT) in order to be able to undertake some of the community pharmacist's prescription checking workload[7]. However, it was believed that some pharmacies might find this difficult to achieve.

The community pharmacist described the pharmacy's efforts to continue providing high-standard health services. The patient discussed potential reasons for achieving such good level of service. These included the size of the pharmacy (being smaller compared to the patient's previous pharmacies), good organisation, and/or leadership.

> *"But um it might equally just be because [pharmacy name] is run better, which again, could be down to [CP's name] because he's he's in charge there."* ***Patient-02***

The community pharmacist expressed his increased job satisfaction because this role had allowed him to look at patients' full records. In turn, this gave him the opportunity to learn more and better understand the treating physician's reasons behind diagnoses and other therapeutic goals.

[7] The normal procedure of dispensing a prescription includes labelling, dispensing, clinically and accuracy checking the prescribed items. The clinical check is the only step that has to be completed by the pharmacist.

Determining community pharmacy's added value

In the last 2nd order theme of the meso-level, the community pharmacist argued the importance of a community pharmacy demonstrating their added value to the patient journey. This focused on identifying appropriate and representative outcome measures. Although this was only discussed by the community pharmacist, it was considered vital to allow this sector to become more integrated in clinical primary care services. The current pharmacy output measure was described as having a "clear bench" at the end of the day (i.e. having clinically and accuracy checked all outstanding dispensed prescriptions). However, this was not representative of a pharmacist's clinical involvement in patient care. Having experienced the way of working in general practice, he recommended that switching to a task-based workflow[8] would be more appropriate to show community pharmacists' value.

> *"We are the only clinicians that tend to work that way, you know. A surgeon doesn't go in everyday and think I want to, you know, clear my whole list, or a GP goes in and think, I need to see everybody. […] No, you know, you pace manage."* ***CP-06-02***

Similar to the previous case study, there was discussion on inequality of health professionals' access to patient records. Inability to access patients' medical records was considered a barrier for community pharmacists. Not being used to seeing full patient records, has led community pharmacists to "learn subconsciously". This meant guessing treatment plans based on the limited information available on the prescription. It was believed that removing this barrier would allow community pharmacists to become more competent in interpreting medical information and, thus, demonstrate their value.

> *"If you are part of the clinical community, you will learn more, you know, […] because you are accessing, you learn [in general practice], and you don't you learn subconsciously [which is the case in community pharmacy]. […] So I am a big fan of community pharmacies, having, having read to write access to patient records."* ***CP-06-02***

[8] Workflow in general practice is managed by utilising the functionality of "tasks" within the IT software; e.g. tasking a staff member to conduct a medication review for a specific patient. The participant here presented this as a way of being able to showcase value-added by the number of completed tasks - which is not possible under current working circumstances in community pharmacy.

Mental barriers were considered key obstacles during the integration process of community pharmacy in primary care. These barriers included hesitancy by community pharmacists to integrate (potentially due to lack of experience or confidence); complaints about the pressures of the pharmacy contract; the unpredictability of demand in pharmacy; and general practices guarding access to patients' medical records. The community pharmacist advised there should be further exploration of barriers to the integration of community pharmacy and general practice. This referred to taking into consideration the evidence on the feasibility of current collaborative working (such as this model); understanding general practices' reluctancy to sharing patient records with community pharmacy; and exploring how to gain efficiencies in pharmacies to allow a more clinically-focused environment.

> *"We need to start to ask the right questions, which is [...] how, you know… Why? Why are we not moving? Who's stopping it because I know now that it doesn't take much to do, to move it."* ***CP-06-02***

3.3.2.2.3 Systems' coordination for patient care (macro-level)

In addition to the collaborators involved and their organisations, this model was also enabled by systems within the society. These included the evolution of technology, and the national agenda's drive to integrate pharmacists in the primary care team. The patient was not aware of the specific processes of the collaborative model. However, his contribution highlighted the importance of communication between pharmacy and practice to deliver patient care services. Consequently, improvements could range from core processes, such as the collection of prescription items, to community pharmacists being utilised as a more accessible healthcare provider than GPs.

Digital systems evolution

The first 2nd order theme of the macro-level reflects the evolution of digital systems. This model required specific technology to be set up in the pharmacy. This was challenging in the beginning (partly due to community pharmacy legalities on wireless connections), and at times unreliable (abrupt disconnection from the practice system). However, this barrier was eventually overcome. The community pharmacist also described the capabilities of technology in managing patient expectations. Examples included conducting video consultations and using the practice text messaging system to alert

patients that he was unable to reach them. The patient described positive experiences of requesting prescriptions online although this could be improved. For example, the service user could be updated on the progress of the request (e.g. when medicines are ready to collect from the pharmacy) and when it is time to reorder medicines.

> *"Then there was a workaround in regards to the remote aspects um, which we managed to set up after some IT issues."* ***GPPcist-11-02***

Participants discussed technology's continuous advancements, with the possibility of better software/connectivity installation options available now. This type of additional costs could impede such a working model. Societal restrictions imposed to control the coronavirus pandemic in 2020 (e.g., lockdowns, restricted movement outside of households, and shielding vulnerable patients) required higher-level changes to respond to ongoing health needs. Part of this included acceleration of technological developments. However, according to participants there was still room for improvement, especially regarding general practice software integration within pharmacy software packages.

Policy development and implementation

National agenda addressing needs was the focus of the second 2nd order theme within the macro-level. Participants' views indicated the NHS deployment of practice-based pharmacist positions as an important macro-level facilitator of pharmacists' integration in the primary care team. In addition to this, policy documents encouraging pharmacists' integration were believed to contain a strong patient narrative. It was clear that multiple societal factors had required additional workforce in general practices to share the workload. These included high pressure on the NHS; GPs' workforce recruitment crisis; increased demand on primary care services; and high expectation of GPs' work output. The GP argued that it has been quicker to train and recruit pharmacists, who could then be delegated some of GPs' activities.

> *"Erm. But the thing is, is that we're expected to see more and more, these days. And it's just impossible to sort of work in the same way that you might have done 15 years ago. Erm. So this is what needs to happen."* ***GP-05-02***

The coronavirus pandemic, which started in March 2020, was found to have changed the delivery of patient appointments within general practice. This included switching from in-person to telephone or video consultations, and prioritisation based on clinical acuity

(patients who need to be seen by a clinician). This could result in institutional reflection of the delivery mechanisms of healthcare.

> *"I think they expect that post-covid we'll be all starting to […] look differently at how we deliver care."* ***CP-06-02***

Seamless integrated care for service user

The final macro-level 2nd order theme reflected the ease of the model's operation. Participants believed it "worked effortlessly", with processes streamlined and staff becoming more familiar with this type of working. The patient was very satisfied with the service received, especially following his experience with previous pharmacies. In his point of view, this collaboration was happening in the background, as he was not aware of specific collaborative activities. He believed close communication between general practice and community pharmacy could be one of the contributing factors to receiving a better service with better information available than in other pharmacies (regarding prescription's availability). Although throughout the data there was a sense of patient satisfaction, there was lack of specific evaluation of this collaborative working by patients.

> *"I'm assuming that it's working well with a lot of their patients to keep that collaboration going. To me it sounds like a no brainer. It makes sense that your pharmacist is more in touch with your GP, with your hospital, to make sure you get the care you need."* ***Patient-02***

The patient believed that patients have more frequent contact with pharmacies, which can be more accessible in the community compared to general practices. Indeed, the community pharmacist was found to be the most accessible clinician within the practice (including out-of-hours). Meanwhile, his pharmacy was more convenient for some patients despite that it was outside the city centre. One of the areas which could be improved was the communication between all three points of care for this patient, i.e. including the patient, the general practice (diagnosis) and the community pharmacy (medicines supply).

3.3.2.3 Collaborative model's outcomes and impact on stakeholders

All participants discussed how they were affected by this collaborative working model. This has been presented in the above section as it emerged in the micro, meso and macro levels of care. Table 10 presents a summary of the impact on stakeholders in terms of clinical, process and financial outcomes.

Table 10: Impact on stakeholders affected by the collaborative activities in Case Study II.

	Clinical outcomes	**Process outcomes**	**Financial outcomes**
Pharmacy staff	Professional development Improved clinically-orientated practice Access to further learning Self-reassurance on competences	Demonstrating value Embracing task delegation Unaffected workload Becoming more innovative and learning to trust Efficient working Community pharmacist's increased job satisfaction Better communication	
General practice staff	Broadening one's way of thinking Successful quality improvement project (reducing hypnotics use)	Sharing workload Fast-tracking queries Staff satisfaction Higher appointment availability Better time management Better communication	Good value for money
Patients	Patient safety Continuity of care	Patient satisfaction Smoother process	

3.3.3 Case study III

This case study explored the collaborative working relationships of a small multiple community pharmacy company (12 branches) working closely with general practices in the same geographical areas as some of the pharmacies. The main focus was on the participating community pharmacist's split role. The community pharmacist was highly involved in the pharmacy company and worked in one branch (approximately 8,000 items per month) for half of his working week. In addition to this, he worked in two general practices three days per week. Practice A was a satellite site of a practice with four part-time and two locum[9] GPs (WTE for GPs was two; approximately 9,600 patients). Practice B was in the city near the pharmacy (five part-time GPs and three locum GPs, WTE for GPs was four, approx. 11,600 patients). The pharmacy was co-located with Practice C, which was another satellite site of the same group of practices as Practice A (two part-time GPs and one locum, WTE for GPs was one, approx. 2,500 patients). This is further explained below (3.3.3.1).

Data were collected during six semi-structured in-depth interviews and seven and a half hours of observations. Observations were conducted at two sites: Practice B, when the participating pharmacist was working in his practice-based role; and at the community pharmacy (part of the pharmacy company), on a day that the pharmacy manager was working (referred to as "pharmacist manager" hereafter). The GP partner of Practice B was considered a key collaborator by the pharmacist participant; however, it was not possible to recruit her due to unexpected personal circumstances. Consequently, the GPs' viewpoint was represented by the GP trainee at Practice B and a long-term GP locum[9] at the Practice C. The participating patient was a user of the pharmacist's services at Practice B and a regular patient of the pharmacy.

[9] "Locum [tenens]: one filling an office for a time or temporarily taking the place of another —used especially of a doctor or clergyman" ([dictionary ref])

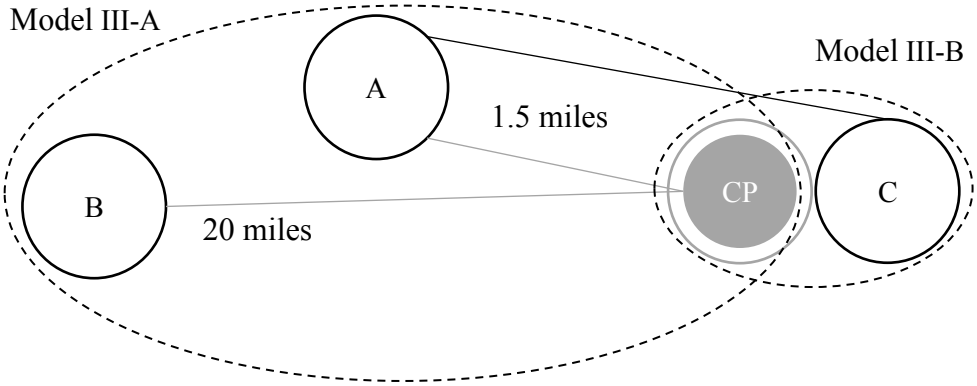
Table 11: Data collected during case study III.

Data collection method	Participant/location	Duration
Observations	Pharmacy – dispensary General practice – community pharmacist's practice-based clinic	4 hours 3.5 hours
Interviews	General practice GP GP Registrar (trainee) GP Receptionist Community pharmacy Community pharmacist (part-time practice-based) Community pharmacist (full-time, company director) Patient	 30 minutes 15 minutes 30 minutes 1 hour 30 minutes 45 minutes

3.3.3.1 Collaborative activities

The collaboration of this case study was based on agreements between the community pharmacy company and general practices. The purpose of this way of working was to train community pharmacists as independent prescribers, which in return would benefit practices by having an additional resource. It should be noted here that the collaborating organisations worked independent of each other. Two models emerged from this case study: Model III-A and Model III-B, which had different levels of collaboration (Figure 12).

Figure 12: Graphical representation of collaborative working - Case Study III.



Legend: O collaborating general practices (Practice A and Practice B, where the pharmacist works part-time, and practice C, which is co-located with the pharmacy and part of the same group of practices as Practice A); O community pharmacy, ● community pharmacist; – distance between community pharmacist's places of work

Model III-A

Model III-A explored the contractual relationship of the participating pharmacist being seconded in two general practices for part of his working week. This included one day at Practice A and two days at Practice B. The remainder of his working week included two days at the pharmacy; being the pharmacy company's managing director, which included human resources responsibilities; and being the owner and superintendent of the pharmacy. The pharmacy company invoiced the practices for the pharmacist's time working there.

The pharmacist's practice-based role focused on sharing GPs' workload to prioritise urgent appointments and being an information resource for the team. Receptionists, nurses and GPs directed medicines-related queries and appointments to the pharmacist. This included: medication reviews; medicines' monitoring and optimisation within specific clinical areas (e.g. polypharmacy and multimorbidity); and management of long-term chronic conditions (e.g. cardiovascular and respiratory disease, pain, and mental health).

His appointments ranged from 15 minutes in Practice A to a mix of 15 minutes (in the morning) and 10 minutes (in the afternoon) at Practice B. Due to the coronavirus pandemic, consultations were predominantly on the phone. Although 10 minutes were sufficient for these consultations, 15 minutes allowed completion of other patient-related tasks. For example, responding to any queries from practice staff in-between appointments.

> *"That extra five minutes I've got, I can then devote to some of the tasks and deal with some other issues or nip out and you know, put sample bottles behind reception for someone to pick up or put blood form behind reception."* ***CP-29-03***

Model III-B

As part of the observations, it became apparent that the pharmacy had a good relationship with the co-located Practice C. This mostly involved bidirectional support, especially related to resolving queries, e.g. stock availability or suggestions for out-of-stock alternative medicines. Model III-B could also be a result of Model III-A and the fact that Practice A and Practice C were part of the same group of practices.

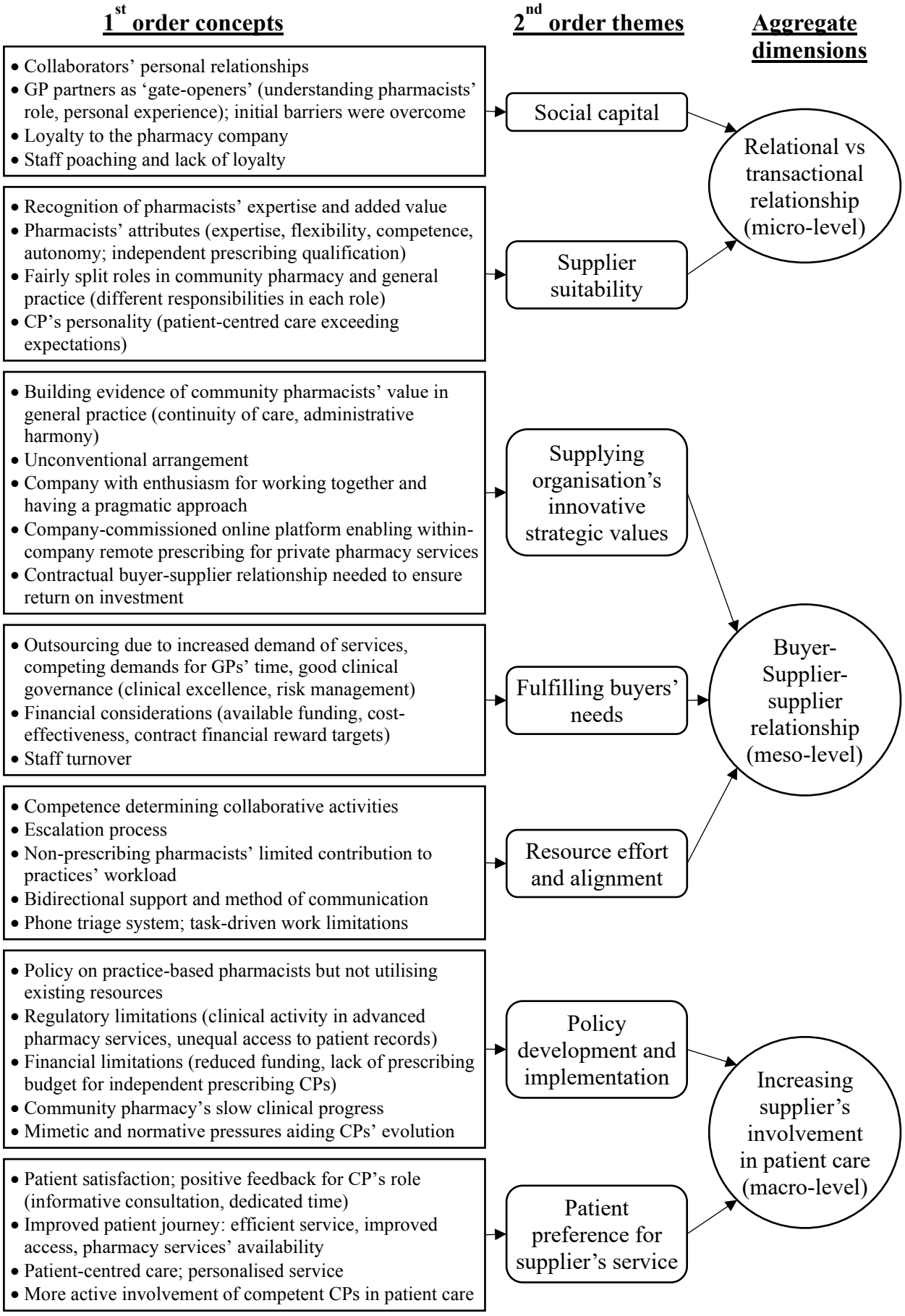
There used to be interorganisational digital integration between Practice C and the pharmacy through shared access to the practice software. However, this collaborative activity was discontinued. The pharmacy was established next to Practice C by the previous practice partner owners (in 2008) and was bought by the small multiple pharmacy company of this case study eight years later (in 2016). This was explored further during discussions with the pharmacy staff on this topic as part of observations. Having experienced both ownerships, the pharmacy manager and the dispenser found the pharmacy and Practice C had always worked collaboratively. In particular, they highlighted the personal relationship of the previous pharmacy and practice owners. The sense of a collaborative relationship continued following the change of pharmacy ownership although to a lesser extent than previously.

> *"[Pharmacy name] made in 2008 and [Pharmacist manager] joined the pharmacy at that time. Then, it was taken over by [Pharmacy company name] in 2016. Surgery is next door (literally); it used to own [Pharmacy name] (GP's wife was community pharmacist and became IP [independent prescriber]). Pharmacy staff: 'Not the same anymore; lost access to medical records; e.g. no more tasks on [practice software] but paper slip when item out-of-stock'."* ***Researcher's observation notes***

3.3.3.2 Key themes identified

The main themes of this case study emphasised the enabling role of an existing relationship between collaborators; the pharmacist's personality; competency and autonomy; and the recognition of pharmacists' capabilities by GPs to fulfil patient care needs. The aggregate theoretical dimensions that emerged from the data referred to the nature of the collaborative relationship on the micro-level (relational versus transactional relationships); the sense of a "buyer-supplier-(supplier's) supplier" relationship on the meso-level (due to the role of the pharmacy company between the practice and the pharmacist); and the desire for increased involvement of community pharmacists in patient care on the macro-level (summary presented in Figure 13).

Figure 13: Data structure for Case Study III.



3.3.3.2.1 Relational versus transactional relationship (micro-level)

Social capital

The first 2nd order theme within the micro-level focused on (existing) social capital. Both participating pharmacists spoke of personal relationships they had with GP partners at Practices A and B. The pharmacist was approached by the GP partner at the time to work at Practice A's main location; this was due to their longstanding relationship and because he was aware of the pharmacist's capabilities. Following the GP partner's retirement and the end of funding, the pharmacist was moved to Practice A (satellite site).

The GP partner of Practice B and the pharmacy company director (CPDir-33-03) were close friends prior to the collaboration. Following a hurdle during an initial agreement, which was overcome, the GP was still interested in trialling a practice-based independent prescriber pharmacist at Practice B (CP-29-03). This was due to her involvement in multidisciplinary care and valuing the potential contribution of this type of pharmacist in the practice.

Both roles were contracted. There was payment for the pharmacist's services (based on hours worked) although the models represented relational relationships (i.e. based on the existing social capital). Work at Practice A had some indirect business gain due to the pharmacy being nearer to Practice A and its satellite surgery. The secondment at Practice B was agreed based on the existing social capital (i.e. there was no gain for the pharmacy business, other than the pharmacist's pay).

> *"We were building a nice, big health centre […] and I felt a bit guilty because the business got sold […] She's got it now, but she didn't get it at the time sort of thing. So yeah, it's just purely, you know, mates."* ***CPDir-33-03***

Loyalty within the pharmacy company employees was another aspect of existing social capital. The pharmacist started working in an earlier form of the company after qualifying as a pharmacist. Following various positions at that company (relief pharmacist, pharmacy manager, company director), he became part-owner of the pharmacy in which he was working twice a week, and managing director of the current form of the company. He remained involved in the pharmacy company, while working in his practice-based role. This was a key difference to two other independent prescriber pharmacy employees, who eventually decided to leave the company (to work solely in general practice). Despite

this, there was a perception that moving to a different role was reasonable by both participating pharmacists. However, the pharmacy director discussed the feeling of "staff being poached by practice manager" as a sign of lack of loyalty.

> *"It all became very secretive. Because they were in negotiations. […] [Ex-employee independent prescriber] knew things but wouldn't tell me; and I'm going, 'but I'm your employer' and, and it was very, very difficult at the time."* ***CPDir-33-03***

Supplier suitability

Participants discussed the pharmacist's suitability in his clinical roles (at the practices and the pharmacy) in the last 2nd order micro-level theme. This related to pharmacists' overall expertise on medicines, their flexible approach to the workload they can undertake, which produces value for the practice, and it also specifically referred to the participating pharmacist's capabilities and attributes. His years of experience in pharmacy practice, the variety of roles, his education (MBA course and independent prescribing qualification) equipped him with the necessary skills to work competently and autonomously. In addition to this, it was clear, especially from the patient's point of view, that the pharmacist's personality was an important aspect of service provision, which exceeded expectations.

> *"But [CP's name] just seems to go that extra mile for you, you know. […] such a nice guy and so helpful, that I wouldn't even think of going anywhere else. […] Yeah, he really does go into detail and explains that, that's why I like it."* ***Patient-03***

3.3.3.2.2 Buyer-supplier-supplier relationship (meso-level)

The meso-level aggregate dimension described this case study's triadic relationship. This referred to the buyer contracting the supplier's supplier to provide services on-site. In other words, the general practice had arrangements with the pharmacy company, which allowed some of their pharmacists to work at the practice (through "secondment").

Supplying organisation's strategic values

The first 2nd order theme within the meso-level focused on business strategy. The pharmacy company director stated one of the key motives of pursing this way of working was to establish the evidence demonstrating the value of community pharmacists, especially in general practice. This was believed to have two output elements: improving

patients' continuity of care (customer perspective); and community pharmacy and general practice working in harmony (provider perspective). The GP registrar also confirmed the latter element based on her experience with the pharmacist at Practice B. The patient repeatedly discussed the importance of having the pharmacist both in the practice and the pharmacy (this is further explored below in Section 3.3.3.2.3, under "*Patient preference for supplier's service"*).

> *"And then we just like communicate that way and then try and complement what each other are doing."* ***GPReg-03-03***

Participants mentioned the movement towards practice-based pharmacists being directly employed by general practices although they believed this way of working was different. The pharmacy company director emphasised the importance of enthusiasm for working together. In addition to this, seconding pharmacist independent prescribers also working in the community allowed them to have a pragmatic approach. For example, completing tasks autonomously, which was advantageous for collaborating practices.

> *"Erm, I think practices and GPs in particular want somebody that can stand on their own two feet and see things through."* ***CP-29-03***

Model III-A's secondment agreement indicated a buyer-supplier-supplier's supplier relationship. This was because the pharmacy company remained as the pharmacist's employer, meaning the general practice was the buyer, the pharmacy company was the supplier, and the pharmacist was the supplier's supplier. The pharmacist director had considered this as a potential business idea. However, it did not flourish due to the ex-employee pharmacist's departure from the company. Competing interests of such buyer-supplier (-supplier's supplier) relationships, thus, proved to be threatening for the company. In fact, this departure terminated the relationship between the pharmacy company and the practice that recruited her subsequently. There was a sense of lack of loyalty between the pharmacist and the company (also Section 3.3.3.2.1, p. 142). As such, the pharmacist director felt that practices should be more sensitive about these matters, and reflected on having more contractual relationships in the future to (at least) ensure return on investment.

> *"So we need to be mindful that actually either PCNs or practices don't poach people who are working on both sides. […] [Other GP's name] […] turned around and said 'well what do you think you've done? You've just actually taken £40,000 worth of*

training that he is not going to benefit from. You expect him to be happy?' So, that was the crux of it." ***CPDir-33-03***

Another finding was the establishment of an online platform to facilitate remote (private) prescribing services within the company's branches. Although this was not directly associated with the collaborative models, it was a tool that could be used to build evidence of community pharmacists' clinical value. The company co-commissioned (with another pharmacy company) an online platform that included patient-facing consultation details. Notably, this platform has normally been used for NHS-funded pharmacy services. This could contribute to pharmacies improving the quality of record-keeping. This has been previously identified not to be a priority for pharmacies. Meanwhile, patients' medical records would remain up-to-date (e.g. via automatic notification and import of consultation data on patients' practice-held records with their consent).

Fulfilling buyers' needs

Within the second 2nd order theme of the meso-level, three participants discussed the pressures on general practice services requiring further operant resources. Increasing demand and clinically urgent services had taken priority over medication reviews. Although these were necessary for some groups of patients, they were commonly delayed. As such, the practice(s) outsourced the pharmacist, who was able to focus on this aspect of care. This could be an important contributor of general practices' upholding good clinical governance. In particular, in the areas of clinical excellence (due to the pharmacist's expertise on medicines) and risk management (as the risk of complications caused by the patient's therapy was better controlled).

"I think there was probably like a massive amount of patient demand for what we could actually, offer. So I know a lot of patients weren't being able to like get their medication because they haven't been reviewed, but they couldn't get an appointment to have a medication review because it was so busy." ***GPReg-03-03***

Financial aspects considered by participants included: the availability of funding (which resulted in the pharmacist's relocation to Practice A); the practice being able to achieve contract targets (i.e. QOF, Section 1.2.1, p. 16); and cost-effectiveness between service providers. Pharmacists were considered more cost-effective than GPs for medicines

management appointments (such as medicines reviews). They were also more cost-effective than contacting a consultant for medicines-related queries.

In Model III-A, the GPs involved were "gate-openers", understanding the pharmacists' value; however, there was also need for additional resources. Practice A was unable to replace a nurse's position with one suitably trained. As such, the pharmacist initially took over that workload. In Practice B, due to GP partners leaving the practice, there was a more speculative approach. It aimed to explore the part-time prescribing pharmacist's role in undertaking some of the practice workload. Notably, although another pharmacist was placed there via the CCG, they were not a prescriber.

Resource effort and alignment

The final 2nd order theme within the meso-level focused on task alignment to appropriate resources. Participants discussed the delegation of workload to the appropriate resources within the practice. In particular, the groups of patients and type of queries allocated to the pharmacist were based on his competency. GPs on-site were also accessible for support or advice when needed. The data collected indicated an escalation process, including safety netting and/or further investigations.

> *"I think it's just making sure you've got those safety nets in if you think people need to be brought in. So, if it's something that I think needs GP I'll just get them booked in the same day or I'll bring them in for a quick chat myself."* ***CP-29-03***

Tasks delegated/re-directed to the pharmacist included medicines optimisation, and, in Practice B, issues that the CCG pharmacist could not fulfil ("*Model III-A*", p. 139). The participating pharmacist was usually able to complete such tasks due to his independent prescribing qualification and associated skillset. As such, this prevented unnecessary addition to the GPs' workload.

> *"I tend to find a lot of the issues that are pinged my way or any issues that [CCG pharmacist] tends to ping to the GPs, because [CCG pharmacist] can't actually prescribe then get passed on to me: '[CP's name] can you finish this one off for us?'."* ***CP-29-03***

Bidirectional support was prominent in both models. All participants described the pharmacist's approachability and accessibility as an information resource within the

practice and in the pharmacy environment. In Model III-A, communication was mostly via the online system as tasks or instant messaging (in-writing). However, the pharmacist mentioned preference towards resolving queries with GPs in-person. In Model III-B, the responsible pharmacist at the pharmacy and practice staff used to communicate in-person or via the practice's software. Since that was discontinued, communication channels changed to in-person or telephone.

> *"We can easily pop in and out of you know surgery to pharmacy […] Obviously covid's changed things. […] So yeah, all- a mixture of all three, really, phone, online and in-person."* ***GP-03-03***

General practice appointments changed from in-person to mainly telephone consultations following 2020's coronavirus pandemic outbreak. This aimed to reduce unnecessary patient visits to the practice. Initial triage of patient calls by the reception team and/or followed by the pharmacist, allowed better workflow management. The pharmacist commented on the reduced opportunities for personal and interprofessional contact in the workplace. This related to general practice's task-driven nature in combination with limited interaction due to covid social distancing government rules.

3.3.3.2.3 Increasing supplier's involvement in patient care (macro-level)

Policy development and implementation

The first 2nd order theme of the macro-level related to policy in relation to pharmacists' role. Two participants (CPDir-33-03 and GPReg-03-03) specifically commented on local commissioning authorities and/or national policy enabling pharmacists working within general practice. However, the community pharmacist director argued that there was a missed opportunity. Existing competent resources in the community could have undertaken such a role (i.e. part-time community pharmacists in general practice), which could uphold continuity of care for patients ("Supplying organisation's innovative strategic values", Section 3.3.3.2.2, p. 143). He believed that this could also have prevented pharmacists moving from other sectors to cover these roles.

During interviews and observations, all three participating pharmacists (part-time pharmacist with split role, pharmacy company director, and pharmacist manager) discussed community pharmacy barriers. These related to community pharmacists' (lack of) independent prescribing qualification and were considered key obstacles to further

integration in primary care. Examples included regulatory limitations within advanced pharmacy service specifications and unequal access to patient records. The pharmacy company director found the level of pharmacists' security access had improved over time. Initial issues with complex access for his seconded community pharmacists were overcome. Similarly, the pharmacist manager argued that despite improvements through Summary Care Records (SCR)[10], inequality remains amongst health professionals with read and write access to patient records within primary care.

> *"Pharmacist manager said: 'new receptionist can access medical records from start of work but the community pharmacist, who is a healthcare professional, cannot access the patient's record. At least we have access to SCR […], that's useful!' "* ***Researcher's observation notes***

It was believed that community pharmacists have been restricted in managing patients' symptoms with over-the-counter medicines, specific prescription-only medicines according to Patient Group Directions or self-care advice. Participating pharmacists and the patient supported that competent independent prescribing community pharmacists could prevent additional pressure on general practices. However, the pharmacists described the lack of NHS prescribing budget and reduced funding for community pharmacies were key barriers.

> *"Rather than stand behind a pharmacy counter and say, 'look sorry I know what's wrong with you, I know what you need but I'm going to have to send you to a GP.' […] But, you know, I think hopefully pharmacy will continue to expand and erm, hopefully one day we'll have an NHS prescription pad, you never know."* ***CP-29-03***

The above reflect institutional pressures. Although coercive pressures have been limiting, normative and mimetic pressures appeared to have aided the evolution of community pharmacists. It was believed that community pharmacy has had a much slower progress regarding clinical integration. This was comparative to hospital pharmacists, whose involvement in clinical ward-based care has been ongoing for a long time. The part-time community pharmacist emphasised how his clinical competence grew rapidly while working in general practice. As such, the professional role of a pharmacist in community

[10] SCR are excerpts from patients' medical records containing a history of their medicines (e.g. repeat, acute and discontinued medicines). Following patient's permission, community pharmacy regulated staff (pharmacist and technician) can access SCR. However, their existence and update lies with the general practice.

pharmacy has been progressing following normative pressures. Overall, the enabler of pharmacists becoming independent prescribers was believed to have stemmed originally in nurses or subsequently hospital pharmacists, leading the change on this.

> *"Almost like our clinical pharmacists, colleagues in hospital. […] Erm, and I think what sort of facilitated that is, perhaps the first move, you know, the move of nurses becoming prescribers and then eventually pharmacists becoming prescribers. I think that's probably the biggest thing, really."* ***CP-29-03***

Patient preference for supplier's service

In the final 2nd order theme of the macro-level, all participants stated the patients' satisfaction with the pharmacist's split role. The participating patient repeatedly commented on the pharmacist and pharmacy exceeding expectations. He valued the time dedicated to him, feeling that he was being listened to, and the informative nature of the pharmacist's approach during consultations. Longer appointments and having an appointment with someone who has a different perspective to a GP were other factors contributing to patient satisfaction. Prior to the coronavirus pandemic, Practice B had asked the pharmacist to handout patient feedback forms to evaluate the service. Although it was not possible to obtain evidence of patient feedback, Practice B's participants mentioned positive patient feedback. The pharmacist also referred to a comment on the practice's social network page:

> *"I have been with the surgery since 1955 no problems with care, and today been to visit the pharmacist [CP-29-03 name] a lovely person, got the answer I needed, so well done [practice name] for introducing a caring pharmacist informative and quick easy access. Thank you"* ***Anonymised verbatim patient comment***

Five participants found that the patient journey was improved. This referred to efficient service (from prescription request to medicines supply; queries resolved promptly); improved access (practice appointment availability, easily accessible community pharmacist); and more streamlined service within the practice. The patient discussed his experience of primary healthcare services being facilitated by having the pharmacist both in the practice and the pharmacy. This was helpful due to the rural setting of his residence, the difficulty encountered with the practice's appointment booking system, and travelling to the practice due to his age. In addition to this, the pharmacist was found to be "a constant" (a point of reference) in his care; for example, compared to seeing different

locum GPs at the practice. Despite the coronavirus pandemic, the community pharmacy services accessibility was valuable for patients (due to the practices stopping face-to-face appointments unless necessary).

> *"[we've] put a bit more and more reliability, I suppose, whether that's right, on [CP's name]."* ***Patient-03***

> *"So popping into the pharmacy is probably becoming even more er valuable to the patients, […] if they just want to be quickly glanced at"* ***GP-03-03***

Improved patient safety was something that emerged throughout data collection. This was due to the possibility of having medication reviews on time; allowing GPs to focus on other patients' acute appointments; ensuring safer prescribing (by easily accessing the pharmacy); and due to continuity of care. The pharmacist also appreciated being able to explore patients' medical problems and medication needs in more depth as part of medicines optimisation.

> *"I'm in the process of weaning somebody off tramadol at the moment who's been on it for years but no one's ever really spoken to the lady and see what her issues are. […] She's pushing her overweight husband up a hill in his wheelchair every day and causing back trouble."* ***CP-29-03***

All participants discussed patient-centred care, referring to care provided or drivers for establishing this way of working. The patient found the overall service at Practice A impersonal. However, he found the pharmacist's characteristic personal service distinguished across all organisations. This was due to patient concerns being addressed; being followed up; and/or being escalated to the GP when necessary. The participating receptionist at Practice B valued the pharmacist's support. This was particularly because it allowed the reception team to provide better and more prompt services to patients (e.g. increased appointment availability).

> *"We would like to give [appointments] to people but we just don't have enough. […] We don't have a lot of time to [...] interrupt doctors, and you know, try and get something done for patients. But having a pharmacist in the building definitely does help."* ***GPRec-06-03***

The patient's comments on future improvements were in line with the pharmacy company director's ultimate goal of having pharmacists more involved in patient care. In particular,

from their usual place of work, rather than redeploying them to general practice. The pharmacy company director acknowledged the possibility of this happening in the future, as trainee pharmacists will become independent prescribers on registering as pharmacists (from 2026). From the patient's perspective, accessing the practice was more difficult than seeing the pharmacist at the pharmacy. As such, he wished the pharmacist was more actively involved in patient care from within the pharmacy and on behalf of the practice.

> *"If you go to your pharmacy it would be ideal. […] it would be nice in the future if […] the pharmacists, you know, that's qualified like [CP's name] could go that bit further and prescribe."* ***Patient-03***

3.3.3.3 Collaborative model's outcomes and impact on stakeholders

Participants involved in these models discussed above how they were affected by the community pharmacist's split role (Model III-A), and the close relationship between the pharmacy and the co-located practice (Model III-B) across the micro, meso and macro levels. Table 12 summarises the clinical, process and financial outcomes.

Table 12: Impact on stakeholders affected by the collaborative activities in Case Study III.

	Clinical outcomes	Process outcomes	Financial outcomes
Pharmacy staff	Improved professional practice, sense of fulfilment and team spirit	Improved pharmacy-practice relationship Problems resolved quickly Time inefficiencies due to discontinued pharmacy access to practice software	Business gain Risk of lack of return on investment (poached staff) Temporary loss of staff
General practice staff	Safer prescribing	Increased appointment availability Prompt resolution of queries Streamlined services Reduced pressure on staff Workload sharing; less unnecessary workload to GPs	Achieving targets for financial rewards
Patients	Patient safety Continuity of care Informative consultations	Improved patient journey (access, efficient service) Patient satisfaction Personal pharmacy service Longer appointments	

3.3.4 Case study IV

This case study involved one community pharmacy (part of a large multiple pharmacy company group, dispensing approximately 20,000 prescription items per month) and its adjacent general practice (12 full and part-time GPs, serving a population of approximately 18,500 patients). The pharmacy used to be near the practice and moved next to it as part of the NHS increasing integration through establishing more health centres 12 years ago (Imison et al., 2008). The WTE was eight for GPs and one for the practice-based pharmacist at the time of data collection. The practice's pharmacy team normally included two clinical pharmacists although at that time there was only one due to staff turnover.

Data were collected during 11 hours of observations and three in-depth interviews (Table 13). The service user's perspective was obtained by interviewing a patient's father, who was her full-time carer. He was responsible for her healthcare arrangements (e.g. booking GP appointments, prescription requests and collection from the pharmacy) due to her medical condition. Despite the researcher, community and practice-based pharmacists' efforts to recruit a GP from the general practice to participate in the research, it was not possible to obtain the views of GPs in this case study. As such, the practice-based pharmacist participated as a member of staff to provide the practice's viewpoint of the collaborative relationship.

Table 13: Data collected during case study IV.

Data collection method	Participant/location	Duration
Observations	Pharmacy – dispensary, General practice – reception visit with pharmacy staff member	11 hours
Interviews	General practice Clinical pharmacist Community pharmacy Community pharmacist Patient	 30 minutes 30 minutes 30 minutes

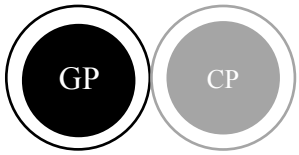
3.3.4.1 Collaborative activities

The collaborative relationship in this case study was more developed than the standard baseline pharmacy-practice relationship. There were some collaborative activities in place although they had not yet been formalised in a contract or evaluated. These activities

were delegated to the community pharmacist to be completed on behalf of the general practice and they included: the assessment of patients' eligibility for monitored dosage systems (MDS), hospital discharge medicines reconciliation for MDS patients, and jointly improving the process for urgent and repeat dispensing prescriptions. Moreover, the community pharmacy team acted as an information resource for alternatives to out-of-stock medicines and advice. This also included the community pharmacist's input on patients' eligibility for the Community Pharmacist Consultation Service, which was a recently released NHS "advanced" pharmacy service (NHS Business Services Authority, 2021).

This model of working did not indicate a Professional Relationship Expansion, and it remained at the *Exploration and Trial* stage of the CWR and rCWR conceptual models (McDonough and Doucette, 2001; Dey et al., 2011). There was more emphasis on increased (especially face-to-face) communication, knowledge and confidence in each partner (Figure 7, p. 107). Figure 14 shows the geographical relationship between the case study's participating organisations.

Figure 14: Graphical representation of collaborative working - Case Study IV.



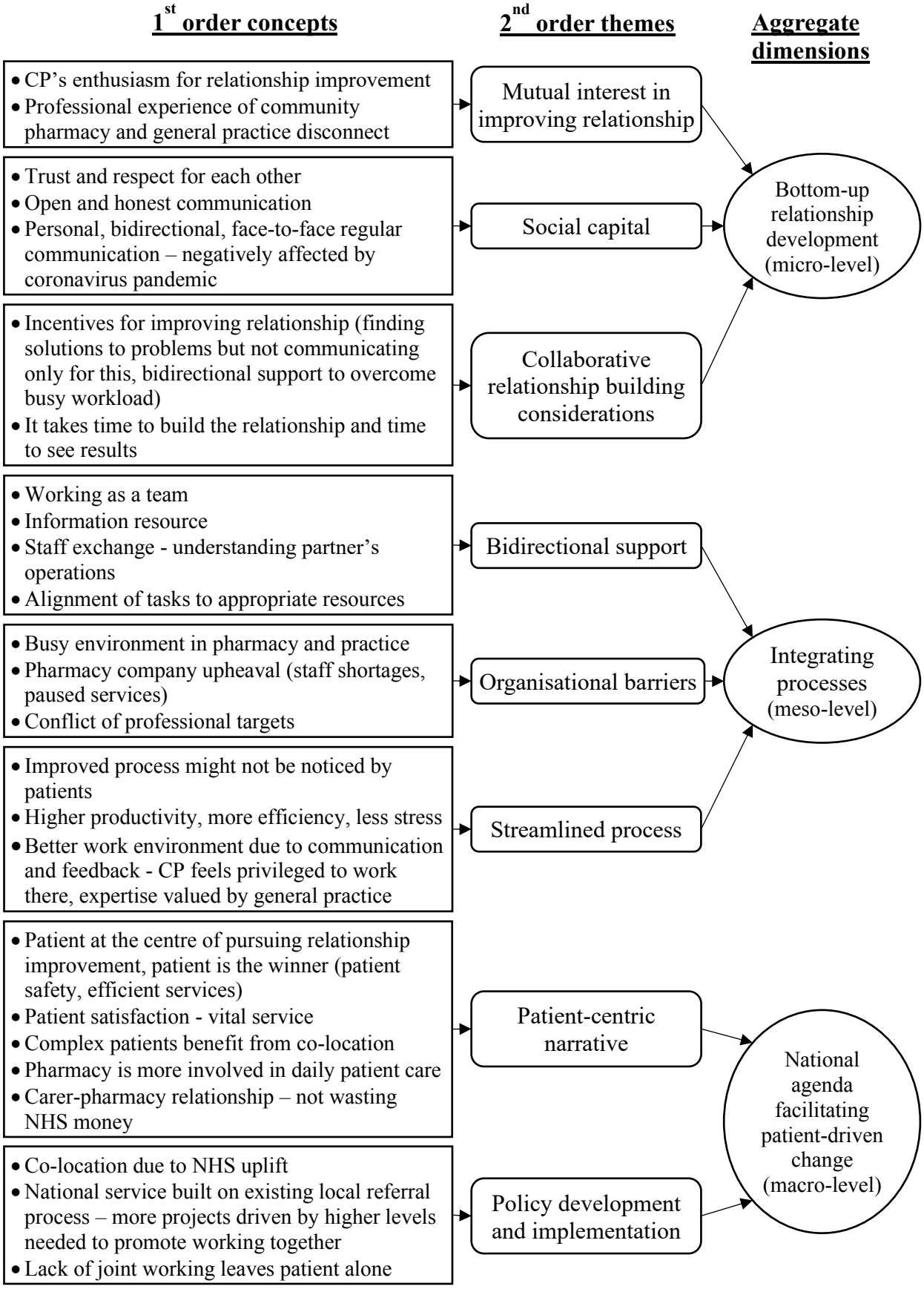
Legend: Expanded relationship of co-located (adjacent) general practice (O) and community pharmacy (O); ● community pharmacist; ● general practitioner

3.3.4.2 Key themes identified

The main themes arising from this case study are presented in this section and are summarised in the data structure (Figure 15). As per previous case studies, the data were analysed in the three distinctive groups of micro, meso and macro levels, throughout which innovative practice occurs and (potentially) induces change (Section 1.4.1, p. 24).

Participants of this case study discussed the previously poor relationship between the general practice and the community pharmacy. They reported this only started to improve when the participating community pharmacist became the pharmacy manager (approximately 16 years prior to data collection). As a result, their bottom-up relationship developed, based on individuals interested in pursuing more coordinated working

Figure 15: Data structure for Case Study IV.



(micro-level, Section 3.3.4.2.1, p. 156). Despite the chronological maturity of this relationship, the content of collaborative activities remained at earlier stages, identifying ways to integrate processes across the two organisations (meso-level, Section 3.3.4.2.2, p. 157). However, it was clear that both parties were working towards collaborating more as this would be in the patients' best interest, and was also enabled by national policy (macro-level, Section 3.3.4.2.3, p. 160).

3.3.4.2.1 Bottom-up relationship development (micro-level)

Mutual interest in improving relationship

The first 2nd order theme at micro-level explored the community pharmacist's initiative to improve the pharmacy-practice relationship. Her enthusiasm and receptiveness, which was welcomed by the practice team, initiated the extension of their relationship. The community pharmacist was involved with her Local Pharmaceutical Committee (LPC) – the local professional body representing pharmacy contractors. This way she hoped to inspire other community pharmacists and GPs to build their relationship on open and honest communication. She aimed to continuously improve the collaborative relationship for everyone to benefit from it. This was also welcomed by the practice team. Both pharmacy and general practice teams' experience of a counter-productive relationship created a mutual notion to develop their collaborative relationship. The practice-based pharmacist's background in community pharmacy allowed him to understand both sides' viewpoint and experience.

> *"[People] just wanted it to get better. […] I went straight into the management and said […] I can't change the past, but I can only change the future now."* ***CP-16-04***

Social capital

Building social capital was the second 2nd order theme at micro-level. This included personal introductions with the practice manager, establishing open and honest communication inbuilt with mutual trust and respect. Both community pharmacist and the carer believed these to contribute to a well-founded beginning. The pharmacists of this case study mentioned aspects that needed to be considered when establishing a collaborative relationship. There was emphasis on bi-directional communication, which was also evident during observations. Face-to-face and regular interaction were important

enablers. For example, during observations, pharmacy technicians would go to the practice reception to resolve prescription problems. The community pharmacist emphasised the importance of accepting fault to build trust.

> *"The foundation is good communication. So I mean, 15 years ago no one spoke to next door at all. [..] If I make a mistake I put my hand up and say 'I'm really sorry, I shouldn't have done that, shouldn't have said that, let's move on'."* ***CP-16-04***

Collaborative relationship building considerations

The third 2nd order theme at micro-level focused on considerations for building collaborative relationships. A facilitator was having incentives for pursuing a closer relationship. These included supporting each other by sharing the workload and finding solutions to problems. However, both participating pharmacists clarified that problem solving should not be the only reason for communicating.

> *"We try not to work in isolation, but try to work together and we communicate, erm, because that's where the biggest flaw has always been. […] As long as we're communicating, that will then start to open up the doors."* ***GPPcist-03-04***

The greatest barrier in progressing such a relationship was considered to be time. Time had impacted this collaboration in different ways. Firstly, high workload limited the available time for individuals to jointly identify ways of working together. Secondly, the community pharmacist discussed the fact that it takes time to build a relationship and more time to see the results of that. This was also apparent by the progress of the relationship level (Figure 7, p. 107 and Figure 14, p. 154)

> *"And that is what we've done, it has taken 15 years here but um… […] It takes time of course, it don't [sic] happen overnight."* ***CP-16-04***

3.3.4.2.2 Integrating processes (meso-level)

Findings within the organisational (meso) level focused on working together as one team. This included supporting each other and complimenting each other's work. Although there were organisational barriers, streamlined services resulted in higher productivity and less stress for health providers and patients.

Bidirectional support

The first 2nd order theme at the meso-level explored bidirectional support. The busy workload within the pharmacy was facilitated by the well-trained pharmacy team (operant resources). This also allowed the community pharmacist to be more involved with the practice, exploring ways of better integration. Exchange of staff gave them an insight of the operations within each organisation. As a result, there was better understanding to align their work according to their skillset and the practice's needs. Furthermore, pharmacy staff acted as information resources for the practice with regard to medication products.

> *"So if you see what the other side is seeing, you're much more able, erm, to understand the problems. Like, you know, simple things like why isn't your prescription ready. […] So it's about educating, informing."* ***CP-16-04***

The practice-based pharmacist commented that the availability of a pharmacist allows better alignment of tasks to the available resources and relieving pressure on GPs. For example, the community pharmacist being responsible for assessing patients' eligibility for MDS; and the practice-based pharmacist being the link between community pharmacies and the practice. This was perceived positively because the queries did not reach GPs; however, it potentially created additional workload for the practice-based pharmacist. This raised the question of whether this was the most appropriate resource for that type of query.

> *"[…] you could say it increases my workload. Or you could argue the case that it is part of what your job role actually is. […] you sometimes go 'well queries are being sent towards me because it's the easiest place to send them, rather than the most appropriate place to send them'"* ***GPPcist-03-04***

Organisational barriers

The second 2nd order theme within the meso-level referred to organisational barriers. The increased workload in both organisations was one of the reasons behind not progressing the collaborative relationship. In addition to this, the pharmacy company was undergoing restructuring. This was combined with staff shortages due to the coronavirus pandemic, which limited availability of services. This was similar to the practice's pharmacy team, where two vacancies had not been filled. However, both pharmacists commented on the

fact that there is always room for improvements on a well-founded relationship. The carer wished the pharmacy would continue a service that had been ceased due to staff shortages. As part of this service the pharmacy called the service user every month to check on the medicines needed to be requested from the practice. The improvement he mentioned was to *"maybe cut a hole in the wall"* ***(PatCarer-04)*** to allow even easier communication.

> *"You can always work to improve things, but, […] really, it's all about communication, trust, respect, and building on that."* ***CP-16-04***

Agency conflict was apparent when discussing the competition of professional targets between community pharmacy and general practice (which are not always aligned). This could pose a barrier to developing a collaborative relationship. However, this is where communication plays an important role, according to participants. Negotiating was required to identify the most suitable way of working for both organisations.

> *"You have to be a little bit selfish at some points and go 'actually, I appreciate that will make your life easier, but it makes my life harder; so can we find a middle point?'."* ***GPPcist-03-04***

Streamlined process

Streamlined process was the final meso-level 2nd order theme. The participants' positive experience with the collaborative relationship was mostly due to the integration and streamlining of processes. However, this may not have necessarily been apparent to patients. The pharmacists referred to the increased communication and feedback (sharing up-to-date patient information) between their organisations. This was having a positive impact on their work environment (less stress and more productivity). The community pharmacist expressed how privileged she felt to work within that site because the practice trusted her expertise and knowledge.

> *"I think, you know, nine times out of ten […] things are really good here. You know, it's a privilege to work here really, because of that."* ***CP-16-04***

In terms of evolution of the collaborative relationship, this had improved over the years to what it was at the time of data collection. Participants noted the coronavirus pandemic triggered improvement of some processes (e.g. regular joint meetings, especially in the

beginning of the pandemic to discuss patient care needs; electronic prescriptions for controlled drugs). However, face-to-face regular communication was minimised.

3.3.4.2.3 National agenda facilitating patient-driven change (macro-level)

On the macro-level, it was clear that change was driven with the patient in mind as the primary beneficiary. There was a strong patient-centric narrative throughout the data. There was also reference to the national agenda on integrating systems facilitating this change.

Patient-centric narrative

The first 2nd order theme at macro-level focused on patient-centredness. This was identified as the main driver for increasing collaborative working. The purpose of providing a more efficient service for the patient was evident when reviewing notes from observations and informal discussions with the pharmacy team members. This was especially important for the participants due to their organisations' relationship history.

> *"Erm. For us it was about. [sigh] It was about working together to provide a better overall service for the patients. So we could solve things quicker […]. Without necessarily the patient having to be running around."* ***GPPcist-03-04***

All participants expressed the improved relationship had a positive impact on patients due to the streamlined process and patient safety. The co-location and level of service provided was considered a vital service for the participating carer. Due to the complexity of the patient's condition and needs, the carer emphasised the convenience of having the patient's pharmacy next to the practice. This allowed easier resolution of any problems, directly by himself or the pharmacy acting on his behalf. He added that there was potential for more complex patients benefiting from such co-located services; conversely patients on less complicated treatment regimens might prefer using their local community pharmacy.

> *"It'd be difficult to move from that pharmacy because of the service we receive and because of the... How they connect so well with each other."* ***PatCarer-04***

The service user also expressed the frustration with the healthcare system due to delays in communication between specialists and GPs. He was responsible for ensuring appropriate management of his daughter's condition (the patient). As such, those

communication delays had contributed to his close relationship with the practice and the pharmacy. However, he found he had a closer relationship with the pharmacy due to the frequency of their interaction (regular medicines requests due to the patient's needs). One particular pharmacy staff member was his main point of contact. She facilitated healthcare needs between the carer, the pharmacy and the general practice. This was greatly appreciated by the carer because it contributed to prompt service provision, especially in urgent situations.

> *"I mean don't get me wrong the staff in [the pharmacy] also work alongside [patient's name] but if I have a problem um, [pharmacy staff A's name] is the one that normally, erm, can sort that issue. […] I think along with [pharmacy staff A's name]'s, erm, polite persuasion, they sort of erm do things a bit quicker for her and in the scenario where we need it urgently."* ***PatCarer-04***

He also emphasised the fact that such close working ensured that NHS money was not wasted. For example, avoiding multiple issues of special medicines by involving the patient/carer, the community pharmacy and the general practice team in communications.

Policy development and implementation

The final 2nd order theme at macro-level related to policy development and implementation. As mentioned previously (Section 3.3.4.2.1, p.156), the efforts to improve the relationship between the practice and the pharmacy were initiated approximately 15 years ago (from the point of data collection in 2020). This was also facilitated by the physical relocation of the pharmacy next to the practice as part of the "NHS uplift" 12 years ago (Imison et al., 2008). As a result, the national agenda (in combination with the individuals involved) provided another motive to the evolve this and the broader relationship between community pharmacists and GPs nationally.

The community pharmacist explained that the sites of this case study were part of the pilot of the *GPs' referral to the Community Pharmacist Consultation Service (CPCS)*, which became an "advanced service" of the Community Pharmacy Contractual Framework across England in November 2020 (NHS Business Services Authority, 2021). The reason for this was because they had already discussed common conditions and groups of patients that would be suitable for referral from the GP to the pharmacy.

"But if I was honest with you, one of the reasons [this locality] was chosen [for the pilot] was because for the last three years, [practice name] and myself have worked on a navigational system. So they asked me the conditions and cohorts of people that they could refer in to pharmacy." ***CP-16-04***

Following the national CPCS service being built on the existing local referral process, the community pharmacist emphasised the importance of more projects being driven by higher levels (e.g. LPCs, CCG, wider NHS partner organisations). This would in turn promote further integration of community pharmacy within primary care. The community pharmacist also mentioned that some pharmacists may still want the "old model". However, this would hinder integration of services. Finally, she stressed that lack of joint working between community pharmacy and general practice could leave the patient on their own, which could be difficult.

3.3.4.3 Collaborative model's outcomes and impact on stakeholders

This relationship affected participants in a positive way despite being in its early collaborative stages (Table 14). Means of evaluation on the effects of the improved relationship were not identified during interviews and observations. The practice-based pharmacist noted that surveying patients on the improved pharmacy-practice communication could be difficult. This was because patients might express their personal opinion on the overall service they receive from the practice and/or the pharmacy, rather than outcomes from the collaborative working.

Table 14: Impact on stakeholders affected by the improved collaborative relationship in Case Study IV.

	Clinical outcomes	Process outcomes	Financial outcomes
Pharmacy staff	Utilising clinical expertise	Staff satisfaction Better work environment	
General practice staff		Reduced workload for GPs Streamlined process Better work environment	
Patients	Patient safety Continuity of care	Smoother patient journey Patient satisfaction	

3.4 Summary of case studies' within-case analysis findings

This section summarises findings from analysis within cases, responding to the first objective of this empirical project through individual examples of collaborative models between GPs and community pharmacists within English primary care. This is followed by Chapter 4, which connects findings from all cases to identify patterns of collaborations involving GPs and community pharmacists.

Within-case analysis focused on the second empirical project's aim and objectives on the level of each case study's collaboration(s). The four case studies presented above, reflected five distinct collaborative models between community pharmacists and GPs that resemble various stages of a buyer-supplier relationship (Table 15).

Table 15: Summary of case studies models' relationship between the collaborating practice and pharmacy.

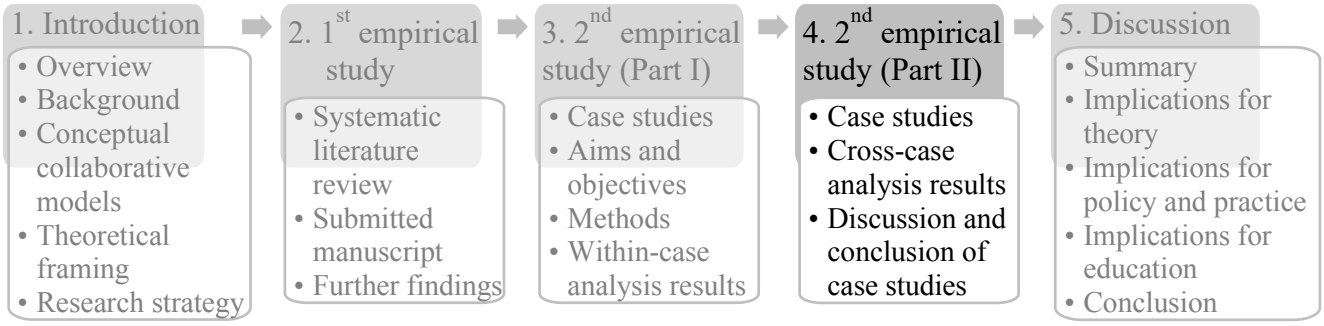
Model	Pharmacy-practice proximity	Social capital	Physical co-location	Purpose of collaboration
I	0 miles	Existing social capital	Pharmacy in practice	Prescription requests and medicines management for specific patient group
II	1-5 miles	Existing social capital	Pharmacist in practice	Medicines reconciliation, management and monitoring (multiple patient groups)
III-A	> 10 miles	Existing social capital	Pharmacist in practice	Medicines management and monitoring (multiple patient groups)
III-B	0 miles	Existing social capital	Pharmacy adjacent to practice	Information resource
IV	0 miles	Building social capital	Pharmacy adjacent to practice	Exploration of integration opportunities

Individual collaborative models' characteristics, ways of operating, and means of evaluation were described. Each model's purpose, drivers, enablers, and barriers were found on three levels: micro (individuals), meso (organisations such as pharmacies and practices) and macro (wider healthcare system and the public). Finally, there was exploration of each collaboration's impact on stakeholders (especially community pharmacists, GPs, and patients), which overall was positive. In response to the research

question, each model's activities had a positive impact on the delivery of primary care services in each context.

The main contributions to healthcare OSCM were that community pharmacist-GP collaborations could represent a hybrid form of a multi-tier supply chain. However, this is highly characterised by the collaborators' persona, their existing social capital, and highly influenced by institutional pressures. Power dynamics were present in all models although in slightly different forms. Most were in the "traditional" form of GPs and their organisations' having more power than community pharmacists in establishing a collaborative model (Hughes and McCann, 2003). This was especially apparent in Models I and II. Model III-A was a more innovative Buyer-Supplier-Supplier's supplier relationship, where the pharmacy company played a key role in enabling the collaborations. However, in Models III-B and IV, collaborative models could have been limited due power held by meso-level organisational strategic values not focusing on collaborative working, and/or by macro-level actors enforcing regulatory restrictions (e.g. shared records, community pharmacists' limited clinical role).

Chapter 4 Patterns of collaborative working between community pharmacists and general practitioners in England



This chapter presents the cross-case analysis (Part II) results, the discussion and conclusion of the second empirical study as a whole.

4.1 Cross-case analysis background

Five collaborative models and their characteristics were identified during within-case analysis (Table 15). These characteristics included the collaborators; collaboration drivers; purpose; barriers and facilitators; and impact on stakeholders involved. Cross-case analysis drew inferences from cross examining the case studies' models, using the "Most-Similar-System" Research Design (Przeworski and Teune, 1970) and "Mill's Method of Difference" (Levi-Faur, 2006) (Section 3.2.3, p. 102). The "similar" context in all case study models was identified as the pharmacy or the community pharmacist being physically linked to the practice (co-location). Part of the cross-case analysis captured the explanatory mechanism and causal pathway leading to community pharmacists and GPs' collaborative working relationships. The following sections focus on findings associated with the phenomenon being studied.

4.2 The explanatory mechanism of collaborative relationships

Exploring ("theorising") the explanatory mechanism was an essential part of understanding variables that influence an outcome. Conceptualising the outcome was the first step of theorising the explanatory mechanism. In this context the outcome was the collaborative working relationship between GPs and community pharmacists. More specifically, due to different depth of their relationship, there were two outcomes. Models

I, II and III-A had an "established collaboration", while Models III-B and IV had a less evolved "arm's-length relationship" – this is further explained below (Section 4.4).

The second step was identifying the causal pathway that led to each outcome. This included considering the causal condition and capturing the causal mechanism. The causal condition referred to the drivers behind pursuing a collaboration. The causal mechanism explored the contributing factors that led to each outcome. In particular, these factors included characteristics and variables enabling/hindering collaborative working relationships. The key findings for each outcome have been presented in Figure 16 and Figure 17. Figure 16 speaks to the mechanism that leads to an "established collaboration" and its impact on stakeholders and overall system integration. This outcome was associated with strategic values, existing social capital, contractual agreements, and the pharmacist/pharmacy being co-located in the general practice.

Figure 16: Theorising the explanatory mechanism of an "established collaboration" between GPs and community pharmacists.

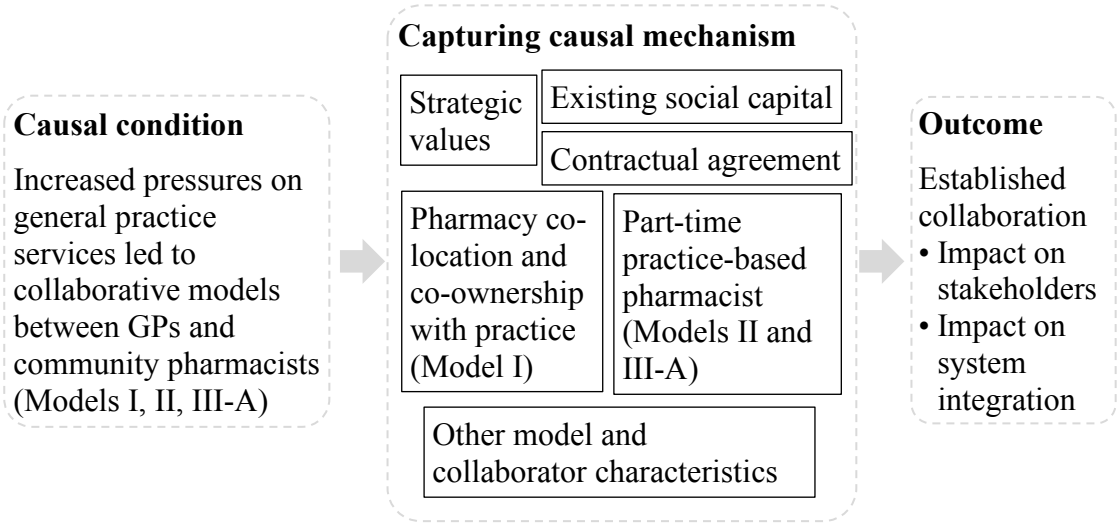
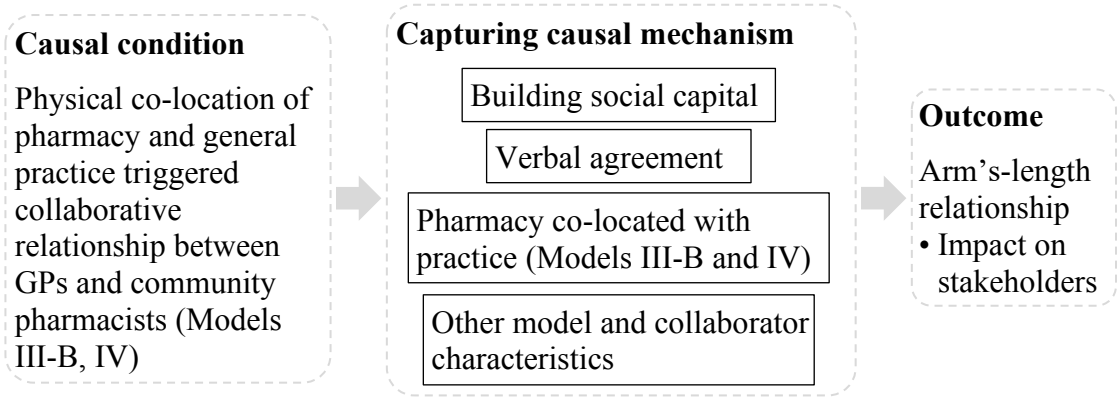


Figure 17 presents the explanatory mechanism of having an "arm's length relationship" and how this affects stakeholders. Here, social capital was being built, agreements for collaborative work (if any) were verbal and the pharmacy was co-located with the practice. In both outcomes, there were other (collaborative) model and collaborator characteristics that contributed or hindered the outcome.

Figure 17: Theorising the explanatory mechanism of an "arm's-length relationship" between GPs and community pharmacists.



The remainder of the cross-case analysis results include more in-depth findings on the components of theorising the explanatory mechanism. First, the drivers have been presented to explain the reason(s) for pharmacists and GPs pursuing enhanced working relationships. Second, each outcome (i.e. "established collaboration" and "arm's length relationship") has been defined to allow distinction of the causal mechanisms leading to each outcome. Finally, the exploration of the causal mechanisms follows.

4.3 Conditions for pursuing a collaborative relationship

Overall, drivers for improving the collaborative relationship, included increasing patient demand for general practice services; local demographic needs; and general practices upholding clinical governance values (risk management and clinical effectiveness). These values referred to upholding patient safety on matters related to medicines management, which was believed to be within the pharmacist prescriber's skillset. From the general practices' point of view, the common driver was fulfilling needs amid increased workload. As such, the collaborating practices outsourced pharmacists to deliver services (in-house or at the collaborating pharmacy). However, the common driver for improving collaborative working, across cases and collaborators, was to pursue an enriched interprofessional relationship.

As GPs and their organisations were in a more powerful position in this relationship, community pharmacists were specifically chosen due to their geographical and professional position in the community. They were also able to assist where the practice either had difficulty engaging a specific patient group (e.g. hard to reach population in

Model II) or was at-capacity (in terms of appointment availability). Identifying new ways of working due to increasing pressures on primary care and high expectation for GPs' work output were drivers in two models. Other motives included education (GP supervision for pharmacist's independent prescribing qualification); individuals' interest in improving the relationship between GPs/practice and community pharmacists/ pharmacy; and demonstrating the value of community pharmacists in general practice. However, the principal driving force of collaborative working relationships was aligning resources as part of improving quality and efficiency of general practice service provision. This meant patients and queries being dealt with by the most appropriate HCP.

In all case studies there was interest in working more collaboratively. Models III-B and IV had less established relationships compared with Models I, II and III-A. Despite this, the pharmacy/pharmacist and practice premises were in close proximity in both groups. As a result, working more collaboratively was perceived beneficial for patients and staff, due to their services being better aligned.

4.4 Causal pathway outcomes and their impact on stakeholders

The case studies' unit of analysis was the relationship between the collaborators (pharmacist-GP or pharmacy-practice). The strength of this collaborative relationship varied across the collaborative models (Figure 7), indicating varied success. No definitive comparison of clinical, process or financial outcomes could be made due to lack of relevant data. However, review of each case study's collaborative characteristics and activities (Sections 3.3.1.1, 3.3.2.1, 3.3.3.1, 3.3.4.1, pp. 109, 124, 138, 153, respectively) allowed for outcomes of the causal pathway to be distinguished between two types of community pharmacist-GP relationships:

- Established collaboration (Figure 16)
- Arm's-length relationship (Figure 17)

This distinction was also based on the overall impact of such collaborative models on the various stakeholders (i.e., healthcare providers and patients) (Sections 3.3.1.3, 3.3.2.3, 3.3.3.3, 3.3.4.3, pp. 121, 135, 151, 162, respectively). It became clear that Models I, II and III-A had a stronger collaborative relationship (thus "established collaboration") than Models III-B and IV, which had a less evolved and less collaborative relationship (thus "arm's-length relationship"). Cross-case analysis revealed themes regarding impact on

patients, the general practice and community pharmacy teams, as well as on system integration. These have been presented below. This process aimed to aid future steps regarding the exploration and implementation of collaborative working relationships involving community pharmacists, GPs and their respective teams.

4.4.1 Collaborative relationship's impact on stakeholders

Pharmacies and staff members

Pharmacy staff satisfaction was improved in all models (Table 8, Table 10, Table 12, Table 14). This referred to job satisfaction; improved professional practice (professional development and change in own way of thinking); and personal fulfilment. In most cases, the collaborative model demonstrated the community pharmacists' added value to patient care. It was believed this raised their professional profile, increasing patient trust in community pharmacy. Effects on pharmacy business were discussed in Models I, III-A and B. Although there was some business gain, losing staff due to secondments or staff poaching was an impediment. Impact on workload had both positive and negative acceptance by staff. In Model I, pharmacy workload was perceived to be somewhat increased due to the collaboration. Conversely, it was not believed to have been affected in Model II. Although both pharmacy teams had ACTs, differentiating factors for this could have been a second pharmacist and the different size of the pharmacy (15,000 vs 6,000 items per month).

General practices and staff members

Impact on the general practice team primarily included appropriately aligning tasks to available resources (Sections 3.3.1.2.2, 3.3.2.2.2, 3.3.3.2.2, pp. 114, 129, 143 respectively). All models reported reduced pressure on GPs and staff (Table 8, Table 10, Table 12, Table 14). This was by sharing workload (e.g. within the practice workflow or through referrals to pharmacies) and increasing appointment availability (due to additional resources being available). As a result, GPs were ultimately able to focus on urgent and/or more complex patients. Collaborative working was found to improve time management in most models. This was mainly related to queries being answered more quickly and easily. Lastly, in Models I and II the community pharmacist was found to be cost-effective due to value-added to patient care and service efficiency. Other areas that affected general practice members included: the belief that multidisciplinary work allows

them to broaden their way of thinking; high staff satisfaction due to the helpful way of working; and the possibility for receptionists to offer service provision choices to patients.

Patients

Patient benefit was perceived in all case studies (Table 8, Table 10, Table 12, Table 14). Improved patient journey and safety were mostly discussed. The patient journey was improved due to better access; efficient overall service; streamlined general practice services; and patient reassurance on data sharing. Patient safety referred to continuity of care; upholding patient safety standards; and improving patients' ability to self-manage their condition and medications (i.e., patient activation). Patient clinical outcomes, such as reduced readmissions, safer prescribing, and less delays in patient reviews, were mentioned although not commonly.

Other patient-related outcomes included patient satisfaction, which was found in all case studies (Table 8, Table 10, Table 12, Table 14). This was in the form of generic satisfaction comments. There was some evidence of positive (or lack of negative) patient feedback in Models I and III-A. However, there was general lack of direct patient evaluation of such collaborative services. Other positive experiences included the pharmacy exceeding patient expectations (especially in Model III-B) and having a longer, more informative consultation with the pharmacist. The latter was also valued because it offered a different perspective on patient care provision.

4.4.2 Collaborative relationship's impact on system integration

System integration was believed to have improved in all models although more substantially in established collaborations (Models I, II and III-A). Patients and health providers' experience of the collaborations indicated that collaborative working allowed a smooth, streamlined and efficient process to be in place. It also improved the pharmacy-practice relationship through better communication; a feeling of being part of the same team; and the understanding that working more closely together was mutually beneficial. There was also a general perceived sense of the service and its operational mechanism being successful. This was validated through positive reinforcement (e.g. awards, publications, positive patient comments). Increased understanding of each collaborators' operations was reported as a positive outcome in all models. This indicated shared

understanding of goals within each organisation and identifying ways to complement each other's work.

4.5 Causal mechanisms - variables influencing collaborative relationships

This section explores capturing the causal mechanisms of each causal pathway. This relates to identifying the characteristics and variables that contribute to each outcome. It was the key step in detecting the distinct differences between having an established collaboration versus an arm's length relationship. Variables identified during within-case analysis indicated the variables to explore further during cross-case analysis. Differences, as well as similarities, were made clearer through comparing and contrasting the identified models' characteristics, their collaborators' characteristics, and the nature of their relationship. More specifically, investigating these variables' association with the outcomes exposed potential success determinants.

There were two most noticeable differences. The first one was the existence of organisation-level strategic values (rather than individual person-level), which influenced the nature of agreement (contractual versus verbal) and the level of social capital within the relationship (existing versus building social capital). The second one was the co-location of the pharmacist (Models II, III-A) or the pharmacy (Models I, III-B, IV) with the practice and the relevance of co-ownership. Finally, other model and collaborator characteristics were also pertinent to having a richer GP-pharmacist relationship (compared to the current routine and non-clinical interaction between community pharmacists and GPs).

4.5.1 Strategic values: nature of agreement and social capital

Organisational-level strategic values appeared to influence the nature of agreement (contractual versus verbal) and be related to the level of social capital between GPs and community pharmacists (existing versus building social capital). Models I, II and III-A had in common the interest in collaborative working on a strategic level. It was evident throughout these case studies that their organisations' strategy focused on materialising this interest by establishing such collaborations. This went in hand with the individuals involved, who shared this interest and innovated by collaborating. Their position in the

respective organisations (i.e. GP partners, pharmacy superintendents) indicated multidisciplinarity at a strategic level.

This was further reinforced by establishing the collaboration through a contractual agreement, which outlined the collaboration specifications. For example, in Models II and III-A, pharmacists were superintendents and both GPs who recruited them were leaders in the practices involved. These models were based on contracting the individual pharmacist for providing services at the practice(s). In Model I, there were specifications related to the collaborative activities undertaken by the pharmacy team, e.g. governance related to access to patient records.

Model I, II and III-A's collaborations were also characterised by existing social capital. This strengthened the collaborative relationship, as it stemmed from each organisation's strategic values towards having integrated services. Models III-B and IV did not have established collaborations. However, it was apparent in Model IV that both organisations' participants wanted to build social capital. Social capital was believed to aid the development of the relationship beyond the routine transactional non-clinical interaction. Following that, a collaboration could be established with the intention of improving patient experience and workflow (within the practice and the pharmacy).

Importantly, individuals' efforts may not be enough to achieve this. This was demonstrated by Model IV. The community pharmacist, who had a leadership role for local pharmacies, aimed to set an example for others. Despite efforts for 12 years, Model IV did not evolve to an established collaboration. Social capital was still being built, with some agreed projects periodically having a more intense/frequent community pharmacist-practice interaction (e.g., service pilots, locally commissioned services). As a result, these did not secure a longer-term collaborative working relationship, where the pharmacist could undertake a more clinically involved role.

4.5.2 Co-location and co-ownership

Another key aspect of the causal mechanism was collaborators' close proximity and if there was co-ownership of their organisations. Close proximity was defined as pharmacist or pharmacy co-location with the practice. In Models II and III-A's established collaboration, the community pharmacists worked part-time for general practices. However, in Models III-B and IV, which had a less deep relationship, the pharmacy was

co-located with the practice. Model I stood out despite the pharmacy-practice co-location. It had long-standing, specific collaborative activities in place, which aimed to relieve the practice's workload. This pharmacy was founded and co-owned by some of the practice's GP partners, which could be the reason for having such a well-established collaboration.

Conversely, Models III-B and IV appeared to be initiated primarily due to the opportunistic co-location of the pharmacy and the practice. In Model III-B there used to be digital integration (partly like Model I). However, this was discontinued when the ownership of the practice and the pharmacy changed to different separate organisations. As such, this could also support the role of co-ownership in having an established collaboration rather than an arm's length relationship.

4.5.3 Other model and collaborator characteristics

Other factors which influenced the level of the collaborative working relationship included other collaborative model characteristics (e.g., nature and purpose of the collaboration) and the collaborators' characteristics (e.g., years since qualification; practice and pharmacy size; leadership role; mutual trust and respect; and pharmacists' value recognition).

Other collaborative model characteristics

The nature of collaboration differed between Models I, II, III-A, and Models III-B, IV. This was one of the reasons for distinguishing them as established collaborations versus arm's-length relationships. Some aspects were similar, especially in terms of patient-centred care and staff exchange to improve understanding of each other's organisation. Nevertheless, there were key differences in the activities that pharmacy staff undertook on behalf of GPs or the practice, and the level of integration. The purpose of the established collaborations was to share the practice's workload on medicines management, including pharmacy-based services (Model I) and participating in quality improvement projects (Model II).

In Models I, II and III-A, the activities delegated to the pharmacist were clinically orientated (patient-facing consultations, medicines reviews). In Model I, pharmacy access to the patients' medical records eased pressures on the practice reception (digital integration). Patients contacted the pharmacy for practice-held information and

requesting prescriptions, especially urgent ones (without having to pay for an emergency medication supply, which was the routine procedure in any pharmacy). In Models II and III-A, pharmacists' activities directly affected GPs' workflow. They were responsible for patients' medication management and reconciliation. Holding minor illness clinics was also part of Model III-A. Pharmacy staff and the collaborating pharmacists in all models acted as information resources that general practice staff used for medicine-related queries. In the cases of Model III-B and IV, this was more limited, focusing on problem-solving (e.g. alternatives for medicines with supply problems). In the latter model, an element of relationship expansion was the exploration of integration opportunities. Examples included jointly agreeing on illnesses that could be managed within the pharmacy and reducing the practice's incoming workload.

Open and honest communication was overall considered important for establishing a good relationship. Communication in all models was bidirectional and mostly in-person. However, in Models I, II and III-A there was the possibility of written communication between the collaborating pharmacist and GP (via shared access to the practice software's tasks). This provided an audit trail and produced evidence of added value in patient care by the pharmacist. Conversely, in Model III-B, and less so IV, communication was based on problem-solving.

Collaborators' characteristics

The nature of collaborative relationship was influenced by several collaborators' characteristics. These included having a leadership role; years since qualification; experience with multidisciplinary work; recognition of pharmacists' value; mutual trust and respect. Most pharmacists and GPs were qualified for at least 10 years (Table 16). All collaborators were in a leadership role within their organisations. The level of leadership differed between established collaboration and arm's-length relationship models. In the former, collaborators were leaders in their respective organisations. In Model IV the community pharmacist was involved in local pharmacy leadership. The size of the organisations (based on the items dispensed per month for pharmacies and the patient list for practices) did not appear to be a determinant for an established collaboration. There was a mix of these factors across the models, which did not indicate if one end of the spectrum led to a collaboration or an arm's-length relationship.

Table 16: Participating organisations' characteristics and key demographic details of participants that could have enabled collaboration.

Model	Sector	Size	Setting	Provider's occupation	Sex	Years in current role	Qualified (years)	Role in leadership
Model I (established collaboration)	General practice	>15000 patients	Suburban	GP	Male	Unknown	10-20 years	Yes
				Pharmacist	Male	5-10 years	> 20 years	No
				Pharmacy technician	Male	< 5 years	Unknown	No
				Reception manager	Female	5-10 years	Unknown	No
				Receptionist	Female	< 5 years	Unknown	No
	Community pharmacy	>15000 items/month	Suburban	Pharmacist (FT)	Male	5-10 years	5-10 years	Yes
				Dispensary manager	Male	5-10 years	Unknown	No
Model II (established collaboration)	Community pharmacy	5000-10000 items/month	Suburban	Pharmacist (PT)	Male	5-10 years	10-20 years	Yes
	General practice	10000-15000 patients	Urban	GP	Male	5-10 years	5-10 years	Yes
				Pharmacist	Male	< 5 years	10-20 years	No
Model III-A (established collaboration)	Community pharmacy	12 pharmacy branches	Suburban-rural	Pharmacist (FT)	Male	Unknown	> 20 years	Yes
	General practice	10000-15000 patients	Urban	GP registrar	Female	< 5 years	Unknown	No
				Receptionist	Female	5-10 years	Unknown	No
				Pharmacist (PT)	Male	< 5 years	> 20 years	Yes
	General practice	5000-10000 patients	Rural					
Model III-B (arm's length relationship)	Community pharmacy	5000-10000 items/month	Rural	Pharmacist (PT)		Unknown		
	General practice	< 5000 patients	Rural	GP	Female	< 5 years	< 5 years	No
Model IV (arm's length relationship)	Community pharmacy	>15000 items/month	Suburban	Pharmacist (FT)	Female	10-20 years	10-20 years	Yes
	General practice	>15000 patients	Suburban	Pharmacist	Male	< 5 years	10-20 years	No

Abbreviations: GP = general practitioner; FT = full-time employment; PT = part-time employment

4.6 Enablers and barriers of collaborative relationships

This section explores more closely the enabling and hindering role of variables that arose from cross-case analysis (Table 17). In all cases, system integration was considered a key enabler. Personal attributes; incentives for collaboration; and the role of national policy were also deemed facilitators across the cases. Regarding barriers, these were mostly in relation to logistics of collaborating (e.g. when implementing a collaborative activity); the community pharmacy sector's limitations; personal views and capabilities; agency conflict; and organisational pressures.

Table 17: Enablers and barriers of collaborative relationships according to micro, meso and macro-levels.

	Enablers	**Barriers**
Micro-level	Personal attributes	Personal views and capabilities
Meso-level	System integration Incentives for collaboration	Collaboration logistics Agency conflict Organisational pressures
Macro-level	National primary care integration policy	Community pharmacy limitations

4.6.1 Enablers of collaborative relationships

Personal attributes

It was clear throughout the case studies that the collaborators' personal attributes played a fundamental role in pursuing a closer collaborative relationship. Enthusiasm by both GPs and community pharmacists was considered an important facilitator. Individuals' proactiveness in pursuing a more clinical role, being open-minded and self-aware of own capabilities were some personal characteristics that could aid collaborative practice. Other key enablers were mutual trust in each other's capabilities and professional experience of working collaboratively.

System Integration

This referred to organisational, physical and digital integration, as well as the importance of social capital. Organisational integration included aligning resources appropriately and according to effort required for activities to be completed. For example, GPs conducting medicines reviews was not considered appropriate use of their time because this could be

done by pharmacists. Pharmacists were recognised as being an adaptable workforce with expertise in medicines. Their quality training equipped them with competency in a patient-facing role and with working autonomously. Community pharmacists had the additional advantage of being part of the community. Moreover, the pharmacy team and the within-hierarchy allowed task delegation enabling community pharmacists' involvement with general practice.

Physical integration referred to accessibility of services due to co-location or close proximity. Although this factor did not distinguish models with an established collaboration from an arm's length relationship, it was noteworthy. It highlighted the key role of the community pharmacist being involved with the practice's operations (Table 15). Another aspect was the organisations' close proximity enabling more frequent pharmacy-practice interaction. Thus, the relationship evolved compared to standard practice, as in Models III-B and IV. Such integration was considered to improve patient access to services due to the co-location and often because it meant extended opening hours. Especially in the case of Model I, which was described as a "one stop shop service", and Model IV, where the improved pharmacy-practice relationship was a crucial benefit for the service user participant. Challenging this idea, in Models II and III-A the community pharmacist worked part-time for practice(s), which were not next to their community pharmacies. Based on this, the type of relationship was not necessarily dependant on co-location of the pharmacy but rather the (community) pharmacist being more clinically integrated with the practice.

Digital integration was an enabler in most models (Models I, II, III-A and III-B). Digital evolution facilitated care provision by having practice software access from the pharmacy (co-located and remotely) and having an audit trail on patient care. The latter also provided evidence of the value added by pharmacists to the practice's operations. Other digital advancements included allowing better communication between stakeholders through the practice software text messaging system. Meanwhile, the pharmacy services' online platform provided information feedback to patients' GPs. Finally, the practice's electronic prescription request platform allowed a smoother patient journey.

Social capital was considered in most cases as an important factor in building good GP-pharmacist relationships. Building a collaboration on existing capital was a facilitator (Models I, II and III-A). Goodwill from both partners was one of the key enablers for the

pharmacy-based services (Model I). Understanding social capital's vital role and having mutual respect between the community pharmacist and GP, were not sufficient to establish a collaboration. In addition to this, change of the organisations' ownership (Model III-B) and slow progress in developing the relationship (Model IV) could be attributed to various factors, e.g. single-sided goodwill, large multiple pharmacy company.

Incentives for collaboration

Incentives for building collaborative working relationships were discussed in most cases. The patient narrative was evident in all case studies, with reference to the general benefit to patients resulting from closer working between community pharmacists and GPs. Although patients were considered the biggest winners, mutual gains for service providers were also enablers. These included financial gain (although in Model I this was to break-even rather than make profit) by achieving QOF targets (Section 1.2.1.2, p. 18); availability of funding for pharmacists' integration; and cost-effectiveness (compared to GPs, nurses and accessing hospital consultants for medication-related queries). Professional development and sharing workload were other facilitating incentives for becoming more integrated with GPs and general practice.

National policy

The national agenda was identified as an enabler due to published policy encouraging multidisciplinary work and moving towards improved integrated healthcare services. National services and infrastructure were considered important in building a closer working relationship between GPs and community pharmacists. This was also connected to the national pilot of practice-based clinical pharmacist and the following wider deployment in English general practices. This was facilitated through national and local organisations (e.g. CCGs).

4.6.2 Barriers to establishing collaborative working relationships

Barriers that could hinder closer collaborative working were identified in all case studies. These mostly focused on personal views and capabilities (micro-level); logistics and, to a lesser extent, agency and organisational pressures (meso-level); and community pharmacy-related limitations (macro-level). Some participants mentioned not having

encountered any barriers, while some others who did, were confident that these could be overcome.

Personal views and capabilities

Individuals' opinion on patient data sharing was considered a barrier to pharmacists' integration. Although this had not been an issue in models where there was pharmacy access to patient records, participants felt there was a general perception that patients may not want that. Pharmacists' perception of their own limited competence (e.g. lack of additional clinical qualifications or experience); or individuals' uncertainty, if a collaborative model will work, could also hinder their integration.

Collaboration logistics

Logistical barriers were discussed in all cases. These mainly referred to communication problems: general lack of communication or face-to-face contact, and communication focused on resolving problems. Consequently, the expansion of the GP-community pharmacist relationship was hindered.

The three case studies characterised by established collaborations reported financial obstacles. These included inadequate incentives; cost of indemnity; lack of clarity on VAT (relating to outsourcing services); and pharmacists' higher salary cost compared to nurses. Managing resources was another category of barriers. This mostly related to training staff; difficulty due to staff turnover; and managerial oversight when working remotely.

Lack of existing social capital was briefly mentioned in all case studies as a barrier. This was also associated with lack of trust and reciprocity to help each other (e.g. not identifying eligible patients for services). Some of the practices' patient-facing operations were obstacles for patients. Examples included problematic patient access due to the appointment booking system or speaking to GPs. These difficulties contributed to lack/slow progress in advancing collaborative relationships.

Agency conflict

Agency conflict was an evident barrier to expanding collaborative relationships between GPs and community pharmacists in all case studies. Findings included competing

priorities and competition between suppliers (e.g. encroachment of nurses' role). Competing priorities were found across micro, meso, and macro levels. Professionals had competing demands on time (micro-level). Each of their organisations often had different priorities (meso-level). Following the creation of PCNs, their attention was drawn away from directly collaborating with each other. Finally, on the macro-level, despite encouraging integration and collaboration, NHS targets directly/indirectly created competition.

Organisational pressures

Organisational pressures hindering collaborative working relationships were briefly discussed. The busy working environment leading to *"hitting a brick wall" (CP-10-01)* with reference to collaboration discussions. All three participants within Model IV expressed their concerns over the pharmacy company's disruptive changes and shortage of staff. Thus, not allowing any time to invest in improving the practice-pharmacy relationship. Healthcare system delays were also barriers, causing frustration to all stakeholders involved.

Community-pharmacy-related limitations

All cases revealed higher-level hurdles for community pharmacies undertaking further activities in collaboration with general practices. These mostly included regulatory limitations regarding community pharmacists' unequal access to NHS patient records and limited clinical capabilities. The difficulty in demonstrating the value of community pharmacy services and forecasting demand was emphasised in two case studies (II and III). For example, it was believed there was lack of understanding of their role and lack of pharmacy services' promotion. Other obstacles included unreliable technology and "mental barriers" (e.g., pharmacists wanting the "old model" of working, doctors' attitudes towards community pharmacists and read-write access being protected).

> *"The people who guard [read-write access] because they realize at the moment that happens […] pharmacies will do everything clinically […]. So it becomes the almost like this barrier that is being set for us"* ***CP-06-02***

4.7 Discussion of case studies

This chapter presented a comparison of all the case studies and models. It identified areas of similarity and difference between the models that they represented. In the following section, the overall case studies' results are discussed in the context of the micro, meso and macro levels.

4.7.1 Micro-level: Bottom-up innovation adoption

Throughout the case studies, it was clear that individual pharmacists and GPs played a key role in establishing a collaborative working relationship. This included personal and professional attributes, such as using one's initiative to pursue a more clinical role, being an independent prescriber, and more importantly both actors having a mutual interest in working collaboratively. This could be described as "NHS change agents". These are key members of NHS organisations in strategic positions, encouraging change within the organisation and helping employees embrace change (Child and Smith, 1987; Burnes, 2004).

Due to the high pressure and unpredictable nature of healthcare, change agents have been found to be those delivering care, while being interested in improving the working environment (Doyle, 2001; Massey and Williams, 2006). Massey and Williams' work (2006) focused on wider implementation of change projects within NHS organisations, via teams applying the CANDO approach (Clean, Arrange, Neatness, Discipline and Ongoing improvement). Such approaches to change (or innovation in the case studies of this doctoral research) might not have been in place due to the strategy of the collaborating organisations. However, the individuals establishing more integrated ways of working, did so to improve their working environment and their product (i.e. patient services).

The existing social capital within the case studies refers to personal relationships between buyers and suppliers. In Models I and III-A this was clearly evident. Organisational literature, and more specifically Social Capital Theory, supports the relevance between buyer-supplier's social capital and performance benefits for the buyer (Granovetter, 1983; Nahapiet and Ghoshal, 1998; Krause et al., 2007). Nahapiet and Ghosal's (1998) relational dimension of social capital supports the type of existing relationship in Models I and III-A. Nonetheless, the cognitive dimension of social capital was present in all case studies due to participants' interest in learning each other's operations. This might have

been the starting point of developing their relationship into a buyer-supplier relationship. However, it also played a role in practically growing shared values and identifying ways to improve the patient journey through integrated care provision (Weick, 1995; Nahapiet and Ghoshal, 1998).

Mutual respect and trust between supplier and buyer were prominent throughout the case studies. As previously mentioned, trust is considered an important aspect of successful collaborations. Grudinschi et al. (2014) explored managers' role in relationship risk management within private, public and non-profit organisations collaborations. Amongst their findings, they highlighted Tuten and Urban's (2001) view that motivation to form a partnership remains a critical attribute of collaborators. This is even if they have had previous experience of a collaborative relationship. Their contribution to this was that partners concerned about high relationship risks would be responsible for building trust, communication channels and, governance and administration (Grudinschi et al., 2014). Thus, in this context, these aspects would be actioned by collaborators who were concerned about the relationship. This resonates with Model IV. The collaboration had not progressed to the next level in over 10 years, despite initial steps having taken place, e.g. communication methods and mutual understanding (Weissenborn et al., 2017).

On the contrary, in Model I there was low perception of risk management because the two organisations were linked through co-ownership (Tuten and Urban, 2001; Grudinschi et al., 2014). Managerial staff were responsible for establishing communication, governance and administrative processes (e.g. audit feedback on supplier's performance). In fact, although competition was present, Principle (buying firm, i.e. general practice) and Agent (supplier, i.e. community pharmacist) were able to overcome their differences for the greater good. For example, the Principle drove the collaboration to fulfil specific needs. The Agent chose to prioritise their interests by continuing the pharmacy-based role. Despite this, there was mutual understanding in moving the relationship past competing interests, irrespective of potential negative repercussions, e.g. on his employment (Tuten and Urban, 2001). Interestingly, previous research found that trust was not shown to have a significant impact on collaboration fluency ("the ability to successfully work and interact with virtual and real partners", Crockett et al., 2011).

In summary, individuals played a fundamental role in having a more integrated relationship between the two main primary care providers (i.e. general practice and

community pharmacy). Although having a pre-existing relationship was an important condition for collaborative working, it did not necessarily lead to establishing a collaboration.

4.7.2 Meso-level: Nature of buyer-supplier relationship and organisations' operant resources

Organisational leadership in changing practice was evident in the case study models as discussed above, primarily by individuals who wanted to make a difference to service provision. These leaders were in key positions of the general practice and community pharmacy organisations. Therefore, they were able to influence the strategy of those organisations. The only exception to this would be in Models III-B and IV, where the pharmacists managing those community pharmacies were not involved in higher-level decision-making within their organisations' strategy. Although the community pharmacist of Case Study IV was involved with the LPC, this did not directly impact the relationship with the relevant practice.

In Case Study III (Model III-A and Model III-B) there was strong drive by the pharmacy company to showcase community pharmacists' value, which led to a buyer-supplier-supplier's supplier relationship. Mena et al. (2013) explored multi-tier supply chain (MSC) management to compensate for the limitations of dyadic buyer-supplier relationships in complex buyer-supplier networks (i.e., the food supply chain in their research, and healthcare in this research). They described three types of MSCs: open, closed, and transitional. In Case Study III, the buyers (general practices), the supplier (pharmacy company) and the supplier's suppliers (community pharmacists) were all formally linked (closed MSC). The supplier had a limited but key role because they brought stability to the chain due to reliability stemmed in the buyer-supplier relationship. However, because the pharmacists (supplier's suppliers) were seconded in general practice, they had direct impact on service provision (the product). This created more interdependency between the buyer and the supplier's supplier (transitional MSC). As such, Case Study III was overall probably best placed in between a closed and a transitional MSC. The transitional MSC poses threat for the supplier (Mena et al., 2013), which was evident in Case Study III ("staff poaching"). As such, the contribution here is that more contractual relationships would be needed to secure the supplier's interdependency in the MSC.

Model II was based on a contractual agreement, where the supplier, who in this case was the community pharmacist (not the pharmacy organisation), was directly employed part-time by the general practice (buyer). Model I was an example of an intra-organisational buyer-supplier relationship (the two organisations operated independently despite the same ownership). Co-ownership and co-location could contribute to the ease of supplier employee exchange, which can positively affect suppliers' performance (Wagner and Krause, 2009). Supplier exchange was apparent in Models I and IV. In the former, the community pharmacist used to hold an afternoon clinic at the practice (discontinued activity) and the technician ultimately moved from the pharmacy to the practice's pharmacy team. Each individual's professional development was the reason for changing roles, i.e. competing interests were present. Despite this, the collaborative working relationship continued, albeit in a different format.

In Models I, II and III-A, the buyers were outsourcing pharmacy expertise, indicating that the power balance weighed towards GPs. Pharmacists undertook clinically appropriate tasks due to increased patient demand for general practice services. In Model I, aspects of convenience for the patient and low resource effort were drivers for delegating specific tasks to the community pharmacy team. This aligned the type of task to the appropriate resource (i.e. pharmacist for clinical review of contraceptive, trained technicians adding prescription requests on the practice system). In Model II, it was believed that the general practice was buying the community pharmacist's expertise (emphasising their position in the community pharmacy).

Both Models II and III-A (with Practice B) were experimental, i.e. they were initiated by the buyer as a trial. Taponen and Kauppi (2020) produced a process framework to aid outsourcing decision-making, which included the following phases: "regular evaluation of service functions, market analysis, cost analysis and benchmarking and evaluating relevant service activities". Findings indicate the important role of service evaluation to determine the most appropriate resource for the relevant service due to be outsourced. Although this framework was produced to aid public organisations' decision-making, it should be noted here that both general practices and community pharmacies are contractors of the NHS (Section 1.2.1, p. 16). McIvor's earlier view (2000) on the outsourcing process resembled aspects of the conceptual models (Section 1.3, p. 22). This work argued the importance of clarifying collaborators' capabilities in order to identify

the most appropriate role for them. In this context, this would be areas where pharmacists can contribute as part of integration of primary care services.

Case Study I's GP and Case Study III's pharmacist believed pharmacists' flexibility allowed the introduction of adaptable workforce in general practice, which would be beneficial amidst other pressures (Dubois and Singh, 2009; Best and Williams, 2019). In contrast, the practice-based pharmacist in Case Study II commented that this role required a particular skillset, which some pharmacists might not find suitable. Therefore, care should be taken when moving into this sector.

Findings of this research also highlighted the community pharmacists' (potential) lack of confidence in clinical work. A pharmacist mentor could play an important role in this. Professional identity and the importance of mentor pharmacists in transitioning to a new role has been supported by previous research in practice-based pharmacists (Pottie et al., 2009; Mann et al., 2018). More recently, Best and Williams (2019) specifically explored professional identity in interprofessional teams. They highlighted the need for support, communication and appropriate management to ease someone in a new role within a multidisciplinary team. This was particularly relevant to new roles that have resulted from change/innovation.

4.7.3 Macro-level: National policy: friend or foe?

On the macro level, national policy towards integration (NHS England et al., 2016b; NHS, 2019) was widely discussed by participants across all case studies, either as an enabler to integration of pharmacists within primary care or as an impediment. Patient-centred care has always been at the forefront of policy, the national agenda, and every healthcare professional's practice. Questions remain as to how community pharmacists are impacted by national policy. There are two elements to this: *policy, regulation and digitalisation limitations*, and *public opinion (of patients and other HCPs) on community pharmacy*.

General practices and community pharmacies both hold contracts with the NHS to provide patient services (Section 1.2, p. 16). Although both organisations are businesses, there is a general perception of pharmacies being more commercial than general practices. This could be due to sales of medicinal and other personal care products. Making profit could be the distinguishing factor between the two. In particular, this could be due to concerns of commercialisation potentially compromising patient safety, especially in

companies with multiple pharmacies (Richardson and Pollock, 2010). Such perceptions emphasise the power imbalance between GPs and community pharmacists. Power dynamics have been found to be associated with building one's professional identity in healthcare historically, especially affecting trust when building collaborative relationships (Payne, 2006; MacDonald et al., 2012; Best and Williams, 2019).

Community pharmacy's professionalisation has been improving over more than a decade, with increased service provision while having to maintain financial stability (Bush et al., 2009). However, further exploration of funding allocation to community pharmacy is still required, especially in response to findings regarding IP community pharmacists' ability to prescribe on the NHS. As evidenced in this research, patients would benefit from a more integrated community pharmacy and general practice network, with more streamlined, seamless services, encapsulating continuity of care and resulting in a smooth patient journey throughout primary care.

Most recently, Anderson et al (2021b) were commissioned to investigate the long-term future of the NHS, while ensuring appropriate operant and operand resource alignment to tasks for efficient and equitable healthcare provision. They reinforced the idea of utilising community pharmacists due to their accessibility (i.e. not moving them to general practice). Artificial intelligence and robotic capabilities during dispensing could enable more clinical roles focused on diagnosis and management. However, further evidence is required on how and when this will be achieved. As such, this should include regulatory facilitation to implement advanced clinical skills, and financial reimbursement reflective of community pharmacists' new role. Furthermore, previous research argued the need for policy within the macro level to specify resources' alignment. In particular, this included the position of community pharmacists' expanded role in terms of their duties, responsibilities, purpose and mechanism of complementarity to other HCPs' role (Mossialos et al., 2013; Mossialos et al., 2015).

In Case Study IV, the participating community pharmacist mentioned the pharmacy moved adjacent to the practice as part of the "NHS uplift". This referred to the NHS LIFT (Local Improvement Finance Trust). This was an initiative by the Department of Health (2007) to form public-private partnerships to improve primary care services. This was through integration of primary and secondary care provision in purpose-built premises. Primary Care Trusts (CCGs of that time) were primarily involved to create hubs of such

services, which also hosted a variety of services such as general practices, outpatient clinics, social care services, pharmacy and others. The Kings Fund published a report on such "polyclinics", which considered learning from the NHS LIFT programme and international examples of such co-located services (Imison et al., 2008). One of the original goals was to bring specialist care within the primary care setting. For pharmacies, this focused more on ease of access for services ("one-stop shop"). Meaning that it was not necessarily aimed at operationally integrating systems of individual organisations within primary care. Lack of integrated information technology systems was a noticeable barrier – although it mostly related to referrals between GPs and on-site specialist services. Thus, the case studies added to this by highlighting the improved collaborative relationship (beyond routine practice), which was enabled by co-location.

The service users who participated in this doctoral research openly discussed their satisfaction with the services received based on the collaborative working within each case. Although Case Study I did not include a patient participant, providers believed Model I was successful due to patients' verbal feedback. Furthermore, there was a call for allowing community pharmacists to be more involved in patient care from their pharmacy. Delegating well-managed, single long-term conditions to community pharmacists was a key theme for future consideration to ease pressure in general practice and make the patient journey more efficient (through resource efficiency, i.e. utilising existing resources in the community, near the patient). This was also supported by Hindi et al. (2019), who qualitatively explored stakeholders' views (patients, pharmacists and GPs), and Mossialos et al. (2015).

Evidence also shows patients being satisfied with pharmacists' ability to prescribe within primary care (Smalley, 2006; Stewart et al., 2008; Stewart et al., 2011), which was strongly supported by the patient participant in Case Study III. A recent rapid review and qualitative study by Khayyat et al. (2021) found high patient satisfaction with community pharmacy post-discharge services. Their recommendations included better patient and public awareness of pharmacy services through comprehensive campaigns and allowing access to patients' medical records. This could improve integration within primary care services, communication (HCP $\Leftrightarrow$ patient, and HCP $\Leftrightarrow$ HCP), and transition and continuity of care. Interprofessional tensions, lack of a system for direct GP-community pharmacist communication (including joint access to records), and the public's opinion

of community pharmacy services (and their high variability), have previously been recognised as barriers to clinical service provision and patient uptake (Mossialos et al., 2015; Murray, 2016; Hindi et al., 2018; Hindi et al., 2019).

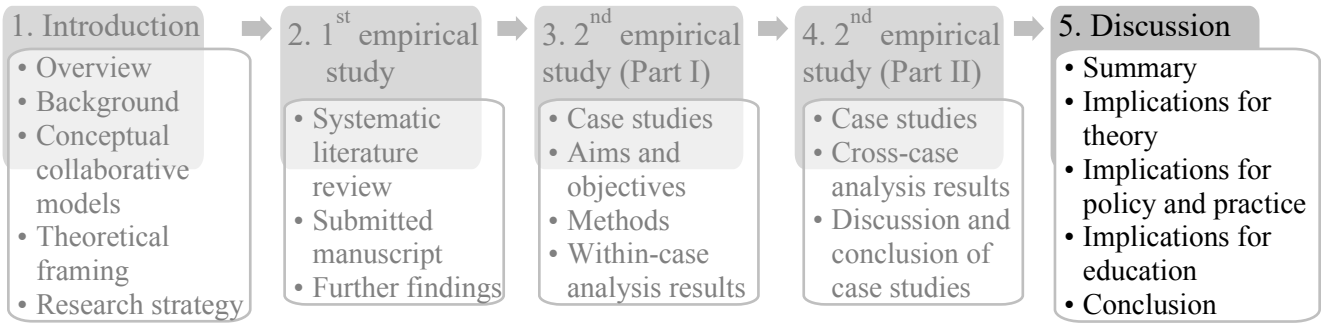
Lack of progress in a relationship could be attributed to other factors, deeper engrained in society or the wider societal system. These could include public opinion and doctors' attitudes towards community pharmacy as well as wider pressures on the NHS. Examples of these could be increasing demand within general practice and community pharmacy, competing priorities for time and reduced funding. Such difficulties could negatively affect professionals when making decisions on pursuing a better relationship, despite policy encouraging this. These have been discussed in more detail above as they are based on individuals' beliefs (micro-level) and organisation/professional groups' operations (meso-level). Some community-pharmacy-related barriers have been closely linked to legal capabilities (Section 4.6.2, p. 178). This research confirms wider regulatory limitations that have been previously recognised as key obstacles to community pharmacists' role expansion and integration within the wider primary care team (Pojskic et al., 2009).

4.7.4 Conclusion of second empirical study

The case studies revealed current examples of collaborative working relationships between community pharmacists and GPs in England. They indicated important contributing factors that encourage the establishment of collaborations. The primary purpose was to jointly work on improving the patient journey within primary care. Enablers included individuals' proactiveness to achieve this, and centralised support to increase utilisation of community pharmacists in collaboration with GPs.

This was the first study to compare specific collaboration models between community pharmacists and GPs in the context of English primary care. The lack of generalisable data and the potentially isolated examples of such rich relationships were limitations. However, the findings provided foundations for healthcare professionals and policymakers to realise such models in practice.

Chapter 5 Discussion



Overall, this research aimed to gain a better understanding of collaborative working relationships involving community pharmacists and GPs; reasons that lead to their creation (drivers); their operational characteristics; relevant barriers and facilitators; and their impact on stakeholders involved (e.g. patients, community pharmacy and general practice teams). The research questions set out at the beginning of the thesis were:

RQ1: What collaborative models involving CPs and GPs currently exist in practice?

RQ2: How do these models impact primary care services?

RQ3: What recommendations can be made to CPs and GPs interested in forming collaborative relationships?

This chapter summarises findings from both empirical studies (systematic literature review and case studies) (Section 5.1, p. 190). This includes a discussion on the relevance of the identified case studies' models to previously published conceptual models (Section 1.3, p. 22) and the typology that emerged from the systematic literature review of this doctoral research (Figure 3, Section 2.1, p.49). Case studies and systematic review findings are then contextualised within the theoretical framing of this research, including implications for theory (Section 5.2, p. 196). Following that, implications for policy and practice (Section 5.3, p. 198) and for education are presented (Section 5.4, p. 201). The thesis conclusion responds to the research questions, including strengths and limitations; future research opportunities.

5.1 Summary of systematic review and case studies

Models I, II and III-A represented collaborations where there was "Commitment to the Collaborative Working Relationship, with mutual cooperation, trust, respect and social exchange between the collaborators" (McDonough and Doucette, 2001) (Figure 7, p. 107). This is because in these models there was an agreement on specific activities to be undertaken by the pharmacist. However, Models III-B and IV were relationships which had not yet reached that stage of commitment.

Conceptual collaborative models have previously identified groups of characteristics as "success determinants" (Section 1.3, p. 22). Case studies' findings mirrored the presence of collaborative working success determinants found in the systematic review: pharmacist location; collaborative service location; collaboration purpose; collaborators' responsibilities; method and type of communication between collaborators (Table 18). In most systematic review collaborations, the pharmacist and the collaborative services were at the pharmacy (n=19/37 studies and n=17/37, respectively). This was variable in the case studies. In "established collaborations" the pharmacist was in the pharmacy (Models I and II) or the practice (Models II and III-A) although they were well integrated with the practice and delivering services on the practice's behalf. Both empirical studies reported the collaboration's purpose as focusing on medicines and supporting colleagues. Most systematic review studies (n=23/37) and "established collaborations" (Models I, II, III-A) differed from "arm's length relationships" (Models III-B, IV) by having clear collaborators' responsibilities. Communication was bi-directional in both empirical studies; it was mostly in writing in the systematic review and variable in the case studies.

Table 18: Presence of success determinants of collaborative working within case studies' models (adapted table from systematic review manuscript).

Success determinant	Pharmacist's location*	Purpose of collaboration	Location of service	Collaborators' responsibilities	Communication
Model I	Collaborating pharmacy	Activities on behalf of practice: - Specific medicine management service (i.e. contraceptive pill) - Prescription and queries fulfilment through pharmacy access to practice patient records	Collaborating pharmacy	Clear (based on agreement between practice and pharmacy)	Method: In-writing (shared patient records, audit trail; online messaging) and in-person depending on urgency Type: bidirectional (community pharmacist ⇔ GP)
Model II	Collaborating practice and pharmacy (remote work for practice)	Activities on behalf of GPs: - Mostly related to medicines management and optimisation - Supporting practice team as an information resource for medicine-related issues	Collaborating practice and remote work for practice (sometimes from the pharmacy)	Clear (based on agreement between practice and pharmacist)	Method: Mostly in-writing (patient records, audit trail; online messaging) Type: bidirectional (community pharmacist ⇔ GP)
Model III-A	Collaborating practice	Activities on behalf of GPs: - Mostly related to medicines management and optimisation, some minor ailments - Supporting practice team as an information resource for medicine-related issues	Collaborating practice	Clear (based on agreement between practice and pharmacist)	Method: In-person primarily, or phone or in-writing (patient records, audit trail; online messaging)) Type: bidirectional (community pharmacist ⇔ GP)
Model III-B	Collaborating pharmacy	Bi-directional support for medicine-related issues	N/A	Unclear or opportunistic	Method: In-person primarily, or phone or in-writing Type: bidirectional (community pharmacist ⇔ GP)
Model IV	Collaborating pharmacy	Bi-directional support for medicine-related issues and identifying ways of improving patient services	N/A	Unclear or opportunistic	Method: Mostly in-person, or phone Type: bidirectional (community pharmacist ⇔ GP)

*Pharmacist's location for the provision of collaborative service(s)

The case studies' collaborative activities were also mapped on the 'collaborative sequence', which derived from the systematic review (Section 2.1, p. 38). This outlined distinctive steps of forming and delivering a collaboration. The collaborators' role and activities at each step of the collaborative sequence is presented in Figure 18. All the steps were identified across systematic review and case studies. Common joint steps included mutually agreeing the service specification, discussing patient care next steps, and meeting to feedback and improve collaborative services - despite this being limited in the case studies due to competing demands on time (Section 4.6.2, pp. 177-178: "Agency conflict" and "Organisational pressures").

Pharmacists were involved in most steps in both empirical studies. Their role was more proactive in "established collaborations" (Models I, II, III-A) and systematic review models, compared to "arm's length relationships" (Models III-B and IV). GPs' role across the steps was mostly related to a specific project; more importantly they played a key role in supporting pharmacists with decision making on patient care (escalation process).

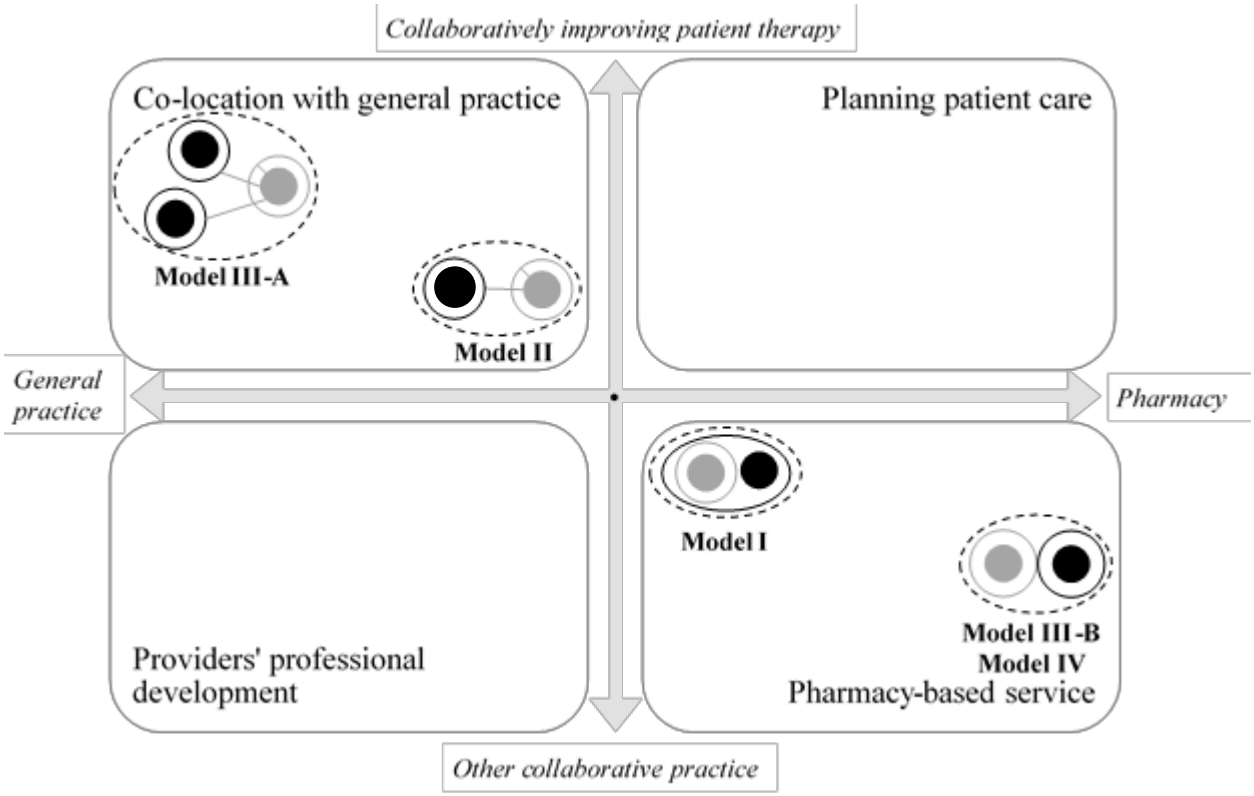
In both empirical studies, there were other collaborators involved. "Collaboration primers" supported "service planning"; they were the research team in the systematic review studies. In the case studies, they were policy makers encouraging and funding pharmacists' integration (e.g. locally commissioned pharmacy-based services in Model IV). Other collaborators included trained non-GP/pharmacist team members delivering a collaborative service (as part of the "action (service delivery)" step).

Figure 18: Case study models' collaborative process alignment to the 'collaborative sequence' of the systematic review, including the collaborators' roles in each step.

	Service planning →	Data collection →	Data review →	Recommendations (care planning) →	Action (service delivery) →	Process feedback (evaluation) and/or	Data feedback to other providers
Community and/or part-time practice-based pharmacists	Agreeing on service specification	Collecting patient data (during consultations)	Reviewing patient treatment (with/ without help from GPs)	- Specific project: discussing and producing a care plan with the patient - Making recommendations to GPs on patient care	- Delivering patient-facing service (including intervention, follow-up consultations) - Accessing practice software to action patient medication requests - Supporting practice team and other collaborators with medicines-related queries	Patient evaluation forms handed out by pharmacist on behalf of practice	Sharing consultation data on practice software (post-intervention)
General practitioners	Delivering patient consultations (as per usual care)	Specific project: initial consultation	Supporting pharmacist when unsure about patient care next steps (escalation process)		Specific project: delivering mutually agreed patient-facing service (including initial intervention consultations)		Receiving patient data (post-intervention)
Joint steps	Meeting to jointly agree on service details or on improving collaborative working relationship			Specific project: meeting to discuss follow-up care		Joint meeting to feedback on further improving collaborative working relationship	
Other collaborators	Local/national authority being "collaboration primers" (policy and regulatory role)				Accessing practice software to action patient medication requests (trained pharmacy staff)		

The case studies' collaborative models reflected to some extent the typology that emerged from the systematic literature review (Figure 19). The case study models included patient care planning (specific mental health project within Model II) and indirect providers' professional development (pharmacist as an information resource). However, they did not specifically or solely focus on those aspects. As such they were not placed in the top-right (planning patient care) or bottom-left quadrants (providers' professional development).

Figure 19: Case study models within systematic review typology.



Legend: O collaborating general practice; ● GP(s); O community pharmacy, ● community pharmacist; – link between community pharmacist's main place of work (community pharmacy) and collaborating general practice(s)

Model I was a pharmacy-based service for a specific consultation (oral hormonal contraception reviews on behalf of the practice). It was characterised by physically and digitally well-integrated pharmacy and practice teams. Co-location with the practice and ownership of the pharmacy by some of the practice partners were distinguishing factors. Although this model was positioned within the bottom-right quadrant of the typology (as a specific pharmacy-based collaborative service), it differed from Models III-B and IV. As such, this model had similarities with the collaborative service described by Billups et al. (2013). This was due to the nature of collaborative activities related to prescription requests and the co-location. A key difference was that the community pharmacist of

Model I was not able to request outstanding monitoring such as blood tests. Nevertheless, despite the community pharmacist's prescribing qualification, the prescription had to be authorised by the GP to allow supply of the medication. Model I was also similar to Shaw and Harrison (2014) and Klepser at al. (2016), in that a specific type of consultation was delegated to the community pharmacist to relieve the practice's pressure on appointment availability.

Models II and III-A were based on community pharmacists working part-time in general practice(s). The clinical aspects of the role were similar, focusing on medicines management, including monitoring and optimisation. As such, they were placed in the top-left quadrant of Figure 19. Here, the pharmacist (rather than pharmacy) was co-location with the general practice. As Model II also involved remote working from within the community pharmacy, it was placed nearer the centre of the typology. One of Model II's specific projects was of clinical (and operational to a certain extent) relevance to the service evaluated by van de Steeg-van Gompel et al. (2009). They both aimed to reduce long-term use of benzodiazepines through a collaborative approach between GPs and community pharmacists. However, Model II included more active involvement of pharmacists. The part-time community pharmacist was the link between the practice and pharmacies, and took over patient follow-ups (after the lead GP of the project conducted the initial patient consultation). The pharmacists' capability of prescribing in Models II and III-A played a key role as they were able to manage the patient without the GP's direct involvement.

Models III-B and IV were in earlier stages of building a CWR. In fact, it could be argued that this type of relationship does not exactly fit with the conceptual models of the x axis in Figure 7, p.107 (McDonough and Doucette, 2001; Dey et al., 2011; Bradley at al., 2012). Models III-B and IV described a professional relationship expansion from standard practice although evaluation was the only missing stage. An important consideration here would be if a collaborative relationship could in fact progress to a transactional collaboration. Meaning that, collaborative activities could expand beyond having an enriched relationship above standard practice. For example, in Model IV the pharmacy and the practice had been in close proximity (adjacent to each other) for 12 years. Despite both sides' efforts for expanding, that relationship had improved above standard practice. However, it had not flourished towards an agreed service or sharing of specific workload.

5.2 Implications for theory

At the micro-level, pre-existing relationships between individuals were a key enabler of establishing collaborative models. The evolution of the relationship typically increases trust between collaborators (Tuten and Urban, 2001; Weissenborn et al., 2017). Founding a collaboration without a pre-existing relationship involves some risk. Arguably, risk-aversity varies between individual professionals, managers and their organisations, which impacts their likelihood to adopt innovations in working practices (Grudinschi et al., 2014). For some, avoiding more clinically orientated service provision could be due to other personal limitations, especially in relation to professional registration/status (Luetsch, 2017; Nabhani-Gebara et al., 2020). As such, this research provides another example of why some health professionals may be more hesitant to collaborate.

At the meso-level, the buyer-supplier relationship was evident throughout the systematic review and case studies' findings. These were mainly dyadic between small-to-medium enterprises, where the GP/general practice was buying the services of a pharmacist/pharmacy. Notably, co-ownership of the two organisations could be a key enabler for collaborating, as in Billups et al. (2013)[11] (identified in first empirical study) and Model I (identified in second empirical study). This facilitated digital systems and service provision integration. It also allowed improved performance through staff exchange, which supported Wagner and Krause's previous work (2009). Further research is required to assess the role of co-ownership and co-location of healthcare organisations which are also operationally integrated. This could be especially beneficial for community pharmacy and general practice owners in applying policy-driven integration.

Findings also provided an example of a triadic relationship (buyer-supplier-supplier's supplier), indicating a multi-tier supply chain. Such a relationship has been described by Mena et al. (2013). Doctoral research findings alluded to a mid-way relationship, between closed and transitional MSC, within primary care. This highlighted the need for a contractual agreement to protect the supplier's interdependency between the buyer and the supplier's supplier. In this context, employed community pharmacists were the supplier's suppliers involved in integrated services. The supplier was the pharmacy

[11] Billups et al. (2013) evaluated a model where the community pharmacist managed medication "refills" and laboratory monitoring for patients on chronic medicines. The participating pharmacies were located within primary care clinics, which were owned by an organisation providing primary and outpatient care at different sites.

company employing them. As such, if community pharmacists were to be utilised more as per policy recommendations, more insurance (through contracts) should be offered to the employing pharmacy companies.

At the macro-level, this research topic was closely related to institutional coercive, normative, and mimetic pressures driving change in this area of practice (DiMaggio and Powell, 1983). Coercive pressures were reflected in NHS policy encouraging collaboration. Community pharmacists' role clinically progressing over time was an example of normative pressure. Finally, mimetic pressures included following the example of pharmacists from other sectors (e.g. hospital) and/or nurses in becoming independent prescribers and working within general practices. As such, findings indicated towards a hybrid theory due to the agency aspect of buyer-supplier relationships (Eisenhardt, 1989b). However, further research in this context is required to explore this. Systematic review and case study results did not establish the sustainability of the identified models over time. Models I, II and III-B included elements of discontinuing collaborative activities due to competing priorities. As such, longitudinal research could offer insights on the impact of agency conflict on pharmacist-GP's BSR within the NHS 'institution'.

Establishing community pharmacists' value was another key finding. Evaluation of this was variable (systematic review findings) or non-existent. Linking this to pharmacists' competition with other suppliers (pharmacists from other sectors, or other HCPs such as nurses), being able to benchmark each supplier's capabilities would be wise when needing to outsource. Benchmarking supplier's value agrees with McIvor (2000) and Taponen and Kauppi's (2020) work. As such, government and professional bodies representing pharmacists should consider identifying ways to evaluate/showcase community pharmacists' value and contribution to relieving pressures on the NHS. This would allow them to make an informed decision on the most appropriate supplier. Anderson et al.'s work (2021a) suggested the possibility of making NHS operations more efficient by appropriately utilising its available workforce.

This doctoral research has demonstrated the relationship between collaborating GPs and community pharmacists mostly reflected that of a Principal and an Agent, especially due to the perceived higher power held by GPs in primary care. The key contribution to the Principal-Agent Theory is that this is a new context where individual contractors of a

(healthcare) system work in cooperation and competition in tandem. As well as a methodological contribution of this new context, this research has emphasised the need for further exploration of professional services' research on hierarchical and agency dynamics. From a Resource-Based Theory perspective, it was clear that in order to be able to utilise a resource (here, community pharmacists), firstly, their value-added needs to be well defined. More evidence of community pharmacists' clinical contribution to the patients' journey in primary care is required. Secondly, the (healthcare) institutional context requires actors across micro, meso and macro levels to acknowledge and enable the resource's utilisation. In this context, it was apparent that individuals and their organisations recognised the value of collaborative working. However, community pharmacists' actions were dependent on macro-level regulatory and logistical constraints.

Applying the micro-meso-macro-level framework in this context was another key methodological contribution. Applying this framework in combination with theoretical perspectives found in OSCM allowed the holistic interpretation of relationship dynamics, operations and the factors affecting the adoption of (collaborative) BSRs. Viewing GPs and community pharmacists from this perspective allowed better understanding of their interaction and, thus, quality improvement of patient services within the (healthcare) Institution.

5.3 Implications for policy and practice

There has been extensive research on GPs' attitudes towards working with (community) pharmacists and vice versa. Over time, doctors' attitudes have evolved, starting with low acceptance of community pharmacists advancing their role beyond dispensing prescriptions, especially from doctors of older age (McKay and Jackson, 1976; Ritchey, Raney and Keith, 1983; Spencer and Clive, 1992; Sutters and Nathan, 1993; Bailie and Romeo, 1996). GPs' concerns continued during the "reprofessionalisation of pharmacy" in the early 2000s in the UK, when pharmacy reforms were under way (Edmunds and Calnan, 2001). Later, these feelings improved, with doctors being more accepting of pharmacists expanding service provision (Muijrers et al., 2003; Blondal et al., 2017). More recently, there has been specific exploration of healthcare professionals and the public's view of pharmacy services provision (Henrich et al., 2011; Kelly et al., 2013; Hindi et al., 2018a and 2018b).

For over a decade, research has been suggesting that pharmacists should demonstrate their capabilities and role as medicines experts to doctors. This is because others may not be aware of their full capabilities and how they could work in harmony (Alkhateeb et al., 2009; Owens et al., 2009; Van et al., 2012, 2012a, 2012b and 2013). This could be through establishing local multidisciplinary networks to increase trust and improve communication. Communication should be beyond non-clinical aspects of care, have increased frequency and clear channels with more face-to-face interaction. Familiarity and better understanding of each other's role has also been considered an enabler of community pharmacists' role expansion and improved integration in primary care (Owens et al., 2009; Kucukarlsan et al., 2010; Wüstmann et al., 2013; Blondal et al., 2017; Löffler et al., 2017).

Although not evidenced in the systematic review findings, the case studies indicated there was agency conflict in two ways: competition between pharmacies and general practices; and between pharmacists and nurses. The latter has been previously researched (Cooper et al., 2011). Competing targets set by the NHS for contractors such as pharmacies and practices could pose a risk to establishing collaborations. However, the counterargument to this could be that the general practice workload has been continuously increasing in recent years. Reasons for this include the ageing population; increasing secondary care waiting time; GP staff shortages and burnout; increased morbidity/improved screening programmes. Consequently, this continuously increasing workload could pose risks to patient safety and/or human resources' wellbeing (McManus et al., 2004; Matheson et al., 2016; Imo, 2017; Hall et al., 2019). As such, there should be more clarity or specific action plans by policy makers on fulfilling contract commitments. This is important when implementing policy encouraging collaborative working and utilising existing resources (e.g. community pharmacy teams).

Competition between suppliers contracted/employed by general practices has also been identified as a challenge for community pharmacist-GP collaborative working relationships. Collaborators' most common concern was cost-effectiveness of nurses, versus pharmacists, versus community pharmacists. The difference between nurses and pharmacists could stem in their training. This is why value added by each of these professionals can be distinct, without encroaching each other's role and duties. Nurses' specialisation from an early stage and high level of practical experience throughout

training has allowed them to become specialists on individual acute or long-term conditions, as well as conducting procedures (e.g. blood-taking, ECG, vaccinations) (NHS, 2015a).

Conversely, pharmacists' familiarity with medicines has put them at an ideal position for single or multiple long-term conditions and the associated medicines management (NHS, 2015b). There has been some tension identified between practice-based and community pharmacists (Nabhani-Gebara et al., 2020). This was in relation to their role in general practice, which could impede community pharmacists' collaborative working with GPs. However, community pharmacists' position could allow management of single long-term conditions within the community, especially with highly activated patients (Ogunbayo et al., 2017). Although there has been some research in the UK on community pharmacists conducting medication reviews within the pharmacy (Richmond et al., 2010), a cost-effectiveness analysis indicated that it was not sustainable (Bojke et al., 2010). This was contradicted by the Canadian-based research project on a community pharmacist-based service aimed at reducing cardiovascular risk; findings included improved patient outcomes and cost-effectiveness (Al Hamarneh et al., 2019). Therefore, overcoming role encroachment misconceptions could be possible through further research into appropriate healthcare resources' utilisation and alignment.

Interview data indicated patient satisfaction was high with the collaborating pharmacies and pharmacists. This was also evident in the systematic review. Especially in Models II, III-B and IV, the service user participants found the service personal. This was compared to other pharmacies and practices, which were considered to be rather customer-focused (negative connotation) or impersonal. Annual patient satisfaction surveys at general practices and community pharmacies have indicated some dissatisfaction with services in some pharmacies and practices (NHS England, 2021). The Care Quality Commission (CQC), which evaluates general practices' care provision, constitutes a transparent way of ensuring patient care is upheld to high standards, with any problems being identified and resolved appropriately (CQC, 2021). Pharmacists and pharmacies are regulated by the General Pharmaceutical Council (GPhC). GPhC pharmacy inspections aim to ensure safe practice although such findings are not publicly available. Recent research has considered stakeholders' views on evaluating pharmacy services using quality indicators (Watson and Skea, 2018; Watson et al., 2019 and 2020). This information could help

patients make an informed decision on the services they use, as well as highlighting community pharmacies' performance and quality of services provided.

Policies have recommended collaboration as a mechanism to improve patient care and sustainability of the healthcare system (NHS HEE et al., 2014; NHS England et al., 2016b; NHS, 2019). The collaborative models' positive impact on patients was confirmed throughout both empirical projects. However, it would be prudent to explore further barriers to closer collaboration as these could be at an individual or higher system level (Rubio-Valera et al., 2012). Thus, evidence used (in combination with expert consensus agreement) within policy documents should be explored further. This would ensure pursuing collaborative relationships between community pharmacists and GPs is appropriate investment of resources (e.g. time, funding, and people).

5.4 Implications for education

Tailoring training according to policy and practice needs could be a possible way of improving uptake of collaborative working and ensuring that would be continued. This could include interprofessional education during higher education to embrace collaborative working from early stages (Parr et al., 2000; Hawkes et al., 2013; Cerbin-Koczorowska et al., 2014; Löffler et al., 2017). However, before this step, the impact of collaborative practice on primary care within the NHS should be thoroughly investigated. Evidence within healthcare policies, especially regarding collaborative working, has been somewhat limited. Therefore, it would be beneficial to obtain such evidence to plan accordingly next steps on training needs.

At present, there is some international evidence of pharmacists' impact on medicines management and drug-related problems (Kozminski et al., 2003; Dinnie et al., 2004; Tinelli et al., 2007; Bissell et al., 2008; Saastamoinen et al., 2009; Vinks et al., 2009; Fiss et al., 2010; Niquille and Bugnon, 2010; Niquille et al., 2010b; Kwint et al., 2011; Azmi and Azmi, 2012; Fiss et al., 2013; Leendertse et al., 2013; Tan et al., 2013; Geurts et al., 2016; Campins et al., 2017; Rhalimi et al., 2017). Based on this doctoral research, community pharmacists-GPs' collaboration models in England were also shown to have positive impact on stakeholders and their localised system (i.e. their shared patients). To expand this to other practices, there could be training in-practice by protecting practitioners' time to meet, discuss and find ways to relieve pressure from each other

(O'Carroll et al., 2016). Upskilling clinical and non-clinical staff could reassure each partner regarding hesitations they might have on transfer of care.

5.5 Conclusions and recommendations

This doctoral research was, to the best of the researcher's knowledge, the first to empirically explore community pharmacists and GPs' relationship as part of primary care services integration in England. Collaborative models involving these health professionals were identified in international literature and within English primary care and analysed using OSCM perspectives. The key contribution was the in-depth empirical research into the operations of community pharmacist-GP collaborations. Another finding was that these collaborative relationships were characterised by principal-agent elements which were also highly dependent on the institutional aspects of the healthcare system.

RQ1: What collaborative models involving community pharmacists and GPs currently exist in practice?

Extant international literature indicated collaborative models in four categories (co-location with general practice, pharmacy-based service, planning patient care and providers' professional development; see Figure 3 of the systematic review manuscript). However, current examples of community pharmacist-GP collaborative models in English primary care mostly fitted across two of those categories: pharmacist co-location within the general practice (Models II and III-A), and pharmacy-based services (Models I, III-B and IV). It is worth noting here that the case studies' contribution was that in both categories there was co-location of the pharmacist or the pharmacy. Integration of the pharmacist in the practice's system and operations was the distinguishing factor leading to a more established collaboration (Models I, II and III-A). Incorporating the case studies' models in the typology of the systematic literature review emphasised the importance of the (community) pharmacist's physical or digital integration within the general practice. System integration of pharmacy and practice operations and accessibility to patient records were key elements of established collaborations.

Bringing the systematic review findings to the case studies' English primary care context, established collaborations' purpose and activities aimed to improve patient therapy and increase efficiency of the medicines' management workflow (i.e. process on prescription

requests and medicines' annual reviews). However, in all cases pharmacists were the information resource for medicines-related queries.

At the micro-level, communication was a key aspect of collaborative working. As previously discussed, building social capital and having established communication channels were fundamental in all models irrespective of their maturity. This was the difference between collaborative working, as it was presented in theoretical (conceptual) and empirical models (systematic review and case studies), and routine daily practice.

RQ2: How do these models impact primary care services?

A qualitative synthesis of systematic review and case studies' findings indicated there was overall positive impact of community pharmacist-GP collaborative working on stakeholders (Table 19). This referred to clinical, process, and financial aspects of care provision. Although there were quantitative studies included in the systematic review, these could not support significant[12] positive impact on primary care services, especially in the UK (Bojke et al., 2010; Richmond et al., 2010).

Medicines management was a key clinical area of improvement. This included overall management of patients' treatment; safer prescribing and monitoring (e.g. clinical investigations); and medication-related queries' resolution (e.g. drug-related problems). Based on the systematic review findings, significance was found in patients with multimorbidity, which could also be supported by Models II and III-A (Vinks et al., 2009; Leendertse et al., 2013). Interestingly, these systematic review models included pharmacists based in community pharmacy, while the case study models' pharmacists were working part-time for the general practice (i.e. their interaction with the patients were from within their practice-based role).

More specifically on the micro-level of practitioners, clinical care improvements referred to aspects of the clinicians' professional development. These included pharmacists' competences developing and feeling more confident with making clinical decisions on patient care. This resonated with findings of both empirical projects. Pottie et al. (2009), in particular, explored part-time practice-based pharmacists' professional identity development when working for the Integrating Family Medicine and Pharmacy to

[12] Significance was based on outcomes with p-value <0.05

Advance Primary Care Therapeutics (IMPACT) project. In addition to this, pharmacists and GPs reported feeling part of the same team, which also allowed broadening their way of thinking.

Table 19: Summary of collaboration impact on community pharmacy, general practice and patients, based on systematic review and case studies' findings.

	Clinical	Process	Financial
Community pharmacy	Professional development Clinical practice Decision-making Reassurance on competence Team-spirit Sense of fulfilment	Demonstrating value Staff satisfaction Workload: increased; not affected; or decreased due to discontinued collaborative services Queries resolution Efficient working Embracing task delegation; learning to trust Becoming innovative Improved communication and pharmacy-practice relationship	Business gain Human resources conflicts (e.g. poaching/temporary absence for training)
General practice	Safer prescribing Broadening way of thinking Quality improvement	Workload sharing Reduced pressure on staff and GPs Streamlined process Appointment availability Time management Queries resolution Communication Work environment Staff satisfaction	Good value for money Financial gain; contractual framework target achievement
Patients	Continuity of care Patient safety	Patient satisfaction Smoother patient journey	

Collaborations' impact on processes was mainly at the meso-level, i.e. affecting the way of working at the pharmacy and practice level. The workload increased, remained unaffected or decreased depending on the collaborative activity and the collaborator. It increased where the collaborative service was provided at community pharmacies in addition to regular services e.g. Model I's "pill-check" and prescription requests (Vinks et al., 2009; Villeneuve et al., 2010; Lalonde et al., 2011; Billups et al., 2013; Krabbe et al., 2013; Shaw and Harrison, 2014; Klepser et al., 2016; Dubán et al., 2017). In cases where activities were conducted by a part-time pharmacist (i.e. not when working for the pharmacy) the workload at the pharmacy was not affected (Model II). Overall, for practices having a pharmacist collaborator (on/off-site) meant that the workload was shared and, as such, felt less for the other members of the practice. Examples included

increased appointment availability; reduced pressure on staff and GPs; streamlined processes; quicker queries' resolution. Where collaborative services were discontinued (e.g. Model III-B), there was an impression that the workload decreased although care provision became disjointed, which was considered a negative effect.

Similarly, financial impact was mainly on the meso-level. Pharmacies were believed to have some level of business gain although staff imbalances (e.g. for training) were considered problematic. Bryant et al. (2011) in fact reported community pharmacists' difficulty in engaging with the collaborative service being studied. This was due to the working environment of community pharmacy. From a general practice point of view, pharmacist collaborators were considered "good value for money", while they also contributed to achieving financial targets of QOF (financial benefit to the practice).

At the macro-level, patients were affected positively by collaborative activities between pharmacists and GPs. Findings mainly included continuity of care; patient safety; satisfaction; and overall a smoother patient journey. Some systematic review studies evaluated macro-level health utility (no change) and the cost of the service (generally improved but not significantly).

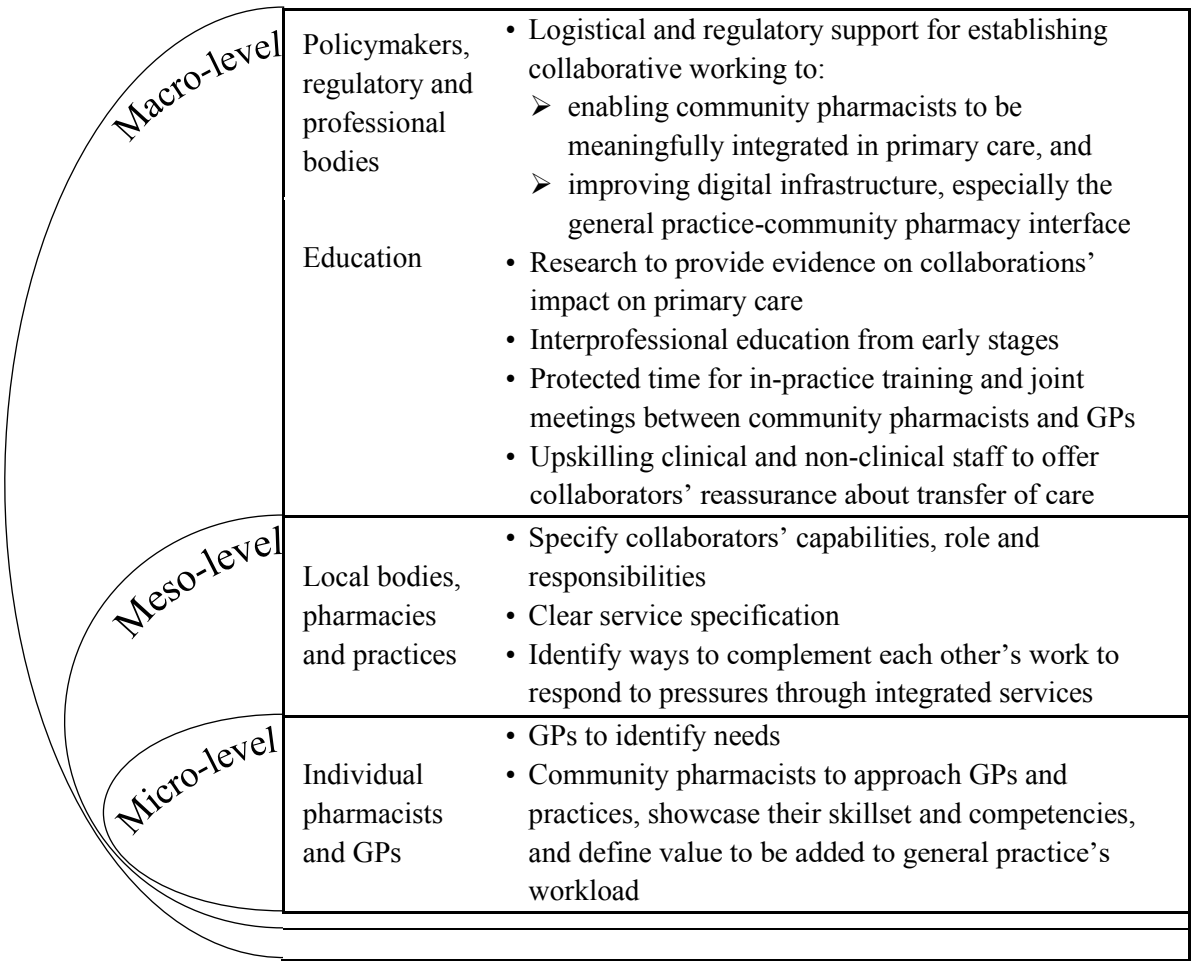
RQ3: What recommendations can be made to community pharmacists and GPs interested in forming collaborative relationships?

The systematic review and case studies' findings indicated previously recommended success determinants for collaborations. These included the need for clarity on the collaborators' capabilities, role and responsibilities. It was evident that having specific service(s) facilitated establishing the collaboration and the collaborators' role and responsibilities. The GP-community pharmacist relationship was considered a BSR, where the former was the buyer and the latter was the supplier. Therefore, the first key recommendation is two-fold. GPs should identify their needs, and community pharmacists should express their skills and competencies. This way the supplier's work would complement the buyer's needs. As a result of this, providers could collaboratively respond to pressures on primary care through well-integrated services.

However, this could only be achieved nationally with macro-level logistical support from regulatory and professional bodies. As such, the second recommendation comes in hand with the first one although aimed at policymakers. In addition to individual collaborators'

actions, there needs to be regulatory and logistical support to enable community pharmacists to be meaningfully integrated within primary care. This requires improvement of digital infrastructure to allow community pharmacists to work in a more clinical role (e.g. undertaking annual reviews of patients with single long-term conditions), and their team to streamline the prescription request process. Eventually, easing general practice workload pressures and improving the patient journey. Figure 20 summarises specific recommendations for policy, education and practice to achieve this through better GP-community pharmacist collaboration.

Figure 20: Recommendations for policy, education and practice.



5.5.1 Strengths and limitations

Strengths and limitations of the systematic review project have been presented within the manuscript. In summary, bias was minimised through multi-stage screening. Data heterogeneity of the included studies led to qualitative synthesis, which provided a deeper

understanding of the collaborative models included. In addition to this, findings should be interpreted with caution as the risk of bias assessment did not exclude studies.

The strengths of the case studies' empirical project included the robust research design, following a pre-defined protocol (Appendix 7). Triangulation of data, with two data collection methods and targeted stakeholder groups in the case studies, in combination with the systematic review findings, led to a more reliable and realistic view of the collaborative models. Overall, the wide spectrum of collaborative working levels and the different contexts that these were set it, demonstrated examples that could be adapted to similar contexts.

Due to the qualitative nature of the research design, generalisability of findings could not be possible. This applied to the systematic review and case studies. Limitations of the case study project were mainly methodological due to the low number of recruited cases. QCA was not possible due to this (less than 10 cases) (Levi-Faur, 2006). However, utilising QCA principles demonstrated key elements of achieving GP-community pharmacist collaborations. Moreover, choosing the most-similar-systems research design allowed control, as the cases were being compared based on similar contexts, however it limited generalisation due to source of selection bias. Other limitations included the difficulty in engaging participants due to competing demands within the healthcare environment (prioritisation of healthcare provision rather than research activity). This was especially evident during the coronavirus (Covid-19) pandemic in 2020, which delayed and potentially limited recruitment and data collection for the case studies (Appendix 8). Known bias included recruitment of participants who already had an interest in the research topic; and bias due to the Hawthorne effect, as participants were aware of the researcher observing them (Payne and Payne, 2004). Finally, it was not possible to determine the sustainability of all included models (beyond the reported data in published literature and at the time of the case studies' data collection).

5.5.2 Future research

Further large-scale research studies on collaborative models involving community pharmacists and GPs are required in response to continuous improvement of service provision under the current circumstances (e.g. workforce shortages, pressure on the NHS). In terms of such collaborations' performance, quantitative research could aid

establishing this. However, this would need to be accompanied by evidence of community pharmacists' actual and potential value-added (i.e., utilising them in their full clinical capacity). Benchmarking community pharmacists' value would allow appropriate resource alignment to tasks and enable evidence-based policy implementation. Both of these could optimise their harmonisation within the primary care team. As a result, the patient journey within primary care could be improved whilst utilising its two main healthcare providers.

Another aspect in need of further research is the sustainability of community pharmacist-GP collaborations. A longitudinal study of such collaborative models could provide more in-depth information on impediments and success determinants, which could form the foundations of wider implementation. Finally, wider study of this phenomenon across England and the UK could provide comparative data to demonstrate contingency of these models on a national and enable comparisons on an international level.

Final thoughts

For the first time, to the researcher's knowledge, collaborative models involving GPs and community pharmacists have been explored in-depth by applying OSCM principles. Firstly, relevant examples were identified in international literature, with few of them in the UK. Following that, qualitative research explored collaborative working relationships found in English primary care in more depth. This was a novel, albeit specific, empirical domain for well-established perspectives in OSCM. This is a topic relevant to the ongoing improvement and integration of primary care services. The research offered evidence-based examples of collaboration, their impact, and recommendations for future steps and opportunities for further research.

Based on the findings of the research reported in this thesis, future collaboration between community pharmacists and GPs could be enhanced if there was mutual interest in practically working together for the benefit of the patient and to improve/facilitate primary care service provision. The pharmacist and the general practice being in close proximity is an enabler for collaboration. Medicines management, supporting colleagues, and having pharmacy-based services on behalf of the practice could be the collaboration's purpose. Operations' mapping indicated pharmacists' proactive role in such collaborations and emphasized the importance of system integration (e.g. community pharmacists' read and write access) in establishing a collaboration. National policy encourages pharmacists' integration although it should address specific steps to achieve this in practice.

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Appendices

Appendix 1: Research dissemination

This work has been presented in several seminars and networking events. These included oral and poster presentations at the University of Bath Department of Pharmacy and Pharmacology (P&P) seminars (2017-2019), the RPS Science and Research Summit (poster, February 2019), the annual Health Services Research & Pharmacy Practice (HSRPP) Conference (oral, April 2019), and the Doctoral Seminar of the international annual European Operations Management Association (EurOMA) Conference (oral, June 2019 and 2020). Abstracts were submitted for RPS Science and Research Summit, HSRPP and EurOMA Doctoral Seminars, with the former two associated with publications (Liaskou et al., 2019; Liaskou, M. et al., 2020) and the latter preparation of a manuscript on Research Design (2019) and Research Findings (2021).

Attendance at these events, as well as the P&P "My life in science" seminars, inaugural lectures and my involvement with the Health and Clinical Research Theme (HCRT) meetings, provided continuous development opportunities as researcher. They offered a wider view of methodologies used by researchers within a similar field to the topic of this doctorate. They were also inspirational due to the insight to potential career paths through others' experiences. Finally, they allowed networking and learning from other research professionals in the Department, the wider pharmacy field, and Management/Business Schools across the world. Appendix 9 (p. 291) includes all events attended throughout this Postgraduate Programme.

Appendix 2: Excerpt from Confirmation report at the end of the first year on the PhD Postgraduate Research Programme (2018) explaining initial research design plans.

This excerpt from the submitted confirmation report at the end of the first year on the PhD Programme explains initials plans of research design following the first empirical project, the systematic literature review. Abbreviations used include CP (Community Pharmacist), GP (General Practitioner), RCGP (Royal College of General Practitioners) and RPS (Royal Pharmaceutical Society). References within this appendix are included in the thesis' References (p. 211).

"Future work

The results from the systematic review will inform the next steps in order to have inter-related stages throughout the PhD. Depending on the outcomes of the systematic review, the topic of CP-GP collaboration may become more focused in specific health (e.g. cardiovascular disease) or process (e.g. annual medical reviews) areas.

The future research steps of the PhD will involve mixed methods. This will include ethnographic research (Britten et al., 1995) with CPs and GPs who currently collaborate in order to identify models that are currently happening in practice. Standalone ethnography is not appropriate as the research topic involves two populations (CPs and GPs) (Goffman, 1961) and the time required to immerse oneself as a researcher within the observed population deems this approach impractical for the PhD duration; research with ethnographic characteristics (e.g. observations of specific CPs and GPs) is more suitable and as such case studies will be conducted (Walters, 2007).

Recruitment will be based on emailing general practices, community pharmacies and Local Pharmacy Committees (LPCs). An invitation will also be disseminated through the RPS' online and professional contact network; here RCGP will also be contacted to request if dissemination via their networks is possible. Due to time and funding restrictions, priority will be given to collaborations taking place in the local area.

Future empirical elements, in addition to observations, will involve one-to-one semi-structured in-depth interviews with CPs and GPs in order to triangulate data on existing

collaborative models in practice, drivers and purpose, barriers and facilitators and evaluation of impact on CPs, GPs and patients. The data collected during interviews will be thematically analysed using the five-stage framework technique (Pope et al., 2000). This method involves five steps: (1) transcription of interview recordings and analysis in order to identify main ideas and recurring themes; (2) coding of themes and sub-categories based on key phrases, incidents and/or types of behaviour to allow easier examination and retrieval of data at a later stage; (3) development of an index (categories) based on the codes produced previously; (4) charting of data with similar content in order to create major categories; (5) mapping of major categories into major themes and their interpretation in order to find explanations for the findings (e.g. key concepts, associations between different themes).

The data produced from the systematic review, observations and interviews will be used to identify characteristics present in the reported models and produce sets of potential collaborative models. These data might be used to inform a Discrete Choice Experiment (DCE), where empirically observed models generate preferences towards the presented model characteristics (Porteous et al., 2016). This method has been previously used in evaluating patient preferences for new pharmacy services (Tinelli et al., 2010). Thus, applying it in a similar context from a different perspective (i.e. the healthcare professionals' point of view) will provide an insight into their preferences. For example, model A and model B each have four characteristics (Table 3); combining the different pairs of characteristics in a questionnaire would indicate the stakeholders' preferences by scoring the models and associated factors. The questionnaire could be distributed to a random sample of community pharmacies and GPs within England in order to obtain the preferences of the wider group of CPs and GPs (Boynton and Greenhalgh, 2004).

Table 3: *Example of observed model characteristics*

Model A	*Model B*
Co-located pharmacy A in urban area	*Pharmacy B and GP surgery B are in adjacent villages in a rural area*
CP A works within GP practice A twice per week	*CP B works at pharmacy B full-time and accepts patients signposted by GP B one day per week*
CP conducts consultations from their office in the surgery	*CP B conducts consultation in the consultation room of pharmacy A*
GP A and the CP A have a historic relationship	*GP B and CP B don't have a historic relationship but had to work together due to GP shortages.*

Diffusion of Innovations theory (Rogers, 2003) comprises four elements: the innovation; the channels through which it is communicated; the time it takes to communicate it; and, the social system it is communicated within. It has previously been used in understanding the adoption of collaborative models between primary care physicians and nurses (Vedel et al., 2013) and thus will provide the theoretical framework that will inform the implementation stages of collaborative models identified from the empirical stages of the PhD.

Ethical approval will be sought by the Research Ethics Approval Committee for Health (REACH); as patient data will not be collected, NHS ethical approval is not required."

Appendix 3: Approvals for second empirical study (case studies)

NHS Research Ethics Committee Approval

North of Scotland Research Ethics Committee (1)
Summerfield House
2 Eday Road
Aberdeen
AB15 6RE

Telephone: 01224 558458
Facsimile: 01224 558609
Email: nosres@nhs.net

NHS Grampian

Please note: This is an acknowledgement letter from the REC only and does not allow you to start your study at NHS sites in England until you receive HRA Approval

16 December 2019

Dr Philip J. Rogers
Department of Pharmacy and Pharmacology
University of Bath
BATH
BA2 7AY

Dear Dr Rogers

Study title:	**A qualitative exploration of the development and effect of collaboration between community pharmacists (CPs) and general practitioners (GPs).**
REC reference:	**19/NS/0184**
Protocol number:	**Not applicable**
IRAS project ID:	**265760**

Thank you for Miss Liaskou's e-submission of 12 December 2019. I can confirm the REC has received the documents listed below and that these comply with the approval conditions detailed in our letter dated 02 December 2019.

Documents received

The documents received were as follows:

Document	Version	Date
IRAS Checklist XML [Checklist 12/12/2019]		12 December 2019
Other [Sponsor's letter of approval for revised participant information sheets and consent form]		12 December 2019
Participant consent form [Consent form (all participants)]	1.2	09 December 2019
Participant information sheet (PIS) [PIS for healthcare professionals and staff]	1.1	03 December 2019

1

Participant information sheet (PIS) [PIS for patients]	1.1	03 December 2019

Approved documents

The final list of approved documentation for the study is therefore as follows:

Document	Version	Date
Interview schedules or topic guides for participants	1.0	23 September 2019
IRAS Application Form [IRAS Form]	265760/1380463/37/326	04 November 2019
IRAS Checklist XML [Checklist 12/12/2019]		12 December 2019
Letter from sponsor		16 October 2019
Other [No Opinion Letter from London-Camden & Kings Cross REC]		13 November 2019
Other [Sponsor's letter of approval for revised participant information sheets and consent form]		12 December 2019
Participant consent form [Consent form (all participants)]	1.2	09 December 2019
Participant information sheet (PIS) [PIS for healthcare professionals and staff]	1.1	03 December 2019
Participant information sheet (PIS) [PIS for patients]	1.1	03 December 2019
Research protocol or project proposal	1.0	25 September 2019
Summary CV for Chief Investigator (CI) [CI's CV (PJR)]		30 August 2019
Summary CV for student [Doctoral student's CV (ML)]		30 August 2019
Summary CV for supervisor (student research) [Lead supervisor's CV (PJR)]		30 August 2019
Summary CV for supervisor (student research) [Academic supervisor's CV (ABJ)]		29 October 2019*
Summary CV for supervisor (student research) [Academic supervisor's CV (MCW)]		29 October 2019*

*date received

You should ensure that the sponsor has a copy of the final documentation for the study. It is the sponsor's responsibility to ensure that the documentation is made available to R&D offices at all participating sites.

19/NS/0184	Please quote this number on all correspondence

Yours sincerely

[redacted]

Ms Sarah Lorick
Assistant Ethics Co-ordinator

Copy to: Professor Jonathan Knight, Pro-Vice-Chancellor, University of Bath
Miss Marianna Liaskou, Student Researcher
Lead Nation - England: HRA.Approval@nhs.net

3

NHS Health Research Authority Approval

Ymchwil Iechyd a Gofal Cymru
Health and Care Research Wales

NHS
Health Research Authority

Dr Philip J. Rogers
Department of Pharmacy and Pharmacology
University of Bath
Bath
BA2 7AY

Email: hra.approval@nhs.net

04 February 2020

Dear Dr Rogers

HRA and Health and Care Research Wales (HCRW) Approval Letter

Study title:	**A qualitative exploration of the development and effect of collaboration between community pharmacists (CPs) and general practitioners (GPs).**
IRAS project ID:	**265760**
Protocol number:	**Not applicable**
REC reference:	**19/NS/0184**
Sponsor	**University of Bath**

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 **265760**. Please quote this on all correspondence.

Yours sincerely,
Christie Ord

Approvals Specialist

Email: hra.approval@nhs.net

Copy to: *Prof. Jonathan Knight*

List of Documents

The final document set assessed and approved by HRA and HCRW Approval is listed below.

Document	*Version*	*Date*
Evidence of Sponsor insurance or indemnity (non NHS Sponsors only) [Sponsor's certificate of insurance]		27 January 2020
Interview schedules or topic guides for participants	1.0	23 September 2019
IRAS Application Form [IRAS Form]	265760/1380 463/37/326	04 November 2019
IRAS Application Form [IRAS_Form_29012020]		29 January 2020
IRAS Application Form XML file [IRAS_Form_29012020]		29 January 2020
IRAS Checklist XML [Checklist_21012020]		21 January 2020
IRAS Checklist XML [Checklist_29012020]		29 January 2020
IRAS Checklist XML [Checklist 12/12/2019]		12 December 2019
Letter from funder [Offer letter for the PhD (including PhD funding details)]		02 October 2017
Letter from sponsor		16 October 2019
Organisation Information Document [OID for non-commercial study]	1.1	20 January 2020
Other [Response to HRA's request for clarifications]	1.0	20 January 2020
Other [Response to HRA's request for additional conditions]	1.1	27 January 2020
Other [Further details on scholarship funding this doctoral research project]	1.0	27 January 2020
Other [Sponsor's letter of approval for revised participant information sheets and consent form]		12 December 2019
Other [No Opinion Letter from London-Camden & Kings Cross REC]		13 November 2019
Participant consent form [Consent form (all participants)]	1.2	09 December 2019
Participant information sheet (PIS) [PIS for healthcare professionals and staff]	1.2	20 January 2020
Participant information sheet (PIS) [PIS for patients]	1.2	20 January 2020
Participant information sheet (PIS) [PIS for healthcare professionals and staff]	1.1	03 December 2019
Participant information sheet (PIS) [PIS for patients]	1.1	03 December 2019
Research protocol or project proposal	1.0	25 September 2019
Schedule of Events or SoECAT [Schedule of events]	1.0	08 October 2019
Summary CV for Chief Investigator (CI) [CI's CV (PJR)]		30 August 2019
Summary CV for student [Doctoral student's CV (ML)]		30 August 2019
Summary CV for supervisor (student research) [Academic supervisor's CV (MCW)]	"date received	29 October 2019
Summary CV for supervisor (student research) [Lead supervisor's CV (PJR)]		30 August 2019
Summary CV for supervisor (student research) [Academic supervisor's CV (ABJ)]	"date received	29 October 2019

IRAS project ID	265760

Information to support study set up

The below provides all parties with information to support the arranging and confirming of capacity and capability with participating NHS organisations in England and Wales. This is intended to be an accurate reflection of the study at the time of issue of this letter.

Types of participating NHS organisation	Expectations related to confirmation of capacity and capability	Agreement to be used	Funding arrangements	Oversight expectations	HR Good Practice Resource Pack expectations
All sites will perform the same research activities therefore there is only one site type.	Research activities should not commence at participating NHS organisations in England or Wales prior to their formal confirmation of capacity and capability to deliver the study.	An Organisation Information Document has been submitted and the sponsor is not requesting and does not expect any other site agreement to be used.	No study funding will be provided to sites as per the Organisation Information Document.	A Local Collaborator should be appointed at study sites	No Honorary Research Contracts, Letters of Access or pre-engagement checks are expected for local staff employed by the participating NHS organisations. Where arrangements are not already in place, network staff (or similar) undertaking any of the research activities listed in the IRAS form (except for administration of questionnaires or surveys), would be expected to obtain an honorary research contract from one NHS organisation (if university employed), followed by Letters of Access for subsequent organisations. This would be on the basis of a Research Passport (if university employed) or an NHS to NHS confirmation of pre-engagement

					checks letter (if NHS employed). These should confirm enhanced DBS checks, including appropriate barred list checks, and occupational health clearance. For research team members only administering questionnaires or surveys, a Letter of Access based on standard DBS checks and occupational health clearance would be appropriate.

Other information to aid study set-up and delivery

This details any other information that may be helpful to sponsors and participating NHS organisations in England and Wales in study set-up.
The applicant has indicated that they do not intend to apply for inclusion on the NIHR CRN Portfolio.

Appendix 4: Participant Information Sheets (one for healthcare providers and one for patients)

IRAS ID: 265760

Study title: A qualitative exploration of the development and effect of collaboration between community pharmacists (CPs) and general practitioners (GPs).

Researcher: Marianna Liaskou, ml510@bath.ac.uk
Supervisor: Dr Philip J Rogers, prspjr@bath.ac.uk, 01225 384445

This information sheet forms part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. Please read this information sheet carefully and ask one of those named above if you are not clear about any details of the project.

1. What is the purpose of the project?

Pharmacists are being increasingly integrated into primary care. This project aims to identify different models of collaboration involving CPs and GPs within England. The project will examine characteristics, drivers, purpose, performance and impact on stakeholders involved in these collaborative models (e.g. CPs, GPs, patients, community pharmacy and general practice staff).

2. Why have I been invited to take part?

You have been invited to take part because you are affected by services that are provided by/to you on the basis of a collaboration that involves a general practitioner and a community pharmacist. Participants in this study include:

- General practitioners whose primary role is within general practice and who currently collaborate with a community pharmacist(s), whose primary role is within community pharmacy, on a part-/full-time basis
- Community pharmacists, whose primary role is within community pharmacy and who currently collaborate with a general practitioner(s), whose primary role is within general practice, on a part-/full-time basis
- Staff of the community pharmacy(ies) or general practice(s) that are part of a collaboration that involves a community pharmacist(s) and a general practitioner(s).

3. Do I have to take part?

No, it is completely up to you to decide if you would like to participate. Before you decide to take part, the researcher undertaking the project as part of a doctoral research project (Marianna Liaskou, ML) will describe the project and go through this information sheet with you. If you agree to take part, she will then ask you to sign a consent form. If at any time you decide you no longer want to participate in this study, you are free to withdraw without giving a reason.

4. What will I have to do?

The researcher (ML) will observe healthcare professionals and staff while they conduct patient-facing services and other responsibilities (e.g. practice meetings) that are part of the collaboration; for example, if as a CP you work one day per week in a general practice, ML will shadow you throughout that day in order to understand your role, duties and interactions with other staff members and patients within the general practice. Another aspect of the project will be interviews with you, the participants, in order to explore your views on the collaboration.

Depending on the type of collaboration and the providers' availability, observations will be conducted over one or two days at each site, where the collaborators primarily work and where they provide collaborative services (patient-facing and/or administration-supporting). Interviews will typically be conducted at the site where the collaborative service is provided or on the telephone if that is more convenient for you.

5. What are the exclusion criteria?

This project will exclude: pharmacists who are primarily based within general practice, i.e. for the majority of their working week; and collaborations that are based purely on interaction between CP and GP as part of daily routine practice (for example, when a CP contacts the GP to issue a medicine different to the originally prescribed one because the latter is not available from the manufacturer/wholesaler).

6. What are the possible benefits of taking part?

There are no immediate benefits to you directly in taking part in this project. However, the information provided by participants will contribute to recommendations on successful collaborative models involving CPs and GPs. These recommendations will help to improve the effectiveness of primary care services.

7. What are the possible disadvantages and risks of taking part?

There are no disadvantages or risks in taking part in this project. If you feel that there is something that makes you feel uncomfortable when being observed or interviewed by the researcher, please let her know; you can choose not to answer questions if you prefer.

8. Will my participation involve any discomfort or embarrassment?

The project is not expected to make you feel discomfort or embarrassment. However, if you feel that way at any point, please let the researcher know in order to stop collecting data and address any concerns you may have. Information collected during participation in the research project will be confidential, unless the researcher becomes concerned about the welfare of the participant or identifies risk to others. In that case the on-site responsible GP/CP will be contacted to take further action.

9. Who will have access to the information that I provide?

The research team will have access to the anonymised information that you provide. All collected data will be treated as confidential and will be anonymised at the first possible instance.

10. How will we use information about you?

We, the University of Bath who is the sponsor for this study, will need to use information from you for this research project. This information will include your name and contact details. People will use this information to do the research or to check your records to make sure that the research is being done properly. People who do not need to know who you are will not be able to see your name or contact details. Your data will have a code number instead. 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.

11. 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.
- We need to manage your records in specific ways for the research to be reliable. This means that we won't be able to let you see or change the data we hold about you.
- 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 (on the University's Research Data Archive).

12. Where can you find out more about how your information is used?

You can find out more about how we use your information:

- at www.hra.nhs.uk/information-about-patients/
- at https://www.bath.ac.uk/corporate-information/university-of-bath-privacy-notice-for-research-participants/
- by asking one of the research team
- by sending an email to djj20@bath.ac.uk or
- by ringing us on 01225 386966.

Contact details for the University of Bath's Data Protection Officer: David Jolly, Vice Chancellor's Office, 4 West 3.05, University of Bath, Claverton Down, BA2 7AY; djj20@bath.ac.uk; 01225 386966.

13. What will happen to the data collected and results of the project?

All data collected during the project including personal, identifiable data will be treated as confidential and will be anonymised in the first instance; hard copies will be kept in a locked room and digital copies will be password-protected and saved on the University of Bath's secure server according to GDPR. Identifiable information about you will be kept until the end of 2020 (or the end of ML's PhD, whichever is earlier). Your name or other identifying information will not be disclosed in any presentation or publication of this or future research. After the project has finished, we will also provide participants with a summary of the overall anonymised project findings. Anonymised data will be published in the University's Research Data Archive, where it will be kept for a minimum of ten years, in order to allow access, if requested by other researchers conducting related research projects and if it is deemed appropriate (only with your consent and the University of Bath's).

14. Who has reviewed the project?

This project has been approved by the NHS Health Research Authority [IRAS ID: 265760] and has been given a favourable opinion by the NHS North of Scotland Research Ethics Committee (1).

15. How can I withdraw from the project?

If you no longer wish to participate at any point during the project, you can inform one of those above in person, by email or telephone. You do not have to provide any reasons for doing so and this will not have any consequences for yourself. If you wish to withdraw your data, please contact one of the above within two weeks of your participation. After this date, it may not be possible to withdraw your data as

some results may have already been published. However, your individual results will not be identifiable in any way in any presentation or publication of this research.

16. What happens if there is a problem?

If you have a concern about any aspect of the project you should ask to speak to the researcher who will do her best to answer any questions. If she is unable to resolve your concern or you wish to make a complaint regarding the project, please contact the Supervisor: Dr Philip J Rogers, prspjr@bath.ac.uk, 01225 384445.

17. If I require further information who should I contact and how?

Thank you for expressing an interest in participating in this project. Please do not hesitate to get in touch with us if you would like some more information:

- Researcher: Marianna Liaskou; Department of Pharmacy and Pharmacology, University of Bath, Claverton Down, BA2 7AY; ml510@bath.ac.uk
- Supervisor: Dr Philip J Rogers; Department of Pharmacy and Pharmacology, University of Bath, Claverton Down, BA2 7AY; prspjr@bath.ac.uk; 01225 384445

IRAS ID: 265760

Study title: A qualitative exploration of the development and effect of collaboration between community pharmacists (CPs) and general practitioners (GPs).

Researcher: Marianna Liaskou, ml510@bath.ac.uk
Supervisor: Dr Philip J Rogers, prspjr@bath.ac.uk, 01225 384445

This information sheet forms part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. Please read this information sheet carefully and ask one of those named above if you are not clear about any details of the project.

1. What is the purpose of the project?

Pharmacists are being increasingly integrated into primary care. This project aims to identify different ways of CPs and GPs working together within England. The project will examine how these ways of working impact everyone involved in these (e.g. CPs, GPs, patients, community pharmacy and general practice staff).

2. Why have I been invited to take part?

You have been invited to take part because you are affected by services that are provided to you on the basis of a collaboration that involves a general practitioner and a community pharmacist. Participants in this study include patients who receive services that are based on a collaboration that involves a community pharmacist(s) and a general practitioner(s).

3. Do I have to take part?

No, it is completely up to you to decide if you would like to participate. Before you decide to take part, the researcher undertaking the project as part of a doctoral research project (Marianna Liaskou, ML) will describe the project and go through this information sheet with you. If you agree to take part, she will then ask you to sign a consent form. If at any time you decide you no longer want to participate in this study, you are free to withdraw without giving a reason.

4. What will I have to do?

The researcher (ML) will observe CPs and GPs while they deliver services to you. You will be offered the opportunity to discuss the service you have received. These interviews will typically be conducted at the site where the service is provided or on the telephone if that is more convenient for you.

5. What are the exclusion criteria?

Vulnerable patients or those unable to give consent to participate in the study will be excluded.

6. What are the possible benefits of taking part?

There are no immediate benefits to you directly in taking part in this project. However, the information provided by you, CPs, GPs and other staff will contribute to recommendations that will help to improve the effectiveness of primary care services.

7. What are the possible disadvantages and risks of taking part?

There are no disadvantages or risks in taking part in this project. In the unlikely event that something makes you feel uncomfortable when being observed or interviewed by the researcher, please let her know; you can choose not to answer questions if you prefer.

8. Will my participation involve any discomfort or embarrassment?

The project is not expected to make you feel discomfort or embarrassment. However, if you feel that way at any point, please let the researcher know in order to stop collecting data and address any concerns you may have. Information collected during participation in the research project will be confidential, unless the researcher becomes concerned about the welfare of the participant or identifies risk to others. In that case the on-site responsible GP/CP will be contacted to take further action.

9. Who will have access to the information that I provide?

The research team will have access to the anonymised information that you provide. All collected data will be treated as confidential and will be anonymised at the first possible instance.

10.How will we use information about you?

We, the University of Bath who is the sponsor for this study, will need to use information from you for this research project. This information will include your name and contact details. People will use this information to do the research or to check your records to make sure that the research is being done properly. People who do not need to know who you are will not be able to see your name or contact details. Your data will have a code number instead. 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.

11.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.
- We need to manage your records in specific ways for the research to be reliable. This means that we won't be able to let you see or change the data we hold about you.
- 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 (on the University's Research Data Archive).

12.Where can you find out more about how your information is used?

You can find out more about how we use your information:

- at www.hra.nhs.uk/information-about-patients/
- at https://www.bath.ac.uk/corporate-information/university-of-bath-privacy-notice-for-research-participants/
- by asking one of the research team
- by sending an email to djj20@bath.ac.uk or
- by ringing us on 01225 386966.

Contact details for the University of Bath's Data Protection Officer: David Jolly, Vice Chancellor's Office, 4 West 3.05, University of Bath, Claverton Down, BA2 7AY; djj20@bath.ac.uk; 01225 386966.

13.What will happen to the data collected and results of the project?

All data collected during the project including personal, identifiable data will be treated as confidential and will be anonymised in the first instance; hard copies will be kept in a locked room and digital copies will be password-protected and saved on the University of Bath's secure server according to the General Data Protection Regulation (GDPR). Identifiable information about you will be kept until the end of 2020 (or the end of ML's PhD, whichever is earlier). Your name or other identifying information will not be disclosed in any presentation or publication of this or future research. After the project has finished, we will also provide participants with a summary of the overall anonymised project findings. Anonymised data will be published in the University's Research Data Archive, where it will be kept for a minimum of ten years, in order to allow access, if requested by other researchers conducting related research projects and if it is deemed appropriate (but only with your consent and the University of Bath's).

14.Who has reviewed the project?

This project has been approved by the NHS Health Research Authority [IRAS ID: 265760] and has been given a favourable opinion by the NHS North of Scotland Research Ethics Committee (1).

15.How can I withdraw from the project?

If you no longer wish to participate at any point during the project, you can inform the researcher or supervisor in person, by email or telephone (contact details are at the top of this document). You do not have to provide any reasons for doing so and this will have no consequences for you. If you wish to withdraw your data, please contact one of the above within two weeks of your participation. After this date, it may not be possible to withdraw your data as some results may have already been published. However, your individual results will not be identifiable in any way in any presentation or publication of this research.

16.What happens if there is a problem?

If you have a concern about any aspect of the project you should ask to speak to the researcher who will do her best to answer any questions. If she is unable to resolve your concern or you wish to make a complaint regarding the project, please contact the Supervisor: Dr Philip J Rogers, prspjr@bath.ac.uk, 01225 384445.

17.If I require further information who should I contact and how?

Thank you for expressing an interest in participating in this project. Please do not hesitate to get in touch with us if you would like more information:

- Researcher: Marianna Liaskou; Department of Pharmacy and Pharmacology, University of Bath, Claverton Down, BA2 7AY; ml510@bath.ac.uk
- Supervisor: Dr Philip J Rogers; Department of Pharmacy and Pharmacology, University of Bath, Claverton Down, BA2 7AY; prspjr@bath.ac.uk; 01225 384445

Appendix 5: Consent Form

IRAS ID: 265760

Centre Number:

CONSENT FORM

Title of Project: A qualitative exploration of the development and effect of collaboration between community pharmacists (CPs) and general practitioners (GPs).

Name of Researcher: Marianna Liaskou, ml510@bath.ac.uk

Please initial box

1. I confirm that I have read the information sheet dated 09/12/2019 (version 1.2) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. ☐
3. I understand that the information collected about me will be used to support other research in the future, and may be shared anonymously with other researchers. ☐
4. I understand the data I provide will be treated as confidential, and that on completion of the project my name or other identifying information will not be disclosed in any presentation or publication of the research. ☐
5. I agree to the University of Bath keeping and processing the data that I provide during the course of this study and my consent is conditional upon the University complying with its duties and obligations under the Data Protection Act. ☐

	Yes	No
6. I agree to be audio-recorded using a digital Dictaphone during the interview.	☐	☐

7. I agree to take part in the above study. ☐

Name of Participant	Date	Signature

Name of Person taking consent	Date	Signature

If you have any concerns or complaints related to your participation in this project please direct them to the researcher (Marianna Liaskou, ml510@bath.ac.uk) or the lead supervisor of this project (Dr Philip J Rogers, prspjr@bath.ac.uk, 01225 384445).

When completed: 1 for participant; 1 for researcher site file; 1 to be kept in medical notes. 20191209 Consent form V1.2

Appendix 6: Interview guide

NB: Due to the coronavirus pandemic, from June 2020 onwards participants were also asked about the impact of the coronavirus pandemic on them and the collaborative activities.

IRAS No.: 265760

Interview topic guide

The following questions will be used as a guide during semi-structured interviews with participants. As part of the introduction, participants will be reminded to express themselves freely and that there is no right or wrong answer. If and as additional themes are raised by interviewees, these will be analysed and if deemed appropriate and relevant, they will be incorporated in the topic guide.

- ## Healthcare professionals & other staff

1. Introductions and welcome
2. Questions?
3. About the participant
    a. Please tell me a bit about yourself and your role in the practice/pharmacy/collaborative model.
    Hint: qualification(s), years of (career and collaborative) experience
4. About the collaboration
    a. Please briefly describe the collaborative working taking place in this practice/pharmacy.
    Hint: including the aim/purpose of the collaboration, methods of communication (e.g. online records), setting (pharmacy/practice)
    b. Why do you think this collaboration was created?
    Hint: who/what factors contributed to the initiation?
    c. How does this collaboration affect you?
        - And why does it have that effect?
    d. How does this collaboration affect the work within the practice/pharmacy?
        - And why does it have that effect?
    e. How do you think patients are affected by this collaboration?
        - And why do you think they are affected that way?
        Hint: what evidence do you have that supports this view?
    f. What do you think has facilitated this collaboration?
        - And why?
    g. What are the barriers to successful operation of this collaboration?
        - And why?
    h. What aspects of the collaboration do you think could be improved?
        - And why?
    i. Do you think this way of working has made things better for you, and if so, how?
        - Or is it unhelpful in any way?
5. Other comments?
6. Thanks and closure

• Patients

1. Introductions and welcome
2. Questions?
3. About the participant
    a. Please tell me a bit about yourself and your relationship with the collaborative service
    Hint: how long have they been service users; number of conditions being treated for and number of medicines
    b. How were you made aware of the collaborative service?
4. About the collaboration
    a. Please briefly describe the collaborative service you have received.
    Hint: including the aim of the collaborative service, methods of communication (e.g. online records), setting (pharmacy/practice)
    b. Why do you think this collaboration was created?
    Hint: who/what factors contributed to the initiation?
    c. How does this collaboration affect you?
        • And why does it have that effect?
    d. How do you think the GP and pharmacist are affected by this collaboration?
        • And why does it have that effect?
    e. How do you think the practice/pharmacy staff are affected by this collaboration?
        • And why does it have that effect?
    f. How do you think the practice/pharmacy is affected as a whole by the collaboration?
        • And why does it have that effect?
        • How does this make you feel?
        Hint: If you have received general practice or community pharmacy services prior to this collaborative service, what has changed during your visit to the practice/pharmacy compared to "standard" care?
    g. What aspects of the collaboration do you think could be improved?
        • And why?
    h. What do you think has helped this collaboration?
        • And why?
    i. What are the barriers to making this collaboration effective for patients?
        • And why?
    j. Do you think this way of working has made things better for you, and if so, how?
        • Or is it unhelpful in any way?
5. Other comments?
6. Thanks and closure

Appendix 7: Research protocol for second empirical study (case studies)

NB: This is the final protocol (September 2020), following amendments due to coronavirus pandemic impact. The "Amendment History" section at the end of the protocol details the relevant changes (pp. 287-288).

NHS
Health Research Authority

Exploring collaborations between CPs-GPs

Qualitative Protocol Development Tool

The research protocol forms an essential part of a research project. It is a full description of the research study and will act as a 'manual' for members of the research team to ensure adherence to the methods outlined. As the study gets underway, it can then be used to monitor the study's progress and evaluate its outcomes.

The protocol should go into as much detail about the research project as possible, to enable the review bodies to fully understand your study.

The use of this collated consensus guidance and template is not mandatory. The guidance and template are published as standards to encourage and enable responsible research.

The document will:

- Support researchers developing protocols where the sponsor does not already use a template
- Support sponsors wishing to develop template protocols in line with national guidance
- Support sponsors to review their existing protocol template to ensure that it is in line with national guidance.

A protocol which contains all the elements that review bodies consider is less likely to be delayed during the review process because there will be less likelihood that the review body will require clarification from the applicant.

We would appreciate self-declaration of how you've used this template so we are able to measure its uptake.

Please indicate the compatibility of this template with any existing templates you already use by stating one of the following on the front of each submitted protocol:

- ✓ **This protocol has regard for the HRA guidance and order of content; OR**
- **This protocol has regard for the HRA guidance; OR**
- **This protocol does not have regard to the HRA guidance and order of content**

FULL/LONG TITLE OF THE STUDY

A qualitative exploration of the development and effect of collaboration between community pharmacists (CPs) and general practitioners (GPs)

SHORT STUDY TITLE / ACRONYM

Exploring collaborations between CPs-GPs

PROTOCOL VERSION NUMBER AND DATE

25/09/2019 Version 1.0

RESEARCH REFERENCE NUMBERS

IRAS Number:	265760
FUNDERS Number:	N/A

Exploring collaborations between CPs-GPs

SIGNATURE PAGE

The undersigned confirm that the following protocol has been agreed and accepted and that the Chief Investigator agrees to conduct the study in compliance with the approved protocol and will adhere to the principles outlined in the Declaration of Helsinki, the Sponsor's SOPs, and other regulatory requirement.

I agree to ensure that the confidential information contained in this document will not be used for any other purpose other than the evaluation or conduct of the investigation without the prior written consent of the Sponsor

I also confirm that I will make the findings of the study publically available through publication or other dissemination tools without any unnecessary delay and that an honest accurate and transparent account of the study will be given; and that any discrepancies from the study as planned in this protocol will be explained.

For and on behalf of the Study Sponsor:

Signature: Date: ...../...../.....

.....

Name (please print):

.....

Position:

.....

Chief Investigator:

Date: .25/9/19.

Signature: [redacted]

Name: (please print):

Dr Philip Rogers

LIST of CONTENTS

Exploring collaborations between CPs-GPs

KEY STUDY CONTACTS

Chief Investigator	Dr Philip Rogers, 01225 384445, prspjr@bath.ac.uk
Study Co-ordinator	Marianna Liaskou, 07807986570, ml510@bath.ac.uk
Sponsor	Prof. Jonathan Knight Vice-Chancellor's Office University of Bath Bath BA2 7AY pro-vc-research@bath.ac.uk 01225 383162
Joint-sponsor(s)/co-sponsor(s)	N/A
Funder(s)	University of Bath David Evans' Scholarship The University of Bath Claverton Down Bath BA2 7AY United Kingdom alumni@bath.ac.uk 01225 388388
Key Protocol Contributors	Dr Philip Rogers, 01225 384445, prspjr@bath.ac.uk Dr Andrea Taylor, prsadjt@bath.ac.uk Prof. Alistair Brandon-Jones, 01225 383594, abj20@bath.ac.uk Prof. Margaret Watson (external supervisor), 0141 548 2677, margaret.watson@strath.ac.uk
Committees	This is a PhD project that is overseen by the supervisory team (PR, ABJ, MW); contact details as shown above. AT was a key contributor to the protocol as she was part of the supervisory team during protocol development.

Exploring collaborations between CPs-GPs

STUDY SUMMARY

Study Title	A qualitative exploration of the development and effect of collaboration between community pharmacists (CPs) and general practitioners (GPs)
Internal ref. no. (or short title)	Exploring collaborations between CPs-GPs
Study Design	Qualitative – inductive exploratory case studies
Study Participants	CPs, GPs, patients, general practice and community pharmacy staff
Planned Size of Sample (if applicable)	Four to 10 case studies of CP-GP collaborating dyads
Follow up duration (if applicable)	N/A
Planned Study Period	9 months
Research Question/Aim(s)	The aim of this study is to gain a deeper understanding of the relationship between CPs and GPs that are involved in collaborative models within England.

FUNDING AND SUPPORT IN KIND

FUNDER(S) (Names and contact details of ALL organisations providing funding and/or support in kind for this study)	**FINANCIAL AND NON FINANCIALSUPPORT GIVEN**
University of Bath David Evans' Scholarship	Financial support only
University of Bath	Sponsorship only

Exploring collaborations between CPs-GPs

ROLE OF STUDY SPONSOR AND FUNDER

The funder and the sponsor have not had and will not have any influence on the study design, conduct, data analysis and interpretation, manuscript writing and dissemination of results.

ROLES AND RESPONSIBILITIES OF STUDY MANAGEMENT COMMITEES/GROUPS & INDIVIDUALS

The supervisory team from this doctoral study will have oversight of the project: Dr Philip Rogers (lead supervisor), Prof. Alistair Brandon-Jones, Prof. Margaret Watson (external supervisor). In addition, a Patient and Public Involvement (PPI) group will be established to "sense check" the conduct of the research at key points in the study. This group will include patients, pharmacists and GPs. We anticipate that this group will meet virtually during the lifetime of this project.

Exploring collaborations between CPs-GPs

PROTOCOL CONTRIBUTORS

The funder and the sponsor have not had and will not have any influence on the study design, conduct, data analysis and interpretation, manuscript writing and dissemination of results.

The research team (as outlined on p. v) were the key contributors to this protocol. The research advisory group, which will consist of patients/members of the public, pharmacist(s) and GP(s), will provide input on:

- the content of materials used at recruitment and participation level;
- the relevance of the research to them as stakeholders, who are affected by CP-GP collaborative models, in order to ensure that this study addresses aspects of practice and service provision that is important to them

KEY WORDS: Pharmacists; General Practitioners; Community Pharmacy Services; Cooperative Behaviour; Buyer-supplier relationships

STUDY FLOW CHART

This study is part of doctoral research and has been informed by a systematic review of the international literature on the topic of collaborations involving CPs and GPs. Figure 1 outlines the process that will be followed during the study, while Figure 2 demonstrates the timeline of the study [starting from the opening the Expression-of-Interest (EOI) call to the end-of-study report; data collection (e.g. observations) will begin once NHS HRA-REC has approved the study].

Figure 1: Case studies' process flowchart

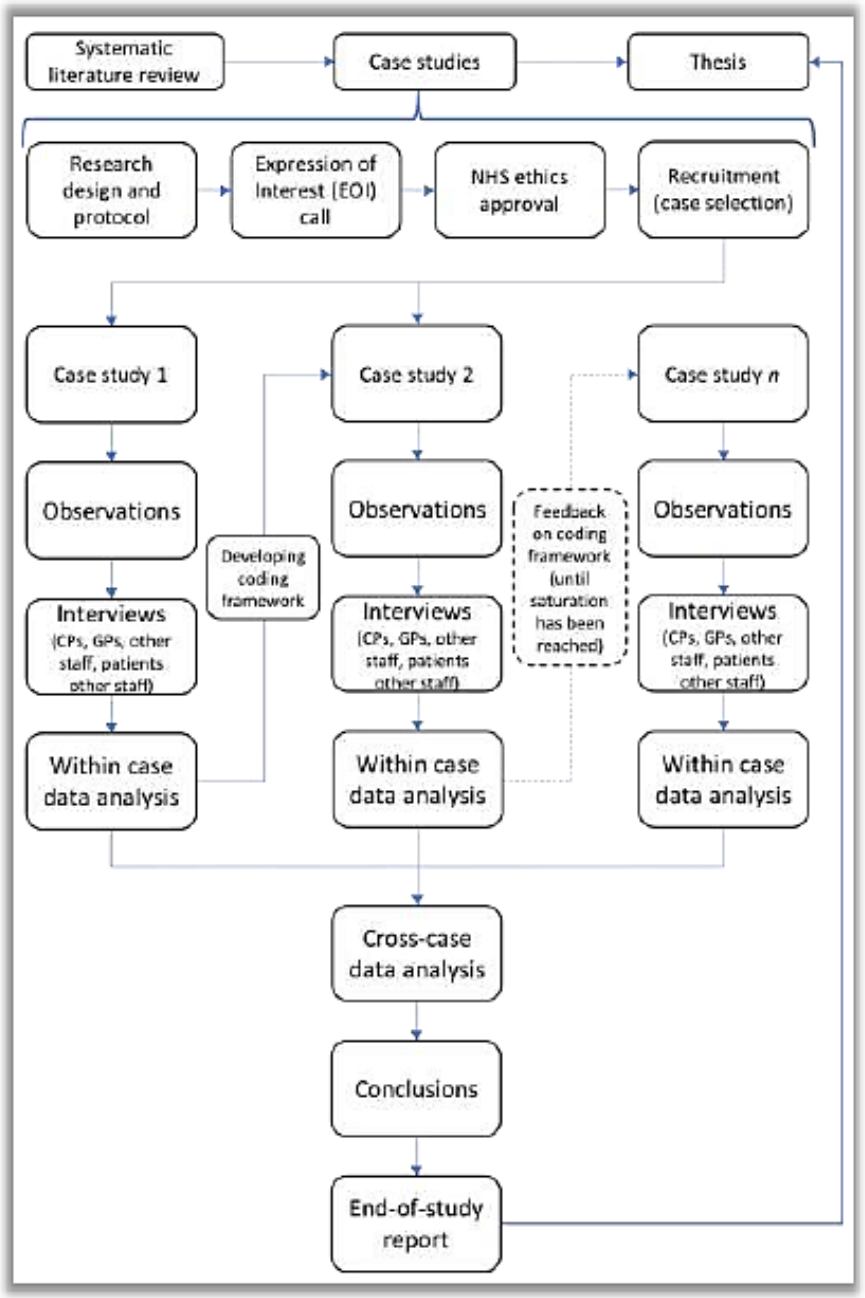
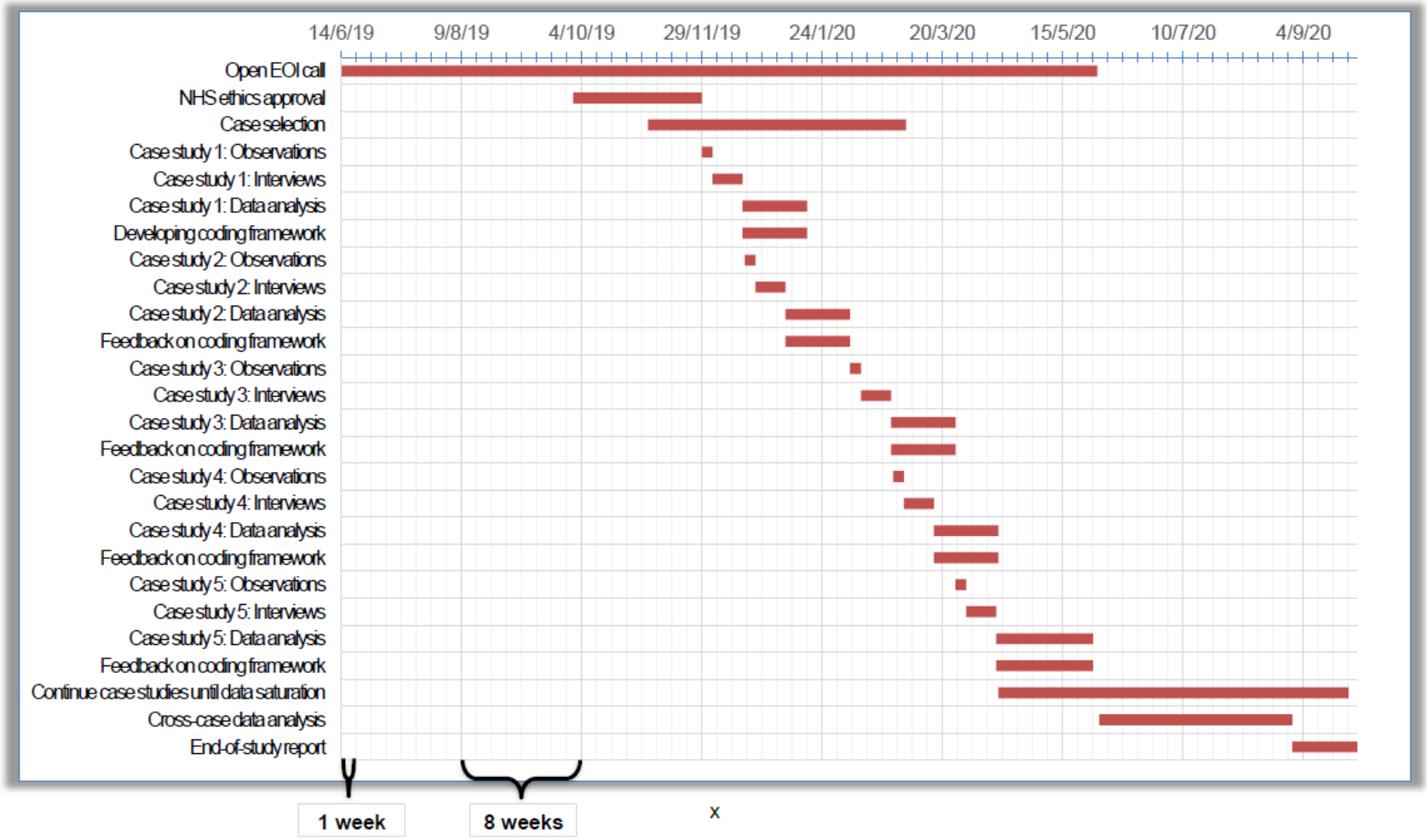


Figure 2: Case studies' timeline (Gantt chart)



Exploring collaborations between CPs-GPs

STUDY PROTOCOL

A qualitative exploration of the development and effect of collaboration between community pharmacists (CPs) and general practitioners (GPs).

1 BACKGROUND

Collaborative working between CPs and GPs has been encouraged by public, government and professional bodies since the early 2010s. The Royal Pharmaceutical Society (RPS) and Royal College of General Practitioners (RCGP), who are the membership bodies of pharmacists and GPs respectively, have published a joint statement (2012) addressing the importance of CP-GP collaborative working in order to improve patient care. This has also been repeatedly highlighted in policies, including the RCGP's vision of "The 2022 GP" (2013), the General Practice Forward View (NHS England and NHS Health Education England, 2016) and more recently the NHS Long Term Plan (2019), which emphasised utilising CPs' skills and frequent interaction with patients. Pharmacists are currently being integrated in general practices within England through the Pharmacy Integration Fund (PhIF) with a recent evaluation of this pilot demonstrating the value of this work (NHS England, 2018). However, such integration poses a risk for the pharmacists working in other areas of practice (e.g. hospital, community pharmacy), who may relocate to undertake this role.

A systematic review conducted as part of the wider doctoral research, of which this study is a part, identified emerging models of working between CPs and GPs with variable characteristics and outcomes (Liaskou et al., 2019). However, these were not well described or analysed in depth in terms of the mechanisms of the collaborative models and their impact on performance. Furthermore, it was evident that there has been minimal exploration of such collaborative working, specifically between CPs and GPs, within the UK (2/37 studies).

This study will use multiple, inductive, exploratory case studies (Yin, 2018) of CP-GP collaborative models for data collection; observations and interviews with the stakeholders involved (CPs, GPs, patients, general practice and community pharmacy staff) will be conducted to gain a better and deeper understanding of their experiences and satisfaction with the model, factors that led to the collaboration, barriers and facilitators during the implementation process. These case studies will follow a rigorous inductive (i.e. theory-inducing, and not theory-testing) approach (Eisenhardt, 1989) using the Gioia Methodology (Gioia et al., 2012), which provides a step-wise two-level analysis of the collected data (firstly, analysis of what participants say, which is then interpreted by the researcher as

part of theory development). Data will be analysed across cases as well in order to identify patterns of the relationship between participants, context and performance of the models.

2 RATIONALE

Pharmacists are being increasingly integrated into primary care and more specifically in general practices. This is encouraged by policy makers in order to create multidisciplinary and well-integrated primary care services. However, this relocation of pharmacists in general practices is shifting the workforce away from existing sectors (e.g. community and hospital pharmacy). Evidence is needed to inform the optimal involvement of pharmacists working with general practitioners.

The NHS Constitution for England (Department of Health & Social Care, 2015) states as one of its core values "Working together for patients". This has been further supported in the recent publication of the NHS Long Term Plan (2019), which highlights the importance of utilising the existing position and skillset of CPs in engaging with patients. Operations management (OM) has a strategic role at process, operations and supply chain level of every business (Slack et al., 2015), which in this research is the NHS. Applying OM principles within the context of collaborative working between CPs and GPs in the English primary care, can provide insights on how such collaboration can impact the way primary care services are currently operating. This will also take into account pressures on the NHS, shortages of GPs and reduced community pharmacy funding.

Using OM will enlighten how multidisciplinary practice between CPs and GPs could influence the balance between resource and flow efficiency (Modig and Åhlström, 2018). In this context, resource efficiency refers to maximum utilisation of resources, i.e. the existing position of CPs in primary care; flow efficiency refers to making the patients' journey in healthcare as smooth as possible and with the least burden to the patient (e.g. without long waiting times between seeing the GP and collecting prescribed medicines from the pharmacy) and least burden to the patient).

3 THEORETICAL FRAMEWORK

This is a novel area of development in primary care and therefore there is a lack of existing theories about CP-GP collaborations. Using an inductive approach based on grounded theory enables exploration of such collaborations. Inductive exploratory case studies will be conducted to identify barriers and enablers to success and recommend appropriate models; operation management (OM) principles will be used to guide this research. Barratt et al. (2011) conducted a review of published OM

case studies from 1992 to 2007, which aimed to showcase how to use case studies within OM, their methodology and outcomes; findings indicated the need for improvement in the reporting and methods of deductive case studies (testing theory), while inductive case studies (theory building) were more rigorous. As part of this the Gioia Methodology (Gioia et al., 2012), which provides a structure for well-founded theory building, will be employed. This approach reflects real practice and is based on participants' experience and views. This resonates with the healthcare area as CP-GP collaborations are highly affected by their professional duty for patient care provision and fluctuating daily workload and pressures. Although this methodology is based on the grounded theory approach for research design and data collection (Glaser and Strauss, 1967), it provides a step-wise analysis of data and aids the synthesis of grounded theory highlighting relationship dynamics.

4 RESEARCH QUESTION/AIM(S)

The overall aim of the research is to explore the following question:

How do collaborative models involving CPs and GPs impact primary care services?

4.1 Objectives

The objectives are to:

- Identify and describe the individual collaborative models' characteristics, ways of operating and means of evaluation
- Analyse purpose, drivers, enablers and barriers evident in the individual collaborations,
- Explore the impact of the individual collaboration on stakeholders (especially CPs, GPs and patients) and their evaluation process.
- Identify patterns across individual cases to make recommendations for effective CP-GP collaborations

4.2 Outcome

The outcomes from this research will ultimately be combined with findings from a systematic review that has identified these aspects within the published literature (Liaskou et al., 2019; unpublished data, 2019). They will include identification of models and an understanding of how the models work and the impact they have on the stakeholders involved, including CPs, GPs and patients.

5 STUDY DESIGN and METHODS of DATA COLLECTION AND DATA ANALYIS

A multiple, inductive, exploratory case study design will be adopted that follows rigorous methodological principles (Eisenhardt, 1989; Yin, 2018). Data will be collected by the project

researcher (Marianna Liaskou) during direct observations of CPs and GPs when they are working together and/or under the collaborative agreement (whether that is an oral or written agreement); for example, this could include patient consultations and staff meeting at participating general practices and community pharmacies. Verbal consent will be obtained from those present at the time of the observations (e.g. from the patients receiving a collaborative service or staff members attending a meeting). These aspects of the study aim to capture interactions between CPs, GPs and staff, relationship dynamics and the practicalities of their collaboration; as such, the observations won't follow a specific format.

Furthermore, in-depth interviews will be conducted (by ML) with all collaborators involved within the model and other stakeholders impacted by the CP-GP collaboration; these include CP(s), GP(s), patients (that have received the collaborative service, if there is one), general practice and community pharmacy staff. Interviews will take place on the day(s) of observations in-person or if that isn't possible, by phone at a suitable time for the participants. An interview guide, which will be piloted by members of the supervisory team and PPI group, will be used to gain a deeper understanding of the participants' role and how they are affected by the model. This topic guide will evolve throughout the study in response to study findings. The combination of observations and interviews with multiple stakeholders will allow triangulation of collected data that will lead to a more reliable and realistic view of the collaborative models' effect on the stakeholders involved.

Analysis within each case (i.e. each collaborative model) will allow to make links between the model's characteristics and how they influence its performance. The Gioia Methodology (2012) will be used to guide analysis of the data collected within each case. As part of this method, qualitative data from observations and interviews will be transcribed, coded and a summary will be sent for respondent checking. Dual coding of the initial three interviews (one with a CP, one with a GP and one with a patient) of the first case study will be completed by a member of the supervisory team. The developing coding framework will be regularly discussed with the supervisory team until saturation is achieved. A reflective research diary will be maintained by the project researcher to record the researcher's standpoint and to capture key decisions made during the data collection phase.

Cross-case analysis will follow to identify patterns of the relationship between the participants, the setting (e.g. urban or rural) and the performance of the models. The cross-case study design will lead to the detection of patterns across the case studies, while looking for similarities and differences. Inferences will be made based on Levi-Feur's (2006) strategy of "Most-Similar System Research

Design (MSSD) and Mill's Method of Difference (MMD)". This allows comparisons between cases with similar context, which in this research is primary healthcare (MSSD), to detect factors influencing performance, while taking into account the variable outcome of different levels of performance/success (MMD).

Data will be analysed using QSR International's NVivo 11 qualitative data analysis software (2015). Following within-case analysis, comparative analysis across case studies will be used to identify patterns with regard to participant characteristics (e.g. experienced versus newly-qualified GPs), context (e.g. urban versus rural setting) and performance (i.e. success).

Data collected during observations will be hand-written in a notebook and then typed into Microsoft® Word. Interviews will be recorded using a digital audio recorder and then transcribed by ML on Microsoft® Word. All files will be anonymised and stored in a password-protected folder. Hard copies of data (i.e. original notes and consent forms) will be kept in a locked office. The hard copies of the hand-written notes will be retained until the end of the PhD, following which they will be destroyed and instead the digital anonymised copy will be archived for at least 10 years (as per University of Bath Policy). Any identifiable information and its linked data (using unique participant ID numbers) will be stored in a separate password-protected Microsoft® Excel file (saved within a password-protected folder); any files used during analysis will only contain unique participant ID numbers.

Once the study's findings are published (either in journal, thesis or conference abstract format), my (anonymised) data will be published on the University of Bath's Research Data Archive to be shared with bona fide researchers upon request.

6 STUDY SETTING

Data will be collected (through observations and interviews) at the site(s) where the collaborative activities take place, including the general practice and community pharmacies. CPs and GPs, who initially expressed their interest in participating, will be contacted once the study has received ethics approval. Those who agree to participate will be provided with the participant information sheet and asked to complete a consent form, which will confirm their participation. Patients, who have received services as a result of the CP-GP collaboration will be asked to participate in interviews; they will also be provided with the participant information sheet and asked to complete a consent form. Similarly, community pharmacy and general practice staff will also be asked to participate to interviews in order to understand their perspectives on how they are affected by the collaborative models.

The data that will emerge from the above will form a case study that will describe the CP-GP collaborative model at each site. Cross-case comparisons will be made following the completion of data collection (see above section 5).

7 SAMPLE AND RECRUITMENT

7.1 Eligibility Criteria

This study is open to staff that work within primary care in some form of CP-GP collaboration within England.

7.1.1 Inclusion criteria

- Pharmacists whose primary role is within community pharmacies AND
    - Either:
        1. Work within a community pharmacy, while collaborating with GP(s) on a part-time basis, i.e. specific day(s) per week or specific period(s) in a year, OR
        2. Work within a community pharmacy, while collaborating with GP(s) on full-time basis, e.g. based on a verbal or written agreement that outlines the conditions of the collaboration/collaborative service, OR
        3. Work within a general practice on a part-time basis, i.e. specific day(s) per week or specific period(s) in a year, OR
        4. Any of the above (1-3), where the collaboration involves other collaborators in addition to GP(s).
- GPs whose primary role is within general practice AND
    - Either:
        1. Work within a general practice, while collaborating with CP(s) on a part-time basis, i.e. specific day(s) per week or specific period(s) in a year,
        2. Work within a general practice, while collaborating with CP(s) on full-time basis, e.g. based on a verbal or written agreement that outlines the conditions of the collaboration/collaborative service, OR

3. Work within a community pharmacy on a part-time basis, i.e. specific day(s) per week or specific period(s) in a year, OR
4. Any of the above (1-3), where the collaboration involves other collaborators in addition to CP(s).

- Adult English-speaking patients receiving services that are provided based on the CP-GP collaboration
- Other staff working at the community pharmacy, where the CP is primarily based and/or which is associated with the collaboration
- Other staff working at the general practice, where:
  - The GP is primarily based and/or which is associated with the collaboration
  - The CP works as part of the collaboration

7.1.2 Exclusion criteria

- Pharmacists who are based within general practice(s) for the majority of their working week
- Collaborations that are based purely on CP-GP interaction rather than co-operation, which requires mutual verbal or written agreement(s) by those involved and which aim to achieve a common goal (e.g. patient care services). For example, interactions based on routine practice communication between CPs and GPs regarding amending prescription items or when pharmacists and GPs are fulfilling their standard role as healthcare professionals are not considered as "collaborations". However, if there has been communication (verbal or written) between the CP and GP (or their staff) that has led to extra steps being taken to improve delivery of patient care, this would be considered as "collaboration".
- Vulnerable patients or those unable to give consent

7.2 Sampling

Previous published literature of conceptual models between (community) pharmacists and (general) physicians has indicated the variety of determinants for success; for example, maturity of relationships or of those involved due to their years of experience in practice, co-location of community pharmacy with general practice, attitudes have been important aspects in collaborative models within primary care (McDonough and Doucette, 2001; Dey et al., 2011; Bradley et al., 2012; Van et al., 2012; Van et

al., 2013; Bardet et al., 2015; Rathbone et al., 2016). As such, during the selection process of the sample for case studies these various characteristics will be taken into account.

7.2.1 Size of sample

The number of case studies will be between four and 10 (Eisenhardt, 1989) and aim to demonstrate a range of different models of collaborations. Each case will comprise at least one CP, one GP and one patient.

7.2.2 Sampling technique

A purposive sampling approach will be employed to reflect as many different models of collaborations as can be identified. The sample will derive from collaborating CPs and GPs, who responded to an Expression of Interest call for this project.

7.3 Recruitment

Eligible participants (CPs and GPs) who have responded to the Expression of Interest (EOI) call will be approached in order to confirm their participation in the study.

7.3.1 Sample identification

The recruitment strategy, which was initiated through the EOI call, was based on a Strengths, Weaknesses, Opportunities and Threats' (SWOT) analysis, which also considered:

- the doctoral research aim (understanding CPs-GPs' collaborative relationship)
- the potential number of collaborating CP-GP dyads in England (based on the total number of pharmacists, excluding full-time practice-based pharmacists).

The chosen recruitment strategy aimed to be inclusive and targeted, while minimising bias (see Table 1). As such, the EoI call was circulated to CPs and GPs' local professional bodies' teams (see Table 1 option 3; more inclusive and less biased option) and directly to CPs and GPs who were part of the University of Bath's Department of Pharmacy and Pharmacology professional network (see Table 1 option 4; more targeted and personal option).

7.3.2 Consent

At the point of recruitment, potential participants will be provided with the participant information sheet, which will outline the research study; following that they will be given the opportunity to discuss any queries and if they agree to participate, they will be asked to complete a consent form.

Table 1: SWOT analysis for recruitment strategy

Recruitment approach	*Strengths*	*Weaknesses*	*Opportunities*	*Threats*
1. Direct contact with pharmacies and general practices	- Quick response - More personal - More inclusive - Less biased	- Time-consuming (for CP/GP and researcher)	- Tailored explanation of the study - Feasible in a specific geographical area (e.g. South West region of England)	- Receptionists or pharmacy staff "gate-keepers" - Miscommunication of the study concept on the phone - No response/unreturned calls
2. EOI call dissemination via professional bodies (i.e. RPS for pharmacists and RCGP for GPs)	- More inclusive - Less biased approach - Professional bodies' support strengthening study's status	- Slow response (via third party) - Less personal - Membership to professional bodies is not mandatory for CPs; additional pharmacy organisations would have to be contacted[1]	- Engagement of larger organisations with the project - Local representative groups and their online platforms can be used if the call is not centrally disseminated (see approach 3 below)	- GDPR limitation (organisations unable to disseminate third-party emails) - Emails could be considered as "spam" or "junk" - No response or unreturned follow-up emails
3. EOI call dissemination via professional bodies' regional groups[2]	- More targeted - Less biased approach - Professional bodies' support strengthening study's status	- Slow response (via third party) Less personal - Currently low uptake and activity of LPFs are not very active at the moment - Membership to professional bodies is not mandatory for CPs; LPCs would have to be contacted	- Engagement of larger organisations' local teams with the project - Direct contact with groups' leaders could encourage promotion of EOI call	- Emails could be considered as "spam" or "junk" - No response or unreturned follow-up email - Low response due to participants' low interest in involvement with local teams
4. EOI call dissemination via professional network of contacts	- More targeted - More personal - Quick response	- More biased approach	- Using social networks (e.g. twitter) to make EOI call more inclusive and less biased Tailored explanation of the study	- Potentially slow response (via third party) - No response/unreturned calls/emails

[1] Additional pharmacy/pharmacists' organisations include: PSNC, NPA and PDA
[2] RPS' LPFs, PSNC's LPCs, RCGP's Faculties or managers supporting GPs/CCGs in establishing PCNs
Abbreviations: CCGs: Clinical Commissioning Groups; CPs: community pharmacists; GDPR: General Data Protection Regulation; GPs: general practitioners; LPCs: local pharmaceutical committees; LPFs: local practice forums; NPA: National Pharmacy Association; PCNs: Primary Care Networks; PDA: Pharmacists' Defence Association; PSNC: Pharmacy Services Negotiating Committee; RCGP: Royal College of General Practitioners; RPS: Royal Pharmaceutical Society

8 ETHICAL AND REGULATORY CONSIDERATIONS

This research aims to improve efficiency of primary care services. Evidence-based recommendations on successful CP-GP collaborative models that will be derived from these case studies could benefit interested actors such as GPs and CPs on the practice level as well as influence healthcare policy through transferrable findings.

Data collected will be anonymised in the first instance (post fieldwork at each site) and treated as confidential. In addition, any hand-written notes taken during observations will be transferred on a digital version. Any participants and names will be coded as profession-years of experience-reference number (e.g. GP-12-01, i.e. a GP that has been practicing for 12 years and was the first one to be observed).

Data collected during observations will be hand-written in a notebook and then typed into Microsoft® Word. Interviews will be recorded using a digital audio recorder and then transcribed by ML on Microsoft® Word. All files will be anonymised and stored in a password-protected folder. Hard copies of data (i.e. original notes and consent forms) will be kept in a locked office. The hard copies of the hand-written notes will be retained until the end of the PhD, following which they will be destroyed and instead the digital anonymised copy will be archived for at least 10 years (as per University of Bath Policy). Any identifiable information and its linked data (using unique participant ID numbers) will be stored in a separate password-protected Microsoft® Excel file (saved within a password-protected folder); any files used during analysis will only contain unique participant ID numbers.

Identifiable personal data will be destroyed at the end of 2020 (or the end of ML's PhD, whichever is earlier). The informed consent which will be stored for an additional 12 months after the study ends in case there is any query or complaint from a participant. As per the PhD's data management plan, anonymised data will be published in the University's Research Data Archive, where it will be kept for a minimum of 10 years, in order to allow access, if requested by other researchers and deemed appropriate.

8.1 Assessment and management of risk

There are not any known potential risks to participants and the study does not intend to cause pain, discomfort or deceive participants. This study aims to seek the views of GPs, CPs and patients about their experiences of collaborative working between GPs and CPs. There are no clinical interventions,

no sensitive information will be collected and no sensitive issues are anticipated to arise. As such we anticipate the risks of participating in this study to be very low.

Interviews with participants will take place where possible in the practice setting as this is a relatively safe and easy-to-access environment for all participants. Where this is not possible, telephone interviews will be conducted.

In case of any complaints or concerns, participants will be given contact details of the project researcher (ML) or lead supervisor (ABJ), which are outlined on the participant information sheet.

8.2 Research Ethics Committee (REC) and other Regulatory review & reports

The study will begin once a favourable opinion has been received from a REC for the study protocol, informed consent forms and other relevant documents e.g. recruitment materials. Substantial amendments that require review by NHS REC will not be implemented until that review is in place and other mechanisms are in place to implement at site. This will not apply if and as additional themes are raised by interviewees; in this case, following data analysis, if these themes are deemed appropriate and relevant, they will be incorporated in the topic guide. All correspondence with the REC will be retained.

The Chief Investigator will:

- notify the REC of the end of the study
- prepare an annual progress report within 30 days of the anniversary date on which the favourable opinion was given
- notify the REC if the study is ended prematurely, including the reasons for the premature termination
- submit, within one year after the end of the study, a final report with the results, including any publications/abstracts, to the REC.

Regulatory Review & Compliance

This study will be conducted in accordance with the UK Policy Framework for Health and Social Care Research. Before any organisation can enrol staff or patients into the study, the CI/PI or designee will obtain confirmation of capacity and capability for each organisation in-line with HRA processes.

Any amendments to the study documents must be approved by the sponsor prior to submission to the &HCRW and REC (if applicable

Amendments

Protocol amendments will be submitted to the Sponsor for approval prior to submission to the HRA and REC; and once approved, on-going permissions will be confirmed with each organisation and relevant R&D office before the amendment is implemented. These amendments will be recorded within Appendix 11.5 of this document. Decisions on whether an amendment is substantial will be discussed within the supervisory team, following HRA's guidance (http://www.hra.nhs.uk/resources/after-you-apply/amendments/) and the University of Bath Department of Pharmacy and Pharmacology's Research Ethics Officer.

8.3 Peer review

Two independent members of the University of Bath Department of Pharmacy and Pharmacology academic staff reviewed the study protocol to ensure high quality peer review.

8.4 Patient & Public Involvement

A Patient and Public Involvement (PPI) group will be established to "sense check" the conduct of the research at key points in the study. This group will include patients, pharmacists and GPs. We anticipate that this group will meet virtually during the lifetime of this project. The PPI group will provide input on:

- the content of materials used at recruitment and participation level;
- the relevance of the research to them as stakeholders, who are affected by CP-GP collaborative models, in order to ensure that this study addresses aspects of practice and service provision that is important to them

8.5 Protocol compliance

Deviations from the protocol are not expected although they can happen at any time; if they occur, they will be adequately documented and reported to the Chief Investigator and Sponsor immediately.

8.6 Data protection and patient confidentiality

Data collected during observations will be hand-written in a notebook and then typed into Microsoft® Word. Interviews will be recorded using a digital audio recorder and then transcribed by ML on Microsoft® Word. All files will be anonymised and stored in a password-protected folder. Hard copies of data (i.e. original notes and consent forms) will be kept in a locked office. The hard copies of the hand-written notes will be retained until the end of the PhD, following which they will be destroyed and

instead the digital anonymised copy will be archived for at least 10 years (as per University of Bath Policy). Any identifiable information and its linked data (using unique participant ID numbers) will be stored in a separate password-protected Microsoft® Excel file (saved within a password-protected folder); any files used during analysis will only contain unique participant ID numbers.

Once the study's findings are published (either in journal, thesis or conference abstract format), anonymised data will be published on the University of Bath's Research Data Archive to be shared with bona fide researchers upon request.

8.7 Indemnity

[to be completed by the sponsor or once sponsorship has been approved]]

[Guidance:

Aim: to fully describe indemnity arrangements for the study

The following areas should be addressed in the protocol:

1. *What arrangements will be made for insurance and/or indemnity to meet the potential legal liability of the sponsor(s) for harm to participants arising from the management of the research?*
2. *What arrangements will be made for insurance and/ or indemnity to meet the potential legal liability of the sponsor(s) or employer(s) for harm to participants arising from the design of the research?*
3. *What arrangements will be made for insurance and/ or indemnity to meet the potential legal liability of investigators/collaborators arising from harm to participants in the conduct of the research? Note that if the study involves sites that are not covered by the NHS indemnity scheme (e.g. GP surgeries in primary care) these investigators/collaborators will need to ensure that their activity on the study is covered under their own professional indemnity.*
4. *Has the sponsor(s) made arrangements for payment of compensation in the event of harm to the research participants where no legal liability arises?*
5. *If equipment is to be provided to site(s) for the purposes of the study, the protocol should describe what arrangements will be made for insurance and/ or indemnity to meet the potential legal liability arising in relation to the equipment (e.g. loss, damage, maintenance responsibilities for the equipment itself, harm to participants or site staff arising from the use of the equipment)*

NB Usually the responsibility for sections 1&2 lie with the sponsor, section 3 with the participating site and section 4 with the sponsor. Section 4 is not mandatory and should be assessed in relation to the inherent risks of the study; however, it may be a condition of REC favourable opinion to have these arrangements in place.]

8.8 Access to the final study dataset

The project researcher and the supervisory team will have access to the full dataset during the study period. Once the study's findings are published (either in journal, thesis or conference abstract

format), the study's anonymised data will be published on the University of Bath's Research Data Archive to be shared with bona fide researchers upon request (with the participants' permission as outlined in the consent form).

9 DISSEMINIATION POLICY

9.1 Dissemination policy

Anonymised findings will be published in journal paper(s), the PhD thesis of the project researcher (ML) and shared at conference events (in abstract and poster/oral presentation format). On completion of the study, a final report will be prepared; this can be accessed upon request to the Principal Investigator. A summary of the overall anonymised project findings will also be provided to interested participants. On completion of the PhD, the study's anonymised data will be published on the University of Bath's Research Data Archive to be shared with bona fide researchers upon request (with the participants' permission as outlined in the consent form).

9.2 Authorship eligibility guidelines and any intended use of professional writers

Authorship of the final study report and publications related to this study will follow The International Committee of Medical Journal Editors' authorship criteria for manuscripts submitted for publication.

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11. APPENDICIES

11.1 Appendix 1- Participant information sheet for CPs, GPs and staff

IRAS ID: 265760

UNIVERSITY OF BATH

Study title: A qualitative exploration of the development and effect of collaboration between community pharmacists (CPs) and general practitioners (GPs).

Researcher: Marianna Liaskou, ml510@bath.ac.uk
Supervisor: Dr Phillip J Rogers, prspjr@bath.ac.uk, 01225 384445

This information sheet forms part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. Please read this information sheet carefully and ask one of those named above if you are not clear about any details of the project.

1. What is the purpose of the project?

Pharmacists are being increasingly integrated into primary care. This project aims to identify different models of collaboration involving CPs and GPs within England. The project will examine characteristics, drivers, purpose, performance and impact on stakeholders involved in these collaborative models (e.g. CPs, GPs, patients, community pharmacy and general practice staff).

2. Why have I been selected to take part?

You have been selected to take part because you are affected by services that are provided by/to you on the basis of a collaboration that involves a general practitioner and a community pharmacist. Participants in this study include:

- General practitioners whose primary role is within general practice and who currently collaborate with a community pharmacist(s), whose primary role is within community pharmacy, on a part-/full-time basis
- Community pharmacists, whose primary role is within community pharmacy and who currently collaborate with a general practitioner(s), whose primary role is within general practice, on a part-/full-time basis
- Staff of the community pharmacy(ies) or general practice(s) that are part of a collaboration that involves a community pharmacist(s) and a general practitioner(s).

3. Do I have to take part?

It is completely up to you to decide if you would like to participate. Before you decide to take part, the researcher (Marianna Liaskou, ML) will describe the project and go through this information sheet with you. If you agree to take part, she will then ask you to sign a consent form. If at any time you decide you no longer want to participate in this study, you are free to withdraw without giving a reason.

4. What will I have to do?

The researcher (ML) will observe healthcare professionals and staff while they conduct patient-facing services and other responsibilities (e.g. practice meetings) that are part of the collaboration; for example, if as a CP you work one day per week in a general practice, ML will shadow you throughout that day in order to understand your role, duties and interactions with other staff members and patients within the general practice. Another aspect of the project will be interviews with you, the participants, in order to explore your views on the collaboration and, if you are a patient, on the collaborative service you have received.

IRAS ID: 265760

Depending on the type of collaboration and the providers' availability, observations will be conducted over one or two days at each site, where the collaborators primarily work and where they provide collaborative services (patient-facing and/or administration-supporting). Interviews will typically be conducted at the site where the collaborative service is provided or on the telephone if that is more convenient for you.

5. What are the exclusion criteria?

This project will exclude:Pharmacists who are primarily based within general practice, i.e. for the majority of their working week; and collaborations that are based purely on interaction between CP and GP as part of daily routine practice (for example, when a CP contacts the GP to issue a medicine different to the originally prescribed one because the latter is not available from the manufacturer/wholesaler).

6. What are the possible benefits of taking part?

There are no immediate benefits to you directly in taking part in this project. However, the information provided by participants will contribute to recommendations on successful collaborative models involving CPs and GPs. These recommendations will help to improve the effectiveness of primary care services.

7. What are the possible disadvantages and risks of taking part?

There are no disadvantages or risks in taking part in this project. If you feel that there is something that makes you feel uncomfortable when being observed or interviewed by the researcher, please let her know; you can choose not to answer questions if you prefer.

8. Will my participation involve any discomfort or embarrassment?

The project is not expected to make you feel discomfort or embarrassment. However, if you feel that way at any point, please let the researcher know in order to stop collecting data and address any concerns you may have.

9. Who will have access to the information that I provide?

The research team will have access to the anonymised information that you provide. All collected data will be treated as confidential and will be anonymised at the first possible instance. The University of Bath will collect information from you for this research study in accordance with our instructions. The University of Bath will use your name and contact details to contact you about the research study and make sure that relevant information about the study is recorded for your care, and to oversee the quality of the study. Individuals from the University of Bath and regulatory organisations may look at your research records to check the accuracy of the research study. The only other people in the University of Bath who will have access to information that identifies you will be people who need to audit the data collection process.

10. What will happen to the data collected and results of the project?

All data collected during the project including personal, identifiable data will be treated as confidential and will be anonymised in the first instance; hard copies will be kept in a locked room and digital copies will be password-protected and saved on the University of Bath's secure server according to GDPR. The University of Bath is the sponsor for this study based in the United Kingdom. We will be using information

from you in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. The University of Bath will keep identifiable information about you until the end of 2020 (or the end of ML's PhD, whichever is earlier). Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible. You can find out more about how we use your information by contacting ML.

Your name or other identifying information will not be disclosed in any presentation or publication of this or future research. After the project has finished, we will also provide participants with a summary of the overall anonymised project findings. Anonymised data will be published in the University's Research Data Archive, where it will be kept for a minimum of ten years, in order to allow access, if requested by other researchers conducting related research projects and if it is deemed appropriate (only with your consent and the University of Bath's).

11.Who has reviewed the project?

This project has been approved by the NHS Health Research Authority [IRAS ID: 265760] and has been given a favourable opinion by the NHS Research Ethics Committee.

12.How can I withdraw from the project?

If you no longer wish to participate at any point during the project, you can inform one of those above in person, by email or telephone. You do not have to provide any reasons for doing so and this will not have any consequences for yourself. If you wish to withdraw your data, please contact one of the above within two weeks of your participation. After this date, it may not be possible to withdraw your data as some results may have already been published. However, your individual results will not be identifiable in any way in any presentation or publication of this research.

13.What happens if there is a problem?

If you have a concern about any aspect of the project you should ask to speak to the researcher who will do her best to answer any questions. If she is unable to resolve your concern or you wish to make a complaint regarding the project, please contact the Supervisor: Dr Philip J Rogers, prspjr@bath.ac.uk, 01225 384445.

14.If I require further information who should I contact and how?

Thank you for expressing an interest in participating in this project. Please do not hesitate to get in touch with us if you would like some more information using the contact details at the beginning of this participant information sheet.

11.2 Appendix 2 - Participant information sheet for patients

IRAS ID: 265760

UNIVERSITY OF BATH

Study title: A qualitative exploration of the development and effect of collaboration between community pharmacists (CPs) and general practitioners (GPs).

Researcher: Marianna Liaskou, ml510@bath.ac.uk
Supervisor: Dr Philip J Rogers, prspjr@bath.ac.uk, 01225 384445

This information sheet forms part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. Please read this information sheet carefully and ask one of those named above if you are not clear about any details of the project.

1. What is the purpose of the project?

Pharmacists are being increasingly integrated into primary care. This project aims to identify different ways of CPs and GPs working together within England. The project will examine how these ways of working impact everyone involved in these (e.g. CPs, GPs, patients, community pharmacy and general practice staff).

2. Why have I been selected to take part?

You have been selected to take part because you are affected by services that are provided to you on the basis of a collaboration that involves a general practitioner and a community pharmacist. Participants in this study include patients who receive services that are based on a collaboration that involves a community pharmacist(s) and a general practitioner(s).

3. Do I have to take part?

It is completely up to you to decide if you would like to participate. Before you decide to take part, the researcher (Marianna Liaskou, ML) will describe the project and go through this information sheet with you. If you agree to take part, she will then ask you to sign a consent form. If at any time you decide you no longer want to participate in this study, you are free to withdraw without giving a reason.

4. What will I have to do?

The researcher (ML) will observe CPs and GPs while they deliver services to you. You will be offered the opportunity to discuss the service you have received. These discussions will typically be conducted at the site where the service is provided or on the telephone if that is more convenient for you.

5. What are the exclusion criteria?

Vulnerable patients or those unable to give consent to participate in the study will be excluded.

6. What are the possible benefits of taking part?

There are no immediate benefits to you directly in taking part in this project. However, the information provided by you, CPs, GPs and other staff will contribute to recommendations that will help to improve the effectiveness of primary care services.

7. What are the possible disadvantages and risks of taking part?

There are no disadvantages or risks in taking part in this project. In the unlikely event that something makes you feel uncomfortable when being observed or interviewed by the researcher, please let her know, you can choose not to answer questions if you prefer.

8. Will my participation involve any discomfort or embarrassment?

The project is not expected to make you feel discomfort or embarrassment. However, if you feel that way at any point, please let the researcher know in order to stop collecting data and address any concerns you may have.

IRAS ID: 265760

9. Who will have access to the information that I provide?

The research team will have access to the anonymised information that you provide. All collected data will be treated as confidential and will be anonymised at the first possible instance. The University of Bath will collect information from you for this research study in accordance with our instructions. The University of Bath will use your name and contact details to contact you about the research study and make sure that relevant information about the study is recorded for your care, and to oversee the quality of the study. Individuals from the University of Bath and regulatory organisations may look at your research records to check the accuracy of the research study. The only other people in the University of Bath who will have access to information that identifies you will be people who need to audit the data collection process.

10.What will happen to the data collected and results of the project?

All data collected during the project including personal, identifiable data will be treated as confidential and will be anonymised in the first instance; hard copies will be kept in a locked room and digital copies will be password-protected and saved on the University of Bath's secure server according to the General Data Protection Regulation (GDPR). The University of Bath is the sponsor for this study based in the United Kingdom. We will be using information from you in order to undertake this study and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. The University of Bath will keep identifiable information about you until the end of 2020 (or the end of ML's PhD, whichever is earlier). Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible. You can find out more about how we use your information by contacting ML.

Your name or other identifying information will not be disclosed in any presentation or publication of this or future research. After the project has finished, we will also provide participants with a summary of the overall anonymised project findings. Anonymised data will be published in the University's Research Data Archive, where it will be kept for a minimum of ten years, in order to allow access, if requested by other researchers conducting related research projects and if it is deemed appropriate (but only with your consent and the University of Bath's).

11.Who has reviewed the project?

This project has been approved by the NHS Health Research Authority [IRAS ID: 265760] and has been given a favourable opinion by the NHS Research Ethics Committee.

12.How can I withdraw from the project?

If you no longer wish to participate at any point during the project, you can inform the researcher or supervisor in person, by email or telephone (contact details are at the top of this document). You do not have to provide any reasons for doing so and this will have no consequences for you. If you wish to withdraw your data, please contact one of the above within two weeks of your participation. After this date, it may not be possible to withdraw your data as some results may have already been published. However, your individual results will not be identifiable in any way in any presentation or publication of this research.

13.What happens if there is a problem?

If you have a concern about any aspect of the project you should ask to speak to the researcher who will do her best to answer any questions. If she is unable to resolve your concern or you wish to make a complaint regarding the project, please contact the Supervisor: Dr Philip J Rogers, prspjr@bath.ac.uk, 01225 384445.

14.If I require further information who should I contact and how?

Thank you for expressing an interest in participating in this project. Please do not hesitate to get in touch with us if you would like more information using the contact details at the top of this information sheet.

Exploring collaborations between CPs-GPs

11.3 Appendix 3 – Consent form

IRAS ID: 265780

Centre Number:

UNIVERSITY OF BATH

CONSENT FORM

Title of Project: A qualitative exploration of the development and effect of collaboration between community pharmacists (CPs) and general practitioners (GPs).

Name of Researcher: Marianna Liaskou, ml510@bath.ac.uk

Please initial box

1. I confirm that I have read the information sheet dated 09/08/2019 (version 1.0) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected. ☐
3. I understand that the information collected about me will be used to support other research in the future, and may be shared anonymously with other researchers. ☐
4. I understand the data I provide will be treated as confidential, and that on completion of the project my name or other identifying information will not be disclosed in any presentation or publication of the research. ☐
5. I agree to the University of Bath keeping and processing the data that I provide during the course of this study and my consent is conditional upon the University complying with its duties and obligations under the Data Protection Act. ☐
6. I agree to take part in the above study. ☐

Name of Participant	Date	Signature
Name of Person taking consent	Date	Signature

If you have any concerns or complaints related to your participation in this project please direct them to the resea (Marianna Liaskou, ml510@bath.ac.uk), the lead supervisor of this project (Dr Philip J Rogers, prspjr@bath.ac.uk 01225 384445).

When completed: 1 for participant; 1 for researcher site file, 1 to be kept in medical notes. 20190809 Consent form V1.0

11.4 Appendix 4 – Interview topic guide

IRAS No.: 265760

Interview topic guide

The following questions will be used as a guide during semi-structured interviews with participants. As part of the introduction, participants will be reminded to express themselves freely and that there is no right or wrong answer. If and as additional themes are raised by interviewees, these will be analysed and if deemed appropriate and relevant, they will be incorporated in the topic guide.

1. Healthcare professionals & other staff

- Introductions and welcome
- Questions?
- About the participant
  - Please tell me a bit about yourself and your role in the practice/pharmacy/collaborative model.
  - *Hint: qualification(s), years of (career and collaborative) experience*
- About the collaboration
  - Please briefly describe the collaborative working taking place in this practice/pharmacy.
    - *Hint: including the aim/purpose of the collaboration, methods of communication (e.g. online records), setting (pharmacy/practice)*
  - Why do you think this collaboration was created?
    - *Hint: who/what factors contributed to the initiation?*
  - How does this collaboration affect you?
    - And why does it have that effect?
  - How does this collaboration affect the work within the practice/pharmacy?
    - And why does it have that effect?
  - How do you think patients are affected by this collaboration?
    - And why do you think they are affected that way?
    - *Hint: what evidence do you have that supports this view?*
  - What do you think has facilitated this collaboration?
    - And why?
  - What are the barriers to successful operation of this collaboration?
    - And why?
  - What aspects of the collaboration do you think could be improved?
    - And why?
  - Do you think this way of working has made things better for you, and if so, how?
    - Or is it unhelpful in any way?
- Other comments?
- Thanks and closure

2. Patients

- Introductions and welcome
- Questions?
- About the participant
  - Please tell me a bit about yourself and your relationship with the collaborative service
    - *Hint: how long have they been service users; number of conditions being treated for and number of medicines*
  - How were you made aware of the collaborative service?
- About the collaboration
  - Please briefly describe the collaborative service you have received.
    - *Hint: including the aim of the collaborative service, methods of communication (e.g. online records), setting (pharmacy/practice)*
  - Why do you think this collaboration was created?

20190923 Interview topic guide V1.0

IRAS No.: 265760

- *Hint: who/what factors contributed to the initiation?*
- How does this collaboration affect you?
  - And why does it have that effect?
- How do you think the GP and pharmacist are affected by this collaboration?
  - And why does it have that effect?
- How do you think the practice/pharmacy staff are affected by this collaboration?
  - And why does it have that effect?
- How do you think the practice/pharmacy is affected as a whole by the collaboration?
  - And why does it have that effect?
  - How does this make you feel?
  - *Hint: If you have received general practice or community pharmacy services prior to this collaborative service, what has changed during your visit to the practice/pharmacy compared to "standard" care?*
- What aspects of the collaboration do you think could be improved?
  - And why?
- What do you think has helped this collaboration?
  - And why?
- What are the barriers to making this collaboration effective for patients?
  - And why?
- Do you think this way of working has made things better for you, and if so, how?
  - Or is it unhelpful in any way?

- Other comments?
- Thanks and closure

20190923 Interview topic guide V1.0

11.5 Appendix 5 - Materials used for the expression-of-interest call

1. Emails for GP/CP recruitment

1.1. Direct email through contacts

Email subject line: Are you collaborating with [pharmacists/GPs][3]?
Dear [GP partner's name/GP/community pharmacy superintendent's name/CP],

My name is Marianna Liaskou. I am a doctoral student at the University of Bath conducting research on different forms of collaboration between community pharmacists (CPs) and general practitioners (GPs). I am contacting you to ask if you could spare 10-15 minutes to discuss your current involvement with [community pharmacists/general practitioners][4] in order to understand better how CPs and GPs collaborate currently within primary care in England.

With pharmacists being increasingly integrated into primary care, evidence is needed to inform the optimal involvement of CPs working with GPs. The aim of my PhD is to identify collaborations involving CPs and GPs within England by exploring through case studies each model's characteristics, drivers, purpose, impact on stakeholders involved and performance. These findings can contribute to daily practice in order to optimise the flow of primary patient care by utilising CPs' existing place and attributes.

If you are part of such a collaborative working relationship (even if it includes other collaborators in addition to CPs and GPs) and would be happy to discuss this please email me, Marianna Liaskou, at ml510@bath.ac.uk. It would be great to hear from you. During our discussion, you will also be asked if you would like to voluntarily participate in the case-study stage, as your input is valued.

Please don't hesitate to contact me for further information.

I look forward to hearing from you.

Yours sincerely,
Marianna Liaskou MRPharmS

Department of Pharmacy and Pharmacology, University of Bath, Claverton Down, Bath, BA2 7AY

Email: ml510@bath.ac.uk

Twitter: @MLReth

PhD student: An exploration of the development and effect of collaboration models between community pharmacists and general practitioners.

Supervisors: Dr P. Rogers, Department of Pharmacy and Pharmacology; Prof. A. Brandon-Jones, School of Management; Prof. M. Watson (external)

David Evans' Studentship

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[3] NB: "pharmacists" when the email is sent to GPs / "GPs" when the email is sent to pharmacists.
[4] NB: "community pharmacists" when the email is sent to GPs / "general practitioners" when the email is sent to pharmacists.

1.2. Email to local CPs/GPs' organisations (e.g. LPCs, CCGs)
Email subject line: Collaborative working models that involve community pharmacists and general practitioners.
Dear Sir/Madam,

My name is Marianna Liaskou. I am a doctoral student at the University of Bath conducting research on different forms of collaboration between community pharmacists (CPs) and general practitioners (GPs). As I am looking for CPs and GPs who are currently collaborating to participate in my study, I am contacting you to ask if you could circulate the below Expression-of-Interest call to your members.

Please don't hesitate to contact me if you require further information.

Many thanks in advance.

Yours faithfully,
Marianna Liaskou MRPharmS

"Dear Sir/Madam,

My name is Marianna Liaskou. I am a doctoral student at the University of Bath conducting research on different forms of collaboration between community pharmacists (CPs) and general practitioners (GPs). I am looking for CPs and GPs, who are currently part of collaborations that involve CPs and GPs and could spare 10-15 minutes to discuss this with me in order to understand better how CPs and GPs collaborate currently within primary care in England.

With pharmacists being increasingly integrated into primary care, evidence is needed to inform the optimal involvement of CPs working with GPs. The aim of my PhD is to identify collaborations involving CPs and GPs within England by exploring through case studies each model's characteristics, drivers, purpose, impact on stakeholders involved and performance. These findings can contribute to daily practice in order to optimise the flow of primary patient care by utilising CPs' existing place and attributes.

If you are part of such a collaborative working relationship (even if it includes other collaborators in addition to CPs and GPs) and would be happy to discuss this please email me, Marianna Liaskou, at ml510@bath.ac.uk. It would be great to hear from you. During our discussion, you will also be asked if you would like to voluntarily participate in the case-study stage, as your input is valued.

Please don't hesitate to contact me for further information.

I look forward to hearing from you.

Yours sincerely,
Marianna Liaskou MRPharmS

Department of Pharmacy and Pharmacology, University of Bath, Claverton Down, Bath, BA2 7AY

Exploring collaborations between CPs-GPs

Email: ml510@bath.ac.uk

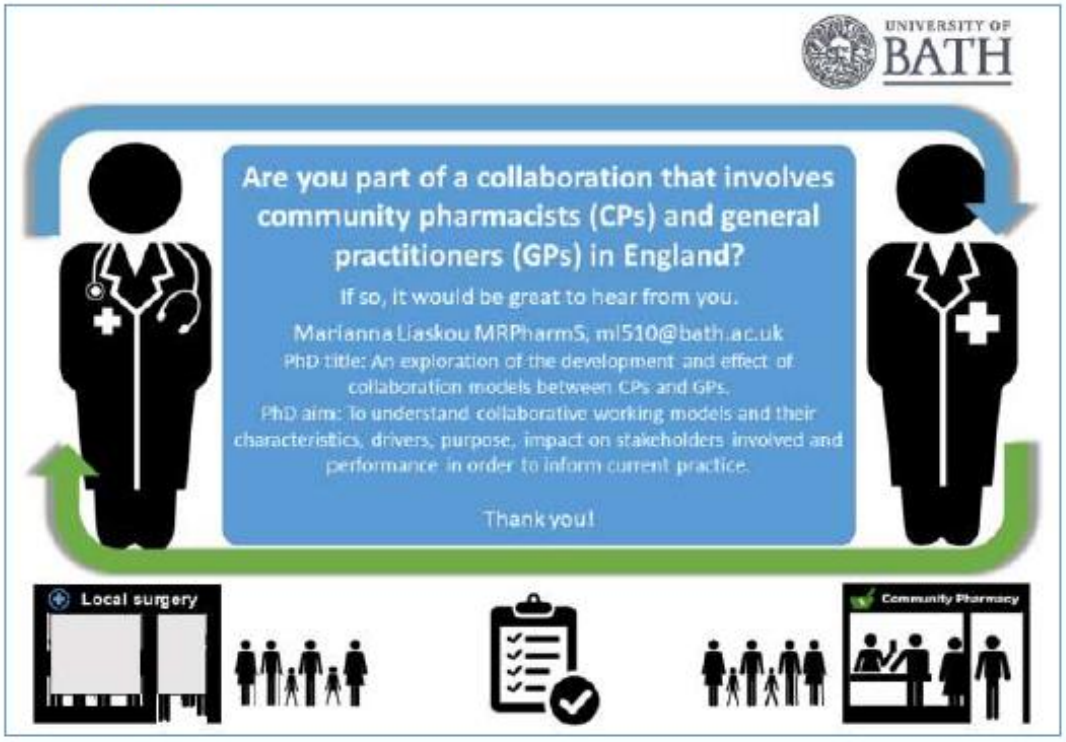
Twitter: @MLReth

PhD student: An exploration of the development and effect of collaboration models between community pharmacists and general practitioners.

Supervisors: Dr P. Rogers, Department of Pharmacy and Pharmacology; Prof. A. Brandon-Jones, School of Management; Prof. M. Watson (external)

David Evans' Studentship

2. EOI flyer



11.6 Appendix 6 – Amendment History

Amendment No.	*Protocol version no.*	*Date issued*	*Author(s) of changes*	*Details of changes made*
265760/NSA1	20190925 Qualitative protocol V1.0	25/09/2019	Marianna Liaskou	Extension of study period beyond 'Planned end date' stated in HRA and REC approved IRAS form (approved 6/2/2020) because of the impact the

				coronavirus outbreak has had on recruiting participants and conducting fieldwork research. The new end date would be 31/12/2020.
265760/NSA2	20200907 Qualitative protocol V1.1	07/09/20	Marianna Liaskou	Minor amendments to study protocol to reflect the impact the coronavirus outbreak has had on research data collection. This includes: - Additional question in interview guide for staff and patients ("How has the coronavirus outbreak changed this collaboration/collaborative service?") - Telephone/teleconference interviews instead of in-person to avoid unnecessary contact. - Observations to take place following risk assessment to ensure regular hand hygiene, wearing of face mask/covering and social distancing where possible, as per government current guidance.

Appendix 8: Research conduct and the coronavirus pandemic

The outbreak of the coronavirus (Covid-19) pandemic caused substantial delay on the progress of fieldwork and recruitment of participants for the second doctoral research project (case studies). This in turn delayed data analysis and writing of the doctoral thesis. Fieldwork involved recruitment of collaborating community pharmacists and GPs, followed by data collection in the field (observations and interviews). These activities were postponed as per Health Research Authority's (HRA) announcement in March 2020. Data collection for one case study was completed in mid-February 2020l; exact dates for on-site data collection for three further case studies were due to be arranged at the end of March and during April 2020. However, these were officially postponed following the Sponsor's (University of Bath) instructions to avoid additional pressure to NHS. As such, data collection was not possible (Spring 2020) or slow (Summer-Autumn 2020). Phone/video interviews took place from June 2020 onwards; observations resumed in September-October 2020. Non-substantial amendments were made to the Sponsor and submitted to HRA to reflect the pandemic's impact on daily practice and the research [i.e., revised end date of the case studies project (31/12/2020); additional measures taken in response to Covid-19 and according to the government's guidance on hygiene and social distancing].

As both community pharmacists and GPs had been under substantial pressure, especially during the national lockdown, making arrangements with participants for data collection took longer than expected and access was limited (e.g. requested documents such as team meetings' minutes were not supplied to the researcher due to participants' high workload). Fieldwork was originally expected to be completed in April 2020, however it was completed in early November 2020. Thus, data analysis was completed in the following months, after which writing of the doctoral thesis took place.

Appendix 9: Training and network events attended by PhD student during the PhD Postgraduate Research Programme (2017-2021)

University of Bath DoctoralSkills Courses

Course code	Course name	Academic year
RP00574	Entrepreneurship masterclass 2: Introduction to the Business Model Canvas	2020/1
RP00583	Entrepreneurship masterclass 1: fundamentals of entrepreneurship	2020/1
RP00559	Introduction to project management - £1174	2020/1
RP00575	Entrepreneurship masterclass 3: Customer discovery journey	2020/1
RP00576	Entrepreneurship masterclass 4: Route to market and customer engagement	2020/1
RP00577	Entrepreneurship masterclass 5: All things finance	2020/1
RP00578	Entrepreneurship masterclass 6: All things legal	2020/1
RP00560	Intermediate project management: risk management	2020/1
RP00561	Advanced project management	2020/1
RP00562	Preparation for the CAPM exam	2020/1
RP00067	Planning and writing your doctoral thesis: in the social sciences	2018/9
RP00056	Word: managing large documents	2018/9
RP00395	Literature searching: Embase	2017/8
RP00456	Writing an effective literature review	2017/8
RP00118	Publications, citations and open access	2017/8
RP00274	Literature searching: SCOPUS	2017/8
RP00421	Literature searching for business, finance and management	2017/8
RP00074	EndNote: Getting started with referencing	2017/8
RP00467	Introducing the alternative format thesis	2017/8
RP00192	Literature searching in the biological sciences: BIOSIS & Zoological record	2017/8
RP00268	The seven secrets of highly successful research students	2017/8
RP00428	How to plan your PhD	2017/8
RP00136	Teaching introduction (for postgraduates who teach)	2017/8
RP00424	Research data management: planning	2017/8
RP00440	Preparing for PhD confirmation (for doctoral students in the social sciences and management)	2017/8
RP00453	Applying for jobs in academia	2017/8
RP00059	Thinking critically and writing critically: in the social sciences	2017/8
RP00563	Qualitative research methods and NVivo taster	2019/0
RP00131	Careers in academia in science and engineering	2019/0

Additional training record (selected events)

Description	Start date
"Pharmacy and Primary care networks – an opportunity for change" (1hr); the online event was hosted by RPS and RPS-LPC Thames Valley steering committee. Panelists: Dr Jim O'Donnell, Slough Locality Lead, Frimley Commissioning Collaborative & ICS; Robert Bradshaw, Thames Valley LPC Chair; Prabhjot Reen, GP-based pharmacist	22/07/2020
"Help us to build a better future for pharmacy - England" (1hr); the online event was hosted by RPS and its format followed a discussion of their future policy within small groups.	08/07/2020
"Perspectives on Supply Chain Productivity" (1.5hrs); webinar hosted online by Jan Godsell, Warwick Manufacturing Group (WMG). Topics discussed included "Importance of productivity" by Nigel Driffield, Warwick Business School; "Supply Chain Productivity", by Jan Godsell & Frances Zhang,WMG; "Role of technology in improving Supply Chain Productivity" by Andy Birtwistle, SupplyVue.	01/07/2020
European Operations Management Association (EurOMA) Doctoral Seminar 25-26/6/20 (2 days=16hrs) and Annual Conference 29-30/6/20 (2 days=16hrs). Attending the EurOMA Doctoral Seminar as a 2nd year student, I presented Preliminary Findings paper of my case study research and had the opportunity to receive feedback from the faculty and other doctoral students. I also had to critically appraise and provide my feedback to one other doctoral students' work, which contained interesting insights that could be relevant to my research (i.e. "coopetition"). The overall participation in the doctoral seminar and the annual conference was helpful, especially in respect to publishing within the operations and supply chain management (OSCM) field.	25/06/2020
RPS-LPC Thames Valley steering group committee meeting (1hr). I was invited to this event to briefly present the topic of my research so that attendees can disseminate the call for participants to their networks and to hear the group's planning for a relevant event.	16/06/2020
"How to write a thesis" online training (2 hrs); Prof. M.C. Watson	15/06/2020
Session 1: Early Careers Researchers' Network meeting: Career presentation (1hr) Louise Sheridan, Global Pharmaceutical Project Director, AstraZeneca. AND Session 2: "How to write a publication" online training (2 hrs); Prof. M.C. Watson	11/06/2020
Online Masterclass: Customer centric operations: getting inside the mind of your customers (2hrs); Prof. A. Brandon-Jones, School of Management, University of Bath.	22/05/2020
Early Careers Researchers' Network meeting: "Energy & Effectiveness: 3 Shifts To More Professional Success & Personal Balance" (1hr); Dr Hannah Roberts.	13/05/2020

Description	Start date
Online courses: 1) Supply Chain Operations by Rudolf Leuschner, Associate Professor, Department of Supply Chain Management, Rutgers the State University of New Jersey (16 hrs over four weeks). The module covered: Lean Operations and Theory of Constraints (week 1), Lean Inventory (week 2), Six Sigma (week 3), Lean Six Sigma (week 4). 2) Quality Improvement in Healthcare by Dr Christos Vasilakis (School of Management and Director of the Bath Centre for Healthcare Innovation and Improvement CHI2, University of Bath), Anna Burhouse (Director of Quality Development Northumbria Healthcare NHS FT), Dr Tricia Woodhead (Associate Clinical Director for Patient Safety, West of England Academic Health Science Network). (30hrs over 6 weeks). The module covered: Introduction to complexity and QI in health and social care (week 1), QI Theory (week 2), Engagement and co-production (week 3), Evaluating QI (week 4), Systems modelling in QI (week 5), Making the case for QI (week 6).	11/05/2020
Conference content made available online. I had prepared and submitted a recorded presentation titled "A worldwide view of collaboration models involving community pharmacists and general practitioners". Other material I watched/read included: the keynotes ("Patient experience as evidence" by S Staniszewska; and "Patient and public involvement & drug utilisation research" by N Britten); oral presentations: - An Evaluation of a Transition Training Programme for Pharmacists Working in GP Settings (by S Bartlett) - Community pharmacists' experiences with, views of, and attitudes towards, general practice-based pharmacists (by H Barry) - Evaluating Community Pharmacists' Perspectives of Collaborative Working with GPs - a Focus Group Study (by R Venables) - A Qualitative Exploration of Young Peoples', Pharmacists' and Contract Managers' Perceptions of the Community community pharmacy chlamydia testing service a qualitative exploration (by L Ahmaro) - Does an NHS Test and Treat Service i	16/04/2020
Transcription - Go Beyond the Words. Training session on how to use transcribing to help in analysing one's data.	19/11/2019
Transferring PhD Skills to Consulting (1.5 hours); Newton Europe. Session on what a career as an operations consultant entails.	18/11/2019
Attending Avon Local Pharmaceutical Committee (LPC) Conference for networking purposes (i.e. recruiting potential participants for case studies) and for professional development (2.5hrs)	09/10/2019
Day conference on Behaviour Change (3hrs): sessions attended included Implementation Science (by Professor Bridie Kent University of Plymouth), the Health Action Process Approach (HAPA) model (by Dr Carly McKay, University of Bath) and Introduction to ImpulsePal (by Dr Samantha van Beurden, University of Exeter).	08/10/2019
Helping the postgraduate teaching team (AP3T) in delivering consultation skills sessions, workshop on collaborative working between community pharmacists and general practitioners and providing feedback to students' presentations. (8hrs)	08/10/2019
HCRT Journal Club (1hr): " Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology. Organizational Research Methods, 16(1), 15–31. https://doi.org/10.1177/1094428112452151". Discussion led by **M. Liaskou**.	24/07/2019

Description	Start date
European Operations Management Association (EurOMA) Doctoral Seminar (2 days) and Annual Conference (3 days). Attending the EurOMA Doctoral Seminar as a 1st year student, I had the opportunity to present a Research Methods paper on the methodology of the case studies stage of my PhD and receive feedback from the faculty and other doctoral students. I also had to critically appraise and provide my feedback to two other doctoral students' work. The overall participation in the doctoral seminar and the annual conference was eye opening in terms of having a better understanding of the role and impact operations management (OM) research can have on society. In addition to this, I was able to build my professional network by meeting new scholars and existing leaders in OM.	15/06/2019
Qualitative Methods Summer Training (1 week) on Comparative Case Study Design.	03/06/2019
Departmental Training and Career Progression Seminar (1hr): Jeanette Müller, Academic Staff Development Manager, and Anne Cameron, Researcher Career Development Adviser.	22/05/2019
P&P PGR 6-month presentations (2 hrs): "Community pharmacist provision of contraception and reproduction health services for women receiving opiate substitution treatment: Pharmacists' perspective; Dr Nour Alhusein." and "Implementation and sustainability of antibiotic stewardship programmes in hospitals: An exploration of pharmacists' perspectives in SW England; Teerapong Monmaturapoj".	08/05/2019
HCRT Seminar: Using Implementation Science to Change Practice and Enhance Patient Care (50 mins); Professor Bridie Kent, Director of the Centre for Innovations in Health and Social Care, Plymouth University: a Joanna Briggs Centre of Excellence	30/04/2019
Departmental seminar: Athena SWAN lecture (50mins); Prof Khuloud Al-Jamal, Chair of Drug Delivery & Nanomedicine, King's College London	10/04/2019
Departmental seminar: Using health economics to optimise medicines-taking in people with chronic illness (50mins); Prof Rachel Elliott, Division of Population Health, Health Services Research & Primary Care, University of Manchester.	27/03/2019
Bath Taps Into Science: Assisting at the P&P stand ("Medicines: Getting Drugs to the Right Place in the Body"; 3hrs) which local school children aged 9 to 11 visited to learn more about medicines, why they are formulated in specific ways, how and where they work in the human body.	15/03/2019
HCRT seminar: Feeling fatalistic about my fertility – how this affects contraception use amongst women receiving opiate substitution treatment and how can community pharmacy help (1hr) Dr Hannah Family and Dr Jenny Scott from Department of Pharmacy and Pharmacology, University of Bath	06/03/2019
Seminar organised by the Institute for Policy Research (University of Bath): "How Does Government Listen to Scientists?" (1hr 15mins) Presentation by Dr Claire Craig CBE, who is Chief Science Policy Officer at the Royal Society	28/02/2019
Departmental seminar: Consent and commercialisation: navigating the open research data agenda (50 mins) Dr Alison Nightingale, Research Data Librarian, University of Bath	27/02/2019
Departmental seminar (1 hr): **Marianna Liaskou** - A worldwide view of collaboration models involving community pharmacists and general practitioners [presenting systematic review]; Husain Naqi - Chemical characterisation and quantification of Spices; Anneka Mitchell - Differences in anticoagulant prescribing for older people with atrial fibrillation.	13/02/2019

Description	Start date
HCRT seminar: Introduction to Research Design Service with Q&A on available support (50 mins) Prof Jon Pollock, University of West England and Research Design Service	11/02/2019
Presenting poster on systematic review of my PhD ("A systematic literature review of collaboration models involving community pharmacists and general practitioners") at the RPS Science and Research Summit (conference). Link to abstract published: https://onlinelibrary.wiley.com/toc/20427174/2019/27/S1 and poster: https://twitter.com/MLReth/status/1093888003746025476	08/02/2019
Departmental seminar: Designing and evaluating interventions to reduce medication errors: challenges and opportunities (50 mins) Prof. Bryony Franklin, UCL School of Pharmacy & Imperial College Healthcare NHS Trust	07/11/2018
P&P PGR 6-month presentations (2 hrs): Changing medication related beliefs - Liz Sheils; Novel immunotherapy: the design and study of small target molecules for the inhibition of S. aureus binder of immunoglobulin (Sbi) - Jennifer Eiyegbenin; The development and evaluation of strategies to promote the optimal use of medicines - Mary Carter; Prognostic markers in axial spondyloarthritis - Elizabeth Reilly.	24/10/2018
Event organised by the Pharmacists Defence Association on "What is the future for commissioning organisations?" to showcase primary care models of collaboration and discuss the current funding situation for pharmacists and the aspirations for the future. (7 hrs)	15/10/2018
Helping as a facilitator at Prof. Mags Watson's (lead supervisor at the time) one-day conference on "Improving the quality use of medicines and pharmacy practice with behaviour change" (3 hrs)	26/09/2018
HCRT seminar: Medication utilisation research: a focus on pharmacy practice (50mins) Dr Line Guenette, University of Laval	21/09/2018
HCRT Journal Club (50 mins): "Leendertse, A. J., Koning, G. H., Goudswaard, A. N., Belitser, S. V., Verhoef, M. , Gier, H. J., Egberts, A. C. and Bemt, P. M. (2013), Preventing hospital admissions by reviewing medication (PHARM) in primary care: an open controlled study in an elderly population. J Clin Pharm Ther, 38: 379-387. doi:10.1111/jcpt.12069" Discussion led by **M. Liaskou**	20/09/2018
HCRT seminar: Automatic Detection of Omissions in Medication Lists (50mins) Prof. Rema Padman, Professor of Management Science and Healthcare Informatics, Heinz College of Information Systems and Public Policy, Carnegie Mellon University, Pittsburgh	15/08/2018
HCRT seminar: Evidence Synthesis and Decision Making (50mins) Prof. Ian Shrier, Centre for Clinical Epidemiology, Lady Davis Institute, McGill University, Montreal, Canada	20/07/2018
PhD students' meeting with departmental statistician (Dr Anita McGrogan) and other HCRT members to discuss confidence intervals and other statistics reported in papers. (1hr)	18/06/2018
Time management course (2hrs 30mins) Doctoral College [online: https://moodle.bath.ac.uk/course/view.php?id=54668]	15/06/2018
Department of Pharmacy & Pharmacology Post-Graduate Research Symposium (3hrs): Attended 6-month presentations of new PhD students. Presented my 6-month progress ('An exploration of the development and effect of collaboration between community pharmacists (CPs) and general practitioners (GPs)' by **M. Liaskou**)	09/05/2018
Departmental seminar: Athena SWAN lecture. (50mins) Prof Sally Ibbotson, University of Dundee	02/05/2018
Departmental seminar: Citizen and patient involvement in drug utilisation research. (50mins) Dr Nicky Britten, University of Exeter Medical School	25/04/2018

Description	Start date
Systematic Review Course: Conducting a Systematic Review - a practical guide (21hrs) Cardiff University - Specilist Unit for Review Evidence	09/04/2018
Departmental seminar: Researching what matters: generating the evidence to inform better care (50mins) Prof Christine Bond, University of Aberdeen	07/03/2018
HCRT seminar: What are the barriers and enablers to collaborative working between GPs and practice-based pharmacists? (50mins) Dr Polly Duncan, University of Bristol	06/03/2018
Departmental seminar: Public engagement: what is it and why do we do it? (50mins) Dr Helen Featherstone, Public Engagement Team	28/02/2018
Departmental seminar (50mins): Pharmacy and Pharmacology research showcase: 'Novel analgesics and opioids' by Dr Alex Disney; 'Sensory impairment and pharm. care' by Dr Nour Alhusein; and 'Phytochemistry of natural polyamines' by Rami Alnajadat	21/02/2018
HCRT seminar (50mins): PGR/Post-doc presentations 'Physical ability of people with rheumatoid arthritis to use common inhalers' by Yasmin Kafaei Shirmanesh (BIRD studentship project); 'Safety and effectiveness of Direct Oral Anticoagulants vs. Vitamin K Antagonists in people aged over 75 with atrial fibrillation' by Anneka Mitchell (Dunhill Medical Trust PhD student); and 'Psychosocial factors of sexual risks among women on opioid substitution treatment: A systematic literature review' by Laura Medina Perucha (PhD student)	19/02/2018
Psychology Departmental Seminar: Not just a poke: Pediatric procedural pain and fear (50mins) Dr Meghan McMurtry, University of Guelph, Canada	07/02/2018
HCRT seminar (50mins): ‘Ageing Well: The Role & Meaning of Physical Activity in Later Life’ by Dr Casandra Phoenix, Department of Health; and ‘Anticholinergic Burden in Older People’ by Dr Tomas Welsh, Royal United Hospitals	22/01/2018
Departmental seminar: Psychology and pharmacy: a healthy mixture (50mins) Dr Delyth James, Cardiff Metropolitan University	13/12/2017
Writing for Publication Workshop (50mins) Professor Mags Watson, Department of Pharmacy & Pharmacology	06/12/2017
HCRT seminar: The role of health care management science in the NHS (50mins) Prof. Christos Vasilakis, School of Management, University of Bath, Professor of Management Science; Director of Centre for Healthcare Innovation & Improvement (CHI^2)	05/12/2017
Managing Supply Chain Relationships (2hrs) Prof. A. Brandon-Jones School of Management (Supply Chain MSc module: Supply chain management MN50636)	01/12/2017
Quality Improvement in Community Pharmacy - Day Conference (4hrs 30mins) Organiser: Prof. Mags Watson, University of Bath, and Health Foundation Improvement Science Fellow Talk: Stakeholders’ perspectives of quality and community pharmacy services in the UK. Workshop: Creating a shared vision to promote quality improvement of community pharmacy services.	22/11/2017
Professor Mags Watson's Inaugural Lecture (1hr) Department of Pharmacy & Pharmacology, University of Bath	22/11/2017
Understanding failure and recovery (3hrs 30mins) Prof. A. Brandon-Jones School of Management (MBA module: Managing Operational Processes MN50344)	21/11/2017
Introduction to data analysis: one set of data but numerous ways of analysing it/them. Writing up qualitative research. (6hrs 30mins) Prof. Nancy Harding School of Management (Qualitative methods module for PhD students)	16/11/2017

Description	Start date
Case study research. Narrative approaches. (6hrs 30mins) Prof Yiannis Gabriel School of Management (Qualitative methods module for PhD students)	15/11/2017
Approaches to improvement – six sigma and lean (7hrs) Prof. A. Brandon-Jones School of Management (MBA module: Managing Operational Processes MN50344)	14/11/2017
A 'roadmap' through the week: theoretical perspectives, methodologies and methods. Introduction to visual methods (3hrs 30mins) Prof. Nancy Harding School of Management (Qualitative methods module for PhD students)	13/11/2017
Ethnography (3 hrs) Dr Elizabeth Mamali School of Management (Qualitative methods module for PhD students)	13/11/2017
Departmental seminar: My life in science (50 mins) Dr Christopher Jones, Department of Pharmacy & Pharmacology, University of Bath	08/11/2017
Understanding demand and managing capacity (4hrs 30mins) Prof. A. Brandon-Jones School of Management (MBA module: Managing Operational Processes MN50344)	07/11/2017
Supply Chain Sourcing (2hrs) Prof. A. Brandon-Jones School of Management (Supply Chain MSc module: Supply chain management MN50636)	03/11/2017
HCRT seminar: Mission impossible: Seeking the truth in systemic sclerosis (50mins) Dr John Pauling, Consultant Rheumatologist at Royal National Hospital for Rheumatic Diseases and Senior Lecturer in the Department of Pharmacy & Pharmacology	26/10/2017
Department of Pharmacy & Pharmacology Post-Graduate 6-month presentations (1hr 45mins)	25/10/2017
Analysing operations processes (7hrs) Prof. A. Brandon-Jones School of Management (MBA module: Managing Operational Processes MN50344)	24/10/2017
Structuring a supply chain (2hrs) Prof. A. Brandon-Jones School of Management (Supply Chain MSc module: Supply chain management MN50636)	20/10/2017
Introduction to OM and Operations Strategy (7hrs) Prof. A. Brandon-Jones School of Management (MBA module: Managing Operational Processes MN50344)	17/10/2017
Professor Neil McHugh's Inaugural Lecture (1hr) Department of Pharmacy & Pharmacology, University of Bath	11/10/2017
Royal Pharmaceutical Society (RPS) Research Fellows Forum (4h 30mins) Networking event based on research in pharmacy.	10/10/2017
Heatlh and Clinical Research Theme (HCRT) seminar: An Analysis of Quality Improvement (QI) Education at United States (US) Colleges of Pharmacy (50 mins) Prof Terri Warholak, University of Arizona, College of Pharmacy	05/10/2017