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Public health service provision by community pharmacies: a systematic map of evidence

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Abbreviations

EHC	Emergency hormonal contraceptives
GP	General Practice
HIV	Human immunodeficiency virus
HLP	Healthy living pharmacy
NHS	National Health Service
OECD	Organisation for Economic Co-operation and Development
PWID	People who inject drugs
QALY	Quality adjusted life year

How to read this report

Because this is the technical report of a systematic map that uses transparent methods, some sections of the report are necessarily detailed. Without compromising on the transparency that is expected of a systematic map, we have structured this report to help those who are more concerned with the findings than the methods. Part I contains the map's findings, implications and evidence gaps, preceded by the background, aims, and brief section on methods. Chapter 3 (Results) starts with an overview of the content of the studies informing the map. In chapters 4 to 12 the findings of the map are then presented in turn for each health condition, with each chapter including a brief description of the areas covered. Part I concludes with a summary of the map's findings, as well as the strengths and limitations, implications, a list of included studies and references (chapters 13 and 14). Part II contains additional detail about the methods: how studies were identified, screened for inclusion and examined in the review, along with appendices that contain further details of the systematic map search strategy and coding tools used (chapter 15). As systematic maps do not report and synthesise the findings of individual studies, critical appraisal of individual studies was not undertaken.

Executive summary

Background

Community pharmacy teams as a health, community and social asset in local communities have a role in improving health and helping to reduce health inequalities, in addition to their medicine optimisation role, by taking every opportunity to engage in health promoting interventions and by supporting self-care and helping people to take control of their health (DH 2005; DH 2008). This aligns with a global agenda for improving healthy life expectancy through accessible, multi-disciplinary networks of community-based healthcare professionals (World Health Organization 2004; DH 2008). It is estimated there are 11,619 community pharmacies across England. It is estimated that 1.6 million people visit a pharmacy every day and that 1.2 million of these visits are for health-related reasons. (LGA 2013; PSNC 2013a). Community pharmacies are easily accessible to people seeking local healthcare (PHE 2014; Fajemisin 2013) and might be a person's only point of contact with a healthcare professional (LGA 2013). The range of services provided in community pharmacies are broad and varied, ranging from long-established services such as prescription services and sale of over the counter medicines, to health advice, education, distribution and advice around emergency hormonal contraception (EHC) and condoms and information or testing for specific conditions such as cholesterol testing. Further services such as chlamydia testing, influenza vaccinations through Healthy Living Pharmacies (PHE 2014b, 2013) are included.

Local government commissioners need to know which public health services are effective and cost-effective to provide through community pharmacy (PHE 2013). Knowledge about service implementation is also valuable. A number of research reviews have examined different aspects of community pharmacy public health service provision, and two in particular provide insights into the extent and nature of existing literature (Anderson et al, 2009 and Fajemisin, 2013). It is important to locate research in public health areas of interest so as to understand in what areas research has been conducted and where there are gaps in the information needed to inform decisions about investment in future research.

Further systematic searches and descriptive analyses are now called for to expand upon and update earlier reviews. The systematic map described in this report provides an up to date and comprehensive overview of studies of relevance to the UK. It describes the range of studies that have examined the effectiveness and appropriateness of community pharmacies at providing public health services to local populations. It highlights service areas where the research evidence base shows particular promise for further development and potential gaps where particular services appear not to have been researched.

Review aims and approach

The aim of this review, commissioned by the Department of Health and Social Care Policy Research Programme, is to undertake a systematic map of the research literature that has investigated the effectiveness and appropriateness of public health services that are currently provided by community pharmacies. The map presents findings about: the nature and scope of the public health service provision that has been researched, focusing in particular on studies from the UK and the rest of the Organisation for Economic Co-operation and Development (OECD), and the extent and nature of the

available evidence, including the types of evaluation conducted. These findings are expected to inform future research decision-making for community pharmacy health service provision in the UK.

Research questions

We located and synthesised the evidence with a view to answering the following key research questions:

1. What empirical research has been conducted, from 2000 until November 2017, into public health service provision by community pharmacies?
2. What are the characteristics of studies that investigate public health service provision in community pharmacies (i.e. country, questions addressed, intervention types, health condition, service provision, setting and study design features - including the outcomes and processes evaluated - and additional demographic characteristics)?
3. What are the gaps in research evidence for key public health interventions delivered through community pharmacies?

Methods

The methods employed in producing this systematic map followed the standard procedure of conducting systematic reviews developed at the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) (Gough et al. 2017). Studies were identified from searching 25 databases and websites and checking references from relevant systematic reviews. Searches were run from the start of 2000 to the end of November 2017. Studies were screened hierarchically against specific criteria with studies needing to meet all of the eligibility criteria for inclusion in the review's final descriptive map. To be included, studies needed to be evaluations of the outcomes of public health interventions delivered from a community pharmacy and conducted within a country under the Organisation for Economic Co-operation and Development (OECD) country umbrella; or evaluations solely of intervention processes or studies of people's perspectives on these interventions that had been conducted in the UK. Public health was defined broadly so as to include primary prevention of communicable and non-communicable disease but also to include support that extends beyond medicines management for people identified to be at risk of, or living with a health condition, so as to prevent and manage illness progression. Studies needed to have been conducted in or since 2000. Due to the number of recognised and detailed studies focused on smoking cessation interventions, it was decided that smoking cessation would not be included in this review.

All study records identified by searches were uploaded to specialist systematic review software for screening. A sample set of studies was screened by all reviewers and when a 90% interrater agreement was reached, studies were screened on titles and abstracts by one reviewer. The bibliographic reference lists of all systematic reviews identified during screening up until May 2017 were searched to identify any primary studies. Full texts of all citations included on title and abstract were retrieved. The remaining studies were then screened by an individual reviewer from the review team.

All relevant studies were coded descriptively according to a classification system developed specifically for this review. The coding tool was applied to capture the key characteristics of the included evaluations of interventions.

At several points during the stages described above, samples of studies were independently screened or coded by all reviewers or by pairs of reviewers, with this work then being discussed so as to increase reliability.

The analyses conducted for this map focus upon intervention evaluations. Studies conducted in the UK that did not evaluate an intervention but instead sought more general perspectives of stakeholders, are noted in the report but are not discussed in detail. The findings of this map are presented in this report and also electronically, in an open online searchable database located at <http://eppi.ioe.ac.uk/webdatabases4/Intro.aspx?ID=15>.

Summary of findings

This systematic map identifies an expanding and diverse research literature seeking to provide evidence on public health interventions that are provided by community pharmacies in OECD countries. Research has developed significantly in the last 17 years, with particular growth in the last five years. The UK and USA are the predominant sources of research evidence.

A total of 289 studies was found and included in the review. These studies described a broad range of community pharmacy public health interventions. These were grouped into three domains: 1) health topics identified as a priority by DHSC/Public Health England (PHE); 2) other health topics; and 3) cross-cutting studies on community pharmacy for public health (i.e. not on a specific health topic). The prioritised health topics were: health checks; sexual and reproductive health; immunisation and travel health; antimicrobial resistance; diabetes and cardiovascular health; alcohol and substance misuse and abuse; and obesity and weight management.

Over two-thirds (68%) of the studies addressed health priority areas (n=197). Of these, 88% (n=134) were focused on diabetes, cardiovascular health, immunisation and travel health, sexual and reproductive health and alcohol misuse or abuse. Over a third of the studies that addressed priority areas (n=76) were focused on diabetes and cardiovascular health alone. Alcohol and drug abuse and misuse interventions were a key focus of research (n=31), particularly in the UK where all but two included studies were set. A noticeable lack of research was identified on antimicrobial resistance with only one study being located in the search period.

Study designs were varied. A total of 233 evaluations of specific interventions. These studies used predominantly single-group, or non-comparative designs (78%/n=179). A quarter of the evaluations (25%/n=59) used a controlled design. Over three-quarters (77%/n=180) of the evaluations presented findings about intervention outcomes, such as the results of testing, physiological changes, or health behaviours. Over four-fifths (77%/n=180) evaluated processes such as the acceptability of specific services to patients or pharmacists or feasibility of delivery. A total of 30 UK-based views studies were also identified. These studies focused on the perspectives of service providers and service users about community pharmacy for public health without examining a specific service.

For almost a third of the included evaluations (n=84), the intervention under study was checking or testing for particular conditions, aiming to identify those at risk and those who might not readily consider seeking assistance from other healthcare sources.

Conclusions

Due to the nature of systematically mapping research evidence, it is not possible to make judgements about the quality or relevance of the included studies. Therefore, future systematic reviews that focus on particular health conditions and interventions provided in the community pharmacy are needed so as to provide greater insight into the quality and relevance of studies and help to identify future areas for primary research.

Whilst this systematic map presents which interventions have been studied, it is not necessarily representative of the breadth of public health services that community pharmacies provide, as studies may not have been undertaken in particular areas, and indeed, numerous studies did not meet the eligibility criteria for inclusion in this review.

However, after completing this systematic map, it appears that understanding about the value of community pharmacy would be enhanced by a greater number of experimental studies in the form of randomised controlled trials, in order to gain insight into the effectiveness of community pharmacy provision of public health interventions. Further, it appears likely that further primary research would be beneficial in the following areas:

- Specific investigations into the impact of community pharmacy on interventions that focus on antimicrobial resistance
- Studies that focus on particular hard to reach populations
- Studies on the provision of HIV testing within a UK context
- Studies that focus on dementia risk and identification of dementia in the elderly
- Studies that focus on cancer risk and identification
- Studies that focus on public health service provision for children

As with any body of research, we encountered limitations in the studies being reviewed. These included highly varied approaches to reporting study methodology, interventions and study participants.

Part 1: Background, brief methods, findings and implications

1 Background

1.1 Description of the problem

In 2008, the Department of Health issued a White Paper that focused on its vision for the future of pharmacy, looking at ways to build on the sector's capacity and capability to deliver further improvements in pharmaceutical services while also helping to ensure safe, effective, fairer and more personalised patient care (DH 2008). The paper highlighted a number of key initiatives to aid the delivery of the transformation of pharmacy services, including enhancing pharmacy's contribution via initiatives aimed at:

- smoking cessation;
- teenage pregnancy rate reduction via contraceptive advice and support and sexual health advice;
- increased access to emergency hormonal contraception (EHC);
- minor ailments;
- chlamydia testing and treatment;
- growing Healthy Living Pharmacy centres;
- checking and testing at risk people;
- monitoring and health checks for conditions such as raised blood pressure, diabetes and asthma (DH 2008).

Enhancing services provided by pharmacies, it was argued, would lead to safer and more effective use of medicines, promoting better health and wellbeing, as well as averting ill health and supporting independence, particularly for those with long term conditions. Community pharmacy (CP) in particular was emphasised as a means to address some of the key health inequalities still apparent in England. The development of CP is also set in the wider context of the global agendas of agencies such as the World Health Organization (WHO), to improve healthy life expectancy and reduction or removal of health threats through the provision of accessible, multi-disciplinary networks of community-based healthcare professionals (World Health Organization 2004; DH 2008).

1.2 Community pharmacy and public health service provision

Public health in England became the responsibility of local government in 2013 (LGA, 2013) which means that local government is responsible for commissioning many public health-related services. Local Authorities commission the majority of public health services that community pharmacies provide (LGA, 2013). Local Authority commissioners want to know what effective and cost-effective services they might commission through community pharmacy (PHE 2013). Community pharmacies are located

in high streets, shopping centres and other community locations throughout the UK. There are currently around 11,619 situated in urban and rural areas across England providing services for an estimated 1.6 million people per day (LGA 2013; PSNC 2013). CPs range in type and size; some are small, individually run businesses, others are run by large chains. Issues of funding pharmacy practice have been a recent topic of contention. The Department of Health outlined funding reductions for community pharmacy practice of 4% in 2016/17 and further 3.4% in 2017/18 (DH 2016). Contractors providing NHS pharmaceutical services under the Community Pharmacy Contractual Framework (CPCF) received £2.687 billion in 2016/17, reducing to £2.592 billion in 2017/18 (DH, 2016, p7).

CPs are easily accessible, which makes them an important resource for communities. They provide a less formal route to health care service provision for those who are not able to or may not wish to use other NHS services such as general practice surgeries (PHE 2014; Fajemisin 2013). Indeed, for some people they are the first and only point of contact with a healthcare professional (PSNC 2013). The role of the community pharmacist has changed substantially over recent years, and they are now considered an important part of the structural landscape of our health services. CPs usually offer convenient opening times, including evening and weekends, allowing access for people who work a range of hours. They are often well placed, geographically, to access groups that services are not otherwise reaching (LGA 2014; PSNC 2013). It has been shown that 90% of the population in England can access a pharmacy from home within a 20-minute walk, with 99% accessibility for the local community in areas of highest deprivation (Todd et al. 2014a).

In 2010, a Government-supported Healthy Living Pharmacy (HLP) Pathfinder programme began (PSNC, 2013b). The HLP is an initiative designed to pro-actively reach out to local communities helping to improve their health and help reduce health inequalities through qualified 'Health Champions', premises that facilitate health promoting interventions and local stakeholder engagement, all underpinned by quality criteria. This is in addition to the NHS services that they provide. HLPs aim to provide a range of interventions and services that contribute towards health improvement and the reduction in health inequalities. This is aided by the unique access to on-site qualified 'Health Champions', who are non-health professional people from the local community who are trained to engage proactively with the local community from which they come (PHE 2014a). They have completed the Royal Society for Public Health level 2 award, *Understanding health improvement*. The current estimate is that there are now in excess of 9,400 HLPs with at least 9400 Health Champions in England. PHE introduced a profession-led self-assessment process for Level 1 HLPs with Levels 2 implemented by local authorities (NICE 2018).

CPs have been providing sexual health services for a number of years, for example contributing to distribution and advice around emergency hormonal contraception (EHC) and condoms. In addition, they have been commissioned to provide chlamydia testing services. CPs carried out 18,932 (1%) of chlamydia tests in England in 2013 (PHE 2014b).

Community pharmacists have been providing seasonal flu vaccinations since the 2015-16 flu season. Community pharmacies with properly trained pharmacists are vaccinating eligible patients, which is negotiated on a year by year basis (PSNC 2015). Over 90% of pharmacies have a private consultation room (LGA 2013).

The way in which community pharmacies might move to offering new and enhanced services is rapidly developing. An example of this is the healthy living pharmacy 'pathfinder' work programme, which has been the subject of interest and experimentation. The Pharmacy and Public Health Forum was established in July 2011 to pull together pharmacy and public health interests in the context of

Government and local public health priorities and to develop, implement and evaluate pharmacy's public health practice. It consisted of six task groups that worked on a range of community pharmacy issues: supporting the roll out of HLPs; developing pharmacists' professional standards for public health practice; consolidating and developing the evidence-base and research for CPs contribution to public health; identifying the role of CP within the new NHS, public health and social care system architecture; considering workforce and training implications; and dealing with internal finance to make the Forum and work sustainable in the future (PHE 2014a). From 9 January 2017 GPs could apply for funding to have clinical pharmacists situate in their practices. Currently there are 490 clinical pharmacists working across approximately 650 GP practices and the target is for a further 1,500 by 2020 (BMA, 2017; NHS England, 2017). Community pharmacy now offers opportunities for local authority commissioners to utilise an important and accessible healthcare resource; capable of reaching communities and providing a variety of public health interventions with qualified staff.

1.3 Researching community pharmacy services

Within the fast-developing landscape of community pharmacy, research surrounding the topic is also growing. Reviews have examined different aspects of community pharmacy public health service provision such as smoking cessation, healthy living, cardiovascular disease prevention, diabetes, blood pressure management, weight management, medication adherence and alcohol abuse or misuse (e.g. Blenkinsopp et al. 2003; Brown et al. 2012; Brown et al. 2016; Gordon et al. 2011; Morgado et al. 2011; Santschi et al. 2011; Sinclair et al. 2004; Van Wijk et al. 2005; Wang et al. 2015; Watson et al. 2009). Two systematic reviews in particular provide insights into the extent and nature of existing literature addressing service provision by community pharmacies (Anderson et al. 2009 and Fajemisin, 2013).

Anderson and colleagues (2009) conducted a systematic review to investigate the contribution of community pharmacy to public health. They focused on the evidence of effectiveness, quality of intervention, costs/cost-effectiveness and skill mix of potential relevance and application for the future development of community pharmacy in the UK. This review incorporated studies that were published between January 1990 to 31 October 2007, which evaluated CP services' work in: promoting health and well-being (e.g. nutrition, physical activity); preventing illness (e.g. smoking cessation, immunisation, and travel health); identifying states of ill health (e.g. testing and case finding); and the maintenance of health for people with chronic or potentially long-term conditions (e.g. asthma, diabetes, hypertension). The authors identified 196 papers that they presented as matrices that categorised type of evidence (e.g. systematic review, randomised control trials etc.); topic areas covered (incl. smoking cessation, cardiovascular disease (CVD) prevention, diabetes etc.); and country in which the research took place. They found that the strongest evidence of effectiveness was for smoking cessation, diabetes, emergency hormonal contraception (EHC), flu immunisation and drug misuse. Evidence for the other conditions identified was more mixed (e.g. in the case of detection and management of CV), or more convincing (e.g. for hypertension and lipid management). The authors also reported that there is evidence to suggest that the availability of pharmacy staff training is key to the delivery of effective services, an issue that the Government recognises in order to equip pharmacists and pharmacy technicians for new clinical roles in patient care (DH 2008). The review by Anderson et al. (2009) also highlights the need to test transferability of findings conducted in other settings to the UK.

Solutions for Public Health published a report in 2013 (Fajemisin 2013) that focused on the effectiveness and cost-effectiveness of the contribution of community pharmacy to improve public health. Existing reviews were interrogated, as opposed to primary studies, focusing on those published between August

2002 and August 2012. The findings of 20 included reviews were used in the final report. Together these addressed seven service areas (smoking cessation, EHC, prevention and management of drug abuse, misuse and addiction, healthy eating and lifestyle advice, chronic disease management, infection control and prevention and minor ailment schemes). Five of these were found to have the strongest evidence: similar to Anderson et al. (2009) the authors concluded that evidence is strongest for smoking cessation, supplying EHC, CVD prevention, blood pressure management, and diabetes. The findings for smoking cessation were again highlighted in this review, in this instance with regard to it being the most common health development activity in UK community pharmacies. Similar to findings in Anderson et al. (2009), training was also highlighted as key to the success of interventions. The report notes that community pharmacists are well placed to provide targeted information and advice on diet and physical activity with management. However, while this review claims to have found strong evidence of sustained improvement in lipid levels for at least one year following the provision of CP chronic disease management and prevention interventions, the report's overall conclusion was that further research was needed to justify the role of community pharmacy in several aspects of CP provision (i.e. COPD, infection control, substance abuse, weight management and minor ailments schemes).

Whilst the above systematic reviews were helpful for developing plans for this current project and for identifying some of the studies that potentially could be included, it is also important to understand where research is plentiful and where there is a paucity of research to help inform researchers, commissioners and practitioners in order to make evidence informed decisions both about future investment in research and to help interested parties to locate relevant research in public health areas of interest. Gaps in the evidence were not identified and the search strategies were not as wide as the one that we employed for our review. The evidence is also becoming outdated quickly, suggesting a need to assemble current evidence that is of use in the rapidly evolving UK community pharmacy setting. The challenges that were identified by Anderson et al. (2009) regarding the applicability of international evidence in the UK setting also required further consideration. Because our map attempts to address gaps in understanding of the extent of public health service interventions provided by community pharmacists, rather than look for specific services, we sought to locate public health services that are provided but are less well known or researched. We also sought to understand the variety of services provided by community pharmacies in a range of Organisation for Economic Co-operation and Development (OECD) countries. Initially, before having evidence of the breadth of service provided and the high number of studies published in this area, the map was to progress to include an in-depth review about the effectiveness and appropriateness of public health service interventions provided in the UK.

1.4 Report aims

The aim of this review, commissioned by the Department of Health and Social Care Policy Research Programme, is to undertake a systematic map of the research literature that has investigated the effectiveness and appropriateness of public health services that are currently provided by community pharmacies. The map presents findings about: the nature and scope of public health service provision, research, costs and other aspects of service appropriateness; the scope of public health service provision; and the extent and nature of the available evidence, including the types of community pharmacy public health services that have been studied. These findings are expected to inform future research and policy decisions for community pharmacy health service provision in the UK.

1.5 Research questions

A gap in the literature currently exists for a review that systematically maps evidence of studies on the effectiveness and appropriateness of public health service provision from community pharmacies. We located and analysed the evidence in this area, with a view to answering the following main research questions:

1. What empirical research has been conducted, from 2000 onwards, into public health service provision by community pharmacies?
2. What are the characteristics of studies that investigate public health service provision in community pharmacies (i.e. country, questions addressed, intervention types, health condition, service provision, setting, and study design features - including measures and conceptual frameworks used and additional demographic characteristics)?
3. What are the gaps in research evidence for key public health interventions?

2 Brief methods

This chapter provides a brief overview of the methods used to conduct the review. A more complete description of the methods is provided in Part II of this report.

The protocol for this review was published on PROSPERO which is available at:

http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42015029919. This systematic map adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance (Moher et al. 2009) provided in Appendix 1. Where necessary, it has been adapted to accommodate the approach taken in this review.

Plans for this review were developed in consultation with members of the policy team at the Department of Health and Social Care and Public Health England. A stakeholder advisory group was convened who commented on the draft protocol by email; attended a meeting to discuss initial findings and help identify areas of public health service provision considered a priority; and commented on the draft report.

Studies were identified from searching 24 databases (from 2000) and websites, and checking references within relevant systematic reviews. Searches were updated to the end of November 2017. Databases were searched using a combination of controlled vocabulary and free-text terms (the latter restricted to the title or abstract fields). All study records identified by searches were uploaded to specialist systematic review software where duplicate studies were identified and removed.

Inclusion/exclusion criteria were applied to identify relevant studies. Studies were screened hierarchically against the inclusion/exclusion criteria and to be included in the systematic map, identified studies had to meet all of the eligibility criteria. To be included, studies needed to be evaluations of the outcomes of public health interventions delivered from a community pharmacy and conducted within a country under the Organisation for Economic Co-operation and Development (OECD) country umbrella, or evaluations solely of intervention processes or studies of people's perspectives on these interventions that had been conducted in the UK. Public health was defined broadly so as to include primary prevention of communicable and non-communicable disease and ill-health but also to include support beyond medications management for people identified to be at risk of, or who are living with a health condition, so as to prevent and manage illness progression. Studies needed to have been conducted in or since 2000. Due to the number of recognised and detailed studies focused on smoking cessation interventions, it was decided that smoking cessation would not be included in this review.

Individual reviewers initially screened these studies using titles and abstracts. The bibliographic reference lists of all systematic reviews identified during screening were also searched to identify any primary studies. However, citation screening for the November update was not executed due to three reasons: 1) the updated search was comprehensive including an additional database; 2) resources were lower in the latter stages of the review process; and 3) the potential yield of studies was expected to be low based on the first execution of systematic review citation searching. Full texts of all citations included on title and abstract were retrieved and then screened again. A total of 44,539 references were screened with 289 studies finally included in the map. A detailed account of the flow of studies is provided in section 15.8.

All relevant studies were descriptively coded according to a comprehensive classification system developed for this review. A coding tool was applied to capture key characteristics of the included studies. All of the review's screening and coding processes were preceded by work by individuals on sample sets of studies, followed by discussion, so as to improve reliability across all reviewers.

3 The evidence-base for public health services in community pharmacy – an overview

Overview of studies included in the map

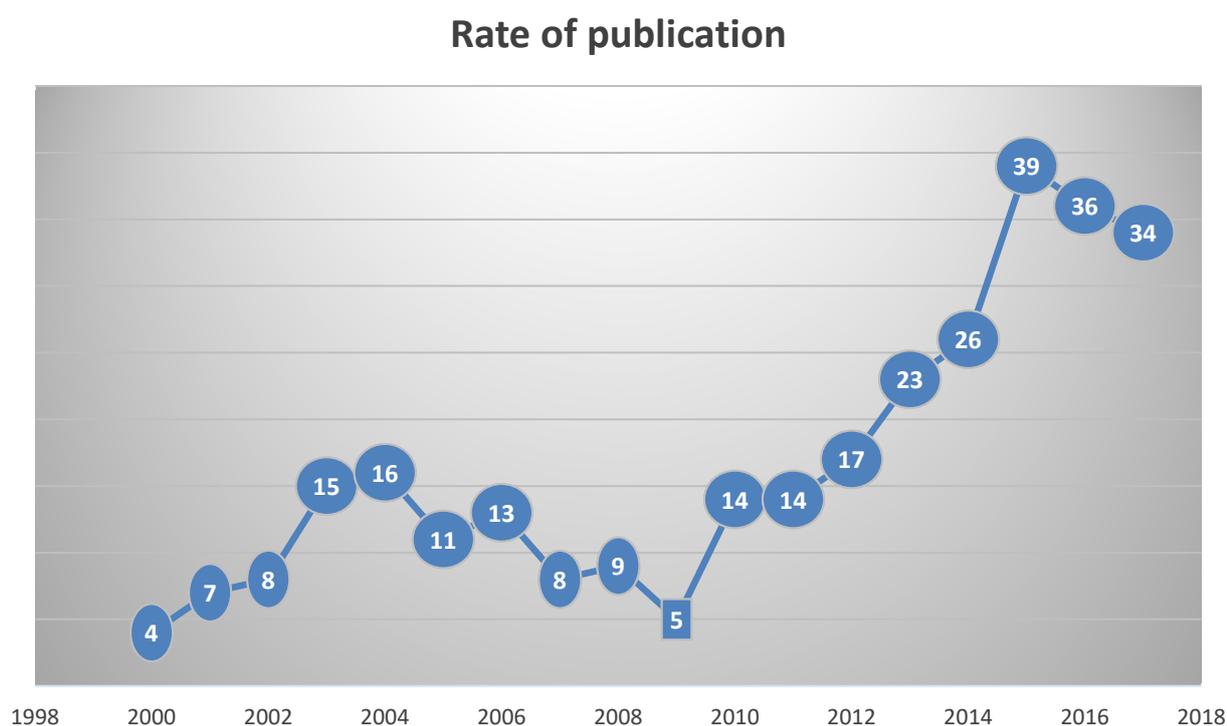
A brief descriptive overview detailing the key characteristics of the 289 studies included in the map is provided below. Key characteristics include the breakdown of studies according to their date of publication, geographical location, priority health topic focus and study design.

The description emphasises seven health topic priorities as suggested by DHSC/PHE. These priorities included: diabetes and cardiovascular risk; sexual health; immunisation; alcohol and drug abuse or misuse; health checks; obesity and antimicrobial resistance (AMR). There is also discussion of studies of interventions for 14 health topics that were not identified as a health priority, as well those examining general aspects of public health service provision and not focused on specific conditions.

3.1.1 Date of publication

Since 2000, studies investigating community pharmacies first peaked in 2003 (n=15) and remained steady until 2006 (see Figure 3.1). A further significant increase of published studies was noted after 2009, reaching a second peak in 2015 (n=39). It should be noted that the number of studies for 2017 is for January to November only.

Figure 3.1 Rate of publication (n=289)



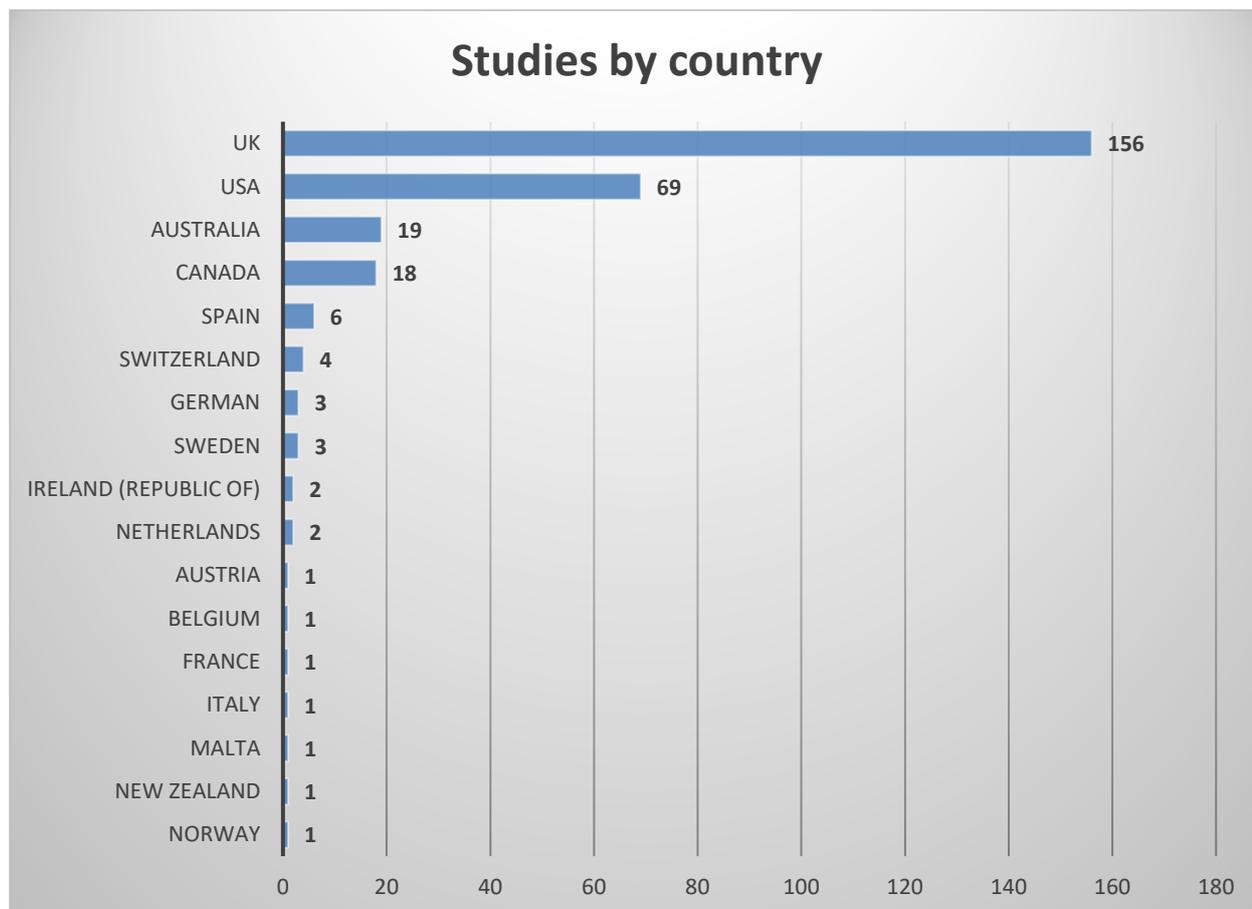
3.1.2 Geographical location

For the purposes of this map, studies on community pharmacy were included only if they were evaluations of the outcomes of interventions conducted within a country under the Organisation for Public health service provision by community pharmacies: a systematic map of evidence

Economic Co-operation and Development (OECD) country umbrella (OECD, 2016), or were evaluations solely of intervention processes or were studies of people's perspectives that had been conducted in the UK.

Of the included 289 studies, over half were conducted in the UK (54%, n=156 - see Figure 3.2), followed by the US (24%, n=69). The remaining studies were conducted in Australia (n=19), Canada (n=18), Spain (n=6) and - each with less than five studies - in Switzerland (n=4), Sweden (n=3), Germany (n=3), Ireland (n=2) Netherlands (n=2), and Austria, Belgium, New Zealand, France, Italy, Malta and Norway with one study in each.

Figure 3.2 Geographical location of included studies (n=289)*

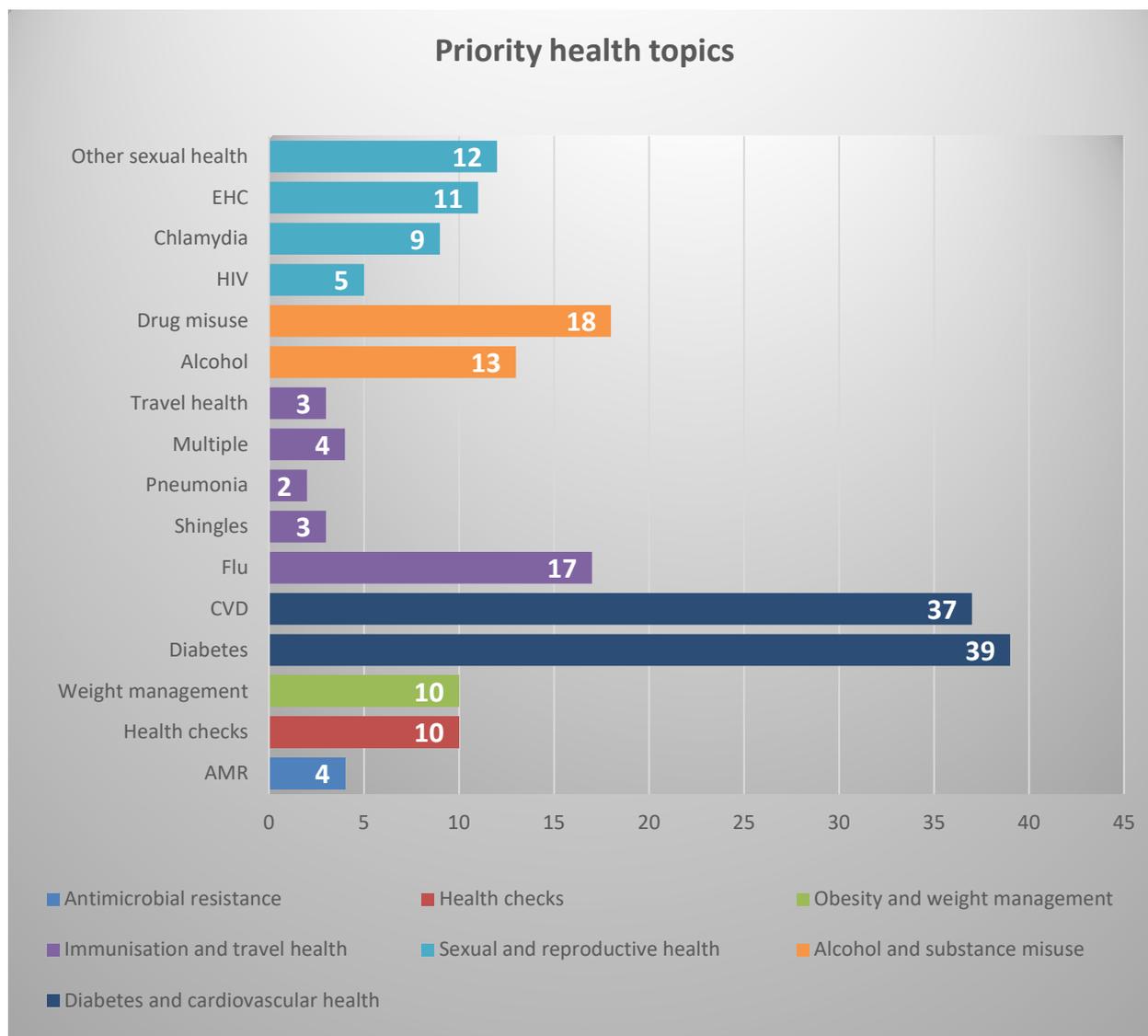


*no studies were conducted in more than one country

3.1.3 Priority health topic focus

A total of 197 studies investigated priority health topics as defined by PHE. Figure 3.3 presents the number of studies identified for each priority health topic, with the number of studies identified for sub-categories of these areas, when relevant.

The largest group of studies investigated community pharmacy services to address diabetes and cardiovascular risk (n=76; diabetes n=39, CVD n=37). The second largest priority health topic identified in the literature was sexual health (n=37), followed by studies on immunisation and travel health (n=29). The sexual health studies focused on emergency hormonal contraception (n=11), testing for chlamydia (n=9), HIV (n=5) and other sexual health services (n=12). The studies on immunisation were concerned with flu vaccines (n=17), shingles (n=3), pneumonia (n=2), multiple vaccinations (n=4) and other types of immunisation against infectious diseases in relation to travel (n=3). Other key areas identified included community pharmacy services to address alcohol and substance abuse or misuse (n=13 and n=18 respectively), obesity via weight management programmes (n=10) and health checks (n=10), with four studies addressing antimicrobial resistance (AMR).

Figure 3.3 Priority health topics: included studies (n=197)

3.1.4 Priority health topics and geographical location

The vast majority of UK community pharmacy research has been conducted in four priority areas: alcohol and substance abuse/misuse (n=28), sexual health (n=26), immunisation and travel health (n=14) and weight management to tackle obesity (n=8). There has been less of a focus in the UK on diabetes (n=8) and cardiovascular health (n=10) compared to studies conducted in the US, Canada and Australia, as demonstrated in Table 3.1.

*Table 3.1 Priority health topics by country of research origin (n=197)**

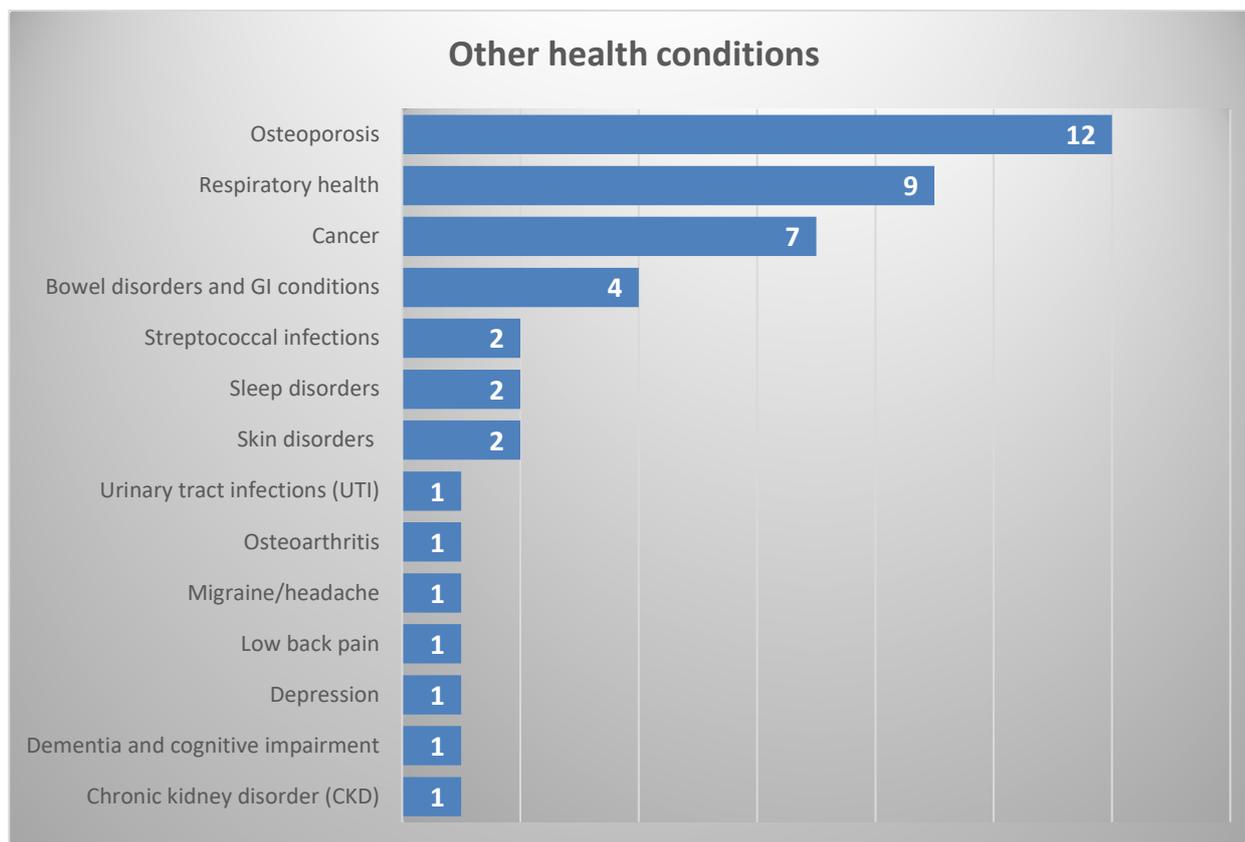
Condition	UK	USA	Canada	Australia	Spain	Sweden	Switzerland	Belgium	Germany	New Zealand	Ireland (R of)	Malta	Austria	Norway
Health Checks	7	2	1											
Sexual / reproductive health All studies	26	7		3	1									
<i>HIV</i>		4			1									
<i>Chlamydia</i>	6			3										
<i>EHC</i>	10	1												
<i>Sex Health Other</i>	10	2												
Immunisation/ travel health All studies	14	12	1						1		1			
<i>Influenza</i>	13	2	1								1			
<i>Shingles, pneumonia, multiple immunisation</i>		8							1					
<i>Travel health</i>	1	2												
Diabetes and cardiovascular health All studies	18	22	11	11	3	3	3	1	1	1		1	1	
<i>Diabetes</i>	8	15	3	5	1	3	2	1	1					
<i>Cardiovascular health</i>	10	7	8	6	2		1			1		1	1	
Alcohol and substance misuse/abuse All studies	28	2												
<i>Alcohol misuse</i>	13													
<i>Services for PWID</i>	15	2									1			
Obesity and Weight management	8	2												
Antimicrobial Resistance (AMR)	1	1	1		1									

* Categories are mutually exclusive.

3.1.5 Other health conditions

In addition to the NHS/PHE health priorities, a total of 46 studies also considered other health conditions addressed in community pharmacies. These included a wide variety of different services, such as osteoporosis (n=12), respiratory health including e.g. COPD, asthma and tuberculosis (n=9), cancer (n=7), bowel disorders and gastrointestinal conditions (n=4) sleep disorders (n=2) and a number of conditions all of which were investigated in one study only (see Figure 3.4).

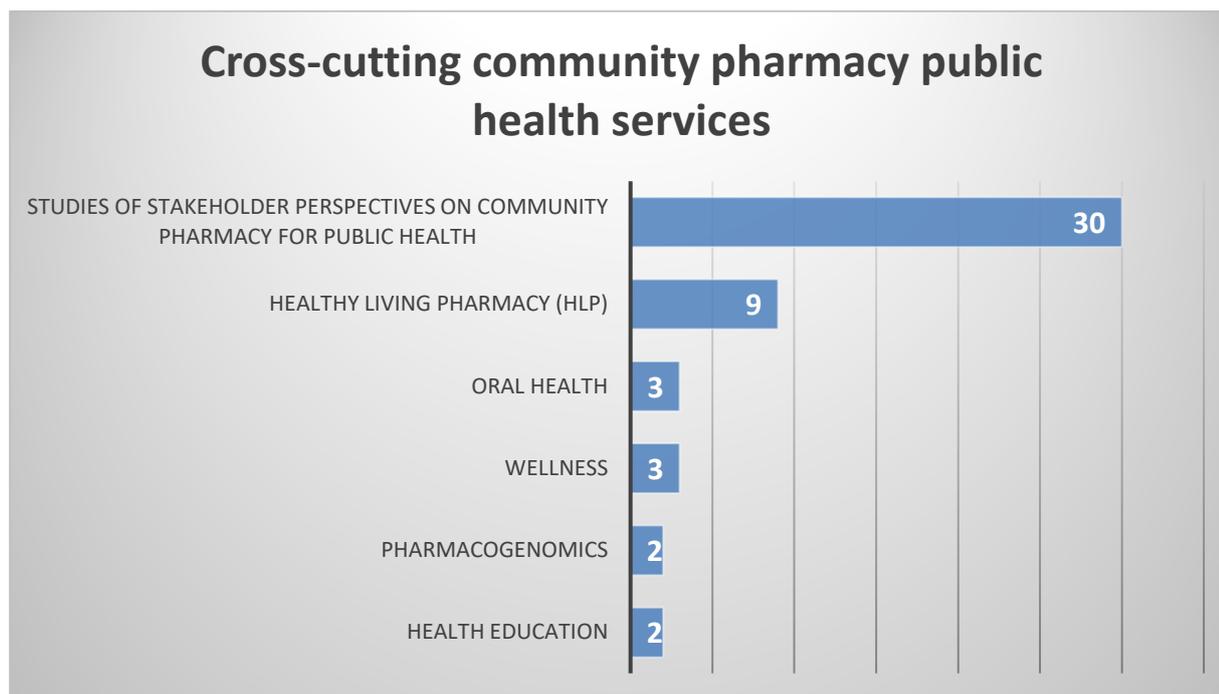
Figure 3.4 Other health conditions (n=46)*



* Categories are mutually exclusive.

3.1.6 Cross-cutting community pharmacy public health services

A further 49 studies investigated broader aspects of community pharmacy for public health and did not have a specific health condition focus. Studies included those concerned with Healthy Living Pharmacies (n=6), and with obtaining stakeholders' views on providing or enhancing public health services via community pharmacies (n=15). The number of studies identified for each of these and other study foci are outlined in Figure 3.5.

*Figure 3.5 Cross-cutting community pharmacy public health services (n=49)**

*Categories are mutually exclusive.

3.1.7 Study purpose and design

We classified the 289 studies in terms of whether or not they evaluated specific community pharmacy interventions. A total of 30 studies elicited the views of service providers; services users and other stakeholders about community pharmacy for public health without examining a specific service. These studies are referred to only in passing in this document, which focuses instead on intervention evaluations.

Studies that were evaluations (n=233) included impact evaluations where data about outcomes were collected and analysed after people accessed community pharmacies, and studies concerned with the acceptability of specific services to stakeholders or with factors influencing or hindering successful implementation and delivery of community pharmacy services (evaluations of processes). Over four fifths (77%/n=180) of the evaluations measured processes in this way.

The evaluations were described according to whether they compared the impact of public health services delivered by community pharmacies with another type of public health service delivery model (a controlled or comparison group design) or examined findings for one group only (non-comparative studies). The majority of the evaluations in this map used single group designs (n=159, 62%).

3.1.8 Summary and introduction to chapters 4-12

This chapter has provided a brief introduction to the studies that are included in this map. In the following chapters, additional in-depth descriptive details of these studies are presented according to their health condition topic focus.

4 Health checks

- **Extent of evidence:** We located ten studies which focused on delivery by community pharmacies of health checks. Nine of which are intervention evaluations and one which is a views study and did not carry out any interventions.
- **Context of evidence:** Seven studies were conducted in the UK; two in the US and one in Canada.
- **Intervention focus:** Five studies evaluated health checks for service users, four studies evaluated a prevention programme for CVD and diabetes, a men’s health risk assessment, a health-check programme to raise women’s awareness of health issues. Three of the UK studies specifically evaluated NHS Health Checks.
- **Intervention components:** Intervention components included the provision of advice, information and testing for risk factors (n=8), referral to other professionals (n=3), incentives to enhance uptake (n=1)
- **Evaluation details:** The main evaluation measure was the acceptability of the intervention to participants, who included service users and health professionals. Only one study was described as prospective and none used a comparison group design.
- **Gaps in research:** Controlled trials are required to provide evidence of the effectiveness of NHS Health Checks in community pharmacy settings. Research would also benefit from provision of cost

4.1 Introduction

In this chapter, a descriptive overview of studies which focus on the health priority topic of health checks is presented. Nine out of ten included studies offer an overview of health ‘preventions’, ‘tests’ or ‘assessments’ of common chronic conditions such as diabetes, CVD or general health checks that test for blood pressure, BMI and glucose testing.

4.2 The included studies

We located ten studies examining the role of the community pharmacy in NHS Health Checks and health checks in other countries. (Banack et al. 2011, Boyle et al. 2004, Cerulli and Malone 2008, Chauhan Avni et al. 2012, Corlett and Krska 2015, Krska and Corlett 2014, McNaughton et al. 2011, Ormston and Dobbie 2011, Panford-Quainoo 2017, Urban 2016). Table 4.1 shows the countries in which these studies were conducted.

Three studies from outside the UK examined a prevention programme for CVD and diabetes (Banack et al. 2011), a men’s health initiative risk assessment (Boyle et al. 2004), a programme aimed at raising women’s awareness of health issues (Cerulli and Malone 2008), five UK-based studies examined health checks for pharmacy service users in general (Chauhan Avni et al. 2012, Corlett and Krska 2015, Krska and Corlett 2014, McNaughton et al. 2011, Ormston and Dobbie 2011). Three of these specifically evaluated NHS Health Checks (Corlett and Krska 2015, Krska and Corlett 2014, McNaughton et al. 2011). One UK study examined people living with learning disabilities. (Urban 2016). One UK study examined promotion of young people’s health by community pharmacists, however was not an intervention evaluation and is therefore not discussed (Panford-Quainoo 2017).

Table 4.1: Health checks: studies included in the map (n=10)

	UK	USA	Canada
Health Checks	7	2	1

4.2.1 Aims of the interventions

The studies used a variety of methods to check or test the health of communities by professional pharmacy staff. One study used a 'MyHealthCheckUp' programme (Banack et al. 2011). This was designed to implement CVD and diabetes prevention programs in community pharmacies and to educate professional staff to promote health behaviour change. Two interventions were gender specific: one targeted men, using a health initiative risk assessment to target and encourage men who were overdue for a physical examination (Boyle et al. 2004); while the other focused on women by providing low-cost, easily conducted health promotion interventions such as blood pressure, weight and glucose measurement in order to increase women's awareness about health issues (Cerulli and Malone 2008). An initiative called 'Making Time' was introduced to provide and improve health and lifestyle outcomes of people living with learning disabilities. This was done via greater support through community pharmacies. (Urban 2016) The remaining five studies all come under the umbrella term 'health checks', two were general NHS health checks which collected data from health check records and views from the general public (attenders of community pharmacies). (Corlett and Krska 2015, Krska and Corlett 2014) although three of these studies had different intervention names. Two studies focused on the views and experiences of the service users and staff: one study reported on a pilot scheme known as 'Healthy Life Check', which was not an NHS health check (Chauhan Avni et al. 2012); and the other study examined the Anticipatory Care Community Pharmacy (ACCP) programme (Ormston and Dobbie 2011). Only one study sought the views of pharmacy staff and other health professionals: 'Healthy Heart Checks' service (McNaughton et al. 2011).

4.2.2 Study Setting

The majority of the included studies (n=6) were set in the UK (Chauhan Avni et al. 2012, Corlett and Krska 2015, Krska and Corlett 2014, McNaughton et al. 2011, Ormston and Dobbie 2011, Urban 2016). Two studies were set in the US (Boyle et al. 2004, Cerulli and Malone 2008) and one in Canada (Banack et al. 2011). Seven described settings reflective of specific regions and demographics in the UK: inner city Leicester (Chauhan Avni et al. 2012), London (Corlett and Krska 2015, Krska and Corlett 2014) and Tees Valley, Northern England (McNaughton et al. 2011) and Grampian and Lanarkshire in Scotland (Ormston and Dobbie 2011) and Leeds (Urban 2016). Most studies did not specify the type of pharmacy setting that was being evaluated. One intervention was delivered in a variety of independent, chain, and grocery chain pharmacies (Cerulli and Malone 2008).

4.2.3 Intervention components

Across the set of included studies, common intervention components included the provision of advice and information and checking or testing for risk factors (Banack et al. 2011, Boyle et al. 2004, Cerulli and

Malone 2008, Chauhan Avni et al. 2012, Corlett and Krska 2015, Krska and Corlett 2014, McNaughton et al. 2011, Ormston and Dobbie 2011) In two studies, the interventions were reported in the context of exploring the views of the staff and service users who engaged in the 'Healthy Life check scheme' (Chauhan Avni et al. 2012), and the Anticipatory Care Community Pharmacy (ACCP) programme (Ormston and Dobbie 2011).

In four studies, the health check also included referral to other professionals and was determined by level of risk (Boyle et al. 2004, Corlett and Krska 2015, Krska and Corlett 2014). One study offered an incentive of a silver heart-shaped clock key chain to women who agreed to have a heart health risk assessment (Cerulli and Malone 2008).

4.2.4 Intervention timing

The information on study duration provided by authors varies and was not very detailed. Three studies do not provide any information (Banack et al. 2011, Chauhan Avni et al. 2012, Krska and Corlett 2014). One study reported the timeline for interventions which was documented in weeks (Cerulli and Malone 2008). One study was more infrequent which stretched over months on 'a need to know basis' (Urban 2016). Four studies did not indicate the duration of the intervention, but reported the level of intensity of the interventions. These included the time spent with the pharmacist or length of the interview, which ranged from 15 minutes to one hour (Boyle et al. 2004, Corlett and Krska 2015, Krska and Corlett 2014, McNaughton et al. 2011, Ormston and Dobbie 2011).

4.2.5 People delivering the intervention

Community pharmacists provided interventions in seven of the ten studies (Banack et al. 2011, Boyle et al. 2004, Corlett and Krska 2015, Krska and Corlett 2014, McNaughton et al. 2011, Ormston and Dobbie 2011, Urban 2016). In one study pharmacy students carried out the intervention in a community setting (Cerulli and Malone 2008).

4.2.6 Training

Training by providers was only mentioned in four included studies (Banack et al. 2011, Boyle et al. 2004, Chauhan Avni et al. 2012, Urban 2016). The training offered to staff in these studies varied from a web-based training module to educational programmes. Five studies did not mention any training (Cerulli and Malone 2008, Corlett and Krska 2015, Krska and Corlett 2014, McNaughton et al. 2011, Ormston and Dobbie 2011).

4.2.7 Cost information

Only one study discussed issues concerning the cost of delivering the checks through the pharmacies via Anticipatory Care Community Pharmacy (ACCP) funding. Local ACCP leads noted that they incurred some unexpected costs around information technology (IT) (purchasing laptops for participating pharmacies), supporting point of care testing and management time associated with delivering ACCP (Ormston and Dobbie 2011).

4.2.8 Details of the study design

A range of study designs was used to evaluate these interventions, although none involved a comparison group (see Table 4.2). All studies were run across more than one community pharmacy and

more than half collected data from a 100 or more participants. One was described as being a prospective cohort study using convenience sampling (Boyle et al. 2004). Eight studies were non-comparative studies that captured the views of participants through interviews about their experiences of being checked or tested for risk factors and distributing advice (Banack et al. 2011, Cerulli and Malone 2008, Chauhan Avni et al. 2012, Corlett and Krska 2015, Krska and Corlett 2014, McNaughton et al. 2011, Ormston and Dobbie 2011, Urban 2016) Two studies analysed the views of patients and health professionals about the feasibility of a pilot scheme and evaluation of the ACCP programme (Chauhan Avni et al. 2012, Ormston and Dobbie 2011). In terms of outcomes, studies mainly examined blood pressure, BMI, spirometry testing and glucose levels (Cerulli and Malone 2008, Corlett and Krska 2015, Krska and Corlett 2014). Only one study reported the results of health checks (Banack et al. 2011).

Table 4.2 Health checks evaluations – study design, sample size and setting (n=9)

Health condition	Study design			Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	Other	< 100	100 +	Multi-centre	Single Centre
Health checks	0	8	1	4	5	9	0

4.2.9 References: Included studies

Banack H, Lowensteyn I, Marchand S, et al. (2011) Promoting health lifestyles in community pharmacies: The My Health Check Up program. *Canadian Pharmacists Journal* 144 (5): e19.

Boyle TC, Coffey J, Palmer T. (2004) Men's health initiative risk assessment study: effect of community pharmacy-based screening. *J Am Pharm Assoc* 44: 569-577.

Cerulli J, Malone M. (2008) Women's health promotion within a community advanced pharmacy practice experience. *American Journal of Pharmaceutical Education* 72: 1-7.

Chauhan Avni C, Hiles S, Patel N, et al. (2012) Pharmacy-based health checks -- acceptable and feasible. *Primary Care Cardiovascular Journal* 5: 74-76.

Corlett SA, Krska J (2015) Evaluation of NHS Health Checks provided by community pharmacies. *Journal of public health* 38: 1-8.

Krska J, Corlett S (2014) *Evaluation of NHS Health Checks provided by community pharmacists with the addition of spirometry*. Medway School of Pharmacy, University of Kent, University of Greenwich.

McNaughton RJ, Oswald NT, Shucksmith JS, et al. (2011) Making a success of providing NHS Health Checks in community pharmacies across the Tees Valley: a qualitative study. *BMC Health Services Research* 11: 1-7.

Ormston R, Dobbie F (2011) *Evaluation of Anticipatory Care Community Pharmacy programme*. NHS Health Scotland. <http://www.healthscotland.com/uploads/documents/16615-EvaluationofAnticipatoryCareCommunityPharmacyprogramme.pdf>

Panford-Quainoo E (2017) *Community pharmacist's experiences of promoting the health of young people [Masters dissertation]*.

Urban R (2016) *Making Time, interim report*. Community Pharmacy West Yorkshire.

5 Sexual and reproductive health

- **Extent of evidence:** We identified 37 studies which focused on community pharmacy-delivered sexual and reproductive health services. 33 of which are intervention evaluations and four which were views study and did not carry out any evaluation interventions.
- **Context of evidence:** The vast majority of studies were conducted in the UK (n=26); others were conducted in USA (n=7), Australia (n=5) and Spain (n=1).
- **Intervention focus:** These services addressed the following health issues: HIV prevention (n=5), chlamydia (n=9), emergency hormonal contraception (n=11) and sex health other (n=8).
- **Intervention components:** Intervention components included **screening** for infection risk factors (n=10), testing for presence of infection (n=18), providing self-testing kits (n=4) advice or information giving (n=27), provision of emergency contraceptives (n=10), incentives to increase intervention uptake or fidelity (n=7), referral to health professionals (n=11).
- **Evaluation details:** The HIV evaluations examined the feasibility (n=1) and cost (n=1) of providing HIV testing, and one evaluated the effectiveness of an incentive. The Chlamydia studies primarily focused on evaluating the acceptability and implementation of screening. All HIV and Chlamydia studies adopted a single-group design. The EHC studies examined contraceptive use and knowledge and attitudes to EHC, as well as implementation, uptake, acceptability and access issues. There were a wide range of study designs, including two RCTs. (N=8) general sexual health services evaluations examined screening for conditions, service uptake, health behaviour, as well as training, and acceptable locations to pick up screening kits. (N=2) were comparative studies and (n=6) were non-comparative which included cross sectional surveys.
- **Gaps in research:** No studies that evaluated HIV testing in the UK were identified, suggesting a need to commission research in this area in particular; and we found only three controlled trials overall - focused on EHC (n=2) and HIV (n=1), which suggests a need for more controlled trials in general to provide evidence of effectiveness.

5.1 Introduction

In this chapter, a descriptive overview of studies is presented which focus on the services provided to the public by community pharmacies for the health priority of sexual and reproductive health. Sexual health interventions generally focus on testing, treatment and prevention of sexually transmitted diseases such as chlamydia, HIV, gonorrhoea, syphilis and HPV. Testing is an intervention used to identify the possible presence of disease or condition that has not yet been diagnosed and is without signs or symptoms. Reproductive health is concerned with issues of conception and contraception.

5.2 Included studies

We located 37 studies that examined the role of community pharmacies in sexual and reproductive health. These focused on HIV prevention (n=5) (Crawford et al. 2016, Fernandez-Balbuena et al. 2015,

Lecher et al. 2015, McCarty 2004, Weidle et al. 2014), chlamydia/gonorrhoea testing and treatment (n=9) (Anderson and Thornley 2011, Baraitser et al. 2007, Cameron et al. 2010, Currie et al. 2013, Gudka et al. 2013, Kapadia 2013, Martin et al. 2012, Roberts et al. 2012, Thomas et al. 2010), emergency hormonal contraception (n=11) (Bissell et al. 2006, Clement and Mansour 2014, Heller et al. 2017, Killick and Irving 2004, Lambeth, Lewisham and Southwark Health Action Zone 2002, Lewington and Marshall 2006, Lloyd and Gale 2005, Michie et al. 2014, Parsons et al. 2013, Raine et al. 2005, Weiss et al. 2007); and general sexual health services provision (n=12) (Buchanan et al. 2016, Chalati 2015, Gale and Watson 2011, Health Watch Southwark 2016, Hohmeier et al. 2016, Kugelmas et al. 2016, Peacham and Symonds 2015, Radley et al. 2017a, Radley et al. 2017b, Saunders et al. 2012, Watson et al. 2003, 2006). Table 5.1 shows the countries in which these studies were conducted. The 33 studies were presented in 37 reports (see Appendix 2 for a listing of those studies reported in more than one publication). All but one of the studies (Gale and Watson 2011) were service evaluations.

Table 5.1: Sexual health services: specific conditions included in the map (n=37)

Sexual Health Services	UK	USA	Canada	Australia	Spain
HIV		4			1
Chlamydia	6			3	
EHC	10	1			
Sexual Health Other	10	2			

5.3 HIV prevention

A total of five studies (Crawford et al. 2016, Fernandez-Balbuena et al. 2015, Lecher et al. 2015, McCarty 2004, Weidle et al. 2014) were found that evaluated the provision of HIV testing in community pharmacies. The population focus expanded beyond the adult general population, to also target injection drug users (McCarty 2004) and those in urban and rural settings (Weidle et al. 2014).

5.3.1 Aims of the interventions

In four studies, the primary aim of HIV testing provision via community pharmacies was to make it 'more accessible to the general population' (Fernandez-Balbuena et al. 2015) and potentially promote 'rapid' (Weidle et al. 2014) and 'earlier testing' to improve 'overall health outcomes' (Lecher et al. 2015, McCarty 2004).

5.3.2 Study Setting

Four of the studies were set in the USA (Crawford et al. 2016, Lecher et al. 2015, McCarty 2004, Weidle et al. 2014), and the remaining study was set in Spain (Fernandez-Balbuena et al. 2015).

5.3.3 *Intervention components*

Two core intervention components were reported in all five studies: checking for risk factors and HIV testing. Additional intervention components included biofeedback and advice (Fernandez-Balbuena et al. 2015, Lecher et al. 2015, Weidle et al. 2014), information (Crawford et al. 2016, Fernandez-Balbuena et al. 2015, Lecher et al. 2015, McCarty 2004) and financial incentives to be tested (Crawford et al. 2016, McCarty 2004). Although the majority of programme components, such as testing, were conducted face-to-face, health promotion material advocating testing was distributed online (Lecher et al. 2015).

5.3.4 *Intervention timing*

The duration of overall programme delivery was not reported, possibly based on the assumption there would be no specific time-limit to such a service. However, the individual time taken to conduct HIV checks and tests was given in three studies (Crawford et al. 2016, Lecher et al. 2015, Weidle et al. 2014). Lecher et al. (2015) reported that the 'median pre-test counselling time was 2 minutes' and the 'median post-test counselling time was 2 minutes for clients with a non-reactive test and 10 minutes for clients with a reactive test'. Similarly, Weidle et al. (2014) report that 'pre-test counselling took a median of 4 minutes, while post-test counselling took a median of 3 minutes'. The time to receive test results was approximately 23 minutes. In the Crawford et al. (2016) the survey intervention took 45-minutes to complete. The equivalent information regarding programme duration was not reported in the studies by Fernandez-Balbuena et al. (2015) or McCarty (2004).

5.3.5 *People delivering the intervention*

HIV checking and testing was performed by community pharmacists in all five studies. However, other providers were also utilised in three studies: counter staff (Lecher et al. 2015), a nurse (Weidle et al. 2014) and a designated HIV counsellor (McCarty 2004).

5.3.6 *Training*

Four studies reported information on training. In Fernandez-Balbuena et al. (2015) they ensured pharmacists were sufficiently skilled to conduct HIV tests 'without the need of ancillary personnel'. Training sessions were 'provided in person or by webinar over a 4-to 5-hour period' in Lecher et al. (2015) and a training curriculum and module was developed to support staff administer 'rapid, point-of-care HIV testing' in the study by Weidle et al. (2014).

5.3.7 *Cost information*

Three studies provided information on the cost of testing. In one Spanish study, expenses ranged from €5-€10 'to cover the costs of the materials and the administration paid to pharmacists for their time and effort' (Fernandez-Balbuena et al. 2015). In the US-based studies, the average cost of testing was an estimated \$47.21 per person (Lecher et al. 2015), with recurrent costs (e.g. costs excluding training and project-related expenditure) estimated at \$32.17 (Lecher et al. 2015). Participants were paid \$30 compensation for completing the survey instrument (Crawford et al. 2016).

5.3.8 *Details of the study design*

One study (Crawford et al. 2016) utilised a non-randomised controlled trial. One study used a non-comparative design (McCarty 2004) which sought to evaluate the effectiveness of an incentive promotion seeking to increase affect HIV testing rates of injection drug users. Three evaluations were

classed as other, (n=2) focused on feasibility of providing HIV testing in community pharmacies (Fernandez-Balbuena et al. 2015, Weidle et al. 2014). The third study aimed to 'document the cost of implementing point-of-care HIV rapid testing' (Lecher et al. 2015). Four studies collected data from 100 or more participants. All five evaluations were run across more than one community pharmacy.

Table 5.2 HIV included evaluations – study design, sample size, setting (n=5)

	Study design			Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	Other	< 100	100 +	Multi-centre	Single Centre
HIV	1 study: Crawford (2016) Non-randomized	1	3	1	4	5	0

5.4 Chlamydia prevention

Nine studies were included that investigated chlamydia prevention (Anderson and Thornley 2011, Baraitser et al. 2007, Cameron et al. 2010, Currie et al. 2013, Gudka et al. 2013, Kapadia 2013, Martin et al. 2012, Roberts et al. 2012, Thomas et al. 2010). Three studies (Cameron et al. 2010, Gudka et al. 2013, Kapadia et al. 2013) focused on at risk populations, three studies (Anderson and Thornley 2011, Baraitser et al. 2007, Martin et al. 2012) focused on the general population, and two studies (Currie et al. 2013, Kapadia 2013) focused on sexually active young people, and one study (Thomas et al. 2010) focused on community pharmacists

5.4.1 Aims of the interventions

Of the interventions focusing on chlamydia/gonorrhoea (n=3) investigated chlamydia testing, offered to the general population or to women specifically requesting emergency hormonal contraceptives (Anderson and Thornley 2011, Gudka et al. 2013, Thomas et al. 2010). Two studies included chlamydia testing and treatment programmes for adults (Baraitser et al. 2007, Cameron et al. 2010,) and one study for sexually active young people of 15-24 years of age (Kapadia 2013) and two studies where the young people were of 16-30 years of age (Currie et al. 2013, Martin et al. 2012).

5.4.2 Study Setting

The majority of studies investigated the delivery of chlamydia services in the UK (n=6). Four of these were in in England (Anderson and Thornley 2011, Baraitser et al. 2007, Cameron et al. 2010, Thomas et al. 2010) and one in Scotland (Kapadia 2013). Three studies were also set in Australia. All nine studies

were multi-centre studies. To maximise programme outreach, services were provided in more than one setting. These were most likely to be independent community pharmacies (Baraitser et al. 2007, Cameron et al. 2010, Currie et al. 2013, Gudka et al. 2013, Kapadia 2013, Thomas et al. 2010) but also included community pharmacies situated in a 'major UK pharmacy chain' (Anderson and Thornley 2011) or other types of health care settings (Cameron et al. 2010).

5.4.3 Intervention components

Testing for chlamydia was the key intervention component, in addition to checking for risk factors or signs potentially indicating the presence of chlamydia (Anderson and Thornley 2011, Baraitser et al. 2007, Currie et al. 2013, Thomas et al. 2010). Further programme components included providing information (Anderson and Thornley 2011, Cameron et al. 2010, Currie et al. 2013, Gudka et al. 2013), advice (Baraitser et al. 2007, Cameron et al. 2010, Thomas et al. 2010) and providing clients with test results. Financial incentives were also a feature of programmes in three studies. These were provided to increase the likelihood of consumer participation/uptake or to ensure programme fidelity.

5.4.4 Intervention timing

The length and duration of chlamydia testing and treatment availability were only reported by two studies (Currie et al. 2013) which reported duration of testing for 12-15 days and (Roberts et al. 2012) reported a one-off test.

5.4.5 People delivering the intervention

All chlamydia programmes were delivered by community pharmacists in addition to other health professionals. These included both qualified nurses (Cameron et al. 2010, Currie et al. 2013, Thomas et al. 2010) and community pharmacy staff, who offered chlamydia testing to young people (Currie et al. 2013).

5.4.6 Training

Five of the nine studies briefly mentioned training (Anderson and Thornley 2011, Baraitser et al. 2007, Currie et al. 2013, Gudka et al. 2013). These were explicit that staff had been trained in the acquisition and sequelae of chlamydia and were skilled in providing advice and information on chlamydia, including treatment options.

5.4.7 Cost information

Very little information was provided on the overall running costs of either chlamydia testing and/or treatment services, four studies provided information of specific costs such as resource costs or incentives. Only one study reported that the price of the test kit was £25 and follow-on treatment service was £18.99 (Anderson and Thornley 2011). One study (based in Australia) provided a breakdown of the costs of the study. This included overall costs for: cash rewards for young people (\$9700), professional service payments for pharmacies (\$9700), staff (\$1411), processing samples (\$11,585), pharmacy education costs (\$2500), participant education costs (\$1000) and other expenses to total \$40,456 (Currie et al. 2013 p.214). Another study gave participants AUD\$10; who provided a urine sample and completed a questionnaire and pharmacies received AUD\$10 per person recruited (Martin et al. 2012). Another study provided detailed information on cost estimate of a sexual health check-up for the routine arm was estimated at £45.89. The cost of the APT pack was common to both APT strategies in the current study and differed only in whether the treatment was for chlamydia/NGU or

gonorrhoea. The total APT pack cost for chlamydia/NGU and gonorrhoea was £29.48 and £24.31 respectively due to the different costs of the antibiotics used for treating chlamydia/NGU (Azithromycin, £8.95) and gonorrhoea (Cefixime, £3.78) (Roberts et al. 2012).

5.4.8 Details of the study design

A range of study designs was used to collect data about these interventions. Only one involved a comparison group. (Roberts et al. 2012) (see Table 5.3). The remaining (n=8) studies adopted a single group design. All studies were run across more than one community pharmacy and slightly more than half collected data from a hundred or more participants.

Four studies collected and analysed cross sectional numerical data on testing reach and uptake (Anderson and Thornley 2011, Cameron et al. 2010, Currie et al. 2013, Gudka et al. 2013). The remaining three studies collected survey and qualitative data via semi-structured interviews in order to meet their study objectives. These included ascertaining the feasibility and acceptability of a chlamydia testing and treatment service to clients and pharmacists (Baraitser et al. 2007), pharmacists' views on offering chlamydia testing to women requesting EHC, (Thomas et al. 2010) and evaluating the implementation of services, including pharmacists' training need requirements (Kapadia 2013). Only one study was retrospective, patients with EAC2 results were routinely recalled for repeat testing unless treated at the initial visit and completed a questionnaire (Martin et al. 2012).

Table 5.3: Chlamydia evaluations – study design, sample size and setting (n=9)

Health condition	Study design			Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	Other	< 100	100 +	Multi-centre	Single Centre
Chlamydia	1	7	1	4	5	9	0

5.5 Emergency hormonal contraception

Emergency hormonal contraception (EHC) involves the provision of contraception to women for administration up to 120 hours of unprotected intercourse NICE 2014. Originally provided via GP surgeries, since 2000 EHC has been increasingly provided in community settings such as walk-in clinics and pharmacies under Patient Group Direction (Lewington and Marshall 2006) with community pharmacies being the largest provider of EHC (Lloyd and Gale, 2005). Provision through these additional settings is thought to improve women's access to EHC.

In total, eleven publications were included in the review, which reported on ten studies focused on EHC (Bissell et al. 2006, Clement and Mansour 2014, Heller et al. 2017, Killick and Irving 2004, Lambeth, Lewisham and Southwark Health Action Zone 2002, Lewington and Marshall 2006, Lloyd and Gale 2005, Michie et al. 2014, Parsons et al. 2013, Raine et al. 2005, Weiss et al. 2007). (See Appendix 2 for details of the studies that were reported in more than one publication.)

5.5.1 Aims of the interventions

Each of the studies included in this set examined the provision of emergency contraception by community pharmacists. Older studies (i.e. those published pre-2010) studied EHC provision alone; however, studies published since 2010 have expanded beyond this to examine EHC in combination with other longer-term contraception methods such as pharmacy-provided routine oral contraception (Parsons et al. 2013), and onward referral for routine oral contraception (Michie et al. 2014), or copper intrauterine device insertion (Clement and Mansour 2014).

5.5.2 Study Setting

Ten studies were situated in the UK and one was situated in the US; and within these, data were collected from varying geographic regions. One study (Killick and Irving 2004) reported on a UK-wide pharmacy intervention implemented across England, Wales and Scotland. Four studies described settings reflective of regions: north-east England (Clement and Mansour 2014), Edinburgh, Scotland (Heller et al. 2017) southwest Kent (Lewington and Marshall 2006), and Avon (Weiss et al. 2007). Three studies reported on different interventions undertaken in the Lambeth, Southwark and Lewisham region of London (Bissell et al. 2006, Lambeth, Lewisham and Southwark Health Action Zone 2002, Parsons et al. 2013). One study each described an intervention occurring: in two areas within North Yorkshire (Lloyd and Gale 2005); within two Health Action Zones in Lambeth, Lewisham and Southwark and Manchester, Trafford and Salford (Bissell et al. 2006); and in Edinburgh, Scotland (Michie et al. 2014). The US-based study was conducted in San Francisco (Raine et al. 2005).

All ten of the included studies conducted their research in multi-centre settings. One was identified as being a high street chain (Killick and Irving 2004). Two interventions took place at community pharmacy and clinic settings (Clement and Mansour 2014, Weiss et al. 2007). One study took place within pharmacy chains and health clinics (Raine et al. 2005). Seven interventions were described as being located in community pharmacies but were not further distinguished (Bissell et al. 2006, Heller et al. 2017, Lambeth, Lewisham and Southwark Health Action Zone 2002, Lewington and Marshall 2006, Lloyd and Gale 2005, Michie et al. 2014, Parsons et al. 2013).

5.5.3 *Intervention components*

Across the set of included studies, the provision of emergency contraception was the common intervention component. Half (n=5) of the interventions also provided some form of onward referral to other health care professionals (Bissell et al. 2006, Clement and Mansour 2014, Lambeth, Lewisham and Southwark Health Action Zone 2002, Michie et al. 2014, Parsons et al. 2013). Additional general information or education on method use was provided in four studies (Bissell et al. 2006, Clement and Mansour 2014, Michie et al. 2014, Parsons et al. 2013), while tailored advice was reported in three studies (Bissell et al. 2006, Clement and Mansour 2014, Killick and Irving 2004). Only study reported incentives given to pharmacists for participation in the research (Heller et al. 2017).

5.5.4 *Intervention timing*

While it is likely that these interventions would constitute one-time contacts between pharmacists and women, the frequency, intensity and duration of EC provision interventions were not clearly described. Only three studies reported measuring data on the length of the consultations with women but did not provide data (Lambeth, Lewisham and Southwark Health Action Zone 2002, Parsons et al. 2013).

5.5.5 *People delivering the intervention*

Community pharmacists provided the intervention in all eleven studies. One study identified additional providers as clinic nurses (Weiss et al. 2007) and clinic health care professionals providing subsequent intrauterine device (IUD) insertion (Clement and Mansour 2014, Raine et al. 2005).

5.5.6 *Training*

Training of providers was described in nine studies (Clement and Mansour 2014, Killick and Irving 2004, Lambeth, Lewisham and Southwark Health Action Zone 2002, Lewington and Marshall 2006, Lloyd and Gale 2005, Michie et al. 2014, Parsons et al. 2013, Raine et al. 2005). However, the nature of descriptions about training varied, ranging from simply acknowledging that training occurred, to stating that more intensive sessions were offered, some being via 'accredited' courses (Clement and Mansour 2014, Parsons et al. 2013).

5.5.7 *Cost information*

Costs of EHC provision by community pharmacies were not well described. Six studies provided no cost information. However, two studies described the cost of EHC reported by women accessing the service (Killick and Irving 2004, Lewington and Marshall 2006); and the Health Action Zone evaluation reported the set up and running costs for the provision of EHC (Lambeth, Lewisham and Southwark Health Action Zone 2002). Two studies provided incentives for study participants (Michie et al. 2014, Raine et al. 2005).

5.5.8 *Details of the study design*

A wide range of study designs were employed to examine community pharmacy-based EHC provision. Two studies used a comparison group design. One was a cluster randomised controlled trial evaluating EHC provision (Michie et al. 2014) and the other was a randomised, single-blind, controlled trial (Raine et al. 2005); this also assessed women's views about the service. The uptake of EHC, acceptability of the service to pharmacists, recipients, and issues related to implementation (e.g. access to GP appointments and community pharmacies and information provision on contraceptive methods) were reported.

Of the other studies, one was a cohort observational study of women accessing EHC via community pharmacies, which compared their data to those of women accessing EHC via family planning clinics (Lewington and Marshall 2006). This study also examined access issues. The remaining studies conducted one-group surveys (Clement and Mansour 2014, Killick and Irving 2004, Lloyd and Gale 2005, Parsons et al. 2013), pharmacists' views (Bissell et al. 2006) or women's views (Weiss et al. 2007) of specific EHC provision services. These examined a range of outcomes and processes, including contraceptive use, knowledge and attitudes to EHC, and issues of acceptability, access, costs, implementation issues, and provider training.

Table 5.4 EHC included evaluations - study design, sample size, setting (n=11)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	< 100	100 +	Multi-centre	Single Centre
EHC	2 studies: Michie (2014) Cluster RCT Raine (2005): RCT single-blind,	9	5	6	11	0

5.6 Other sexual health services

Twelve studies reported on broader sexual health services. Ten were based in the UK (Buchanan, et al. 2016, Chalati 2015, Health Watch Southwark 2016, Peacham and Symonds 2015, Radley, et al. 2017a, Radley et al. 2017b, Saunders et al. 2012, Watson, et al. 2003, 2006, Saunders et al. 2012, Watson et al. 2003, Watson et al. 2006). Two were US based studies (Hohmeier et al. 2016, Kugelmas et al. 2016).

Six UK studies were evaluations. Three focused on hepatitis C virus (HCV)(Buchanan et al. 2016, Radley et al. 2017a, Radley et al. 2017b). (Buchanan et al. 2016) was a pilot pharmacy based testing service for HCV, other BBV and syphilis. Both Radley et al. studies (2017) focused on uptake and treatment. Two UK evaluations focused on sexually transmitted infections (STIs). One looked at increase in STI testing in young people (15-24 years) in a London Borough with high rates of infection using a new self-test kit (testing for chlamydia and gonorrhoea (CT/GC), and HIV) alongside condom distribution via the pan-London condom scheme (Peacham and Symonds 2015). The other STI study looked at exploring the acceptability of various medical, recreational and sports venues as settings to access self-collected

testing kits for STIs and HIV among men in the general population and those who participate in sport (Saunders et al. 2012). One UK evaluation examined EHC and chlamydia service provision as one component of healthy living, vascular, and sexual health services provided within community pharmacies (Chalati 2015). A further four UK studies were not intervention evaluations and are not discussed further (Gale et al. 2011, Health Watch Southwark 2016, Watson et al. 2003, Watson et al. 2006).

Two were US based evaluation studies (Hohmeier et al. 2016, Kugelmas et al. 2016); one focused on implementing and exploring the impact of a pharmacist-led multimodal approach to improve HPV vaccination rates in the community (Hohmeier et al. 2016). The other US evaluation aimed to identify the prevalence of HCV AB+ using birth cohort and high risk factors in individuals tested at retail pharmacies and to link HCV AB+ individuals with a pathway to care (Kugelmas et al. 2016).

5.6.1 Aims of the interventions

The interventions varied in focus. Three studies focused on testing, one on reducing HCV burden (Buchanan et al. 2016), and two studies on hepatitis C (Radley et al. 2017a, Radley et al. 2017b). Three interventions focused on offering community pharmacy-based provision testing service in EHC, chlamydia testing, smoking cessation and Healthy Living services (Chalati 2015), hepatitis C (Kugelmas et al. 2016) and STI testing for young people (Peacham and Symonds 2015). One intervention in the second focused on providing of STI and HIV testing kits in community pharmacies and other venues (Saunders et al. 2012). One study focused on improving HCV vaccinations (Hohmeier et al. 2016).

5.6.2 Study Setting

The majority of the included evaluations (n=6) were set in the UK (Buchanan et al. 2016, Chalati 2015, Peacham and Symonds 2015, Radley et al. 2017a, Radley et al. 2017b, Saunders et al. 2012) two studies were set in US (Hohmeier et al. 2016, Kugelmas et al. 2016). Seven studies were conducted in multi-centre settings and only one study in a single setting (Hohmeier et al. 2016).

5.6.3 Intervention components

Across the set of included studies, common intervention components included the provision of advice, information, testing (STI and HIV self-testing kits), resource access and referral to appropriate medical and social services (Buchanan et al. 2016, Chalati 2015, Hohmeier et al. 2016, Kugelmas et al. 2016, Peacham and Symonds 2015, Saunders et al. 2012). In one study interventions included pre-test counselling. In the event of a test for HBV being positive, a member of the hepatology team attended the pharmacy for a point-of-diagnosis consultation with the patient and testing pharmacist (Buchanan et al. 2016).

5.6.4 Intervention timing

The information on study duration provided by authors varies and was not very detailed. Three studies do not provide any information (Chalati 2015, Peacham and Symonds 2015, Saunders et al. 2012). One study reported the timeline for interventions which was documented in weeks (Hohmeier et al. 2016). Three studies were more infrequent which stretched over months (Buchanan et al. 2016, Radley et al. 2017a, Radley et al. 2017b).

5.6.5 *People delivering the intervention*

Community pharmacists provided interventions in four of the eight studies (Buchanan et al. 2016, Chalati 2015, Hohmeier et al. 2016, Radley et al. 2017a, Radley et al. 2017b). Two studies other types of healthcare practitioners also carried out the intervention (Buchanan et al. 2016, Kugelmas et al. 2016). One study used a 'pharmacist independent prescriber' in the evaluation intervention study (Radley et al. 2017a).

5.7.6 *Training*

None of the eight studies reported any staff training related to the provision of community pharmacy sexual health services.

5.7.7 *Cost information*

Only three out of eight studies discussed the costs of the intervention (Chalati 2015). In one evaluation each pharmacy received £30 per test, which was split into £15 for sample collection and the entry of results into PharmOutcomes and £15 for the delivery of the results to the client (Buchanan et al. 2016). The Chalati (2015) study was a cost-effectiveness analysis of enhanced services for stop smoking, chlamydia testing and emergency contraception provided by pharmacies. In one study the cost was described for the RCT as: the total cost of the conventional Pathway was estimated at £933 (£643 service cost, £290 monitoring cost), and the cost of the Pharmacy Pathway was estimated £238 (£143 service cost, £95 monitoring cost). The costs associated with the pharmacy setting are around one quarter of the cost of treating a patient via the conventional care pathway that requires referral and patient attendance at another site (assuming the same cost of DAA treatment). In terms of staff capacity, the pharmacy pathway model uses four hours less service resources than the conventional pathway (6.66 h with conventional pathway versus 2.66 h with pharmacy pathway) (Radley et al. 2017b).

5.7.8 *Details of the study design*

A range of study designs was used to evaluate these interventions, two studies used controlled design (Radley et al. 2017a, Radley et al. 2017b) (see Table 4.2). These studies used an exploratory cluster randomised controlled trial with mixed methods evaluation. Six studies used varied non-comparative methods. One evaluation intervention used dry blood spot tests which were undertaken at community pharmacies for HCV, hepatitis B, HIV and syphilis. Individuals who tested positive were automatically referred to the mainland hepatology service and seen at a pharmacy 'point-of-diagnosis' consultation (Buchanan et al. 2016). One study conducted cross-sectional surveys with community pharmacy staff (Chalati 2015). The other conducted a cross-sectional survey with young men from across England (Saunders et al. 2012). One study focused on a single-centre, quasi-experimental interrupted time series mixed-methods pilot study was used to investigate a pharmacist-led, multimodal educational intervention approach to improve HPV rates in the community (Hohmeier et al. 2016). Another study used an ongoing IRB-approved testing study involving 45 retail pharmacies located in nine US metropolitan areas (Kugelmas et al. 2016). In another study, nine CPs were selected based on high rates of emergency contraception provision and condom distribution (Peacham and Symonds 2015).

Table 5.2: Other sexual health services evaluations – study design, sample size and setting (n=8)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non- Comparative	< 100	100 +	Multi-centre	Single Centre
Sex Health Other	2	6	5	3	7	1

5.7.9 References list of included studies

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Baraitser P, Pearce V, Holmes J, Horne N, Boynton PM et al. (2007) Chlamydia testing in community pharmacies: evaluation of a feasibility pilot in south east London. *Quality and Safety in Health Care* 16: 303-307.

Bissell P, Savage I, Anderson C (2006) A qualitative study of pharmacists' perspectives on the supply of emergency hormonal contraception via patient group direction in the UK. *Contraception* 73: 265-270.

Buchanan R, Hassan-Hicks P, Noble K, et al. (2016) Integrating community pharmacy testing for hepatitis c with specialist care. *Clinical Pharmacist* 8.

Cameron ST, Glasier A, Muir A, et al. (2010) Expedited partner therapy for Chlamydia trachomatis at the community pharmacy. *BJOG: An International Journal of Obstetrics and Gynaecology* 117: 1074-1079.

Chalati W (2015) *Cost-effective analysis of vascular and sexual health pharmacy services [Phd Thesis]*. Kingston University, UK.

Clement KM, Mansour DJ (2014) Improving uptake of the copper intrauterine device for emergency contraception by educating pharmacists in the community. *Journal of Family Planning and Reproductive Health Care*. 40: 41-45.

Crawford ND, Dean T, Rivera Alexis V, et al. (2016) Pharmacy Intervention to Improve HIV Testing Uptake Using a Comprehensive Health Screening Approach. *Public Health Reports (Washington, DC: 1974)* 131 Suppl 1: 139-146.

Currie MJ, Deeks LS, Cooper GM, et al. (2013) Community pharmacy and cash reward: a winning combination for chlamydia screening? *Sexually Transmitted Infections* 89: 212-216.

Fernandez-Balbuena S, Belza MJ, Zulaica D, et al. (2015) Widening the Access to HIV Testing: The Contribution of Three In-Pharmacy Testing Programmes in Spain. *PLoS ONE* 10: 1-11.

Gale A, Watson MC (2011) The provision of current and future sexual health services from community pharmacies in Grampian, Scotland. *International journal of clinical pharmacy* 33: 183-190.

Gudka S, Marshall L, Creagh A, et al. (2013) To develop and measure the effectiveness and acceptability of a pharmacy-based chlamydia screening intervention in Australia. *BMJ open* 3: e003338.

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Heller R, Johnstone A, Cameron S (2017) The feasibility of contraceptive injections at the community pharmacy. *Eur J Contracept Reprod Health Care* 22(5):327-333.

Hohmeier K, Randolph D, Smith C, et al. (2016) A multimodal approach to improving human papillomavirus vaccination in a community pharmacy setting. *SAGE Open Med.* 4: 2050312116682128.

Kapadia MZ (2013) *Chlamydia testing and treatment in community pharmacies: findings and lessons learned from setting out to evaluate an unexpectedly short lived service in Lothian, Scotland [PhD Thesis]*. University of Edinburgh.

Killick SR, Irving G (2004) A national study examining the effect of making emergency hormonal contraception available without prescription. *Human Reproduction* 19: 553-557.

Kugelmas M, Pedicone L, Lio I, et al. (2016) Hepatitis C antibody screening in a retail pharmacy setting: Local testing and linkage to care via an HCV management specialist. *Gastroenterol Hepatol (N Y)*. 13(2): 98–104.

Lambeth, Lewisham and Southwark Health Action Zone (2002) *A Timely Service: A Lambeth, Southwark and Lewisham Health Action Zone Project on Access to Emergency Hormonal Contraception Through Accredited Community Pharmacies*. London: LSL HAZ.
http://www.lho.org.uk/Download/Public/8753/1/em_contr_3.pdf

Lecher SL, Shrestha RK, Botts LW, et al. (2015) Cost analysis of a novel HIV testing strategy in community pharmacies and retail clinics. *J Am Pharm Assoc* 55: 488-492.

Lewington G, Marshall K (2006) Access to emergency hormonal contraception from community pharmacies and family planning clinics. *Br J Clin Pharmacol* 61: 605-608.

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Martin S, Currie M, Deeks L, et al. (2012) Do cash incentives increase the uptake of chlamydia testing in pharmacies? *Sexually Transmitted Infections* 88.

McCarty WL (2004) *A study of the effectiveness of a designed intervention on HIV testing rates of injecting drug users [Phd thesis]*. University of Nebraska, USA.

Michie L, Cameron ST, Glasier A, et al. (2014) Pharmacy-based interventions for initiating effective contraception following the use of emergency contraception: a pilot study. *Contraception* 90: 447-453.

Parsons J, Adams C, Aziz N, et al. (2013) Evaluation of a community pharmacy delivered oral contraception service. [J Fam Plann Reprod Health Care](#) 39: 97-101.

Peacham A, Symonds M (2015) Enhanced sexual health services in community pharmacies-pilot. *Sexually Transmitted Infections* 91: A21.

Radley A, Melville K, Tait J, et al. (2017a) A quasi-experimental evaluation of dried blood spot testing through community pharmacies in the Tayside region of Scotland. *Frontline Gastroenterol* 8: 221-228.

Radley A, Tait J, Dillon J (2017b) DOT-C: A cluster randomised feasibility trial evaluating directly observed anti-HCV therapy in a population receiving opioid substitute therapy from community pharmacy. [The Int J Drug Policy](#) 47: 126-136.

Raine TR, Harper CC, Rocca CH, et al. (2005) Direct access to emergency contraception through pharmacies and effect on unintended pregnancy and STIs: a randomized controlled trial. *Jama* 293: 54-62.

Roberts T, Tsourapas A, Sutcliffe L, et al. (2012) Is Accelerated Partner Therapy (APT) a cost-effective alternative to routine patient referral partner notification in the UK? Preliminary cost-consequence analysis of an exploratory trial. [Sex Transm Infect](#) 88: 16-20.

Saunders JM, Mercer CH, Sutcliffe LJ, et al. (2012) Where do young men want to access STI screening? A stratified random probability sample survey of young men in Great Britain. [Sex Transm Infect](#) 88: 427-432.

Thomas G, Humphris G, Ozakinci G, et al. (2010) A qualitative study of pharmacists' views on offering chlamydia screening to women requesting Emergency Hormonal Contraception. *BJOG* 117: 109-113.

Watson L, Bond C, Gault C (2003) A survey of community pharmacists on prevention of HIV and hepatitis B and C: current practice and attitudes in Grampian. [J Public Health Med](#) 25: 13-18.

Watson L, Bond C, Gault C (2006) A survey of pharmacy assistants in Grampian on prevention of HIV and hepatitis B and C. *International Journal of Pharmacy Practice* 14: 129-134.

Weidle PJ, Lecher S, Botts LW, et al. (2014) HIV testing in community pharmacies and retail clinics: a model to expand access to screening for HIV infection. [*J Am Pharm Assoc*](#) 54: 486-492.

Weiss MC, Locke R, Graham A (2007) Users' views of new providers of emergency contraception: a qualitative study. *Primary Health Care Research and Development* 8: 112-120.

6 Immunisation and travel health

- **Extent of evidence:** We identified 29 studies which focused on community pharmacy immunisation, influenza testing and travel health services. All were evaluations of services.
- **Context of evidence:** The majority of studies were conducted in the UK (n=15); others were conducted in the USA (n=12), Canada (n=1), Germany (n=1) and the Republic of Ireland (1).
- **Intervention focus:** These services addressed following health issues: influenza (n=17), Shingles (n=3), pneumococcal disease (n=2), multiple immunisations (n=4), travel health (n=3).
- **Intervention components:** Intervention components included providing influenza vaccination (n=20), Information (n=8), education and advice (n=11), referral to health professionals (n=4), and counselling (n=1).
- **Evaluation details:** Studies examined the following outcomes: patient acceptability of immunisation delivered by pharmacists (n=12); pharmacist's acceptability of intervention or service (n=7); acceptability of information interventions to patients (n=7); issues of access and convenience (n=12); implementation (n=8); and other processes (n=18). Four of the 29 evaluations used a control group design.
- **Gaps in research:** The majority of UK studies are process evaluations of providing the service rather than evaluating interventions to promote service use. No controlled trials were located that focused on the provision of travel health services.

6.1 Introduction

In this chapter, a descriptive overview is presented of studies which focused on services provided to the public by community pharmacies for the health priority area of immunisation. Since travel health is not provided by the NHS in England it is not a health priority. However, because travel health services include provision of immunisation this issue has been incorporated into this chapter. Immunisation services encompass administering of vaccines, education about vaccines or reducing risk for influenza, or referral to other health professionals for administering vaccines. Travel health additionally includes vaccination and health education relating to international travel. The data provided in this chapter are split into five domains: influenza, shingles (herpes zoster virus), pneumonia, multiple immunisations and travel health.

6.2 Included Studies

We located 29 studies concerning the role of community pharmacies in immunisations and travel health. Seventeen studies, within 19 reports, focused on influenza: (Anderson and Thornley 2014, Anderson and Thornley 2016, Atkins et al. 2016, Evans et al. 2016, Hind et al. 2004, Healthwatch Norfolk 2014, Revill 2015, James 2015, Khatau and Leatherland 2016, Local Pharmaceutical Committees of

Cumbria and the North East, 2015, Local Pharmaceutical Committees of Cumbria, Northumberland, and Tyne and Wear 2014, Marra et al. 2014, Miller et al. 2012, NHS Sheffield 2014, Pharmaceutical Society of Ireland 2015, Rai 2015, Shenson et al. 2015, Urban 2015, and Warner et al. 2013). Nine studies were of other kinds of immunisation to influenza. Three of these concerned shingles (herpes zoster virus): (Bedwick et al. 2017, Hess 2013, Wang et al. 2013); two concerned pneumococcal disease: (Taitel et al. 2011, Westrick et al. 2016); and four focused on multiple immunisations: (Bluml et al. 2017, Brackett et al. 2015, Fuchs 2006, Sparkman et al. 2017). A further three studies were focused on travel health: (Hess et al. 2010, Hind et al. 2008, Tran et al. 2015). Table 6.1 shows the countries in which the 29 studies were conducted.

Table 6.1: Immunisation group: specific conditions

Immunisation group	UK	USA	Canada	Germany	Ireland	Japan
Influenza	13	2	1		1	
Other immunisation (Shingles, Pneumonia, Multiple immunisations)		8		1		
Travel Health	1	2				

6.3 Influenza

The influenza vaccine is seasonally administered and available to the general population. In the UK, some community pharmacies offer influenza vaccines to adults, and they are free of charge through the NHS to certain at-risk groups of people through the NHS. General practice surgeries also offer this service. Seventeen studies were found and are described here, of which two are reported in two citations (Anderson and Thornley 2014, Anderson and Thornley 2016, Atkins et al. 2016, Evans et al. 2016, Healthwatch Norfolk 2014, Hind et al. 2004, James 2015, Khatau and Leatherland 2016, Local Pharmaceutical Committees of Cumbria and the North East, 2015, Local Pharmaceutical Committees of Cumbria, Northumberland and Tyne and Wear 2014, Marra et al. 2014, Miller et al. 2012, NHS Sheffield 2014, Pharmaceutical Society of Ireland 2015, Rai 2015, Revill 2015, Shenson et al. 2015, Urban 2015, and Warner et al. 2013).

6.3.1 Aims of the interventions

Most of the UK studies related to the expansion of service into community pharmacies. They were largely aimed at increasing influenza vaccination uptake among specific groups of people who are particularly vulnerable to influenza; the nature of these groups varied between studies. Many studies aimed to provide evidence for the commissioning of influenza vaccinations through pharmacy and were undertaken across different regions in the UK. In contrast, the few studies identified from Canada and the USA were aimed at increasing influenza vaccination uptake by the general population (Marra et al. 2014, Miller et al. 2012, Shenson et al. 2015). Two of these studies also aimed to educate the general population in order to reduce their risk of acquiring influenza (Marra et al. 2014, Miller et al. 2012).

6.3.2 *Study Setting*

Thirteen studies were set in community pharmacies in the UK (Anderson and Thornley 2014, 2016, Atkins 2016, Evans et al. 2016, Healthwatch Norfolk 2014, Hind 2004, James 2015, Khatau and Leatherland 2016, Local Pharmaceutical Committees of Cumbria and the North East 2015, NHS Sheffield 2014, Rai 2015, Urban 2015a, Warner et al. 2013). Two studies were set in the USA (Miller et al. 2012, Shenson et al. 2015) and one study was set across rural communities in Canada (Marra et al. 2014) and one was set in Ireland (Pharmaceutical Society of Ireland 2015).

Sixteen of the seventeen studies were set in more than one pharmacy. The exception is the oldest study, which was a small pilot of influenza vaccination in a Scottish pharmacy (Hind et al. 2004). Two studies also included general practice settings (Healthwatch Norfolk 2014, Warner et al. 2013). One study also included clinics near polling stations (Shenson et al. 2015).

It was not always clear whether the pharmacy was independent or part of a chain. However, three studies involved both independent and chain pharmacies (Rai 2015, Shenson et al. 2015, Warner et al. 2013) and two involved one high street chain pharmacy (Anderson and Thornley 2014, 2016).

6.3.3 *Intervention components*

For 15 out of 17 studies the intervention evaluated was concerned with providing influenza vaccination within community pharmacies (Anderson and Thornley 2014, Anderson and Thornley 2016, Atkins et al. 2016, Evans et al. 2016, Hind et al. 2004, Healthwatch Norfolk 2014, James 2015, Khatau and Leatherland 2016, Local Pharmaceutical Committees of Cumbria and the North East 2015, NHS Sheffield 2014, Pharmaceutical Society of Ireland 2015, Rai 2015, Shenson et al. 2015, Urban 2015a, Warner et al. 2013). Of these studies, one study provided an information leaflet on the need for vaccination and when and where the services could be accessed (Warner et al. 2013). Another study used outreach: the 'Vote & Vax' programme was an intervention aiming to increase uptake by promoting vaccination on the day of US national elections (Shenson et al. 2015).

Two other studies evaluated education and information provision to promote immunisation (Marra et al. 2014, Miller et al. 2012). The Pharmacy-based Immunisation in Rural Communities Strategy (PhICS) (Marra et al. 2014) involved education and information to promote the service. Participating pharmacies had a dedicated nurse or pharmacist to educate patients on the benefits of vaccination, to vaccinate patients, monitor for potential adverse events and provide education on influenza prevention (e.g. handwashing, lack of effect of antibiotics for influenza). The intervention also involved promoting the services in the community through posters and local media.

In Miller et al. (2012), student pharmacists provided education using various standardised materials relating to steps to fighting influenza, information about influenza, including H1N1 influenza, and information for patients with certain medical conditions.

6.3.4 *Intervention timing*

Some pharmacies had specific times available for the service. In Marra et al. (2014), pharmacists were encouraged to hold one or two clinics per week during the influenza vaccination period. Some studies reported a required ten-minute waiting period after the vaccine was administered in case of an adverse event.

6.3.5 *People delivering the intervention*

In most cases, the community pharmacist delivered the intervention, or it was unclear who delivered the intervention. In the two-year Canadian study, initially a nurse administered the vaccination in the first year, but by the second year more were run by pharmacists as they had since been certified to give injections (Marra et al. 2014). Student pharmacists were used as educators in the US study by Miller et al. (2012).

6.3.6 *Training*

Training was mentioned in nine studies. Training was provided to ensure competence of vaccine administration and patient safety. The intervention delivered by student pharmacists involved prior training of the students (Miller et al. 2012).

6.3.7 *Cost information*

Seven studies referred to costs, and all were from the UK. Atkins et al. (2016) undertook a cost-effectiveness evaluation and detailed the cost of influenza vaccine administration comparing general practice and pharmacies. Two studies noted that pharmacies were paid the same fees that general practitioners received (NHS Sheffield 2014 and Warner et al. 2013). Rai (2015) specified the cost and observed that the vaccine cost was additional to the same fee as general practitioners received. Local Pharmaceutical Committees of Cumbria and the North East (2015) included details of costs of training, vaccine costs and pharmacist professional fees. James (2015) specified the costs of payment vouchers, and the vaccine service costs.

6.3.8 *Details of the study design*

A range of study designs was used to evaluate these interventions, with one evaluation involving a comparison group (see Table 6.2). All but one of the studies were run across more than one community pharmacy and all but two collected data from a hundred or more participants. The one controlled evaluation used a randomised controlled design (Marra et al. 2014) to compare vaccination rates between pharmacies where there was education and promotion of influenza vaccine services and those without. This study also measured how patients heard of the influenza vaccination clinic, and their reasons for attending.

The remaining studies used a single-group study design. Atkins et al. (2016) used data analysis of reported vaccinations and surveys of pharmacists and general practitioners to estimate costs, and the impact of pharmacy influenza vaccinations on accessibility and uptake. The other 15 evaluations focused on processes related to provision. These included the uptake of vaccination, the reasons people chose to receive vaccinations within the pharmacy, recipient acceptability of the service, and providers and stakeholders' views. Miller et al. (2012) also assessed patients' knowledge regarding the H1N1 vaccine and changes in acceptability of pharmacist providing immunisation following the intervention. A US study, Shenson et al. (2015), compared the number of clinics held across regions in the 'Vote & Vax' intervention. This also included the rate of immunisation uptake between pharmacies and polling places, patient demographics and whether patients received a vaccine for first time. There were a variety of processes measured in the UK studies; key aspects are listed here:

- Acceptability of vaccination interventions to pharmacists (Atkins et al. 2016, Evans et al. 2016, Hind et al. 2004, Rai 2015).

- Patient acceptability of immunisation delivered by pharmacists (Anderson 2014, Healthwatch Norfolk 2014, Hind et al. 2004. Local Pharmaceutical Committees of Cumbria and the North East 2015, NHS Sheffield 2014, Rai 2015, Urban 2015a, Warner et al. 2013).
- Acceptability of providing information interventions to patients (Warner et al. 2013).
- GP opinions of pharmacy influenza vaccination services (Atkins 2016, Hind et al. 2004, Rai 2015).
- Issues surrounding access and convenience (Anderson 2014, Anderson 2016, Healthwatch Norfolk 2014, Khatau and Leatherland 2016, Hind et al. 2004, NHS Sheffield 2014, Urban 2015a, Warner et al. 2013).
- Implementation (Healthwatch Norfolk 2014, Hind 2004, Local Pharmaceutical Committees of Cumbria and the North East 2015, Rai 2015, Urban 2015a, Warner et al. 2013).
- Reach and uptake of the service (Anderson 2016, James 2015, Khatau and Leatherland 2016, NHS Sheffield 2014, Rai 2015, Urban 2015a, Warner et al. 2013).
- Other processes (Anderson 2014, Anderson 2016, Evans et al. 2016, Healthwatch Norfolk 2014, Local Pharmaceutical Committees of Cumbria and the North East 2015, NHS Sheffield 2014, Rai 2015, Urban 2015a, Warner et al. 2013).

Table 6.2: Influenza evaluations – study design, sample size and setting (n=17)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	< 100	100 +	Multi-centre	Single Centre
Influenza	1 study: Marra (2014): cluster-RCT	16	2	15	14	1

6.4 Other immunisation - Shingles (herpes zoster)

Shingles is caused by contracting the varicella-zoster virus, one of the herpes viruses. Once contracted the virus appears to become latent but the likelihood of viral reactivation to shingles (zoster) increases with each decade of life (Kleinschmidt-DeMasters and Gildea, 2001). Shingles is a common condition, with an estimated one in every four people suffering from at least one episode of shingles during their life (NHS, 2016). Shingles usually develops in the elderly, being eight to ten times more frequent after the age of 60 years. Uncommonly, shingles can spread to large cerebral arteries to cause a range of large-vessel vascular damage, ranging from vasculopathy to vasculitis, with stroke (Kleinschmidt-DeMasters and Gildea, 2001). The shingles vaccine (Zostavax®) is indicated for immunisation of adults over 70 years old (Merck 2016). Three studies focused on shingles (Bedwick et al. 2017, Hess 2013, Wang et al. 2013).

6.4.1 *Aims of the interventions*

Three US studies focused on increasing vaccination rates in older people over 60 years in community pharmacies: Bedwick et al. (2017), Hess (2013) and Wang et al. (2013). All studies evaluated the effectiveness of communication interventions. Wang et al. (2013) also surveyed patient satisfaction with the pharmacist as an immuniser, and each patient's sources of information and factors influencing accepting the vaccine.

6.4.2 *Study Setting*

Hess (2013) and Wang et al. (2013) used interventions initiated by pharmacists within several pharmacies. One was set in multiple supermarket pharmacies (Hess et al. 2013), and the other was set in three independent community pharmacies (Wang et al. 2013). However, both studies included communication beyond the pharmacy. Bedwick et al. (2017) was undertaken in one independent community pharmacy.

6.4.3 *Intervention components*

In the US-based Hess (2013) study, communication took place with pharmacy prescription clients in their homes, through 30-second automated telephone messages. The messages aimed to educate recipients about their risk for developing shingles and invited them to speak to their pharmacist about obtaining a vaccination.

Wang et al. (2013), also a US-based study, used three different interventions: a postal letter sent to clients of a pharmacy; a flyer accompanying prescriptions; and a newspaper press release. Each contained information about herpes zoster infection and the herpes zoster vaccination including indications, adverse effects, and contraindications.

Bedwick et al. (2017) was an automated phone message that was sent three times to all eligible patients over a period of three months.

6.4.4 *Intervention timing*

All studies had short study periods: Bedwick et al. (2017) and Hess (2013) delivered three automated messages every month over three months; Wang et al. (2013), administered flyers over one month and the letters and press release were issued once.

6.4.5 *People delivering the intervention*

Community pharmacists provided services in all studies.

6.4.6 *Training*

In the automated provider study, only pharmacies employing at least one full-time pharmacist who had previously administered at least one shingles vaccine during a three-month pre-study period were recruited, and all pharmacists were trained using the American Pharmacists Association's Pharmacy-Based Immunisation delivery certificate training programme (Hess 2013). Training is not mentioned in the studies by Bedwick et al. (2017) and Wang et al. (2013).

6.4.7 Cost information

No cost information was presented in the two studies.

6.4.8 Details of the study design

The effectiveness of automated messages was measured using a randomised controlled trial covering 9,650 households (Hess 2013). In the study by Wang et al. (2013) the effectiveness of publicity interventions and personalised letters was measured using a before and after design, where vaccination rates were measured before and during the intervention. This was also compared with the average change in vaccination rates in both the three months before and after this time, to assess trends over time. The views of recipients of the vaccine were obtained from a survey, which had 205 respondents, out of 252 administered. Bedwick et al. (2017) used a single-group study design.

6.5 Other immunisation - Pneumonia

Two studies were included that focused on the promotion of pneumococcal vaccinations in community pharmacy settings, Taitel et al. (2011) and Westrick et al. (2016). The US Advisory Committee on Immunisation Practices (ACIP) recommends both pneumococcal polysaccharide vaccine and pneumococcal conjugate vaccine to be administered routinely to all adults over 65 years. In certain groups under 65, selection of either vaccine depended upon risk factors or conditions (Kim 2015).

6.5.1 Aims of the interventions

Both interventions aimed to increase the uptake of pneumococcal vaccinations in community pharmacies. One aimed to train pharmacists, through the 'RxVaccinate programme' (Westrick et al. 2016). The other intervention educated at-risk patients at the same time as they received an influenza vaccination (Taitel et al. 2011).

6.5.2 Study Setting

Both studies were set in the USA and took place in several community pharmacies that were part of a chain, and the RxVaccinate programme also included pharmacists from independent pharmacies.

6.5.3 Intervention components

The RxVaccinate programme consisted of two self-directed training webinars and coaching sessions for pharmacists. Coaching groups facilitated engagement among pharmacists through face-to-face workshops, an online community, and teleconferences (Westrick et al. 2016). Patient education involved the pharmacist recommending pneumococcal vaccines to appropriate patients when they received influenza immunisations. The pharmacist asked patients about their risk of pneumococcal disease (e.g., age, smoking status, co-morbid conditions) and if they had previously been vaccinated. (Taitel et al. 2011).

6.5.4 Intervention timing

In the RxVaccinate programme, the pharmacist training involved two short webinars, a four-hour coaching session, and coaching sessions offered for the next 12 months after the workshop, including monthly teleconferences (Westrick et al. 2016).

6.5.4 People delivering the intervention

Both interventions were delivered by community pharmacists. The RxVaccinate pharmacist training intervention was also delivered by both experts and peers.

6.5.5 Training

No specific training to deliver the interventions was mentioned in the study reports.

6.5.6 Cost information

No cost information was presented in the study reports.

6.5.7 Details of the study design

The impact of the RxVaccinate program was evaluated using a randomised controlled study design, and the coaching was only delivered to the intervention group. The impact of the pharmacist-led education intervention was assessed based on retrospective data analysis of the records of those who should have received an intervention. This was compared with secondary data which was used as a benchmark to represent traditional care.

6.6 Other immunisation - Multiple immunisations

Four studies focused on increasing uptake of multiple immunisations. Three studies evaluated pharmacist advice for increasing multiple immunisations, where indicated. Of these, two studies focused on the general population (Brackett et al. 2015, Fuchs 2006), one study concerned an employee population (Sparkman et al. 2017). A fourth study relates to a process that assisted pharmacists in identifying unmet vaccination needs so they could educate and promote immunisation to those receiving an influenza immunisation (Bluml et al. 2017).

6.6.1 Aims of the interventions

The US study was of an intervention that aimed to increase immunisation rates by the use of motivational interviewing and to conduct immunisations within the pharmacy (Brackett et al. 2015). The aim of the intervention in the Fuchs (2006) study was also to increase vaccination rates by pharmacy assessment, while providing education and referral to physicians. Sparkman et al. (2017) added an immunisation check-up to an annual employee health check. Bluml et al. (2017) evaluated a practice model aimed to identify immunisation needs in order to educate eligible patients and improve immunisation rates.

6.6.2 Study Setting

Three studies were set in the USA (Bluml et al. 2017, Brackett et al. 2015, Sparkman et al. 2017), and the other study was set in Germany (Fuchs 2006). Two of these were set in multiple pharmacies (Bluml et al. 2017, Sparkman et al. 2017), one of which was a supermarket chain (Sparkman et al. 2017), and the two other studies were set within a single pharmacy (Brackett et al. 2015, Fuchs 2006). The motivational interviewing intervention took place within a supermarket pharmacy (Brackett et al. 2015).

6.6.3 *Intervention components*

Brackett et al. (2015) used motivational interviewing on clients eligible to receive the vaccines, and if a person was considered ready and willing to receive an immunisation, a prescription was obtained. The Fuchs (2006) study provided patients with an overview of their personal vaccination status, a printed record, and information on the benefits and possible risks associated with vaccination. They were asked to obtain any vaccinations from their general practitioner that they had not yet received. The Sparkman et al. (2017) provided recommendations on immunisations as part of an annual health assessment. Bluml et al. (2017) consisted of a practice model to help pharmacists identify and assess people who need certain immunisations, followed by education and administration of recommended vaccines.

6.6.4 *Intervention timing*

The time taken to deliver the intervention was only collected in the German study (Fuchs 2006), and the vaccination consultation lasted an average of nine minutes.

6.6.5 *People delivering the intervention*

The pharmacist delivered the interventions.

6.6.6 *Training*

Pharmacists delivering motivational interviewing were trained in the concepts of motivational interviewing, sample dialogues to discuss immunisations, orientation to the project objectives, and a data collection form. The pharmacists were provided with pocket cards containing essential information for each immunisation in the project, tips for using motivational interviewing and which patients to target for interventions (Brackett et al. 2015). Bluml et al. (2017) describes who staff were trained to implement the practice model. No training was specified in the studies by Fuchs (2006) or Sparkman et al. (2017).

6.6.7 *Cost information*

No cost information was provided for the studies.

6.6.8 *Study design*

The pilot study on motivational interviewing was compared to a pharmacy with similar characteristics, patient demographics and advertising of immunisations (Brackett et al. 2015), though it was a small study with just 19 participants. Immunisation outcomes, pharmacists' views on feasibility, and patient views were collected.

The Fuchs study (Fuchs 2006) took place in a single pharmacy without a comparison group, and involved 312 participants over five weeks out of around 2,500 who were informed of the intervention. It was aimed at children and adults.

Sparkman et al. (2017) was a single-group study design of a cohort of 252 employees and their partners. Bluml et al. (2017) was a single-group study design consisting of 1080 patients who had received influenza immunisations within the pharmacies involved in the study.

6.6.9 Study design for other immunisations

For the shingles, pneumonia and multi immunisation evaluations, a range of study designs was used to evaluate these interventions, with three of the six evaluations using a comparison group (see Table 6.3). Two thirds of the studies were run across more than one community pharmacy and the same proportion collected data from a hundred or more participants.

Table 6.3: Shingles, Pneumonia and multi immunisation evaluations – study design, sample size and setting (n=6)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	< 100	100 +	Multi-centre	Single Centre
Shingles, pneumonia, multiple immunisations	Three studies: Brackett (2015): Controlled Trial. Hess (2013): RCT Westrick (2016). Cluster randomized experimental design	6	2	7	6	2

6.7 Travel Health

As noted above travel health is not provided by the NHS in England and as such is not a health priority, but because of the overlap with immunisations it is included in this chapter. Travel health services within a community pharmacy encompass both immunisations recommended for travel to certain countries and education to maintain health while travelling. Two outcome evaluations are described (Hess et al. 2010, Tran et al. 2015). One UK process evaluation concerns the feasibility of a travel health and vaccination service at two Scottish pharmacies (Hind et al. 2008). It surveyed patients on the acceptability of the service, including accessing the service, reason for choosing pharmacy, whether they would re-use it or considered it value for money. The remainder of this section describes the two outcome evaluations.

6.7.1 *Aims of the interventions*

All interventions were aimed at the general population to improve their health when travelling to different countries.

6.7.2 *Study Setting*

The studies were set in the USA and each evaluated a travel health clinic in a single pharmacy, one in an independent pharmacy (Hess et al. 2010) and another in a supermarket pharmacy (Tran et al. 2015).

6.7.3 *Intervention components*

The studies involved personalised advice on travel, the dispensing of immunisations and antimalarial medicines and the dispensing of other medicines, such as prophylactic medicines. The medicines and vaccines dispensed depended on the pharmacist's protocol, and referral to other providers were made if necessary. In Tran et al. (2015), the pharmacist contacted the patient's general practitioner for this and followed-up to document their immunisations. Both studies provide more specific information on the education delivered to patients. In Hess et al. (2010), the pharmacist educated patients about health and personal risks such as malaria, travellers' diarrhoea and other non-vaccine-preventable diseases and advised on good health practices to prevent food, water, vector-borne diseases. In Tran et al. (2015), the pharmacist also advised the patient on any non-prescription medicines, clothing, devices, and created an information chart for them. For example, they advised on sun protection, insect-protection and altitude sickness prevention.

6.7.4 *Intervention timing*

The length of time per consultation was described in one study and was estimated to be 30-60 minutes (Tran et al. 2015). Prior to this, there was earlier contact between the patient and pharmacist to identify the patient's needs, the pharmacist undertook research to assess and plan recommendations, and received authorisations from the patient's general practitioner for medicines and vaccines not covered by the pharmacist's protocol. The patients were followed up by telephone for any vaccine boosters that were needed at a later time.

6.7.5 *People delivering the intervention*

In both studies, the pharmacist delivered the interventions and there was some communication with general practitioners regarding the immunisations administered.

6.7.6 Training

In both studies, the lead pharmacist in charge of the clinics had a Certificate in Travel Health (CTH) from the International Society of Travel Medicine (ISTM) (Hess et al. 2010, Tran et al. 2015).

6.7.7 Cost information

In the study by Tran et al. (2015), the fees were paid by patient or third-party reimbursement for immunisation and administration fees and there was also a travel clinic consultation fee charged to the patient. The other study, Hess et al. (2010), implies some costs were paid for by the patient for certain services, but details are not given.

6.7.8 Details of the study design

Both the evaluations utilised a single-group study design (see Table 6.4), sampled a hundred or more participants and evaluated service processes. One study, Hess et al. (2010), evaluated the intervention across multiple pharmacies. Tran et al. (2015) is set in one pharmacy.

Hess et al. (2010) studied the acceptance and refusal rates for vaccines and medicines recommendations, evaluated the change in patient understanding of travel-related issues, patient acceptance and satisfaction with the clinic and factors influencing these, and possible reasons for refusal of any recommendation made. Patient surveys and pharmacy records were used to compile data.

Tran et al. (2015) surveyed participants after their travels in order to gain an insight into the outcomes of the clinic. They asked participants how many of the recommended behaviour techniques were used for: sun protection; insect-protection; travellers' diarrhoea and altitude sickness prevention. They explored acceptability and convenience of the service and patients' acceptance of recommendations by pharmacist.

Table 6.4: Travel health included evaluations – study design, sample size, and setting (n=3)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non- Comparative	< 100	100 +	Multi-centre	Single Centre
Travel health	0	3	0	3	2	1

6.7.9 Reference list of included studies

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Anderson C, Thornley T (2016) Who uses pharmacy for flu vaccinations? Population profiling through a UK pharmacy chain. *Int J Clin Pharm* 38: 218-222.

Atkins K, van Hoek AJ, Watson C, et al. (2016) Seasonal influenza vaccination delivery through community pharmacists in England: evaluation of the London pilot. *BMJ Open* 6: e009739-e009739.

Bedwick BW, Garofoli GK, Elswick BM (2017) Assessment of targeted automated messages on herpes zoster immunization numbers in an independent community pharmacy. *J Am Pharm Assoc* 57: S293-S297.e291.

Bluml BM, Brock KA, Hamstra S, et al. (2017) Evaluation of the Impact of an Innovative Immunization Practice Model Designed to Improve Population Health: Results of the Project IMPACT Immunizations Pilot. *Population health management*.

Brackett A, Butler M, Chapman L (2015) Using motivational interviewing in the community pharmacy to increase adult immunization readiness: A pilot evaluation. *J Am Pharm Assoc* 55: 182-186.

Evans AM, Wood FC, Carter B (2016) National community pharmacy NHS influenza vaccination service in Wales: a primary care mixed methods study. *British Journal of General Practice* 66: e248-e257.

Fuchs J (2006) The provision of pharmaceutical advice improves patient vaccination status. *Pharm Pract (Granada)* 4: 163-167.

Healthwatch Norfolk. (2014) *Patient Experience of the Community Pharmacy Flu Vaccination Service in Norfolk. An independent evaluation of patient experience*. Healthwatch Norfolk.
<http://www.healthwatchnorfolk.co.uk/wp-content/uploads/2015/11/14-04-Community-Pharmacy-Flu-Vaccination-Service.pdf>

Hess KM, Dai CW, Garner B, et al. (2010) Measuring outcomes of a pharmacist-run travel health clinic located in an independent community pharmacy. *J Am Pharm Assoc* 50: 174-180.

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Hind C, Peterkin G, Downie G, et al. (2004) Successful provision of influenza vaccine from a community pharmacy in Aberdeen. *Pharmaceutical Journal* 273: 194-196.

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Khatau T, Leatherland S (2016) *Pilot for the Administration of nasal flu vaccine by community pharmacy. Evaluation report*. Leicester Partnership NHS Trust.

Kleinschmidt-DeMasters BK and Gilden DH (2001) Varicella-Zoster Virus Infections of the Nervous System. *Arch Pathol Lab Med* 125:770-780.

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Local Pharmaceutical Committees of Cumbria, Northumberland and Tyne and Wear (2014) *NHS Flu Vaccination – Evaluation Report (Community Pharmacy Delivery in Cumbria, Northumberland, Tyne and Wear)*. Local Pharmaceutical Committees of Cumbria, Northumberland, Tyne and Wear. http://www.gandstlpc.net/uploads/9/9/0/1/9901392/pharmacy_flu_service_evaluation_report_-_final.pdf

Marra F, Kaczorowski J, Gastonguay L, et al. (2014) Pharmacy-based Immunization in Rural Communities Strategy (PhICS): A community cluster-randomized trial. *Can Pharm J* 147: 33-44.

Miller S, Patel N, Vadala T, et al. (2012) Defining the pharmacist role in the pandemic outbreak of novel H1N1 influenza. *J Am Pharm Assoc* 52: 763-767.

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Pharmaceutical Society of Ireland (2015) *Report on the Evaluation of the Seasonal Influenza Vaccination Service in Pharmacy 2014/2015*. Pharmaceutical Society of Ireland.

Rai GK (2015) *Evaluation of the Community Pharmacy Flu Vaccination Pilot 2014-15. Birmingham, Solihull and Black Country Area Team.* NHS England.

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Shenson D, Moore RT, Benson W, et al. (2015) Polling places, pharmacies, and public health: Vote & Vax 2012. *Am J Public Health* 105: e12-15.

Sparkman A, Brookhart Andrea L, et al. (2017) The impact of an immunization check-up at a pharmacist-provided employee health screening. *J Am Pharm Assoc* 57: S274-S278.

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7 Antimicrobial resistance

- **Extent of evidence:** We identified four studies which focused on antimicrobial resistance. Three of these were evaluations of interventions.
- **Context of evidence:** The studies were conducted in Canada, Spain and the USA.
- **Intervention focus:** The interventions addressed the issue of increasing appropriate antibiotic use, improving clinical outcomes, satisfaction and costs for adults undertaking antibiotic treatment.
- **Intervention components:** Intervention components included: providing information (n=3) and advice (n=1) to encourage patients to adhere to medicine taking regimes.
- **Evaluation details:** One study used a RCT design, one used a non-randomised controlled design and one was a non-comparative study. One examined the physiological outcomes (number of infectious symptoms; infection severity scores), two assessed adherence to antibiotic course; two measured patient satisfaction and one assessed knowledge/attitudes.
- **Gaps in research:** The paucity of research located on this health topic suggests that more research is needed on all aspects of antimicrobial resistance public health interventions within community pharmacy.

7.1 Introduction

In this section we present a descriptive overview of studies about services provided to the public by community pharmacies to tackle antimicrobial resistance (AMR); the management of infections through community pharmacy is reported in Section 11. Tackling AMR is a UK strategic priority, with the aim to reduce the number of serious infections that are resistant to treatment (DH and DEFRA 2013). Inappropriate use and overuse of antimicrobials such as antibiotics is a major driver of antimicrobial resistance, although emerging research shows that there is more than just the overuse of antibiotics which leads to AMR (Singer 2017). AMR in the clinical setting has attracted increasing coverage in the media in the past few years. Dame Sally Davies, Chief Medical Officer (CMO) for England, highlighted the challenges of AMR in a 2017 blog for the King's Fund (Davies 2017). The CMO's attention to the subject has renewed the dialogue in the UK on AMR mitigation — a debate that began more than three decades earlier (Singer 2017). Another study which also drew attention to this argued that Antibiotic resistance was considered to be a more important global challenge than climate change, obesity or food security. Initiatives such as the Global Action Plan on Antimicrobial Resistance highlights the importance of training all healthcare professionals (Dyar 2018).

7.2 Included studies

Four studies on antimicrobial resistance were included (Beaucage et al. 2006, Hancock Mellor 2016, Machuca et al. 2003, Rodis et al. 2004). All but one were intervention evaluations (Hancock Mellor 2016). Hancock and Mellor (2016) explored community pharmacists' and public views and experiences of antimicrobial stewardship, rather than a specific intervention and is not further described.

7.2.1 Aims of the interventions

The principal aim of all three intervention evaluations was around the appropriate use of antibiotics. Beaucage et al. (2006) aimed to improve clinical outcomes, pharmaceutical care and reduce costs for patients taking antibiotics. Machuca et al. (2003) aimed to improve antibiotic adherence and symptom-resolution. Rodis et al. (2004) aimed to reduce the unnecessary use of antibiotics in ambulatory care.

7.2.2 Study Setting

One study each was based in Canada (Beaucage et al. 2006), Spain (Machuca et al. 2003) and the USA (Rodis et al. 2004). The authors did not specify the types of community pharmacies the interventions were set in, however those delivering the intervention were community pharmacists.

7.2.3 Intervention components

All three interventions included information provision; one also included the provision of advice (Beaucage et al. 2006). One offered the intervention face-to-face and then by telephone (Beaucage et al. 2006) and two were face-to-face (Machuca et al. 2003, Rodis et al. 2004).

7.2.4 Intervention timing

The duration of the intervention was not described in two studies; in one study the intervention lasted 20 minutes (Machuca et al. 2003). The intervention frequency was only discussed in one study, where there were two contact times (Beaucage et al. 2006); it is presumed to be one-off for the other two interventions.

7.2.5 People delivering the intervention

In all three of the included studies the community pharmacist delivered the intervention.

7.2.6 Training

The provision of training that was offered to those delivering the study intervention was mentioned in one study (Rodis et al. 2004). This study stated that training was received on patient education prior to the intervention.

7.2.7 Cost information

One study reported cost information (Beaucage et al. 2006), specifically the net cost of the intervention.

7.2.8 Details of the study design

As Table 11.4 indicates, all three intervention evaluations had 100 or more participants. Two studies involved single centres (Machuca et al. 2003, Rodis et al. 2004) and one involved multi centres (Beaucage et al. 2006). One was a randomised controlled trial (Beaucage et al. 2006), one was a non-randomised controlled study (Machuca et al. 2003) and one was a non-comparison study (Rodis et al. 2004). Two explored health behaviour change (antibiotic adherence) (Beaucage et al. 2006, Machuca et al. 2003), two assessed patient satisfaction (Beaucage et al. 2006, Rodis et al. 2004), one measured changes in knowledge/attitudes (Rodis et al. 2004) and one looked at physiological outcomes (Beaucage et al. 2006).

Table 7.1: Antimicrobial resistance – study design, sample size and setting (n=3)

Health condition	Study design		Sample size		No. pharmacies studied	
			< 100	100 +	Multi-centre	Single Centre
	Controlled	Non Comparative	< 100	100 +	Multi-centre	Single Centre
Antimicrobial resistance	2 studies Beaucage et al. (2006) RCT Machuca et al. (2003) Non-randomised controlled trial	1	0	3	1	2

7.3 Reference list of included studies

Beaucage K, Lachance-Demers H, Ngo TT, et al. (2006) Telephone follow-up of patients receiving antibiotic prescriptions from community pharmacies. *American Journal of Health-System Pharmacy* 63: 557-563.

Hancock J, Mellor C (2016) An evaluation of antimicrobial stewardship in community pharmacy. *Journal of Huddersfield student research* 2(1): e23.

Machuca M, Espejo J, Gutierrez L, et al. (2003) The effect of written information provided by pharmacists on compliance with antibiotherapy. *Ars Pharmaceutica* 44: 141-157.

Rodis J, Green C, Cook S, et al. (2004) Effects of a pharmacist-initiated educational intervention on patient knowledge about the appropriate use of antibiotics. *American Journal of Health-System Pharmacy* 61: 1385-1389.

8 Diabetes and cardiovascular risk

- **Extent of evidence:** We located 76 studies which focused on diabetes (n=39) or on cardiovascular health (n=37).
- **Context of evidence:** 68 studies were intervention evaluations. Of the diabetes studies, four were conducted in the UK; 15 were conducted in the US, five in Australia, three in Sweden and Canada, two in Switzerland, and one each in Spain, Belgium and Germany. The cardiovascular health studies were conducted in the UK (n=7), the US (n=7), Canada (n=7), Australia (n=6), Spain (n=2) and one each in Malta, New Zealand and Switzerland.
- **Intervention focus:** The diabetes studies focused on diabetes management (n=32), reducing known diabetes risk (n=3) and identifying diabetes risk and diabetes through community **screening** (n=4). Those focused on cardiovascular health examined cardiovascular disease management (n=11), anticoagulation management (n=5), reducing known CVD risk (n=8) and **screening** for CVD risk in the community (n=13).
- **Intervention components:** Intervention components in the diabetes focused studies consisted mainly of the provision of advice (n=29), education (n=25) and **screening** for risk factors or testing (n=21). This set included provision to groups as well as individuals. The interventions in the cardiovascular health focused studies were most likely to use **screening** and testing (n=26), education (n=14) and advice-giving (n=11). Across both diabetes and cardiovascular health, interventions also made use of referral to other health professionals, incentives, biofeedback and service and resource provision.
- **Evaluation details:** 68 of the studies were service evaluations. A comparison group design was used in 16 of the 35 diabetes evaluations and in 11 of the 33 cardiovascular health evaluations. Between them these studies reported on all the outcome domains described in this report, as well as on all of the types of intervention processes. Eight studies were not evaluations of specific interventions but instead examined the perspectives of service users and pharmacists about provision more generally of diabetes (n=4) and cardiovascular management (n=4) or focused on cost effectiveness (n=1).
- **Gaps in research:** The review identified that, although there are a number of controlled design intervention evaluations, only two were conducted in the UK. Indeed, only eleven evaluations in total were conducted in the UK, suggesting the need for investment in UK-based controlled design studies.

8.1 Introduction

In this chapter, a descriptive overview of studies which focused on the services provided to the public by community pharmacies for the health priority of diabetes and cardiovascular health is presented. Cardiovascular disease encompasses conditions which affect the heart and the circulatory system and

can manifest in many ways. Diabetic conditions affect the body's ability to control the levels of free glucose (sugar) in the blood and also have a significant impact on the cardiovascular system. The data provided in this chapter are split into two domains: diabetes services and cardiovascular health services.

8.2 Included studies

We located more studies on diabetes and cardiovascular health than for any other health condition. In total (n=76) studies were identified across these two domains.

The remainder of this chapter is organised in terms of these two domains (diabetes and cardiovascular health services) with further subsections for the conditions seen within each domain. The references for studies are listed separately for each domain below.

8.3 Diabetes

We located 39 studies that focused on diabetes. Four of the 39 studies explored stakeholder views about diabetes services in general, rather than focusing on a specific intervention (Abduelkarem et al. 2003, Douglas et al. 2007, Haigh et al. 2007, Twigg et al. 2013).

The analysis presented in this chapter is based on the 35 studies that evaluated interventions. The evaluated interventions can be split into: support for people with a diagnosis of diabetes (n=28); support for people known to be at risk of diabetes (n=3); and those that aimed to identify diabetes or diabetes risk among a previously undifferentiated group of people (n=4). Table 8.1 shows the countries in which these studies were conducted.

Table 8.1: Diabetes group (n=35)

	UK	USA	Canada	Australia	Spain	Sweden	Switzerland	Belgium	Germany
Diabetes management	3	14	3	3	1	3		1	
Diabetes risk reduction				1			1		1
Diabetes and diabetes risk identification	1	1		1			1		

The following sections provide details on the range of diabetes interventions provided by community pharmacies for each of the above categories in turn.

8.3.1 Diabetes management

This section examines the 28 evaluations of interventions aimed at supporting people with a diagnosis of diabetes (Ali et al. 2012, Armour et al. 2004, Bunting et al. 2011, Castle 2016, Cranor et al. 2003, Doucette et al. 2009, Fera et al. 2009, Fornos et al. 2006, Hogue et al. 2003, Johnson et al. 2014, Kraemer et al. 2012, Krass et al. 2007, McLean et al. 2008, Mehuys et al. 2011, Nau et al. 2001, Nau and Ponte 2002, Oyetayo et al. 2011, Papastergiou et al. 2016, Planas et al. 2003, Rashed et al. 2010, Rosin and Townsend 2008, Sansgiry Sujit et al. 2012, Sarkadi and Rosenqvist 2001, Sarkadi and Rosenqvist 2004, Sarkadi et al. 2005, Taylor et al. 2005, Twigg et al. 2015a, West et al. 2003). These 28 evaluations were reported in 36 reports (see Appendix 2).

8.3.1.1 *Aims of the interventions*

While all interventions in this set of evaluations aimed to improve the management of diabetes, there was variation in focus. In terms of diabetes type, one was aimed at type 1 as well as type 2 diabetes (West et al. 2003) and another was aimed at diabetes that was poorly-controlled (Twigg et al. 2015a). While most were aimed at improving participants' glycosylated haemoglobin (A1C) levels, or overall cardiovascular risk profiles, some interventions were focused on other aspects of cardiovascular health, such as improved blood pressure control (McLean et al. 2008). There was also an emphasis on improving patients' self-care skills (Bunting et al. 2011, Castle 2016, Cranor et al. 2003, Doucette et al. 2009, Fera et al. 2009, Hogue et al. 2003, Johnson et al. 2014, Kraemer et al. 2012, Krass et al. 2007, Mehuys et al. 2011, West et al. 2003) and identifying patients who are not achieving therapeutic goals (Nau and Ponte 2002)

8.3.1.2 *Study Setting*

Half (n=14) of the included diabetes management studies were set in the US (Bunting et al. 2011, Cranor et al. 2003, Doucette et al. 2009, Fera et al. 2009, Hogue et al. 2003, Johnson et al. 2014, Kraemer et al. 2012, Nau et al. 2001, Nau and Ponte 2002, Oyetayo et al. 2011, Planas et al. 2003, Rashed et al. 2010, Sansgiry Sujit et al. 2012, West et al. 2003). Five studies were set in Canada (McLean et al. 2008, Papastergiou et al. 2016) and Australia (Armour et al. 2004, Krass et al. 2007, Taylor et al. 2005). Europe was the setting for three related Swedish studies (Sarkadi and Rosenqvist 2001, Sarkadi and Rosenqvist 2004, Sarkadi et al. 2005), one study from Spain (Fornos et al. 2006), one from Belgium (Mehuys et al. 2011), and two studies from the UK (Ali et al. 2012, Twigg et al. 2015a).

All but one of the 28 studies (West et al. 2003) were conducted across several pharmacies. The community pharmacy type was unspecified in just over half of the studies (n=13). Interventions otherwise were delivered entirely in a pharmacy multiple (Ali et al. 2012, Hogue et al. 2003, Johnson et al. 2014, McLean et al. 2008, Oyetayo et al. 2011, Papastergiou et al. 2016, Planas et al. 2003), entirely in an independent pharmacy (Nau et al. 2001, Nau and Ponte 2002, West et al. 2003), or in a mixture of independent and chain pharmacies (Fera et al. 2009, Kraemer et al. 2012, Twigg et al. 2015a), with the last of these cases involving some outreach by pharmacists to participants' workplaces (Fera et al. 2009). Only one study where the setting was unclear (Rosin and Townsend 2008).

8.3.1.3 *Intervention components*

In all but three cases (Armour et al. 2004, Bunting et al. 2011, Rosin and Townsend 2008), the diabetes management interventions were delivered solely through face-to-face encounters. In these three cases, some consultations were held over the telephone, either as a follow up to a face-to-face session, or

when participants were not able to attend the pharmacy. All but four of the 28 diabetes management evaluations (Sarkadi and Rosenqvist 2001, Sarkadi and Rosenqvist 2004, Sarkadi et al. 2005, West et al. 2003) were of interventions delivered to individuals rather than groups. One study was of an intervention with both individual and group sessions (West et al. 2003). The other three evaluated the same intervention in different phases of its development (from piloting, through controlled trialling to wider implementation). This group intervention aimed for group participants to identify their own questions for discussion, and for answers to be provided by group participants, rather than by the group facilitator. Other interventions offered access to wellness classes (Hogue et al. 2003) and to a free diabetes support service (West et al. 2003).

Nearly all of the interventions involved advice-giving by a pharmacist (n=24) or described interventions as educational or described the use of an educational curriculum or detailed guidelines relating to health or health behaviour (n=22). Of those studies that did not emphasise education, in one, all participants had in an earlier intervention attended a diabetes education clinic (Doucette et al. 2009). Another emphasised the importance of participants being able to direct discussions (Twigg et al. 2015a).

A process of feeding back clinical test results to participants was described in twelve of the studies (Ali et al. 2012, Armour et al. 2004, Doucette et al. 2009, Fera et al. 2009, Hogue et al. 2003, Johnson et al. 2014, Krass et al. 2007, McLean et al. 2008, Mehuys et al. 2011, Papastergiou et al. 2016, Planas et al. 2003, Taylor et al. 2005). In several studies it was clear that consultations with a pharmacist involved their using questionnaires to identify lifestyle risk factors (Hogue et al. 2003), taking physical measurements (e.g. of blood pressure or weight (Ali et al. 2012, Castle 2016, Cranor et al. 2003, Hogue et al. 2003, Johnson et al. 2014, McLean et al. 2008, Nau et al. 2001, Nau and Ponte 2002, Papastergiou et al. 2016, Planas et al. 2003, Sansgiry Sujit et al. 2012, Taylor et al. 2005)), making assessments of feet or skin (Cranor et al. 2003, Sansgiry Sujit et al. 2012), or conducting point of care blood testing. (Castle 2016, Fera et al. 2009, Johnson et al. 2014, Nau et al. 2001, Nau and Ponte 2002, Papastergiou et al. 2016, Planas et al. 2003, Sansgiry Sujit et al. 2012, Taylor et al. 2005). However, it was often not possible to identify whether pharmacists were conducting the clinical tests or measurements themselves during sessions with patients or if these were being provided through another service.

Communication and lines of responsibility between pharmacists and other health professionals were mentioned in all but two of the studies, but detail was sparse. In some studies, it appeared that pharmacists might be following strict protocols with physicians taking most decisions about care e.g. (Bunting et al. 2011, Nau et al. 2001, Nau and Ponte 2002, Sansgiry Sujit et al. 2012, Twigg et al. 2015a, West et al. 2003). In two, participants needed to be referred by a physician (Hogue et al. 2003). There sometimes appeared to be a requirement for clinicians to be sent reports about patients (Doucette et al. 2009, Fornos et al. 2006, Hogue et al. 2003, Johnson et al. 2014, Kraemer et al. 2012, McLean et al. 2008, Papastergiou et al. 2016, Planas et al. 2003, Sansgiry Sujit et al. 2012, West et al. 2003), whereas, in other cases, the reporting process appeared to be more at the pharmacist's discretion (e.g. Ali et al. 2012, Armour et al. 2004, Cranor et al. 2003, Fera et al. 2009, Krass et al. 2007, Oyetayo et al. 2011). Referral by pharmacists to physicians and other health professionals was also described (Rosin and Townsend 2008) (e.g. Ali et al. 2012, Cranor et al. 2003, Fera et al. 2009, Johnson et al. 2014, Krass et al. 2007, Papastergiou et al. 2016, Sarkadi and Rosenqvist 2004, Sarkadi et al. 2005, Twigg et al. 2015a).

Some interventions involved the provision of additional resources or incentives, and in some cases an explicit reorganisation of services was described. Participants were provided with free blood sugar measurement meters for use at home (Armour et al. 2004, Cranor et al. 2003, Johnson et al. 2014, Krass

et al. 2007, Mehuys et al. 2011, Planas et al. 2003, Rashed et al. 2010, Taylor et al. 2005) or had insurance or medication payments waived (Bunting et al. 2011, Cranor et al. 2003, Fera et al. 2009, Johnson et al. 2014, Kraemer et al. 2012, Oyetayo et al. 2011, Rashed et al. 2010). Other interventions involved a physical redesign of the pharmacy to provide a special diabetes section (West et al. 2003), collective planning by several rural pharmacies to share provision efforts (Hogue et al. 2003), and the provision of a drop-in clinic at set specified times (Twigg et al. 2015a).

8.3.1.4 Intervention timing

All of the studies provided some information about the timing of intervention provision (Bunting et al. 2011). Six were described as continuing for over a year (Doucette et al. 2009, Fera et al. 2009, Fornos et al. 2006, Nau et al. 2001, Nau and Ponte 2002, Rashed et al. 2010), and nine for 12 months (Ali et al. 2012, Hogue et al. 2003, Johnson et al. 2014, Kraemer et al. 2012, Oyetayo et al. 2011, Sansgiry Sujit et al. 2012, Sarkadi and Rosenqvist 2001, Sarkadi and Rosenqvist 2004, Sarkadi et al. 2005), two interventions were delivered for six months (Rosin and Townsend 2008, Twigg et al. 2015a) one for six-eight weeks respectively (Twigg et al. 2015a, West et al. 2003) and one for one-three months (Castle 2016)

The frequency of sessions was unclear in only two of the studies (Rashed et al. 2010, Rosin and Townsend 2008). Most interventions involved monthly sessions (Ali et al. 2012, Armour et al. 2004, Fornos et al. 2006, Hogue et al. 2003, Krass et al. 2007, Planas et al. 2003, Sarkadi and Rosenqvist 2001, Sarkadi and Rosenqvist 2004, Sarkadi et al. 2005), or sessions run every one and a half to three months (Bunting et al. 2011, Cranor et al. 2003, Doucette et al. 2009, Fera et al. 2009, Johnson et al. 2014, McLean et al. 2008, Oyetayo et al. 2011, Sansgiry Sujit et al. 2012). One provided weekly sessions (West et al. 2003). Others were run as an initial visit with follow-ups, either at three months (Castle 2016, Papastergiou et al. 2016), one-three months (Nau et al. 2001, Nau and Ponte 2002) or spread over nine months (Taylor et al. 2005). Other reports referred to drop-in clinics (Twigg et al. 2015a) and sessions that coincided with medication refills (Mehuys et al. 2011).

Few studies reported on the length of intervention sessions. Six described these as an hour-long (Nau et al. 2001, Nau and Ponte 2002, Planas et al. 2003, Rashed et al. 2010, Rosin and Townsend 2008, West et al. 2003). Others reported an average of 15 minutes (Cranor et al. 2003), 20-25 minutes (Papastergiou et al. 2016), 30 minutes (Johnson et al. 2014), 40 minutes (Twigg et al. 2015a), and 50 minutes (Fera et al. 2009).

8.3.1.5 People delivering the intervention

As well as involving community pharmacists, five interventions involved nurses (Ali et al. 2012, Bunting et al. 2011, Hogue et al. 2003, McLean et al. 2008, West et al. 2003), one as a co-ordinator (West et al. 2003). Dietitians were involved in two cases (Hogue et al. 2003, West et al. 2003). In several studies, health insurance agencies and third party organisations were involved in managing aspects of the intervention – for example in assigning people to particular pharmacies, or handling participants' records (Bunting et al. 2011, Fera et al. 2009). The design of the group intervention described in the three related studies conducted by Sarkadi and colleagues used co-education by peers (Sarkadi and Rosenqvist 2001, Sarkadi and Rosenqvist 2004, Sarkadi et al. 2005). Only one study mentioned the participation of a pharmacy technician (Sansgiry Sujit et al. 2012). For one study (Castle 2016) this was not reported.

8.3.1.6 Training

There were three studies in which there was no mention of pharmacists undergoing training for the purposes of diabetes management (Hogue et al. 2003, Rosin and Townsend 2008)) (Papastergiou et al. 2016). Details varied but ranged from self-directed learning packages followed up by a brief face-to-face training session (e.g. Twigg et al. 2015a), through to between a day and a week of purposely developed workshop training (e.g. Sarkadi and Rosenqvist 2004), to a requirement for training accredited by National Diabetes or Pharmacy Associations (e.g. Kraemer et al. 2012, Sansgiry Sujit et al. 2012, West et al. 2003).

8.3.1.7 Cost information

Seven studies provided information on costs, but these were generally in the form of overall costs related to diabetes (e.g. exploring possible savings in terms of changes to overall medication and treatment use by participants) (Bunting et al. 2011, Cranor et al. 2003, Fera et al. 2009, Kraemer et al. 2012, Krass et al. 2007, Rashed et al. 2010, Taylor et al. 2005). One study presented the payments made to pharmacists per patient (Krass et al. 2007) and others estimated the intervention's return on investment (Bunting et al. 2011) or compared costs with projections (Fera et al. 2009) or with those seen at baseline (Cranor et al. 2003). Two studies were designed as full cost-effectiveness evaluations. One presented findings comparing medical and physician insurance claims and prescription costs for the study's comparison groups (Rashed et al. 2010). The other presented findings on the cost to the healthcare sector per patient for a known reduction in HbA1c levels (Taylor et al. 2005).

8.3.1.8 Details of the study design

Design characteristics for the 28 evaluations are summarised in Table 8.2. This shows that all but one were conducted over more than one pharmacy and that 16 of the evaluations had samples of one hundred or more participants.

Thirteen of the studies were evaluations that used a comparison group design with randomisation (Ali et al. 2012, Doucette et al. 2009, Fornos et al. 2006, Krass et al. 2007, Planas et al. 2003, Rosin and Townsend 2008, Sarkadi and Rosenqvist 2004), or without (Armour et al. 2004, Kraemer et al. 2012, McLean et al. 2008, Mehuys et al. 2011, Rashed et al. 2010, Taylor et al. 2005). Of the remainder, one was a retrospective cohort study (Sansgiry Sujit et al. 2012) and the rest used a single group before and after design.

All 28 evaluations presented findings about outcomes and almost half of these (n=12) also reported on intervention processes. In terms of outcomes, all but five studies reported on physiological changes such as glycosylated haemoglobin (A1C), and cholesterol/lipid levels, or weight. Of the remaining five, one reported on health behaviour and knowledge outcomes (Mehuys et al. 2011) one on health service use and results of testing (Papastergiou et al. 2016), one study presented findings of the outcomes of assessment (Nau et al. 2001, Papastergiou et al. 2016) and two reported psychosocial outcomes (Sarkadi and Rosenqvist 2004, Taylor et al. 2005).

The processes evaluated in these studies included acceptability to recipients (Armour et al. 2004, Castle 2016, Cranor et al. 2003, Fera et al. 2009, Taylor et al. 2005, Twigg et al. 2015a), acceptability to community pharmacists (Armour et al. 2004, Castle 2016, Cranor et al. 2003, Kraemer et al. 2012, Twigg et al. 2015a), the actual interventions provided by pharmacists (Armour et al. 2004, Doucette et al. 2009, Kraemer et al. 2012, Papastergiou et al. 2016), and training (Armour et al. 2004, Sarkadi and

Rosenqvist 2004, Twigg et al. 2015a). One study examined the value of the intervention to participants' managers, as well as participants' perspectives of factors influencing the costs to them of taking up the service (Cranor et al. 2003). Two studies evaluated patient reach and uptake of the intervention (Castle 2016, Rosin and Townsend 2008).

8.3.2 Diabetes risk reduction

This section examines the three evaluations of interventions aimed at supporting people without a diagnosis, but known to be at risk from diabetes (Botomino et al. 2008, Maulavizada et al. 2016, Schmiedel et al. 2015).

8.3.2.1 Aims of the interventions

One of the three evaluated interventions was aimed at helping those on medication for mental health conditions manage the metabolic side effects of those medications (Maulavizada et al. 2016). The other two interventions were both aimed at individuals more generally found to be at risk of diabetes. Participants were recruited for the first of these via community-wide risk assessment programme, and then received pharmacist advice of different levels of intensity, in particular about diet and exercise for weight loss (Botomino et al. 2008). The second was a lengthier pharmacist-delivered lifestyle intervention programme to prevent Type II diabetes (Schmiedel et al. 2015).

8.3.2.2 Study Setting

The first of these three studies was conducted in a single pharmacy in Australia (Maulavizada et al. 2016), the other two both conducted studies across a number of pharmacies within Europe (in Switzerland and Germany respectively). In all cases, no detail was given about the types of community pharmacy involved.

8.3.2.3 Intervention components

The two European-based interventions (Botomino et al. 2008, Schmiedel et al. 2015) involved pharmacists giving advice and helping participants to set goals and had educational and testing components. In one, the stages of change approach was used to frame discussions following an initial questionnaire-based assessment of risk factors and blood glucose testing (Botomino et al. 2008). In the other, participants kept a journal, and attended individual, as well as group sessions, while also receiving tests for plasma glucose levels (Schmiedel et al. 2015). The pharmacist's role in the Australian intervention was framed mainly around medicines management, but the intervention within the pharmacy setting included questionnaire-based and other measurements (e.g. for smoking behaviour, weight and blood pressure) and blood tests for blood glucose and lipid profiles, which were fed back to participants, as well as education (Maulavizada et al. 2016).

8.3.2.4 Intervention timing

Detail is given in two of the three studies about intervention frequency and duration. In one study a case is referred to where a participant received six appointments within a six month period, and it is noted that no time restrictions were placed on nurses' consultations (Maulavizada et al. 2016). The other reports that participants received three individual counselling sessions and five group-based lectures – whose length is not specified – over 12 months (Schmiedel et al. 2015).

8.3.2.5 People delivering the intervention

As described above, one intervention involved nurses as well as community pharmacists (Maulavizada et al. 2016). This study also states that all staff within the pharmacy, including pharmacy assistants, helped identify participants at-risk for adverse medication effects for referral to the pharmacist and nurse-run clinic. Community pharmacists were the only providers mentioned in the other two studies.

8.3.2.6 Training

Training was described in two studies. In both, pharmacists were trained in two evening courses for counselling on risk factors (Botomino et al. 2008) and for half a day on behaviour changes (Schmiedel et al. 2015). In one, pharmacy teams were also trained in blood glucose measurement (Botomino et al. 2008).

8.3.2.7 Cost information

None of the studies evaluated the impact of the interventions on costs, or described the costs of the intervention. Two described the payments for participation required of individual participants or of participating pharmacies (Botomino et al. 2008, Maulavizada et al. 2016).

8.3.2.8 Details of the study design

Design characteristics for the three evaluations are summarised in Table 8.2. This shows that two of the three evaluations had samples of one hundred or more participants and that the same proportion were multi-centred studies.

Two of the three evaluations used comparison group designs (Botomino et al. 2008, Schmiedel et al. 2015), with one of these randomising participants (Schmiedel et al. 2015). Two of the three reports on intervention processes as well as outcomes (Botomino et al. 2008, Maulavizada et al. 2016). All three studies evaluated physiological changes, with two measuring weight-loss, one postprandial plasma glucose levels and blood pressure, and another producing individualised case studies with outcomes selected to demonstrate the breadth of the service. Health behaviour outcomes, such as physical activity and nutrition levels were also reported in all three studies. Knowledge (Maulavizada et al. 2016) and psychosocial outcomes, in the form of a quality of life measure (Schmiedel et al. 2015) were also reported.

8.3.3 Diabetes risk identification

This section examines the four evaluations of interventions aimed at identifying diabetes or diabetes risk among a previously undifferentiated group of people (Bovet et al. 2011, Kilkenny et al. 2014, Olenak Calpin 2010, Twigg et al. 2015b).

8.3.3.1 Aims of the interventions

All four interventions aimed to identify diabetes risk. One (Bovet et al. 2011) included additional testing for those who appeared at high risk from initial assessments about whether participants appeared to have diabetes or pre-diabetes. This intervention included a region-wide mass-media supported awareness-raising campaign, but all four describe an intention to raise awareness among participants about diabetes risk factors and aimed to provide advice to encourage lifestyle changes.

8.3.3.2 Study Setting

The studies were set in Switzerland (Bovet et al. 2011), Australia (Kilkenny et al. 2014), the US (Olenak Calpin 2010) and the UK (Twigg et al. 2015b). All but one (Olenak Calpin 2010) was conducted across multiple pharmacies. Two studies specified the type of pharmacy setting. In one this was a pharmacy chain (Olenak Calpin 2010). In the other (Bovet et al. 2011) it was independent pharmacies .

8.3.3.3 Intervention components

All interventions used questionnaires to assess diabetes risk. One intervention's use of a two-stage blood-testing approach examining both blood glucose and A1c levels in some participants has already been referred to above (Bovet et al. 2011). Another of the evaluations compared assessment by questionnaire alone to questionnaire-based assessment supplemented with random (non-fasting) blood-glucose testing (Kilkenny et al. 2014). Blood testing (for glucose and cholesterol) was conducted in one further study (Olenak Calpin 2010). The other evaluation assessed risk with a questionnaire (Twigg et al. 2015b). All interventions involved weight or waist measurements. All interventions followed up risk assessments with tailored advice with or without goal setting. Participants with medium or high risk assessments were advised to visit a physician. They were provided with standard letters to assist with this in one case (Kilkenny et al. 2014). In another, results were mailed directly to a physician (Olenak Calpin 2010). In one intervention, participants were provided with their readings on an A5-sized card within a plastic cover and it was intended that this be updated on future visits (Bovet et al. 2011).

8.3.3.4 Intervention timing

All of the interventions were single consultations for assessment without follow-up within the periods evaluated. These were described as designed to last ten minutes (Twigg et al. 2015b), taking more or less than five minutes (Kilkenny et al. 2014), a 20 minute appointment (Olenak Calpin 2010), and taking 10-30 minutes (Bovet et al. 2011).

8.3.3.5 People delivering the intervention

In addition to community pharmacists, one study refers to counter staff (Twigg et al. 2015b), and another outlines the role of the regional mass media in promoting awareness and helping recruit participants for assessment (Bovet et al. 2011).

8.3.3.6 Training

All but one of the studies (Olenak Calpin 2010) described provider training. In all three interventions pharmacists were required to attend online training. In one study this was described as taking approximately 40 minutes to complete (Kilkenny et al. 2014). The other two studies report that online learning was supplemented by a two hour workshop and hands on training in point of care testing (Bovet et al. 2011), and by face-to-face learning of an unspecified length (Twigg et al. 2015b).

8.3.3.7 Cost information

One of the studies provided details of intervention costs, in the form of the overall costs of a regional promotional campaign and the costs per participant of disposable testing materials (Bovet et al. 2011).

8.3.3.8 Details of the study design

Design characteristics for the four evaluations are summarised in Table 8.2. This shows that all of the evaluations had samples of one hundred or more participants and that all but one of the evaluations were conducted across several pharmacy settings. One of the four evaluations used a comparison group design (Kilkenny et al. 2014). Pharmacies were randomly allocated in this study, but the study authors described the study as observational, since several pharmacies swapped their allocation after randomisation.

All four evaluations reported on the results of assessment and two reported on service use or referral outcomes (Kilkenny et al. 2014, Olenak Calpin 2010). One study reported on health behaviour outcomes, in the form of reports of modifications to lifestyle (Olenak Calpin 2010). All four of the studies also measured intervention processes, including acceptability to recipients (Bovet et al. 2011, Olenak Calpin 2010), intervention feasibility (Kilkenny et al. 2014) and the numbers assessed (Twigg et al. 2015b).

Table 8.2 Diabetes evaluations – study design, sample size and setting (n=28)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	< 100	100 +	Multi-centre	Single Centre
Diabetes management	13	15	12	16	27	1
	Ali (2012) RCT					
	Armour (2004) Parallel group, repeated measures design					
	Doucette (2009) RCT					
	Fornos (2006) RCT					
	Krass (2007) RCT					
	Kraemer (2012) Randomized trial					
	McLean (2008) RCT					
	Mehuys (2011) Randomized, controlled parallel-group					
	Planas (2003): . RCT					
	Rashed (2010)					
	Rosin (2008)					
	Sarkadi (2004)					

	RCT Taylor (2005) Parallel groups design with a control and intervention group					
Diabetes risk reduction	2 Botomino (2008) Schmiedel (2015) RCT	1	1	2	2	1
Diabetes and diabetes risk identification	1 Kilkenny (2006)	3	0	4	3	1

8.4 Cardiovascular health

We located a total of 37 studies that focused on cardiovascular health. Three of the 37 studies found explored views about cardiovascular health services in general, rather than focusing on a specific intervention such as those listed in table 8.3 (Killick 2015, Morton et al. 2015, Tompson et al. 2017).

The foci of the 33 intervention evaluations can be summarised as: cardiovascular management; anticoagulation management; cardiovascular risk reduction; and assessment for cardiovascular risk in the community setting. Table 8.3 shows the countries in which these studies were conducted.

Table 8.3: Cardiovascular health (n=33)

	UK	USA	Canada	Australia	Spain	New Zealand	Switzerland	Malta	Austria
CVD management	4	2	4				1		
Anticoagulation management	1	1	1			1		1	
CVD risk reduction	1	2	2	1	2				
CVD risk assessment	4	2	2	4					1

The following sections provide details on the range of cardiovascular health interventions provided by community pharmacies for each of the above categories in turn.

8.4.1 Cardiovascular management

We located eleven studies that focused on cardiovascular management (Bajorek et al. 2016, Isetts et al. 2016, Marra et al. 2017, Ryan-Woolley and Cantrill 2000, Santschi et al. 2017) (Bunting et al. 2015, Jaffray 2010, Killick 2015, Morton et al. 2015, Tsuyuki et al. 2002, Tsuyuki et al. 2004). Nine of these evaluated intervention outcomes and/or processes (Bajorek et al. 2016, Isetts et al. 2016, Marra et al. 2017, Ryan-Woolley and Cantrill 2000, Santschi et al. 2017) (Bunting et al. 2015, Jaffray 2010, Killick 2015, Morton et al. 2015, Tsuyuki et al. 2002, Tsuyuki et al. 2004).

A further two studies (Killick 2015, Morton et al. 2015) did not evaluate interventions but investigated the experience of UK community pharmacists and patients respectively, about cardiovascular management services in general, and are not discussed further in this section.

8.4.1.1 *Aims of the interventions*

The nine interventions evaluated were all aimed at improving the lives of people with cardiovascular disease. The aim of the intervention in one study was to use meetings with a “health coach”, pharmacist or health educator, to change health behaviour (Bunting et al. 2015). In one UK study, the intervention employed was to enhance the appropriateness of therapy, explore medicine taking compliance and concordance and provide lifestyle and social support to patients (Jaffray 2010). The other studies used interventions to lower cholesterol levels (Tsuyuki et al. 2002, Tsuyuki et al. 2004), control blood pressure (Bajorek et al. 2016, Isetts et al. 2016, Santschi et al. 2017) or manage angina (Ryan-Woolley and Cantrill 2000)

8.4.1.2 *Study Setting*

Two studies were set in the UK (Ryan-Woolley and Cantrill 2000) (Jaffray 2010). Both studies were multi-centre studies, the nature of the community pharmacy setting was unspecified for one study (Jaffray 2010) and included additional non-pharmacy health service for the other (Ryan-Woolley, 2000). Two studies were set in the USA (Bunting et al. 2015, Isetts et al. 2016) both were multicentre studies; the type of community pharmacy setting was unspecified in one instance (Bunting et al. 2015) and included additional non-pharmacy health service for the other (Isetts et al. 2016) Four studies were set in Canada. One (Marra et al. 2017) was a cost evaluation with no specific setting. Three studies by Tsuyuki et al. (Tsuyuki et al. 2002, Tsuyuki et al. 2004) were set in Canada and were multicentre studies. Although it was difficult to discern the setting for the 2002 study, the 2004 study was set in high street or supermarket pharmacy chains. One study was set in Switzerland in a mixture of unspecified and other non-pharmacy settings (Santschi et al. 2017) and the final study was in Australia in an unspecified community pharmacy setting (Bajorek et al. 2016) both of which were multicentre studies.

8.4.1.3 *Intervention components*

The core components of the evaluated interventions were assessment and testing (Bunting et al. 2015, Santschi et al. 2017, Tsuyuki et al. 2002, Tsuyuki et al. 2004), education (Bajorek et al. 2016, Santschi et al. 2017) (Bunting et al. 2015, Tsuyuki et al. 2002, Tsuyuki et al. 2004), referral or communication with professionals (Bunting et al. 2015, Jaffray 2010, Ryan-Woolley and Cantrill 2000, Tsuyuki et al. 2002, Tsuyuki et al. 2004) and medicines management (Bunting et al. 2015, Isetts et al. 2016, Jaffray 2010,

Ryan-Woolley and Cantrill 2000, Tsuyuki et al. 2004). Additional intervention components included advice (Bunting et al. 2015, Tsuyuki et al. 2002); and incentives (Bunting et al. 2015).

8.4.1.4 Intervention timing

The studies reported that interventions consisted of one initial visit with a varied distribution of follow up visits; thirty minutes every three months with a follow up after a year (Ryan-Woolley and Cantrill 2000); thirty minutes every three months up to four years of the study (Bunting et al. 2015, Jaffray 2010); visits at two, four, eight, 12, and 16 weeks (Tsuyuki et al. 2002); and telephone follow up at two and four weeks and then three and six month face-to-face visits (Tsuyuki et al. 2004); three months and 12 month follow up (Bajorek et al. 2016) one, two, four, six and eight month face-to-face follow ups (Isetts et al. 2016), or every six months (Santschi et al. 2017)

8.4.1.5 People delivering the intervention

Six of the intervention studies included in this map used community pharmacists only to deliver the intervention (Bajorek et al. 2016, Isetts et al. 2016, Jaffray 2010, Ryan-Woolley and Cantrill 2000, Tsuyuki et al. 2002, Tsuyuki et al. 2004). One intervention (Bunting et al. 2015) used community pharmacists, community members (peers) and American Health Care (a pharmacist-owned company which managed recruitment but also performed data collection and other tasks).

8.4.1.6 Training

Six evaluations reported information on training. In one, training consisted of web-based education such as lectures or workshops (Tsuyuki et al. 2004). Another study provided six hours of training on clinical modules (Ryan-Woolley and Cantrill 2000). For one study the training was a two-hour workshop about standardised blood pressure measurement (Santschi et al. 2017) One study was not specific about the nature of the training provided (Bajorek et al. 2016) (Jaffray 2010). Chronic care coaches were given training in best practices, how to counsel patients and documentation in one study (Bunting et al. 2015).

8.4.1.7 Cost information

Detailed cost information was provided in the Bunting et al. (2015) study including the total health plan average savings for patients grouped by condition (diabetes, dyslipidaemia and hypertension). Tsuyuki et al. (2002) use an estimate cost from a previously published economic evaluation by Simpson et al. (2005) that estimates costs at \$7 per patient per four months. Detailed cost information on various parameters focusing on hypertension is provided in one study (Marra et al. 2017). One further study mentioned costs but did not provide information (Jaffray 2010).

8.4.1.8 Details of the study design

Design characteristics for the four evaluations are summarised in Table 8.4. This shows that all were conducted over more than one pharmacy and had samples of one hundred or more participants. It also shows that three studies used a controlled design. Five studies employed randomised controlled designs (Bajorek et al. 2016, Isetts et al. 2016, Jaffray 2010, Santschi et al. 2017, Tsuyuki et al. 2002). The Bunting et al. (2013) study used a quasi-experimental design, collecting data both pre- and post-intervention but only using a control group for its financial analysis. One cost evaluation was identified (Marra et al. 2017). The fourth evaluation used a single group study design (Tsuyuki et al. 2004).

8.4.2 Anticoagulation management

Our search identified five studies that focused on anticoagulation management (Amruso 2004, Coleman et al. 2004, Harrison et al. 2015, Mifsud et al. 2014, Wilson et al. 2004)

8.4.2.1 *Aims of the interventions*

The principal aims of anticoagulation interventions were to test and monitor INR, to reduce bleeds associated with pharmacological treatment (Amruso 2004); monitor INR levels (Mifsud et al. 2014) or maintain the same levels of INR control as achieved in hospital (Coleman et al. 2004); adjust medicine dosage to maintain stable INR (Harrison et al. 2015, Wilson et al. 2004).

8.4.2.2 *Study Setting*

All five included studies were set in different countries: UK (Coleman et al. 2004); USA (Amruso 2004); New Zealand (Harrison et al. 2015); Malta (Mifsud et al. 2014) (and Canada (Wilson et al. 2004). Two studies took place in a single community pharmacy setting (Coleman et al. 2004, Wilson et al. 2004). The other three studies were multicentre studies (Amruso 2004, Harrison et al. 2015, Mifsud et al. 2014). Only the Amruso et al. (Amruso 2004) study specified the type of pharmacy setting, which was high street or supermarket pharmacy chains.

8.4.2.3 *Intervention components*

The primary intervention component used by all four studies was anticoagulation assessment or testing for INR levels. Medicines management in the form of warfarin therapy dosage alterations were also a key component of two studies (Coleman et al. 2004, Harrison et al. 2015). Two other studies included patient education in the intervention (Amruso 2004, Wilson et al. 2004). Further intervention components were bio feedback (Coleman et al. 2004) and referral or communication with other professionals (Wilson et al. 2004).

8.4.2.4 *Intervention timing*

The frequency or duration of the studies were not described in three studies (Amruso 2004, Coleman et al. 2004, Mifsud et al. 2014). The Wilson et al. (2004) study consisted of one 30 minute session. For the Harrison et al. (2015) study there was an initial consultation with the median duration of follow-up stated as 197 days (interquartile range 168 to 219).

8.4.2.5 *People delivering the intervention*

Anticoagulation management interventions were delivered by community pharmacists only for all five studies (Amruso 2004, Coleman et al. 2004, Harrison et al. 2015, Wilson et al. 2004)

8.4.2.6 *Training*

Details of training were provided in three studies (Coleman et al. 2004, Harrison et al. 2015, Wilson et al. 2004). In the Coleman et al. (2004) study, pharmacists attended a one-day first aid course run by St John Ambulance, on finger prick technique for blood sampling, use of the coagulometer (Coagucheck) and use of the computerised anticoagulation advisory system. Pharmacists were formally assessed at the end of their training to determine their level of knowledge, understanding and competence to practise. Pharmacists delivering the intervention in Harrison et al. (2015) attended a structured training and

accreditation programme run by the Pharmaceutical Society of New Zealand. For Wilson et al. (2004), four community pharmacists received monitor training, extensive anticoagulation education, and certification in anticoagulation therapy management over the course of a four-day workshop. Information on training was not provided in one study (Amruso 2004).

8.4.2.7 *Cost information*

Cost information was not provided in four of the studies (Mifsud et al. 2014) (Amruso 2004, Coleman et al. 2004, Wilson et al. 2004). Harrison et al. (2015) state that pharmacies were paid a fee for initial training and service set-up, plus a fee provided to each patient to cover the cost of time and consumables; actual costs were not provided, however.

8.4.2.8 *Details of the study design*

Design characteristics for the five evaluations are summarised in Table 8.4. This shows that two studies were conducted in a single pharmacy and that only one of the five evaluations had a sample of one hundred or more participants. It also shows that all five studies used a single group design. Physiological change outcomes were measured in three studies (Amruso 2004, Coleman et al. 2004, Wilson et al. 2004). In the case of Amruso et al. (2004), a retrospective observational study was conducted that investigated the ability of community pharmacists to control INR within therapeutic ranges and determine the incidence of thromboembolic events and bleeding and the satisfaction of patients with the service. Wilson et al. (Wilson et al. 2004) also evaluated service use outcomes and rates of thromboembolic and major haemorrhagic complications. Harrison et al. (2015), evaluated the quality of anticoagulation control within a new care programme and reported the results of assessment; however the details of the study design were not made explicit in the report. Four studies reported on aspects of process (Amruso 2004, Coleman et al. 2004, Mifsud et al. 2014, Wilson et al. 2004) and in all four cases the processes that were investigated were patients' receptiveness to the intervention.

8.4.3 Cardiovascular risk reduction

Our search located eight studies that evaluated cardiovascular risk reduction for high risk populations (Amariles et al. 2012, Chabot et al. 2003, Fikri-Benbrahim et al. 2012, Lai 2007, McNamara et al. 2015, Tsuyuki et al. 2016, Twigg et al. 2016, Zillich et al. 2005). The majority of the studies (n=4) focused on hypertension (Chabot et al. 2003, Fikri-Benbrahim et al. 2012, Lai 2007, Zillich et al. 2005). The remaining studies focused on cardiovascular disease in general (McNamara et al. 2015) and atrial fibrillation (Twigg et al. 2016).

8.4.3.1 *Aims of the interventions*

The main intervention aim of included studies was to improve or control blood pressure level (Amariles et al. 2012, Chabot et al. 2003, Fikri-Benbrahim et al. 2012, Twigg et al. 2016). Further interventions aimed to: carry out ECGs (Twigg et al. 2016); measure the impact of blood pressure monitoring on quality of life (Lai 2007); improve drug treatment adherence, physical activity, alcohol consumption and body mass index (Chabot et al. 2003). Further interventions aimed to reduce the five-year risk of CVD onset for participants, estimated using the Framingham CVD risk score (McNamara et al. 2015); and to identify cholesterol levels (HbA1c) (Naunton et al. 2006). In one study (Zillich et al. 2005) the intervention aimed to develop tailored written treatment recommendations for the patient's physician.

8.4.3.2 *Study Setting*

The majority of the studies were set in the USA (n=2) (Lai 2007, Zillich et al. 2005), Spain (n=2) (Amariles et al. 2012, Fikri-Benbrahim et al. 2012) and Canada (n=2) (Chabot et al. 2003); with the two remaining studies being set in the UK (Twigg et al. 2016), and Australia (McNamara et al. 2015).

All studies were multi-centre, with the majority (n=6) not providing details on the type of community pharmacies that were involved (Amariles et al. 2012, Chabot et al. 2003, Fikri-Benbrahim et al. 2012, Lai 2007, Tsuyuki et al. 2016, Zillich et al. 2005). The remaining two studies were set in independent pharmacies (McNamara et al. 2015, Twigg et al. 2016).

8.4.3.3 *Intervention components*

All eight studies used intervention components that assessed for risk factors or signs. Six employed educational tools: either to improve adherence (Chabot et al. 2003) or for knowledge about hypertension, lifestyle habits, and the importance of medication adherence. Participants were also shown how to use a blood pressure monitor correctly (Fikri-Benbrahim et al. 2012, McNamara et al. 2015). Referral or communication with other professionals was included as part of the intervention in five studies (Chabot et al. 2003, Fikri-Benbrahim et al. 2012, McNamara et al. 2015, Twigg et al. 2016), with one involving consultation with a cardiologist to analyse findings (Twigg et al. 2016). The provision of advice was explicitly mentioned in two studies (Chabot et al. 2003, Twigg et al. 2016). Only one intervention was described as using biofeedback - in the form of blood pressure (BP) testing and stickers given to participants (Chabot et al. 2003). Incentives were only used as part of the intervention in one study in the form of feedback and rewards (Chabot et al. 2003).

8.4.3.4 *Intervention timing*

The frequency and duration on the interventions varied greatly between studies. In one study, the intervention occurred whenever a patient requested another prescription for antihypertensive agents (Chabot et al. 2003). In another study, patients were required to attend at least five face-to-face appointments with the pharmacist: an initial visit followed by visits in weeks 4-6, 8-10, 14-16, and 32 (Amariles et al. 2012). Five interactions with patients were also noted in two further studies; either from initial measurement and then at, one month, three months, six months and nine months (Lai 2007); or at monthly intervals with the initial visit taking approximately 30 min, and subsequent visits 15–20 min (Amariles et al. 2012, McNamara et al. 2015). One study described three visits over three weeks with triplicate measurements taken (two to three minutes apart). The patients were instructed on how to take blood pressure at home in a 20-minute training session by their pharmacist. The patients then measured their blood pressure over 20 weeks at least once a week (three times in the morning and three in the evening). At the start of the intervention period and eight weeks later patients measured their blood pressure over five consecutive days (Fikri-Benbrahim et al. 2012). One study required an initial consultation and regular follow-ups with all patients for a minimum of every three-four weeks for three months. In one study (Zillich et al. 2005) the intervention was either in the form of a high-intensity four visits spaced a week apart, or a low intensity three visits each spaced six-eight weeks apart. No details of the frequency or duration of the intervention were provided in one study (Twigg et al. 2016).

8.4.3.5 *People delivering the intervention*

In four studies, only community pharmacists delivered the intervention (Amariles et al. 2012, Fikri-Benbrahim et al. 2012, McNamara et al. 2015, Zillich et al. 2005). Lai et al. (Lai 2007) involved both community pharmacists and healthcare practitioners who were clinicians in delivering the intervention. Two studies (Chabot et al. 2003, Twigg et al. 2016) used community pharmacists and other pharmacy staff or support staff to deliver the interventions.

8.4.3.6 *Training*

Seven studies provided details on required staff training (Amariles et al. 2012, Chabot et al. 2003, Fikri-Benbrahim et al. 2012, McNamara et al. 2015, Tsuyuki et al. 2016, Twigg et al. 2016, Zillich et al. 2005). Four detailed that pharmacists were given training on blood pressure measurement (Chabot et al. 2003, Fikri-Benbrahim et al. 2012, Twigg et al. 2016, Zillich et al. 2005). In one, pharmacists and support staff received a two-hour training session on use of the decision-aid software) (Chabot et al. 2003). In one study, pharmacists were given intensive training on the assessment and management of overall cardiovascular risk using multiple risk factor interventions (MRFI) approaches; health education and behaviour change processes (McNamara et al. 2015). Pharmacists were required to undergo educational programmes in one study (Zillich et al. 2005). Pharmacists attended face-to-face training – on a variety of cardiovascular conditions and risks, with a hotline for pharmacists to connect them with cardiovascular risk reduction experts and study procedures. One study also described how pharmacists received face-to-face training that included condition knowledge, service delivery information and completed a distance learning package on managing atrial fibrillation in primary care (Twigg et al. 2016). In another study (Amariles et al. 2012) pharmacists took part in an eight-hour training course on pharmacist interventions in cardiovascular disease which included lectures on various aspects of cardiovascular disease, risk factors, prevention, intervention and monitoring that focused on therapeutic goals for blood pressure and total cholesterol according to patients' clinical conditions. Only one study did not provide details of training required by staff (Lai 2007).

8.4.3.7 *Cost information*

No cost information was provided for the majority of studies (n=6). In one study, pharmacists received a fee for each blood pressure measurement (\$4.00 CDN) and per intervention (all types \$5.00 except for recommendation to physician \$10.00) (Chabot et al. 2003). One study describes the compensation that was provided to pharmacists at \$75.00/hour (Zillich et al. 2005).

8.4.3.8 *Details of the study design*

Design characteristics for the eight evaluations are summarised in Table 8.4. This shows that all were conducted over more than one pharmacy and that all but one had one hundred or more participants. It also shows that five of the eight studies employed controlled study designs (Amariles et al. 2012, Chabot et al. 2003, Fikri-Benbrahim et al. 2012, Tsuyuki et al. 2016, Zillich et al. 2005). In Zillich et al. (Zillich et al. 2005) a randomised block design was employed where pharmacies were allocated to either a high-intensity (HI) or a low-intensity (LI) group. A randomised controlled trial was used by Tsuyuki et al. (Tsuyuki et al. 2016) to evaluate the effectiveness of a community pharmacy based intervention to identify cases of cardiovascular risk. A quasi-experimental design was used for Chabot et al. (Chabot et al. 2003) to develop a pharmacist intervention programme and investigate its impact on blood pressure levels and the factors that affected hypertension control in patients who were being treated with

antihypertensive drugs. The Fikri-Benbrahim et al. (Fikri-Benbrahim et al. 2012) study assessed the effect of a protocol-based pharmacist intervention on blood pressure control, also focussing on hypertensive patients. This was a quasi-experimental study with a control group (Fikri-Benbrahim et al. 2012). Amariles et al. (Amariles et al. 2012) employed a randomised controlled trial design to investigate the effectiveness of the Dader Method for pharmaceutical care to achieve therapeutic goals for blood pressure and total cholesterol on populations with a mixture of cardiovascular disease or risk factors for cardiovascular disease. Three studies used a single group study design (Lai 2007, McNamara et al. 2015, Twigg et al. 2016).

8.4.4 Cardiovascular risk identification

Thirteen studies were identified that focused on risk assessment in the community setting (Horgan et al. 2010, Hourihan et al. 2003, Hunt et al. 2013, Krass et al. 2003, Liu et al. 2009, Lowres et al. 2012, Peterson et al. 2010, Rohla et al. 2016, Sandhu et al. 2016, Tarride et al. 2017, Taylor et al. 2012, Tice and Phillips 2002 and Tompson et al. 2017). All but one (Tompson et al. 2017) were intervention evaluations. The majority of the studies (n=8) focused on cardiovascular disease in general. Two studies focused on atrial fibrillation (Lowres et al. 2012, Tarride et al. 2017), one study focused on dyslipidaemia (Tice and Phillips 2002), one study focused on stroke (Sandhu, 2016).

8.4.4.1 *Aims of the interventions*

The principal aim of the intervention in the majority of studies (n=8) was to identify people at risk of cardiovascular disease (Horgan et al. 2010, Hourihan et al. 2003, Hunt et al. 2013, Krass et al. 2003, Liu et al. 2009, Peterson et al. 2010, Rohla et al. 2016, Sandhu et al. 2016, Tarride et al. 2017, Taylor et al. 2012, Tice and Phillips 2002). Also, interventions were used to refer people to correct care (Horgan et al. 2010, Krass et al. 2003) and in one study, to obtain pulse and iECG recordings (Lowres et al. 2012).

8.4.4.2 *Study Setting*

Three of the evaluations were set in the UK (Horgan et al. 2010, Hunt et al. 2013, Taylor et al. 2012) and four were set in Australia (Hourihan et al. 2003, Krass et al. 2003, Lowres et al. 2012, Peterson et al. 2010). Two studies were set in the USA (Liu et al. 2009, Tice and Phillips 2002), two studies were set in Canada (Sandhu et al. 2016, Tarride et al. 2017) and one study was set in Austria (Rohla et al. 2016).

All studies were multi-centre studies, with exception of one study (Liu et al. 2009). In the majority of instances, the type of community pharmacy setting was unspecified. One study was set in a high street pharmacy chain (Tice and Phillips 2002), one in an independent pharmacy (Liu et al. 2009) and one was set in unspecified rural community pharmacies and other non-public health service settings (Hourihan et al. 2003).

8.4.4.3 *Intervention components*

In all studies the primary intervention component was assessment of risk factors or signs, with advice-giving also often explicitly stated. Eight studies also included the referral or communication with other professionals as part of the intervention (Horgan et al. 2010, Hourihan et al. 2003, Hunt et al. 2013, Krass et al. 2003, Lowres et al. 2014, Rohla et al. 2016, Sandhu et al. 2016, Taylor et al. 2012). Two

studies had the added component of the provision of information to participants (Krass et al. 2003, Taylor et al. 2012) and another education (Lowres et al. 2012).

8.4.4.4 *Intervention timing*

The intervention was reported as requiring a one-time face-to-face interaction ranging between five minutes (Lowres et al. 2012) to around 30 minutes (Hunt et al. 2013, Krass et al. 2003), and up to 45 minutes (Peterson et al. 2010). Details were missing from four of the studies (Hourihan et al. 2003, Tarride et al. 2017, Taylor et al. 2012, Tice and Phillips 2002).

8.4.4.5 *People delivering the intervention*

Ten of the interventions used community pharmacists to assess eligible participants. Liu et al. (Liu et al. 2009) used pharmacy technicians and students as well as community pharmacists to deliver their intervention. One study used a student to deliver the intervention (Sandhu et al. 2016). In two studies the people delivering the intervention was not clear (Rohla et al. 2016, Tarride et al. 2017).

8.4.4.6 *Training*

Details of training were provided in eight studies (Hourihan et al. 2003, Krass et al. 2003, Lowres et al. 2012, Peterson et al. 2010, Sandhu et al. 2016, Tarride et al. 2017, Taylor et al. 2012, Tice and Phillips 2002). In two studies, training took the form of self-directed learning and skills-based workshops (Hourihan et al. 2003, Krass et al. 2003). One comprised of an online module (Sandhu et al. 2016) Training was mentioned but no specific details on training were provided in four studies (Liu et al. 2009, Lowres et al. 2012, Rohla et al. 2016, Tarride et al. 2017, Taylor et al. 2012). In one study, pharmacists were trained how to use questionnaires, equipment, and assessment tools as well as how to provide counselling (Peterson et al. 2010). How to conduct assessment sessions was the focus of one study (Tarride et al. 2017) and use of assessment tools was the focus another study.(Sandhu et al. 2016). In one dyslipidaemia management study pharmacists required training to use the LDX machine (Tice and Phillips 2002). Details of the training required by staff were not mentioned in two studies (Hunt et al. 2013, Liu et al. 2009).

8.4.4.7 *Cost information*

Six studies provided cost information. One (Lowres et al. 2012) provided costing details for elements such as iECG testing and diagnostic assessment of AF. Others provided the costs for two tests: a non-fasting basic test (\$20.00) and a complete lipid and glucose profile (\$30.00), stating that all tests were offered on a fee-for-service basis (Tice and Phillips 2002). One study provided detailed cost estimates on assessment (\$66 per person) and incremental cost per QALY gained (\$7,480), which were also discussed in relation to costs associated with ischemic stroke (-\$90) (Tarride et al. 2017) No cost information was provided for the remaining studies.

8.4.4.8 *Details of the study design*

Design characteristics for the twelve evaluations are summarised in Table 8.4. This shows that all but one was conducted over more than one pharmacy and that the same number had one hundred or more participants. The table also shows that all twelve studies employed a single-group study design. For six, detailed elements of the study design were not provided. The design of the study by Liu et al. (Liu et al. 2009), that investigates pharmacist-managed health assessment to identify union members who were at risk of cardiovascular events, is described as a descriptive non-experimental study. Lowres et al. (2012)

used a cross-sectional study design to investigate the feasibility, impact and cost-effectiveness of community pharmacy-based assessment for atrial fibrillation using iPhone ECG technology. All but one of the studies (Tice and Phillips 2002) measured results of assessment. Three studies evaluated service use or referral outcomes (Hunt et al. 2013, Krass et al. 2003, Tice and Phillips 2002). One study evaluated knowledge and attitudinal outcomes (Peterson et al. 2010). Processes that were evaluated were: acceptability to intervention recipients (n=4) (Krass et al. 2003, Peterson et al. 2010, Taylor et al. 2012, Tice and Phillips 2002); costs and resources (Lowres et al. 2012, Peterson et al. 2010, Tarride et al. 2017); and training and support (Lowres et al. 2012, Peterson et al. 2010) or other implementation issues (Lowres et al. 2014, Sandhu et al. 2016). One study (Tice and Phillips 2002) also evaluated how the type of test chosen affects patient satisfaction. Taylor et al's (2012) study supplemented a survey of users of an assessment service provided by a Primary Care Trust with a survey of people who had not used the service.

Table 8.4 Cardiovascular health evaluations – study design, sample size and setting (n=25)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	< 100	100 +	Multi-centre	Single Centre
CVD management	6 Bajorek (2016) Bunting (2015) CT Isetts (2016) Jaffray (2010) RCT Santschi (2017) Tsuyuki (2002) RCT	2	0	8	8	0
Anticoagulation management	0	5	4	1	3	2
CVD risk reduction	5 Amariles (2012) RCT Chabot (2003) CT Fikri-Benbrahim (2012) Quasi-experimental study with a control group Tsuyuki (2016): Randomized trial	3	1	7	8	0

	Zillich(2005): Randomized trial					
CVD risk identification	0	12	1	11	11	1

8.5 Reference list of included studies

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9 Alcohol and substance misuse and abuse

- **Extent of evidence:** We identified 31 studies which focused on pharmacy services to address alcohol (n=13) and substance misuse (n=18), 24 of which were evaluations of specific interventions.
- **Context of evidence:** 21 intervention evaluations were conducted in the UK, two were conducted in the USA and one in the Republic of Ireland.
- **Intervention focus:** The principal aim of the interventions was to assess participants for risky or harmful behaviours and, for those identified as at-risk, to encourage a reduction in risky behaviours.
- **Intervention components:** All 11 alcohol interventions included assessment. Other alcohol intervention components included advice (n=10), referral (n=8), information (n=5), education (n=1) and counselling (n=1). Components of the 13 substance misuse interventions included needle and syringe programmes (n=10), and methadone/buprenorphine provision (n=6), information (n=5), advice (n=5), referral (n=4) and education (n=3), immunisation (n=2), testing (n=2), screening (n=1) and service access (n=1).
- **Evaluation details:** Studies examined the following health outcomes: results of assessment (n=10), behaviour change (n=5), service use and referrals (n=4), knowledge and attitudinal changes (n=3) and physiological changes (n=2). Process measures included: implementation issues (n=17), acceptability to pharmacists (n=14), acceptability to recipients (n=13), acceptability to others (n=6), training (n=9), access issues (n=5), reach/uptake (n=3), costs/resources (n=1) and other processes (n=11). Three of the substance misuse studies and one of the alcohol studies used a controlled evaluation design. All the remainder were single group studies, for example cohort studies or cross-sectional surveys.

9.1 Introduction

In this chapter, a descriptive overview is presented of studies which focus on the services provided to the public by community pharmacies for the health priority of alcohol misuse and abuse.

Though an accepted element of many societies globally, excessive consumption of alcohol can result in extensive morbidity. Approximately 10,000 deaths per year in the UK can be directly related to alcohol abuse or misuse (Office for National Statistics 2017). Further, hazardous amounts of alcohol can lead to chronic liver disease, liver cirrhosis, and can have profound behavioural consequences such as public and domestic violence, accidents and job loss (Davies et al. 2013).

People who inject drugs (PWID) are a vulnerable population at risk of multiple problems arising from injecting drug use and other risky behaviours (e.g. concomitant alcohol use, sexual risk taking). These can include infection with HIV, hepatitis B and C. Needle and syringe programmes are a well-established

service provided by community pharmacies as one way to assist this vulnerable group as is the provision of methadone treatment services.

9.2 The included studies

In total, (n=31) studies were identified across the two domains of alcohol and substance misuse.

The remainder of this chapter is organised in terms of these two domains, with further subsections for the conditions seen within each domain. The references for studies are listed separately for each domain below. Table 9.1 shows the countries in which these studies were conducted.

Table 9.1: Alcohol and substance misuse and abuse (n=31)

	UK	USA	Republic of Ireland
Alcohol	13	0	0
Services for people who inject drugs	15	2	1

9.3 Alcohol

Thirteen studies were identified that focused on alcohol. These studies were reported in sixteen publications (see Appendix 2 for a listing of studies reported in more than one publication) (Brown et al. 2014, Davies et al. 2013, Dhital et al. 2015, Dhital et al. 2013, Dhital et al. 2010, Fitzgerald Stewart 2006, Fitzgerald et al. 2015, Goodall Dawson 2006, Gray et al. 2012, Hampshire and Isle of Wight LPC 2009, Khan et al. 2013, Krska Mackridge 2014, Mackridge et al. 2016, Quirk et al. 2016, Urban 2014, Urban 2015b). All but two studies (Dhital et al. 2010, Fitzgerald et al. 2015) were evaluations of interventions. Of these two, one aimed to explore pharmacy users' views on alcohol use assessments and brief interventions in pharmacies using semi-structured interviews (Dhital et al. 2010); the other aimed to explore the general public's views on community pharmacists' role in reducing alcohol consumption and related harm through a questionnaire (Fitzgerald et al. 2015).

The analysis below focuses on the 11 included intervention evaluations (Brown et al. 2014, Davies et al. 2013, Dhital et al. 2015, Dhital et al. 2013, Fitzgerald Stewart 2006, Goodall Dawson 2006, Gray et al. 2012, Hampshire and Isle of Wight LPC 2009, Krska Mackridge 2014, Mackridge et al. 2016, Urban 2014, Urban 2015b).

9.3.1 Aims of the interventions

The principal aim of all the reported alcohol interventions in community pharmacies was to assess participants for risky or harmful drinking behaviours and, for those identified as at-risk, to provide a brief intervention and advice to encourage a reduction in drinking and/or referral or signposting to additional services.

9.3.2 *Study Setting*

In this chapter, a descriptive overview is presented of studies which focus on the services provided to the public by community pharmacies for the health priority of alcohol misuse and abuse.

Though an accepted element of many societies globally, excessive consumption of alcohol can result in extensive morbidity. Approximately 10,000 deaths per year in the UK can be directly related to alcohol abuse or misuse. Further, hazardous amounts of alcohol can lead to chronic liver disease, liver cirrhosis, and can have profound behavioural consequences such as public and domestic violence, accidents and job loss (Davies et al. 2013).

People who inject drugs (PWID) are a vulnerable population at risk of multiple problems arising from injecting drug use and other risky behaviours (e.g. concomitant alcohol use, sexual risk taking). These can include infection with HIV, hepatitis B and C. Needle and syringe programmes are a well-established service provided by community pharmacies as one way to assist this vulnerable group and the provision of methadone treatment services is another established service offered.

9.3.3 *Intervention components*

All of the interventions involved assessment of risky/harmful drinking behaviours and a brief intervention of either advice (all except Dhital et al. (2015)), or motivational interviewing (Dhital et al. 2015). Some interventions also provided information (Dhital et al. 2015, Dhital et al. 2013, Fitzgerald Stewart 2006, Urban 2014, Urban 2015), education (Davies et al. 2013) and referral or communication with other professionals (Brown et al. 2014, Dhital et al. 2015, Dhital et al. 2013, Fitzgerald Stewart 2006, Hampshire and Isle of Wight LPC 2009, Krska Mackridge 2014, Urban 2014, 2015).

9.3.4 *Intervention timing*

All of the studies evaluated brief interventions, and two provided more detail. One reported that the discussion after assessment took up to ten minutes (Dhital et al. 2015); another described how discussions took an average nine minutes with non-hazardous clients, 13 minutes with hazardous or harmful clients and nearly 16 minutes with harmful clients (Fitzgerald Stewart 2006).

9.3.5 *People delivering the intervention*

Community pharmacists delivered the interventions in all but one of the studies, where the provider type was not reported (Urban 2014). In seven studies, other pharmacy staff such as counter staff or technicians also provided the intervention (Dhital et al. 2013, Goodall Dawson 2006, Gray et al. 2012, Hampshire and Isle of Wight LPC 2009, Krska Mackridge 2014, Mackridge et al. 2016, Urban 2015a).

9.3.6 *Training*

Staff were trained for the intervention in all studies. When described, training varied from e-learning (Davies et al. 2013) to courses lasting 1.5 - 3.5 hours (Dhital et al. 2015, Gray et al. 2012, Krska Mackridge 2014) to one day (Dhital et al. 2013) or two days (Fitzgerald Stewart 2006). Staff in one study were required to attend several training events lasting for more than one day in total (Urban 2015b). Another study ran a follow-up two hour training sessions seven weeks after the start of the trial (Dhital et al. 2015).

9.3.7 Cost information

Only five studies provided any information about costs, and only one reported the estimated cost of the intervention (£134 per person) (Dhital et al. 2013). Four studies reported that pharmacies were remunerated for each intervention delivered (Dhital et al. 2013, Gray et al. 2012, Urban 2014, Urban 2015c) and one reported the total overall costs of all the projects (Hampshire and Isle of Wight LPC 2009).

9.3.8 Details of the study design

Table 9.2 shows that, in general, the 11 evaluation studies did not utilise an experimental design. One study included a comparison group (Dhital et al. 2015); the remaining ten did not. All but one of the evaluations included 100 or more participants and the same proportion evaluated across more than one pharmacy setting.

All studies assessed process measures and all but one (Brown et al. 2014) also assessed intervention outcomes, such as the results of assessment (for risky alcohol behaviour) (Davies et al. 2013, Dhital et al. 2013, Fitzgerald Stewart 2006, Goodall Dawson 2006, Gray et al. 2012, Hampshire and Isle of Wight LPC 2009, Krska Mackridge 2014, Urban 2014, 2015a), health behaviour changes such as changes in alcohol consumption (n=4) (Dhital et al. 2015, Dhital et al. 2013, Fitzgerald Stewart 2006, Mackridge et al. 2016), service use and referrals (n=2) (Dhital et al. 2013, Krska Mackridge 2014) and/or physiological changes (n=1) (Dhital et al. 2015).

Nine studies explored implementation issues, and two did not (Davies et al. 2013, Dhital et al. 2015). Eight investigated the acceptability of the intervention to recipients (Brown et al. 2014, Dhital et al. 2015, Dhital et al. 2013, Fitzgerald Stewart 2006, Gray et al. 2012, Krska Mackridge 2014, Mackridge et al. 2016, Urban 2014, 2015a) and six explored the interventions' acceptability to community pharmacists (Brown et al. 2014, Dhital et al. 2013, Fitzgerald Stewart 2006, Gray et al. 2012, Mackridge et al. 2016, Urban 2014, Urban 2015b). Six reported views about training (Dhital et al. 2013, Fitzgerald Stewart 2006, Goodall Dawson 2006, Gray et al. 2012, Urban 2014, 2015a). Other evaluated processes included the reach/uptake of the interventions (Davies et al. 2013, Mackridge et al. 2016, Urban 2015c); the interventions' acceptability to other stakeholders such as commissioners and alcohol service managers (Gray et al. 2012, Krska Mackridge 2014) and access issues (Fitzgerald Stewart 2006).

Table 9.2: Alcohol misuse and abuse evaluations – study design, sample size and setting (n=11)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	< 100	100 +	Multi-centre	Single Centre

Alcohol misuse	1 study: Dhital (2015) Parallel group RCT	10	1	10	11	0
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9.4 Services for people who inject drugs

A total of 18 studies were identified which examined services for people who inject drugs (PWIDs) (Abdulrahim 2006, Bates et al. 2015, Britton Scott 2006, Clarke et al. 2001, Crawford et al. 2013, Fisher et al. 2003, Fleming et al. 2001, Gidman Coomber 2014, Hall Matheson 2008, Jaffray et al. 2014, Mackie et al. 2004, Mackridge et al. 2010, McVeigh et al. 2017, Roberts Hunter 2004, Rosenblom et al. 2003, Scott Mackridge 2009, Sheridan et al. 2003, Sheridan et al. 2007). These studies were reported in 27 publications (see appendix 2). Five studies were of people's perspectives about these services in general, rather than an evaluation, and are not described further here (Gidman Coomber 2014)(Hall Matheson 2008, Roberts Hunter 2004, Rosenblom et al. 2003, Scott Mackridge 2009).

9.4.1 Aims of the interventions

The principal aim of community pharmacy services provided to people who inject drugs is to examine the extent and range of services available for PWIDs.

9.4.2 Study Setting

Almost all of the 13 included evaluations (n=10) took place in the UK, with two located in America (Crawford et al. 2013, Fisher et al. 2003) and one in the Republic of Ireland (McVeigh et al. 2017). All of the studies evaluated needle and syringe interventions. Most of these were set in community pharmacies that were further unspecified (Britton Scott 2006, Clarke et al. 2001, Crawford et al. 2013, Fleming et al. 2001, Jaffray et al. 2014, Mackridge et al. 2010, McVeigh et al. 2017, Sheridan et al. 2003, Sheridan et al. 2007), although one study provided an intervention across multiple types of community pharmacies, including high street or supermarket chains, independent pharmacies, and other non-pharmacy health settings (Jaffray et al. 2014).

9.4.3 Intervention components

In general, community pharmacy interventions to address risk management in people who inject drugs (PWIDs) focused on either needle and syringe programmes, methadone and/or buprenorphine provision and supervision, or a combination of both. Clarke et al. (2001) described needle and syringe programmes alone, while Mackie et al. (2004) evaluated methadone/buprenorphine provision alone.

However, a variety of other intervention components were included. Ten of the thirteen studies evaluated needle and syringe programmes (Abdulrahim 2006, Bates et al. 2015, Clarke et al. 2001, Crawford et al. 2013, Fleming et al. 2001, Jaffray et al. 2014, Mackridge et al. 2010, McVeigh et al. 2017, Sheridan et al. 2003, Sheridan et al. 2007). Five of those studies evaluating needle and syringe programmes also described additional services. For example, Abdulrahim et al. (2006) described the provision of information, immunisation, testing and assessment services in addition to a needle and syringe programme. The programme described by Bates et al. (2015) provided advice, education, immunisation and testing. The needle and syringe programme evaluated by Crawford et al. (2013) also provided service access. Finally, Sheridan et al. (2003) and McVeigh et al. (2017) described the provision of advice and referral to other professionals.

A total of six studies evaluated methadone provision services (Britton Scott 2006, Fleming et al. 2001, Jaffray et al. 2014, Mackie et al. 2004, Mackridge et al. 2010, Sheridan et al. 2003). Two of these studies also examined needle and syringe programmes (Fleming et al. 2001, Sheridan et al. 2007). Another two examined methadone treatment, needle and syringe programmes and other services: the intervention evaluated by Jaffray et al. (2014) provided additional advice and general health information to PWID and that studied by Mackridge et al. (2010) provided information, referral to or communication with other health professionals, and education. Finally, one study examined methadone provision and supervision without needle and syringe programmes but with the addition of pharmacist advice and information (Britton Scott 2006).

9.4.4 Intervention timing

The frequency, duration and extent of the pharmacy-based interventions for PWID were not well described across this set of studies. Jaffray et al. (2014) described motivational interviewing techniques between pharmacists and PWIDs to be 'brief daily' interactions, but did not report their number. Mackie et al. (2004), in evaluating methadone services provided by community pharmacists, noted that contact with PWID could be 'daily or weekly, depending on the prescription'. The remaining studies did not state the frequency or duration of the interventions. While some contact with PWIDs under needle and syringe programmes would likely be opportunistic, methadone treatment services could be expected to occur more frequently.

9.4.5 People delivering the intervention

Community pharmacists provided services to PWID all 13 included evaluations. In four cases counter staff were also reported to be involved (Crawford et al. 2013, Mackridge et al. 2010, McVeigh et al. 2017, Sheridan et al. 2007) and dispensing technicians were also involved in one (McVeigh et al. 2017).

9.4.6 Training

Only three of the 13 evaluations described staff training to provide services for PWID (Bates et al. 2015, Crawford et al. 2013, Jaffray et al. 2014). These ranged from simply noting that staff training had taken place and had identified a need for much more training to be provided (Bates et al. 2015), to more detailed information on the content and duration of training. For example, one study reported individual and group training sessions occurring quarterly and when new staff were hired (Crawford et al. 2013). These training sessions aimed to teach staff skills 'to engage PWID in conversations while creating a comfortable and non-judgmental environment, provide service referrals, and inform clients about the study and schedule appointments' (p.399). Similarly, Jaffray et al. (2014) described four sessions provided by accredited motivational interviewing trainers who provided pharmacy providers

with skills training to facilitate communication with PWIDs through open questions, reflective listening, affirming and eliciting 'change talk' (p.5). The first session focused on learning techniques, while the second and third provided opportunities for practical skill application. The fourth session assessed participants' motivational interviewing competence.

Cost information

None of the studies described intervention costs.

9.4.7 Details of the study design

This set of evaluations used a broad range of study designs (see Table 9.3). All of the studies were multi-centre and nine used samples of a hundred participants or more.

Allocation of the intervention to participants was under researcher control in only two of the 13 studies (Crawford et al. 2013, Jaffray et al. 2014). These studies were larger, long-term intervention evaluations that reported several syntheses of data. Both used comparison groups. One utilised a randomised controlled trial (RCTs) in conjunction with observational cohort studies (Crawford et al. 2013); the other employed a cluster RCT design with multiple cohort observational studies, surveys and interviews (Jaffray et al. 2014). Both studies examined a wide range of outcomes, including: assessment, referrals to medical and social services, illicit drug use; treatment retention; physical and psychological health; and knowledge and attitudes. Multiple processes were also assessed, including: acceptability to PWID, pharmacists and general customers, implementation issues, reach and uptake, and provider training support.

A larger proportion of the studies in the set described methods in which researchers simply surveyed or accessed participants' views of a programme: these did not allocate participants to an intervention and evaluate a change in outcomes. These studies included surveys, interviews or cohort studies. Six studies conducted surveys of staff and/or participants (Abdulrahim 2006, Britton Scott 2006, Clarke et al. 2001, Fleming et al. 2001, Sheridan et al. 2003, Sheridan et al. 2007). Some of these compared data from different groups of participants. For example, Clarke et al. (2001) conducted a survey of nine pharmacists selected from a larger pool based on their probability of dealing with PWID; these were matched to nine individual clients selected randomly from a larger list of clients using community pharmacy needle syringe programmes and their responses compared. Another study surveyed pharmacists in Dublin, and compared findings to those from pharmacists surveyed in Glasgow (Mackie et al. 2004). Three studies conducted qualitative interviews or focus groups to elicit views of the provision of needle syringe programmes and/or methadone services (McVeigh et al. 2017)(Jaffray et al. 2014, Mackridge et al. 2010). One study utilised survey and qualitative interview methods (Bates et al. 2015). And lastly, one study examined service provision, compared with national data from a previous similar survey (Fleming et al. 2001). These studies reported findings related to acceptability to pharmacy providers, PWID and general clients, access, cost and implementation issues, and issues related to provider training.

Table 9.3: Evaluations of services for people who inject drugs – study design, sample size and setting (n=13)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	< 100	100 +	Multi-centre	Single Centre
Drug misuse	3 studies Crawford (2013) RCT Fisher (2003) RCT Jaffray (2014) Cluster RCT, randomised	10	3	10	13	0

9.4.8 Reference list of included studies

Abdulrahim D (2006) *Findings of a survey of needle exchanges in England*. National Treatment Agency. <http://w.smmgp.org.uk/download/rcgp-certificates/cert04/cert04-p01-d03.pdf>

Bates G, Pendlebury M, Cochrane M, Mackridge A (2015) *Needle exchange services in Knowsley: an investigation into the needs and experiences of staff and service users*. Centre for Public Health, Liverpool John Moores University. Liverpool England: <http://www.cph.org.uk/wp-content/uploads/2015/11/Needle-Exchange-Service-in-Knowsley-Final-revised.pdf>

Britton RM, Scott J (2006) Community pharmacy services to drug misusers in the south west of England: results of the 2003–2004 postal survey. *International Journal of Pharmacy Practice* 14: 235-241.

Brown S, Henderson E, Sullivan C (2014) The feasibility and acceptability of the provision of alcohol screening and brief advice in pharmacies for women accessing emergency contraception: an evaluation study. *BMC Public Health* 14: 1139.

Clarke K, Sheridan J, Griffiths P, Noble A, Williamson S, Taylor C (2001) Pharmacy needle exchange: do clients and community pharmacists have matching perceptions? *Pharmaceutical Journal* 266: 553-556.

Crawford ND, Amesty S, Rivera AV, Harripersaud K, Turner A, Fuller CM (2013) Randomized, community-based pharmacy intervention to expand services beyond sale of sterile syringes to injection drug users in pharmacies in New York City. *American Journal of Public Health* 103: 1579-1582.

Davies J, Gill J, Crisp M, Taylor D (2013) *Pan-London Pharmacy Alcohol Awareness Campaign*. London: UCL School of Pharmacy. <http://www.healthwatchsouthwark.co.uk/wp-content/uploads/2013/05/Alcohol-Final.pdf>

Dhital R, Whittlesea CM, Norman IJ, Milligan P (2010) Community pharmacy service users' views and perceptions of alcohol screening and brief intervention. *Drug and Alcohol Review* 29: 596-602.

Dhital R, Whittlesea CM, Milligan P, Khan NS, Norman IJ (2013) The impact of training and delivering alcohol brief intervention on the knowledge and attitudes of community pharmacists: a before and after study. *Drug and Alcohol Review* 32: 147-156.

Dhital R, Norman I, Whittlesea C, Murrells T, McCambridge J (2015) The effectiveness of brief alcohol interventions delivered by community pharmacists: randomized controlled trial. *Addiction* 110: 1586-1594.

Fisher DG, Fenaughty AM, Cagle HH, Wells RS (2003) Needle exchange and injection drug use frequency: a randomized clinical trial. *Journal of Acquired Immune Deficiency Syndromes: JAIDS* 33: 199-205.

Fitzgerald N, Stewart G (2006) *Development, implementation and evaluation of a pilot project to deliver interventions on alcohol issues in community pharmacies: 'Drinking in Pharmacies'*. The School of Pharmacy, The Robert Gordon University.

http://alcoholresearchuk.org/downloads/finalReports/AERC_FinalReport_0038.pdf

Fitzgerald N, Youngson E, Cunningham S, Watson M, Stewart D (2015) Support for community pharmacy-based alcohol interventions: a Scottish general public survey. *Public Health* 129: 1431-1438.

Fleming GF, McElroy JC, Hughes CM, Sheridan J, Strang J (2001) The role of the community pharmacist in drug abuse: a comparison of service provision between Northern Ireland and England/Wales. *Pharmacy World and Science* 23: 13-16.

Gidman W, Coomber R (2014) Contested space in the pharmacy: public attitudes to pharmacy harm reduction services in the West of Scotland. *Research In Social and Administrative Pharmacy* 10: 576-587.

Goodall T, Dawson P (2006) *A feasibility study: The role of community pharmacists in the identification and treatment of hazardous drinking*. Leeds: Leeds Primary Care Trust.

Gray JN, Wilson SE, Cook PA, Mackridge AJ, Blenkinsopp A, Prescott J, Stokes LC, Morleo MJ, Heim D, Krska J, Stafford L (2012) *Understanding and optimising an identification/brief advice (IBA) service about alcohol in the community pharmacy setting*. Liverpool: Liverpool Primary Care Trust.

http://clock.uclan.ac.uk/5972/3/Final_full_report_25th_october_2012.pdf

Hall S, Matheson C (2008) Barriers to the provision of needle-exchange services: A qualitative study in community pharmacies. *International Journal of Pharmacy Practice* 16: 11-16.

Hampshire and Isle of Wight LPC (2009) *Alcohol identification and brief advice projects. Outcomes report*. Hampshire and Isle of Wight, LPC.

Jaffray M, Matheson C, Bond CM, Lee AJ, McLernon DJ, Johnstone A, Skea L, Davidson B (2014) Does training in motivational interviewing for community pharmacists improve outcomes for methadone patients? A cluster randomised controlled trial. *International Journal of Pharmacy Practice* 22: 4-12.

Khan NS, Norman IJ, Dhital R, McCrone P, Milligan P, Whittlesea CM (2013) Alcohol brief intervention in community pharmacies: a feasibility study of outcomes and customer experiences. *International journal of clinical pharmacy* 35: 1178-1187.

Krska J, Mackridge AJ (2014) Involving the public and other stakeholders in development and evaluation of a community pharmacy alcohol screening and brief advice service. *Public Health* 128: 309-316.

Mackie CA, Healy AM, Roberts K, Ryder S (2004) A comparison of community pharmacy methadone services between Dublin and Glasgow: (1) extent of service provision in 1997/1998 and views of pharmacists on existing provision and future service developments. *Journal of Substance Use* 9: 235-251.

Mackridge AJ, Beynon CM, McVeigh J, Whitfield M, Chandler M (2010) Meeting the health needs of problematic drug users through community pharmacy: a qualitative study. *Journal of Substance Use* 15: 367-376.

Mackridge AJ, Krska J, Stokes EC, Heim D (2016) Towards improving service delivery in screening and intervention services in community pharmacies: a case study of an alcohol IBA service. *Journal of public health* 38: 92-98.

McVeigh J, Hearne E, Bates G, Van H, Marie C (2017) Community pharmacist experiences of providing needle and syringe programmes in Ireland. *Research in social & administrative pharmacy* 13: 767-777.

Quirk A, MacNeil V, Dhital R, Whittlesea C, Norman I, McCambridge J (2016) Qualitative process study of community pharmacist brief alcohol intervention effectiveness trial: Can research participation effects explain a null finding? *Drug And Alcohol Dependence* 161: 36-41.

Roberts K, Hunter C (2004) A comprehensive system of pharmaceutical care for drug misusers. *Harm reduction journal* 1: 6.

Rosenblom E, Taylor K, Harding G (2003) Service provision to opiate misusers from pharmacies - An exploratory study. *Journal of Social and Administrative Pharmacy* 20: 110-116.

Scott J, Mackridge A (2009) Pharmacy support staff involvement in, and attitudes towards, pharmacy-based services for drug misusers. *International Journal of Pharmacy Practice* 17: 325-332.

Sheridan J, Carson T, Aggleton M (2003) Providing dental health services to drug users: testing a model for a community pharmacy advice and referral scheme. *Pharmaceutical Journal* 271: 180-182.

Sheridan J, Manning V, Ridge G, Mayet S, Strang J (2007) Community pharmacies and the provision of opioid substitution services for drug misusers: changes in activity and attitudes of community pharmacists across England 1995-2005. *Addiction* 102: 1824-1830.

Urban R (2014) *Calderdale Alcohol Identification and Brief Advice Service Evaluation 1st November 2013 – 31st October 2014*. Community Pharmacy West Yorkshire. <http://www.cpwpy.org/doc/916.pdf>

Urban R (2015c) *Kirklees Alcohol Identification and Brief Advice Service Evaluation March 2013 – October 2014*. Community Pharmacy West Yorkshire. <http://www.cpwpy.org/doc/972.pdf>

10 Obesity and weight management

- **Extent of evidence:** Ten studies focused on community pharmacy-based weight management interventions to address obesity. Four of these sought stakeholders' perspectives in weight management services in general and six were evaluations of specific interventions; the following details relate to the six evaluations of specific interventions.
- **Context of evidence:** Four of the six intervention evaluations were UK-based and two were US-based.
- **Intervention focus:** The principal aim of interventions was to support overweight patients in losing weight.
- **Intervention components:** Intervention components included advice (n=6), education (n=3), information (n=2) and resource access (meal replacements) (n=1).
- **Evaluation details:** Studies examined the following outcomes: weight-loss (n=6), physiological outcomes (n=2) health behaviours (n=2), acceptability to service users (n=3) and acceptability to pharmacists (n=1). Three of the evaluations were controlled trials and three used a single group design.
- **Gaps in research:** This topic could benefit from greater insight into cost of intervention delivery and time commitments per interaction.

10.1 Introduction

In this chapter, a descriptive overview of studies is presented which focuses on the community pharmacy services provided to the public by community pharmacies for the health priority of obesity health is presented. Obesity can lead to a range of common health problems, such as type 2 diabetes, heart disease and cancer and can reduce life expectancy. The data provided in this chapter covers weight management services.

10.2 Included studies

Ten studies reported in twelve papers were identified; these studies focused on community pharmacy weight management services (Ahrens et al. 2003, Boardman and Avery 2014, Bush et al. 2014, Bush et al. 2011, Counterweight Project Team 2012, Harmon et al. 2014, Jolly et al. 2011, Luevorasirikul et al. 2010, Morrison et al. 2013, Newlands et al. 2011, Weidmann et al. 2012, Weidmann et al. 2015). A full list of linked reports is provided in Appendix 2.

Four studies explored stakeholders' views about weight management services in general, rather than focusing on a specific intervention (Luevorasirikul et al. 2010, Newlands et al. 2011, Weidmann et al. 2012, Weidmann et al. 2015) and are not further discussed in this Chapter.

The following analysis is based on the six intervention evaluations (Ahrens et al. 2003, Boardman and Avery 2014, Bush et al. 2014, Harmon et al. 2014, Jolly et al. 2011, Morrison et al. 2013) Table 10.1 shows the countries in which these studies were conducted.

Table 10.1: Obesity and weight management (n=6)

	UK	USA
Obesity and weight management	4	2

10.2.1 Aims of the interventions

The principal aim of weight management services in community pharmacies was to support overweight patients in losing weight.

10.2.2 Study Setting

The majority of the six included evaluations (n=4) was set in the UK (Boardman Avery 2014, Bush et al. 2014, Jolly et al. 2011, Morrison et al. 2013); the remaining two were set in the USA (Ahrens et al. 2003, Harmon et al. 2014).

Half the studies were set in a single pharmacy (i.e. one site) (Ahrens et al. 2003, Harmon et al. 2014, Jolly et al. 2011) and half were set in several pharmacies (i.e. many sites) (Boardman Avery 2014, Bush et al. 2014, Morrison et al. 2013).

Four studies did not specify the specific study setting other than noting that the studies were set in community pharmacies (Ahrens et al. 2003, Bush et al. 2014, Jolly et al. 2011, Morrison et al. 2013). Two studies were set in high street chains (Boardman Avery 2014, Harmon et al. 2014), one of which also included independent pharmacies (Boardman Avery 2014).

10.2.3 Intervention components

All of the interventions included advice. Three also offered education (Ahrens et al. 2003, Harmon et al. 2014, Jolly et al. 2011) and two provided information (Bush et al. 2014, Harmon et al. 2014). One intervention provided access to resources, in this case, meal replacement products (Ahrens et al. 2003).

10.2.4 Intervention timing

All of the interventions offered multiple sessions, ranging from nine to fifteen visits. Among the three studies which described the sessions' lengths, these ranged between 10 and 30 minutes, although the initial session typically lasted longer (Harmon et al. 2014, Jolly et al. 2011, Morrison et al. 2013). The intervention duration ranged from 12 weeks (Jolly et al. 2011) to 12 months (Morrison et al. 2013). The study duration was unclear for one intervention (Boardman Avery 2014).

10.2.5 People delivering the intervention

Pharmacists delivered the intervention in all the studies. In one case, pharmacists and counter assistants, dispensers and healthcare practitioners provided the intervention (Bush et al. 2014); while in another study, pharmacists and pharmacist assistants provided the intervention (Morrison et al. 2013).

10.2.6 Training

Staff training for the intervention was provided in four studies (Boardman Avery 2014, Bush et al. 2014, Jolly et al. 2011, Morrison et al. 2013). Three studies reported the duration of training, with one offering 11 hours training in total (Morrison et al. 2013), another providing two days (Bush et al. 2014) and a third providing three days training (Jolly et al. 2011).

10.2.7 Cost information

Two studies reported the cost of delivering the intervention (Bush et al. 2014, Jolly et al. 2011). Three studies only reported the costs to patients (Ahrens et al. 2003, Harmon et al. 2014) or payments to providers (Morrison et al. 2013); one only reported who funded the programme (Boardman Avery 2014).

10.2.8 Details of the study design

The designs used by the six evaluations were very varied (see Table 10.1). Three employed comparison groups (Ahrens et al. 2003, Bush et al. 2014, Jolly et al. 2011) and three did not (Boardman Avery 2014, Harmon et al. 2014, Morrison et al. 2013). Two thirds included one hundred or more participants and half were conducted across several pharmacies.

All the studies measured weight change; two also measured other physiological changes, e.g. blood pressure (Ahrens et al. 2003, Boardman Avery 2014). Two studies assessed changes in health behaviours, namely nutritional intake (Harmon et al. 2014) and physical activity (Jolly et al. 2011). Three studies explored the acceptability of the intervention to recipients (Bush et al. 2014, Harmon et al. 2014, Jolly et al. 2011); one also considered its acceptability to community pharmacists, implementation issues, views about training and its reach (Bush et al. 2014). One study reported attendance (Morrison et al. 2013).

Table 10.1 Obesity and weight management evaluations –study design, sample size and setting (n=6)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	< 100	100 +	Multi-centre	Single Centre
Obesity and Weight management	3 studies: Ahrens (2003) Open label RCT, Open-label RCT Bush (2014): Randomized, retrospective, observational comparison Jolly (2011) RCT	3	2	4	3	3

12.4.3 Reference list of included studies

Ahrens RA, Hower M, Best AM (2003) Effects of weight reduction interventions by community pharmacists. *J Am Pharm Assoc* 43: 583-589.

Boardman HF, Avery AJ (2014) Effectiveness of a community pharmacy weight management programme. *International journal of clinical pharmacy* 36: 800-806.

Bush J, Langley CA, Patel A, et al. (2011) *Evaluation of the Heart of Birmingham teaching Primary Care Trust (HoBtPCT) Weight Management Programme*. Birmingham, UK: Aston University.
http://eprints.aston.ac.uk/16563/1/My_Choice_Project_Report_Final.pdf

Bush J, Langley C, Mills S, et al. (2014) A comparison of the provision of the My Choice Weight Management Programme via general practitioner practices and community pharmacies in the United Kingdom. *Clinl Obes* 4: 91-100.

Counterweight Project Team (2012) The implementation of the Counterweight Programme in Scotland, UK. *Family Practice* 29 Suppl 1: i139-i144.

Harmon M, Pogge E, Boomershine V (2014) Evaluation of a pharmacist-led, 6-month weight loss program in obese patients. *J Am Pharm Assoc*54: 302-307.

Jolly K, Lewis A, Beach J, et al. (2011) Comparison of range of commercial or primary care led weight reduction programmes with minimal intervention control for weight loss in obesity: lighten Up randomised controlled trial. *Bmj* 343: d6500.

Luevorasirikul K, Boardman HF, Anderson CW (2010) A study of university students and pharmacists' perspectives on weight management. *International Journal of Health Promotion and Education* 48: 42-45.

Morrison D, McLoone P, Brosnahan N, et al. (2013) A community pharmacy weight management programme: an evaluation of effectiveness. *BMC Public Health* 13: 282.

Newlands RS, Watson MC, Lee AJ (2011) The provision of current and future Healthy Weight Management (HWM) services from community pharmacies: a survey of community pharmacists' attitudes, practice and future possibilities. *International Journal of Pharmacy Practice* 19: 106-114.

Weidmann AE, Cunningham S, Gray G, et al. (2012) Views of the Scottish general public on community pharmacy weight management services: international implications. *International journal of clinical pharmacy* 34: 389-397.

Weidmann A E, MacLure K, Marshall S, Gray G, and Stewart D. (2015). Promoting weight management services in community pharmacy: perspectives of the pharmacy team in Scotland. *International Journal of Clinical Pharmacy*, 37, pp.599-606.

11 Other health conditions

- **Extent of evidence:** We identified 46 studies which focused on a variety of health conditions not covered within the priority health topics described in Chapters 4-10.
- **Context of evidence:** The majority of studies were conducted in the USA (n=16), followed by the UK (n=13) and the others were conducted in Australia (n=6), Canada (n=3), Netherlands (n=2), Spain (n=1), Switzerland (n=1), Germany (n=1), Italy (n=1), Norway (=1) and France (n=1).
- **Intervention focus:** These services addressed a range of health conditions, with the majority of studies focusing on osteoporosis (n=12), respiratory health (n=9), and cancer (n=7). The remaining studies were on: bowel disorders (n=4); chronic kidney disease (n=1); dementia and cognitive impairment (n=1); depression (n=1); low back pain (n=1); migraine and headache (n=1); osteoarthritis (n= 1); skin disorders (n=2); sleep disorders (n=2); streptococcal infections (n=2); and urinary tract infections (n=1).
- **Intervention components:** Intervention components included advice (n=27), assessment (n=23), referral (n=24), information (n=24), feedback on tests (n=9), education (n=8), medicines management (n=6), testing (n=6), resource access (n=5), immunisation (n=1), incentives (n=1) counselling (n=3), and social support (n=1).
- **Evaluation details:** The majority of the studies employed a single group study design (n=31), although ten controlled evaluations were identified for cancer and osteoporosis, migraine, osteoarthritis, low back pain and another for respiratory health. Studies examined the following outcomes: results of assessment (n=22), service use and referral (n=16), physiological outcomes (n=11), knowledge and attitudinal outcomes (n=11), psychosocial outcomes (n=7), and health behaviour outcomes (n=8). The processes that were measured were: acceptability to recipients of the intervention (n=22), reach (n=17), implementation issues (n=9), acceptability to community pharmacists (n=10), cost (n=7), training (n=4), acceptability to others (n=3), access (n=2), and other processes (n=5). There were ten randomised controlled trials (cancer (n=3); osteoporosis (n=3); respiratory disease (n=2); chronic kidney disease (n=1); low back pain (n=1); migraine (n=1) and osteoarthritis (n=1).
- **Gaps in evidence:** Only 13 UK studies examined conditions that were not identified as priority health topics. Further research into a greater variety of health conditions is suggested to help evidence the range of public health services that could be offered in community pharmacy.

11.1 Introduction

This chapter provides a descriptive overview of the studies that focus on a range of services provided to the public by community pharmacies to address various other health conditions not listed as a health priority by the advisors to this review. This includes:

- bowel disease

- early cancer awareness
- chronic kidney disease and renal impairment;
- dementia and cognitive impairment;
- depression; long term conditions;
- low back pain
- migraine and headache;
- osteoarthritis;
- osteoporosis;
- respiratory health;
- skin disorders;
- sleep disorders;
- urinary tract infections.

Table 11.1 shows the countries in which these studies were conducted.

Table 11.1: Other health conditions (n=46)

Health condition	UK	USA	Canada	Australia	Spain	Switzerland	Germany	Netherlands	France	Italy	Norway
Bowel disease and gastrointestinal conditions	2		1	1							
Early cancer awareness	3	2								1	1
Chronic kidney disease								1			
Dementia and cognitive impairment		1									
Depression		1									
Low back pain				1							
Migraine							1				
Osteoarthritis			1								
Osteoporosis		9	1	1	1						
Respiratory health	4	2		1				1	1		
Skin disorders	2										
Sleep disorders				1		1					
Streptococcal infections	1	1									
Urinary tract infections	1										

11.2 Bowel disease and gastrointestinal conditions

11.2.1 Introduction

In this section, a descriptive overview of studies is reported which focus on the services provided to the public by community pharmacies for the health condition of bowel diseases such as colorectal cancer, inflammatory bowel disease, dyspepsia and gastrointestinal conditions, which can be difficult to identify and treat at an early stage. Community pharmacies have the potential to appropriately identify and refer symptomatic clients.

11.2.2 The included studies

We found four studies which examined the role of community pharmacies who carried out services for bowel disease, dyspepsia and gastrointestinal conditions, they were all evaluated interventions.

Studies focused on varied conditions, one study examined bowel disease topic (Sriram et al. 2016). One study focused on dyspepsia (Renaud and Glavas 2002) and two studies focused on chronic gastrointestinal condition, coeliac disease (National Association Primary Care 2015, Urwin et al. 2016).

11.2.2.1 *Aims of the interventions*

The aims of the interventions varied in approach, one intervention evaluation was a Gut Check program which could identify and distinguish between those patients who can safely use over-the-counter products to treat their GI symptoms, those who need referral or patients at risk. (Renaud and Glavas 2002). One study aimed to evaluate a self-administered questionnaire provided to clients presenting with bowel symptoms to multiple community pharmacies (of unknown type). Researchers sought to understand staff acceptance of the questionnaire, the number of GP referrals made as a result of using the questionnaire; and the number of subsequent diagnoses made by GPs. (Sriram et al. 2016) Two studies on coeliac disease, one on focused on increasing awareness and early recognition of coeliac disease in people who are taking medications for IBS and/or anaemia. The other on targeted case finding service for coeliac disease using a small number of community pharmacies (National Association Primary Care 2015, Urwin et al. 2016)

11.2.2.2 *Study Setting*

Two of the studies were set in the UK (National Association Primary Care 2015, Urwin et al. 2016). One was set in Australia. (Sriram et al. 2016) and the last one was set in Canada. (Renaud and Glavas 2002) All of the reported interventions were conducted in multi-centre community pharmacies.

11.2.2.3 *Intervention components*

Advice and information was the common intervention component and was provided by three studies. (National Association Primary Care 2015, Renaud and Glavas 2002, Sriram et al. 2016).

Three studies provided referrals with other professionals such as GP or physician. (Renaud and Glavas 2002, Sriram et al. 2016, Urwin et al. 2016) Two studies carried out assessment for risk factors bowel symptoms and dyspepsia) (Renaud and Glavas 2002, Sriram et al. 2016). Lastly, the two coeliac disease interventions included point of care (POC) testing. (National Association Primary Care 2015, Urwin et al. 2016)

11.2.2.4 *Intervention timing*

Two studies reported timelines of the interventions, one taking place over three months (Renaud and Glavas 2002) and one study indicated a one-off meeting (Urwin et al. 2016).

11.2.2.5 *People delivering the intervention*

In three studies, community pharmacists provided the service (Renaud and Glavas 2002, Sriram et al. 2016, Urwin et al. 2016). One study identified additional assistance from counter staff and one study identified additional providers as trained members of the pharmacy team (National Association Primary Care 2015, Urwin et al. 2016)

11.2.2.6 *Training*

Three studies discussed pharmacist training (National Association Primary Care 2015, Renaud and Glavas 2002, Urwin et al. 2016). Training consisted of educational, online and how to carry out POC testing.

11.2.2.7 *Cost information*

In all four studies no cost information was provided.

11.2.2.8 *Details of the study design*

As Table 11.2 indicates, all four studies were none comparative studies. All of the four were multi-centre studies with one sample size of less than 100 participants (Sriram et al. 2016). Three studies had a sample of more than 100 participants (National Association Primary Care 2015, Renaud and Glavas 2002, Urwin et al. 2016).

Table 11.2: Bowel disease, Dyspepsia and gastrointestinal conditions evaluations - study design, sample size and setting (n=4)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	< 100	100 +	Multi-centre	Single Centre
Bowel disease and gastro-intestinal conditions		4	1	3	4	0

11.2.3 *Reference list of included studies*

National Association Primary Care (2015) *Early detection of coeliac disease through community pharmacy*. National Association Primary Care.

Renaud D, Glavas D (2002) GI intervention: A program for community pharmacists. *Canadian Pharmaceutical Journal* 135: 34-38.

Sriram D, McManus A, Emmerton Lynne M, Parsons Richard W, Jiwa M (2016) A model for assessment and referral of clients with bowel symptoms in community pharmacies. *Current Medical Research And Opinion* 32: 661-667.

Urwin H, Wright D, Twigg M, McGough N (2016) Early recognition of coeliac disease through community pharmacies: a proof of concept study. *International journal of clinical pharmacy* 38: 1294-1300.

11.3 Early cancer awareness

11.3.1 Introduction

In this section, a descriptive overview of studies is reported which focus on the services provided to the public by community pharmacies for the health condition of cancer. The studies found examined different types of cancers: breast, cervical, colorectal and skin. Two studies explored the early detection of different types of cancer.

11.3.2 The included studies

We found seven studies which examined the role of community pharmacies who carried out talked to patients presenting with certain symptoms and advised on different types of cancers. All evaluated interventions. The studies focused on early cancer detection (Badenhorst et al. 2015, Kjome et al. 2017), breast cancer risk assessment and education (Giles et al. 2001), self-sampling to increase participation in cervical cancer screening (Rossi et al. 2015), a pharmacy-led skin cancer campaign (Camden and Islington Public Health 2015, Pearce et al. 2016) and supplemental colorectal cancer screening interventions offered during an annual influenza vaccination campaign (Potter et al. 2010).

11.3.2.1 Aims of the interventions

Although the aims of the interventions varied in approach, they could be grouped into two categories: interventions that aimed to identify those who are at-risk, and interventions that aimed to educate people at-risk about cancer. Four studies used methods of screening and education to engage participants (Giles et al. 2001, Kjome et al. 2017, Potter et al. 2010, Rossi et al. 2015). The main aim of the study on breast cancer was to test the hypothesis that: 'an education programme can increase women's confidence in screening practices' (Giles et al. 2001, p2). The main aim of the study was to carry out mole scans at a retail chain pharmacy. (Kjome et al. 2017). The study on cervical screening aimed to evaluate the effect on participation in organised screening programme (Rossi et al. 2015). The study on colorectal cancer compared two pharmacy-based interventions which coincided with an annual influenza campaign (Potter et al. 2010). One study created a campaign to increase public awareness of the signs and symptoms of cancer within a community pharmacy setting and to encourage appropriate GP presentation, and promoting early detection services where appropriate (Camden and Islington Public Health 2015).

11.3.2.2 Study Setting

Three of the studies were set in the UK: one in North of England (Badenhorst et al. 2015); one in London (Camden and Islington Public Health 2015) and the other in Wales (Pearce et al. 2016). Two were set in

the USA: one in Richmond, Virginia (Giles et al. 2001); and the other in San Francisco, California (Potter et al. 2010). One was set in northern Italy (Rossi et al. 2015) and lastly one was set in Norway (Kjome et al. 2017).

All of the reported interventions were conducted in community pharmacy multiples. One intervention also included home testing and clinic settings in northern Italy (Rossi et al. 2015). One intervention also included health screening fairs (Giles et al. 2001).

11.3.2.3 *Intervention components*

Advice was the common intervention component utilised across the set of included studies. Additionally, six studies provided information and education materials on related cancer topics (Giles et al. 2001, Pearce et al. 2016, Potter et al. 2010, Rossi et al. 2015). In four studies, participants additionally took part in a screening programme; one was carried out by the pharmacist (Giles et al. 2001, Pearce et al. 2016, Potter et al. 2010, Rossi et al. 2015), and the other two studies relied additionally on the participants to carry out self-testing using kits provided by the pharmacists (Potter et al. 2010; Rossi et al. 2015). One study, which examined colorectal cancer, was run as part of an annual influenza vaccination campaign and referral (Potter et al. 2010).

11.3.2.4 *Intervention timing*

Three studies reported timelines of the intervention taking place over one month (Giles et al. 2001, Pearce et al. 2016, Potter et al. 2010, Rossi et al. 2015). Two studies provided a timeline over six months, which also included a follow up (Badenhorst et al. 2015, Rossi et al. 2015). One study reported timelines in minutes and how long the conversations took place between pharmacists and patients. (Camden and Islington Public Health 2015). One study patients received correspondence within two weeks of mole scan and follow up if further investigation was required (Kjome et al. 2017).

11.3.2.5 *People delivering the intervention*

Community pharmacists were the only provider mentioned in three studies. Two studies identified additional assistance from counter staff (Pearce et al. 2016) and two studies identified additional providers as health care professionals (Rossi et al. 2015).

11.3.2.6 *Training*

Only four studies discussed pharmacist training (Badenhorst et al. 2015, Pearce et al. 2016). The study on skin cancer described how the pharmacist staff were invited to take part on how to use resources, but this was not mandatory (Pearce et al. 2016). In the study on early cancer detection, pharmacists were provided with one-hour intensive training (Badenhorst et al. 2015). In the study on awareness of cancer, two staff from each pharmacy (one pharmacist and one medicines counter assistant) had to attend a face-to-face half day Cancer Research UK 'Talk Cancer' training session and in addition participate an online e-learning tool (Camden and Islington Public Health 2015). In the dermatological cancer screening study, all pharmacy staff performing mole scans were required to read the procedure, take an online course, and practical training in use of the Siascope and the Mole Navigator® system and a final practical test, where the employee performed the service and the resulting scans were approved by ScreenCancer (Kjome et al. 2017).

11.3.2.7 Cost information

In all seven studies, only two studies provided cost information. One study shared information on payments attached to each element of the campaign: the information that pharmacies were required to submit in order to receive payment, timescales and actual spend. The maximum amount a pharmacy could receive during the campaign was £1,300. The total actual spend was £18,990 (Camden and Islington Public Health 2015). In the other study where patients self-selected for the service, they identified the moles they wanted to scan, paid a set fee per mole, 350 NOK (approximately 50 USD) for the first mole, and 150 NOK (21 USD) for subsequent scans (Kjome et al. 2017). Only one study referred to cost in the study's conclusion explaining how the colorectal cancer test used in this study was approved for sale in pharmacies in the USA, but was not currently available (Potter et al. 2010).

11.3.2.8 Details of the study design

As Table 11.2 indicates, three of the seven evaluations of cancer services used a controlled design. All of the seven were multi-centre studies with a sample size of 100 participants or more.

The first controlled study used a randomised, paired, pre-post design where training, assessment of risks and education on breast-self-examination took place using the Breast Cancer-Risk Assessment Tool (Giles et al. 2001) The second used a multicentre randomised controlled design to compare the uptake a Pap test by women using three methods: self-sampling; picking up the test from the pharmacy; and a standard recall letter from a health centre (Rossi et al. 2015). The third controlled evaluation was a time-randomised clinical trial which was run alongside an influenza vaccination campaign. This study examined a range of outcomes and processes, including issues of acceptability and reach (Potter et al. 2010). Two studies were described as non-comparative, the first collected data from patients who had moles scanned at Norwegian Boots pharmacies (Kjome et al. 2017). The other study focused on a targeted campaign on a cancer screening programme (Camden and Islington Public Health 2015). Of the remaining two evaluations, one was a prospective study which targeted the general population whereby trained pharmacists advised on alarm symptoms for cancer detection (Badenhorst et al. 2015). The other used a retrospective analysis of data taken from participants' responses to a sun-safety quiz to examine service acceptability (Pearce et al. 2016).

Table 11.2: Cancer evaluations - study design, sample size and setting (n=7)

Health condition	Study design			Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	Other	< 100	100 +	Multi-centre	Single Centre

Cancer	3 studies: Giles et al. 2001: Randomized, paired, pre- post study Rossi et al. 2015: RCT Potter et al. 2010): Time-randomized clinical trial	2	2	0	7	7	0
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11.3.2.9 Reference list of included studies

Badenhorst J, Todd A, Lindsey L, et al. (2015) Widening the scope for early cancer detection: identification of alarm symptoms by community pharmacies. *International journal of clinical pharmacy* 37: 465-470.

Camden and Islington Public Health (2015) *Cancer Awareness Campaign with Islington Community Pharmacies. Evaluation report*. Cancer Research UK.

Giles JT, Kennedy DTP, Dunn EC, et al. (2001) Results of a community pharmacy-based breast cancer risk-assessment and education program. *Pharmacotherapy* 21: 243-253.

Kjome R, Wright D, Bjaen A, et al. (2017) Dermatological cancer screening: Evaluation of a new community pharmacy service. *Research in social & administrative pharmacy* 13: 1214-1217.

Pearce S, Evans A, Phelps C, et al. (2016) The case for targeting community pharmacy-led health improvement: Findings from a skin cancer campaign in Wales. *International Journal of Pharmacy Practice* 24: 333-340.

Potter MB, Gildengorin G, Wang Y, et al. (2010) Comparative effectiveness of two pharmacy-based colorectal cancer screening interventions during an annual influenza vaccination campaign. [J Am Pharm Assoc](#) 50: 181-187.

Rossi G, Fortunato C, Barbarino P, et al. (2015) Self-sampling to increase participation in cervical cancer screening: an RCT comparing home mailing, distribution in pharmacies, and recall letter. *British Journal of Cancer* 112: 667-675.

11.4 Chronic kidney disease (CKD) and renal impairment

Chronic kidney disease (CKD) is a reduction in kidney function, the ability of the kidneys to excrete waste products from the body. One study was identified that focused on testing for this condition (Geerts et al. 2013). This study tested creatinine levels and glomerular filtration rate (GFR).

The Geerts et al. (2013) study was set in three community pharmacies and five general practices in the southern Netherlands. This study aimed to investigate the feasibility of point of care creatinine testing (POCCT) in community pharmacies in order to monitor whether appropriate drug therapy was being given to ambulatory elderly patients, aged 70 or over, who were prescribed drugs for diabetes and/or cardiovascular disease that are eliminated by the kidneys. Pharmacist and pharmacy technicians tested 46 people for creatinine levels and GFR by finger prick blood samples using an i-STAT analyser. Costs per test were estimated at \$7.94 (2013 prices), which included: disposables (\$1.52), cartridge (\$.4.70), and labour (\$1.72) but excluded the cost of purchasing the i-STAT analyser and staff training costs. They state that the cost to measure creatinine levels in the central laboratory is \$6.66. Geerts et al. (2013) report that the point-of-care operators (pharmacists or pharmacy technicians) were trained by accredited technicians from the Department of Clinical Chemistry and Haematology of the University Medical Centre in Utrecht Netherlands, but do not provide details about the extent, or duration of training. In addition to reporting the results of testing, the authors also evaluated the acceptability of the intervention to both the recipients and the providers using a five-point Likert scale; and also examined issues regarding the implementation of this intervention.

11.4.1 Reference list of included studies

Geerts A, De Koning F, De Vooght K, et al. (2013) Feasibility of point-of-care creatinine testing in community pharmacy to monitor drug therapy in ambulatory elderly patients. *Journal of Clinical Pharmacy and Therapeutics* 38: 416-422.

11.5 Dementia and cognitive impairment

Dementia is a syndrome associated with declining cognitive abilities. Dementia can be caused by diseases such as Alzheimer's or strokes (Rickles et al. 2014) and a range of other factors. It is estimated that over 800,000 people in the UK population are directly affected by dementia, costing the UK economy more than cancer and heart disease combined (Luengo-Fernandez et al. 2010). Early diagnosis and treatment can lessen the burden of illness and community pharmacies might be well-placed to assist with this. One study was identified which examined pharmacy services in relation to cognitive memory testing (Rickles et al. 2014). Overall, the study sought 'to evaluate the impact of pharmacy-based cognitive memory testing activities with a focus on early detection of Alzheimer's disease, appropriateness of referral of at-risk patients to their primary care physicians for potential diagnosis, and outcomes of physician referral related to follow-up. The programme also measured patient satisfaction with advanced clinical services and the willingness of patients to pay for cognitive memory testing services.' (Rickles et al. 2014). The intervention sought to determine patient's ability to retain and recall pre-existing information, short-term forgetfulness, word finding capability impairment, speech, noun-retrieval, semantic memory and language. Set in 12 high street pharmacy chains in the Oregon and North Carolina regions of the USA, pharmacists provided elderly clients with testing for risk factors of cognitive dementia, counselling and education based on the individual clients' needs, and appropriate referral to clients' general practitioner. The duration, frequency and intensity of this intervention was not described by authors. Pharmacists were trained through a two-hour webinar provided by the American Pharmacists Association. Costs of the intervention were not provided. The number of appropriate referrals to general practitioners was assessed, as were the number of clients planning to go to their general practitioners, and clients' acceptability of this service and their willingness to pay. These were examined via self-completion surveys and follow-up telephone interviews.

While this study describes a promising intervention for early cognitive impairment detection and referral, it does not provide robust evidence of effectiveness. Further, the issue of willingness to pay may not be relevant to the UK context of pharmacy service provision. Further investigation within a UK-based evaluation would provide more relevant evidence.

11.4.1 Reference list of included studies

Rickles NM, Skelton JB, Davis J, et al. (2014) Cognitive memory screening and referral program in community pharmacies in the United States. *International Journal of Clinical Pharmacy* 36: 360-367.

11.6 Depression

Depression is a mental health issue which affects a large proportion of the population. Community pharmacies provide an accessible location for clients experiencing symptoms of depression who might otherwise remain unidentified and/or unsupported. One study was identified which examined assessment (Rosser et al. 2013) for depression.

(Rosser et al. 2013) aimed to develop, implement and evaluate a depression assessment intervention in terms of its ability to detect clients with depression symptoms and to describe the onward GP referrals and treatment that resulted. Provided across 32 supermarket pharmacies in Ohio USA, pharmacists administered two versions of the Patient Health Questionnaire to assess depression symptoms occurrence and severity. This appeared to be a one-time intervention, although it was not further described. No additional training of pharmacists was described, nor were costs provided. Those with higher PHQ scores were referred to their GP, and subsequent follow-up by pharmacists was undertaken to determine GP attendance and subsequent treatment. This was evaluated by use of a one-group survey.

A one-group survey method was utilised which limits the claims about the effectiveness of the interventions under study. In addition, a possible lack of additional training for pharmacists to provide these interventions was noted; and no costs about provision were given by authors. This information would be useful in designing future evaluations.

11.6.1 Reference list of included studies

Rosser S, Frede S, Conrad WF, et al. (2013) Development, implementation, and evaluation of a pharmacist-conducted screening program for depression. *J Am Pharm Assoc*53: 22-29.

11.7 Low back pain

Back pain is experienced by a broad segment of the population, often with a significant impact on activities of daily living and working when it is poorly managed. Community pharmacies are well-placed to support people with low back pain in managing this condition. One study was included which examined pharmacy-based strategies to promote client management of low back pain (Slater et al. 2013).

This study, which was a controlled evaluation, aimed to evaluate the effectiveness of a community pharmacy-based intervention to help clients manage low back pain. Conducted in Australia, the study was set in community pharmacies of unknown type. Pharmacies provided clients with either: (1) pamphlets alone; or (2) pamphlets in conjunction with education strategies provided by pharmacists; compared to (3) usual care. Beliefs about low back pain and fear avoidance beliefs were the primary outcomes measured. Secondary outcomes included activity impairment, pain severity and clients' perceptions of the pamphlet's usefulness. While not described, the intervention appears to have been a one-time event of unknown intensity and duration. Training on pamphlet use and the education strategy was provided to pharmacists. Pharmacies were remunerated AUS\$10 for each participant recruited into the study, which was described as a cluster RCT.

11.7.1 Reference list of included studies

Slater H, Briggs AM, Watkins K, et al. (2013) Translating evidence for low back pain management into a consumer-focussed resource for use in community pharmacies: a cluster-randomised controlled trial. *PLoS ONE* 8: e71918.

11.8 Migraine and headache

Headaches, including migraine and tension-type headaches are amongst the most prevalent disorders of mankind, effecting an estimated half to three quarters of adults. (World Health Organisation, 2011b). We identified one study set in northern Germany (Hoffmann et al. 2008)

The aim of the study was to evaluate the effects of pharmaceutical care for headache and/or migraine sufferers on clinical and psychological outcomes. The study was a prospective randomised controlled trial. The intervention was designed to improve the management of headaches and was delivered face-to-face by community pharmacists. Patients in the intervention group received pharmaceutical care from trained pharmacists, and a standard manual and advice, which included general information about applying advices and awareness of possible adverse drug effects for medicines that they were taking. Patients in the control group received usual care with the regular pharmaceutical consultation from pharmacists with no special training. Pharmacists who provided the intervention took part in a two-day training programme that was conducted by a physician and a pharmacist from the research university.

Community pharmacies in the intervention group participated in a two-day central training programme conducted by a physician and a pharmacist who were employees of the university. The training was based on a comprehensive standard operation manual that was distributed to the intervention pharmacists upon completion of the programme.

A total of 112 community pharmacies treated 410 adults from the general population, 201 in the intervention group and 209 in the control group. Prior to the intervention, patients had a telephone interview and then again four months after the intervention had occurred. Outcomes measured were the number of days with headache, severity of headaches, self-efficacy and patients' own perceptions of their health-related quality of life using the SF-35 sum scale for mental health.

The intervention required two interviews. Processes such as acceptability to patients and time effort were measured but no cost information was provided.

11.8.1 Reference list of included studies

Hoffmann W, Herzog B, Muhlig S, et al. (2008) Pharmaceutical care for migraine and headache patients: a community-based, randomized intervention. *Annals of Pharmacotherapy* 42: 1804-1813.

11.9 Osteoarthritis

Osteoarthritis is a common form of arthritis, leading to painful and stiff joints. One study, which used a RCT design, explored whether community pharmacies could improve quality of osteoarthritis care (Brookhart et al. 2013, Marra et al. 2012). The study was reported in three publications (see Appendix 2). The intervention aimed to deliver multi-disciplinary pharmacologic and non-pharmacologic treatment options. It targeted men and women aged 50+ who were at risk of osteoarthritis (i.e. patients with knee pain who were experiencing pain, aching, or stiffness in or around the knee(s) on most days of the last month; were overweight, defined as a body mass index (BMI) > 25 kg/m²; had not been actively participating in a formal exercise programme within the past six months; and had self-reported difficulty in activities attributed to knee pain). The study took place in (unspecified) community pharmacies in the USA. The intervention involved a pharmacist consultation where patients were offered education, medication review and referral to a physiotherapist-guided group exercise programme, which included an assessment, an individualised home programme and a six-week group exercise class. The outcome of this consultation was recorded and shared with the patients' general practitioners. No information was provided about staff training. A cost-utility analysis was conducted and reported in a separate publication. This found that from a Ministry of Health perspective, the average patient receiving the intervention cost \$120 compared to \$115 for usual care (Marra et al. 2012). The evaluation assessed the overall quality of osteoarthritis care and changes in function, pain and generic quality of life.

11.9.1 Reference list of included studies

Brookhart A, Fountain K, Moczygemba L, et al. (2013) Community pharmacist-provided osteoporosis screening and education: Impact on patient knowledge. *Innovations in pharmacy* 6: 1-10.

Marra CA, Cibere J, Grubisic M, et al. (2012) Pharmacist-initiated Intervention Trial in Osteoarthritis: a multidisciplinary intervention for knee osteoarthritis. *Arthritis Care and Research* 64: 1837-1845.

11.10 Osteoporosis

11.10.1 Introduction

In this section, a descriptive overview of studies is presented which focuses on the community pharmacy services provided to the public for the health priority of osteoporosis. Osteoporosis disease has serious implications and can lead to bone fractures and deterioration of bone tissue. With an aging population, incidences related to osteoporosis are likely to rise; the data from the following studies are mainly from an ageing population and explore a variety of interventions used by pharmacists to identify and address this health concern (Brookhart et al. 2013, Elliott et al. 2002b).

11.10.2 Included studies

We located twelve studies examining the role of community pharmacies in osteoporosis, all of which were intervention evaluations (Barris Blundell et al. 2006, Brookhart et al. 2013, Elliott et al. 2002b, Goode et al. 2004, Johnson et al. 2008, Law and Shapiro 2005, MacLaughlin et al. 2005, McDonough et al. 2005, Naunton et al. 2006, Newman and Hanus 2001, Summers and Brock 2005, Yuksel et al. 2010). The evaluated interventions were reported in fifteen reports (see Appendix 2).

The studies primarily focused on osteoporosis testing and education (n=11). One study collected data on 'risk of glucocorticoid-induced osteoporosis' (McDonough et al. 2005).

11.10.2.1 Aims of the interventions

The overarching aim of the osteoporosis studies was to evaluate and test the impact of testing and education offered by community pharmacists in a variety of different settings. Only two studies did carry out tests for bone density (BD) (McDonough et al. 2005, Newman and Hanus 2001). Six interventions only involved women. (Barris Blundell et al. 2006, Elliott et al. 2002, Johnson et al. 2008, Law and Shapiro 2005, Naunton et al. 2006, Newman and Hanus 2001). Three focused on older women above 50 years old (Elliott et al. 2002, Johnson et al. 2008, Naunton et al. 2006). Two initiatives aimed to reach out to rural communities by using portable equipment (Elliott et al. 2002, Naunton et al. 2006).

11.10.2.2 Study Setting

The majority of the included studies were set in the USA and data were collected from a variety of geographic regions (Brookhart et al. 2013, Elliott et al. 2002, Goode et al. 2004, Johnson et al. 2008, Law and Shapiro 2005, MacLaughlin et al. 2005, Newman and Hanus 2001, Summers and Brock 2005). One study was set in Canada (Yuksel et al. 2010), one in Australia (Naunton et al. 2006), and one in Spain (Barris Blundell et al. 2006).

The interventions in the included studies mostly took place in multi-centre community pharmacy settings (n=9). Three studies took place in a single centre setting (Barris Blundell et al. 2006, Law and Shapiro 2005, Summers and Brock 2005). Three were identified as being located in a high street or supermarket pharmacy setting (Brookhart et al. 2013, Goode et al. 2004, Summers and Brock 2005). One was identified as an independent pharmacy (Elliott et al. 2002). One intervention took place in community pharmacy and out-patient clinic (MacLaughlin et al. 2005). One intervention was conducted as 'outreach' from a community pharmacy: osteoporosis classes, that were held either in the local community centre or at the pharmacist (Newman and Hanus 2001). Two studies described the study

setting as rural, one in Wisconsin, USA and the other as Tasmania, Australia (Elliott et al. 2002, Naunton et al. 2006).

11.10.2.3 Intervention components

Across the set of 12 included studies, the use of ultrasound or bone density testing was the common intervention component (Barris Blundell et al. 2006, Brookhart et al. 2013, Elliott et al. 2002, Goode et al. 2004, Johnson et al. 2008, Law and Shapiro 2005, MacLaughlin et al. 2005, Naunton et al. 2006, Summers and Brock 2005, Yuksel et al. 2010). There were nine interventions which, alongside bone density testing, also offered a range of other interventions which included: advice (counselling, further explanation of results), information (education pamphlets, diet, calcium intake) and bio feedback (Barris Blundell et al. 2006, Brookhart et al. 2013, Elliott et al. 2002, Goode et al. 2004, Johnson et al. 2008, Law and Shapiro 2005, MacLaughlin et al. 2005, McDonough et al. 2005, Naunton et al. 2006, Summers and Brock 2005, Yuksel et al. 2010). In three studies, participants with 'high risk' diagnosis were advised or referred to their GP to discuss further treatment (Barris Blundell et al. 2006, Goode et al. 2004, Naunton et al. 2006). There was only one intervention study which did not share the results with the participants, instead the information was sent directly to the primary care provider and the participants were advised to follow this up (Elliott et al. 2002).

11.10.2.4 Intervention timing

The frequency and duration of the interventions were not described in detail. Eight studies provided information on the amount of time allocated to counselling after positive bone density testing (which varied from one to six months) (Barris Blundell et al. 2006, Brookhart et al. 2013, Goode et al. 2004, Johnson et al. 2008, McDonough et al. 2005, Naunton et al. 2006, Summers and Brock 2005, Yuksel et al. 2010).

11.10.2.5 People delivering the intervention

Community pharmacists provided the intervention in all twelve studies. One intervention also included assistance from students (Johnson et al. 2008), and three studies included assistance from other healthcare professionals such as a nurse and health practitioner (Elliott et al. 2002, Law and Shapiro 2005, MacLaughlin et al. 2005).

11.10.2.6 Training

Training of providers was described in eight of the studies (Elliott et al. 2002, Goode et al. 2004, Johnson et al. 2008, MacLaughlin et al. 2005, McDonough et al. 2005, Naunton et al. 2006, Newman and Hanus 2001, Yuksel et al. 2010). The training primarily consisted of education on osteoporosis, menopause, and how to use the device for bone density testing. Two interventions provided a more structured accredited certificate programme or classroom-based programme (MacLaughlin et al. 2005, McDonough et al. 2005, Newman and Hanus 2001).

11.10.2.7 Cost information

Four studies mention costs of some description, and these are divided into two categories: pharmacists who are paid per patient to conduct the tests (Johnson et al. 2008, Newman and Hanus 2001) and participants who were charged a fee for the service (Goode et al. 2004, Law and Shapiro 2005). There were three studies which pointed out that participants were not charged for the tests (Brookhart et al.

2013, Elliott et al. 2002, Summers and Brock 2005). The remaining eight studies did not mention any cost information.

11.10.2.8 *Details of the study design*

Three of the 12 evaluations used controlled designs (see Table 11.3). All but one had 100 participants or more and all and three-quarters were conducted across more than one pharmacy.

Of the studies with controlled designs, all used random allocation to groups (Brookhart et al. 2013, McDonough et al. 2005, Yuksel et al. 2010). In one further study, the design implemented was prospective and cross-sectional, using only one group but comparing two different types of bone density testing equipment: quantitative ultrasound and dual-energy x-ray absorptiometry (MacLaughlin et al. 2005).

The eight remaining evaluations were non-comparative, using single group study designs (Barris Blundell et al. 2006, Elliott et al. 2002, Goode et al. 2004, Johnson et al. 2008, Law and Shapiro 2005, Naunton et al. 2006, Newman and Hanus 2001, Summers and Brock 2005). Examples of the methodology approach ranged from a cross-sectional survey approach, to a prospective trial collecting data pre and post intervention, with no control group (Barris Blundell et al. 2006, Law and Shapiro 2005).

The acceptability to patients of testings in a pharmacy setting were key processes that were measured and reported through collecting data using questionnaires (Elliott et al. 2002, Law and Shapiro 2005, MacLaughlin et al. 2005, McDonough et al. 2005, Newman and Hanus 2001, Summers and Brock 2005). Studies also examined attitudinal change, reach and uptake, and health behaviour and physiological change (Brookhart et al. 2013, Johnson et al. 2008, Law and Shapiro 2005, McDonough et al. 2005, Naunton et al. 2006, Newman and Hanus 2001).

Table 11.3: Osteoporosis evaluations – study design, sample size and setting (n=12)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non- Comparative	< 100	100 +	Multi-centre	Single Centre

Osteoporosis	3 studies:	9	1	11	9	3
	Brookhart (2013) Prospective, randomised, controlled study					
	McDonough (2005) Randomised control					
	Yuksel (2010) randomized, controlled trial					

11.10.3 References of included studies

Barris Blundell D, Rodriguez Z, Sabio S, et al. (2006) Screening for osteoporosis among post-menopausal women in community pharmacy. *Pharmacy practice* 4: 95-101.

Brookhart A, Fountain K, Moczygemba L, et al. (2013) Community pharmacist-provided osteoporosis screening and education: Impact on patient knowledge. *Innovations in pharmacy* 6: 1-10.

Elliott ME, Meek PD, Kanous NL, et al. (2002b) Osteoporosis screening by community pharmacists: use of National Osteoporosis Foundation resources. *J Am Pharm Assoc* 42: 101-110.

Goode JV, Swiger K, Bluml BM (2004) Regional osteoporosis screening, referral, and monitoring program in community pharmacies: findings from Project IMPACT: Osteoporosis. *J Am Pharm Assoc* 44: 152-160.

Johnson JF, Koenigsfeld C, Hughell L, et al. (2008) *Bone health screening, education, and referral project in northwest Iowa: creating a model for community pharmacies.* *J Am Pharm Assoc* 48:379-387.

Law AV, Shapiro K (2005) Impact of a community pharmacist-directed clinic in improving screening and awareness of osteoporosis. *Journal of Evaluation in Clinical Practice* 11: 247-255.

MacLaughlin EJ, MacLaughlin AA, et al. (2005) Osteoporosis screening and education in community pharmacies using a team approach. *Pharmacotherapy* 25: 379-386.

McDonough RP, Doucette WR, Kumbera P, et al. (2005) An evaluation of managing and educating patients on the risk of glucocorticoid-induced osteoporosis. *Value in Health* 8: 24-31.

Naunton M, Peterson GM, Jones G (2006) Pharmacist-provided quantitative heel ultrasound screening for rural women at risk of osteoporosis. *Annals of Pharmacotherapy* 40: 38-44.

Newman ED, Hanus P (2001) Improved bone health behavior using community pharmacists as educators: the Geisinger Health System Community Pharmacist Osteoporosis Education Program. *Disease Management and Health Outcomes* 9: 329-335.

Summers KM, Brock TP (2005) Impact of pharmacist-led community bone mineral density screenings. *Annals of Pharmacotherapy* 39: 243-248.

Yuksel N, Majumdar SR, Biggs C, et al. (2010) Community pharmacist-initiated screening program for osteoporosis: randomized controlled trial. *Osteoporos Int* 21: 391-398.

11.11 Respiratory health

11.11.1 Introduction

In this section, a descriptive overview of studies which focus on the services provided to the public by community pharmacies for respiratory health is presented. Respiratory health encompasses chronic obstructive pulmonary disease (COPD), tuberculosis, asthma, and sleep apnoea.

11.11.2 Included studies

Nine studies on respiratory health were included. Of these, five focused on chronic obstructive pulmonary disease (Fuller et al. 2012, Khachi et al. 2016, van Boven et al. 2016, Wright et al. 2015a, Wright et al. 2015b); two on asthma (Khachi et al. 2016, Kritikos et al. 2005) and one each sleep apnoea (Perraudin et al. 2015), lung cancer (Robinson and Fuller 2017) and tuberculosis (Jakeman et al. 2015). All were intervention evaluations.

11.11.2.1 Aims of the interventions

The principal aim of five interventions was around testing or diagnosis (Robinson and Fuller 2017, Fuller et al. 2012, Jakeman et al. 2015, Perraudin et al. 2015 and Wright et al. 2015b). Three aimed to provide medication support (Khachi 2016, van Boven et al. 2016, Wright et al. 2015a) and one aimed to increase awareness of asthma (Kritikos et al. 2005).

11.11.2.2 Study Setting

Four of the studies were set in the UK (Khachi 2016, Robinson and Fuller 2017, Wright et al. 2015a, Wright et al. 2015b), two in the USA (Fuller et al. 2012, Jakeman et al. 2015) and one each in Australia (Kritikos et al. 2005), France (Perraudin et al. 2015) and The Netherlands (van Boven et al. 2016).

Study sites were varied. Four studies did not specify a specific study setting beyond stating that they took place in community pharmacies (Perraudin et al. 2015, Robinson and Fuller 2017, van Boven et al. 2016, Wright et al. 2015a). Another study included unspecified community pharmacies and outreach (Fuller et al. 2012), and another two were set only in outreach from the pharmacies (Khachi 2016, Kritikos et al. 2005). Two were set in high street/supermarket pharmacies (Jakeman et al. 2015, Wright et al. 2015b); one of these also involved independent pharmacies (Jakeman et al. 2015).

11.11.2.3 Intervention components

Five interventions included referral or communication with other professionals (Jakeman et al. 2015, Perraudin et al. 2015, van Boven et al. 2016, Wright et al. 2015a, Wright et al. 2015b) and five involved advice (Fuller et al. 2012, Khachi 2016, van Boven et al. 2016, Wright et al. 2015a, Wright et al. 2015b). Four offered testing (Fuller et al. 2012, Khachi 2016, Jakeman et al. 2015, Wright et al. 2015b), three included counselling (van Boven et al. 2016, Wright et al. 2015a, Wright et al. 2015b), and three involved education (Fuller et al. 2012, Kritikos et al. 2005, Wright et al. 2015a). Information was provided in three interventions (Kritikos et al. 2005, Perraudin et al. 2015, van Boven et al. 2016), three provided medicines management services (Khachi 2016, van Boven et al. 2016, Wright et al. 2015a) and one involved referral (Robinson and Fuller 2017).

11.11.2.4 Intervention timing

The duration of the intervention was not described in any study and the intervention frequency was also rarely discussed, though presumed to be one-off in many cases. Only two studies specified the intervention frequency; both cases involved more than one session (van Boven et al. 2016, Wright et al. 2015a).

11.11.2.5 People delivering the intervention

In most studies the community pharmacist delivered the intervention; one study also used counter staff [Robinson and Fuller 2017] and another used high school students as peer educators (Kritikos et al. 2005). In two studies this information was not provided (van Boven et al. 2016, Wright et al. 2015b).

11.11.2.6 Training

The training offered to those providing the study was described to some extent in all but one study (Wright et al. 2015b), although only three mentioned the duration of training: five hours (Jakeman et al. 2015), one day (Wright et al. 2015a) and 16 hours (Fuller et al. 2012).

11.11.2.7 Cost information

Four studies calculated the cost savings associated with the interventions (Khachi 2016, van Boven et al. 2016, Wright et al. 2015a, Wright et al. 2015b); three provided no cost information (Fuller et al. 2012, Kritikos et al. 2005, Robinson and Fuller 2017) and one each only reported the cost of the intervention to patients (Jakeman et al. 2015) or the amount pharmacists were paid per participant (Perraudin et al. 2015).

11.11.2.8 Details of the study design

As Table 11.4 indicates, of the nine intervention evaluations, all but three had 100 or more participants and all were multi-centre studies. Only one included a controlled design (Perraudin et al. 2015). Five looked at service use/referral outcomes (Fuller et al. 2012, Perraudin et al. 2015, Robinson and Fuller 2017, van Boven et al. 2016, Wright et al. 2015a), three presented the results of testing (Jakeman et al. 2015, Khachi 2016, Wright et al. 2015b) and in three, health behaviour outcomes were explored (smoking and medicine adherence) (Fuller et al. 2012, Khachi 2016, van Boven et al. 2016). Two studies looked at psychosocial outcomes (quality of life) (van Boven et al. 2016, Wright et al. 2015a), two measured physiological changes (Khachi 2016, van Boven et al. 2016) and another, asthma knowledge (Kritikos et al. 2005).

Table 11.4: Respiratory health evaluations – study design, sample size and setting (n=9)

Health condition	Study design		Sample size		No. pharmacies studied	
			< 100	100 +	Multi-centre	Single Centre
	Controlled	Non Comparative	< 100	100 +	Multi-centre	Single Centre
Respiratory Health	1 study Perraudin (2015) RCT	8	3	6	9	0

11.11.3 Reference list of included studies

Fuller L, Conrad WF, Heaton PC, et al. (2012) Pharmacist-managed chronic obstructive pulmonary disease screening in a community setting. *J Am Pharm Assoc* 52: e59-66.

Jakeman B, Gross B, Fortune D, et al. (2015) Evaluation of a pharmacist-performed tuberculosis testing initiative in New Mexico. *J Am Pharm Assoc* 55: 307-312.

Khachi H, Enti R, Karikari P (2016) Impact of a pharmacist-led asthma and COPD respiratory clinic in general practice. *Clinical Pharmacist* 8.

Kritikos V, Saini B, Bosnic-Anticevich SZ, et al. (2005) *Innovative asthma health promotion by rural community pharmacists: a feasibility study.*

Perraudin C, Fleury B, Pelletier-Fleury N (2015) Effectiveness of intervention led by a community pharmacist for improving recognition of sleep apnea in primary care-A cohort study. *J Sleep Res* 24: 167-173.

Robinson S, Fuller E (2017) *A lung health service: Doncaster pharmacy direct referral for chest x-ray: a project summary.* UK: NHS England, Cancer Research UK and Macmillan Cancer Support. https://www.cancerresearchuk.org/sites/default/files/doncaster_pharmacy_to_cxr_project_summary.pdf, <http://www.cancerresearchuk.org/health-professional/early-diagnosis-activities/ace-programme/ace-programme-projects>

van Boven JFM, Stuurman-Bieze AGG, Hiddink EG, et al. (2016) Effects of targeting disease and medication management interventions towards patients with COPD. *Current Medical Research and Opinion* 32: 229-239.

Wright D, Twigg M, Barton G, et al. (2015a) An evaluation of a multi-site community pharmacy-based chronic obstructive pulmonary disease support service. *Int J Pharm Pract* 23: 36-43.

Wright D, Twigg M, Thornley T. (2015b) Chronic obstructive pulmonary disease case finding by community pharmacists: a potential cost-effective public health intervention. [*Int J Pharm Pract* 23: 83-85.](#)

11.12 Skin disorders

Skin disorders cover a range of topical conditions, but we only identified two studies on this issue. One study explored British pharmacy staff views on their role in managing undiagnosed skin problems and the barriers and facilitators to their management in a community pharmacy setting, using semi-structured interviews (Tucker and Stewart 2015). One intervention evaluation was identified, which focused on psoriasis (Tucker and Stewart 2017). This British non-comparative study aimed to increase patients' understanding of psoriasis and reduce its severity and impact on quality of life. The authors did not specify the types of community pharmacies the intervention was set in, however those delivering the intervention were community pharmacists. During the intervention the pharmacists provided information to patients during two face-to-face consultations. All providers were given a training pack with information on psoriasis. Intervention costs were not reported. The intervention was delivered in multiple settings and involved fewer than 100 participants. The outcomes measured were physiological changes, psychosocial outcomes and knowledge/attitudinal outcomes.

11.12.1 Reference list of included studies

Tucker R, Stewart D (2015) An exploratory study of the views of community pharmacy staff on the management of patients with undiagnosed skin problems. *International Journal of Pharmacy Practice* 23: 390-398.

Tucker R, Stewart D (2017) The role of community pharmacists in supporting self-management in patients with psoriasis. *The International Journal of Pharmacy Practice* 25: 140-146.

11.13 Sleep disorders

Sleep disorders can pose significant health risks and reduce quality of life. Community pharmacies can support greater identification and treatment options for people potentially living with sleep disorders. Two studies were identified which examined assessments for sleep disorders (Fuller et al. 2011, Hersberger et al. 2006).

Fuller et al. (2011) sought to develop, implement and evaluate a community pharmacist-led sleep health awareness and education programme for patients at risk of a sleep disorder. The programme was delivered by community pharmacists in both urban and rural areas of Australia. Assessment for sleep disorders was undertaken using different validated instruments for assessing the risk of insomnia, restless legs syndrome and for obstructive sleep apnoea. All patients identified at risk of a sleep disorder were referred to a physician. Community pharmacists also provided written information and advice about their condition/symptoms, including individuals who were not at risk of a sleep disorder but experienced sleep disturbance. The number of sessions and length of the programme sessions was not described but it appeared to be a one-time intervention with follow-up via referral when required. A two-day sleep health training programme for pharmacists was provided to enhance their confidence in assessments and included sessions on sleep hygiene and other sleep-related good practice. A single-group design was used to evaluate the programme, measuring the number of people assessed and uptake of referrals for those identified at-risk, health behaviour changes made, and any changes in pharmacists' knowledge and attitudes to sleep health. The costs and payment per intervention were not documented, but each pharmacist received \$AUD15 for each patient for whom they completed data collection.

Hersberger et al. (2006) investigated a campaign delivered in Switzerland aimed at supporting the detection of sleep disturbance, including 'daytime sleepiness' via free assessments and targeted counselling in community pharmacies. In addition to assessment and counselling on sleep hygiene, pharmacists, across multiple sites, also made referrals to doctors if there was an indication of sleep disorder risk. Training as part of the campaign included written instructions and oral teaching on technical issues and interpretation of assessment results. Pharmacies also needed to subscribe in advance and pay a fee of €300 to get all promotional material advertising the programme and to retain access to education activities and the online questionnaire. The duration of the programme was suggested as ongoing, and the time required to assess and provide counselling estimated at between 15 and 30 minutes. The single group evaluation design collected data on outcomes, e.g. the results of assessing and the number of referrals made, and processes, including acceptability to community pharmacists and recipients

Both studies used single group designs and focused primarily on establishing uptake and reach of their programmes. As Table 11.5 also indicates, both were multi-centre studies with 100 or more participants.

Table 11.5: Sleep disorder evaluations – study design, sample size and setting (n=2)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	< 100	100 +	Multi-centre	Single Centre
Sleep disorders	0	2	0	2	2	0

11.13.1 Reference list of included studies

Fuller J, Wong K, Krass I, et al. (2011) Sleep disorders screening, sleep health awareness, and patient follow-up by community pharmacists in Australia. *Patient Education and Counseling* 83: 325–335.

Hersberger KE, Renggli VP, Nirikko AC, et al. (2006) Screening for sleep disorders in community pharmacies—evaluation of a campaign in Switzerland. *Journal of Clinical Pharmacy and Therapeutics* 31: 35–41.

11.14 Streptococcal infections

Streptococcus pyogenes is bacteria that mainly results in mild infections. However, repeated infections from group A streptococcus (GAS) may activate numerous autoimmune diseases, such as acute rheumatic fever, acute post-streptococcal glomerulonephritis and rheumatic heart disease, which are responsible for in excess of half a million deaths per year globally (Walker et al. 2014). In excess of 600 million cases of GAS pharyngitis are reported each year (Carapetis et al. 2005).

Two studies were identified that focused on point-of-care testing for the management of this condition by community pharmacists (Klepser et al. 2016, Thornley et al. 2016). Klepser et al. (2016) was a multicentre study set in 55 independent, chain, mass merchandiser and regional food store pharmacies across three states of the USA (Michigan, Minnesota and Nebraska). The study was a single group design that described a community pharmacy-based collaboration with physicians to manage GAS in patients. Community pharmacists delivered the intervention in the pharmacy sites and physicians delivered the intervention at primary care sites. The intervention required one face-to-face visit for the test and a telephone call within 24-28 hours of the test. The outcomes measured were the results of testing; after testing, patients were informed of the pharmacist's interpretation of the findings. When the test result was positive, the pharmacist contacted the patient's healthcare provider in order to develop a treatment plan, or referred to an emergency department. A total of 273 adults were tested using the Group A Streptococcal rapid antigen detection test or GAS RADT test, which involved taking a throat culture (RADT) to establish an etiologic diagnosis. All pharmacists who were responsible for enrolling and testing patients had to complete the Collaborative Institutional Training Initiative programme and also a 20-hour point-of-care testing certificate course. The cost of the service was \$75, with eligible patients receiving a voucher to cover the cost of the test. The cost of any antibiotics dispensed were the responsibility of the patient, or the patient's insurer, but this was not explicitly described.

Thornley et al. (2016) was also a multicentre study, set in 35 chain pharmacies in two localities in the UK. The study was a single group design that described an intervention using point of care tests for patients with sore throats to diagnose streptococcal pharyngitis and offer appropriate antibiotic treatment. Community pharmacists and pharmacy counter staff delivered the intervention. The intervention was delivered face-to-face, with point-of-care test results provided within five minutes. The outcomes measured were the results of testing, the costs/resources and reach/uptake achieved. As well as the point-of-care test, patients were offered information and advice about their condition, as well as products for symptomatic relief where appropriate. Patients with atypical or severe symptoms were referred to their GP. A total of 367 patients were seen. Across all participating pharmacies, 98 pharmacists undertook a training package which included a face-to-face component. Patients paid £7.50 for the test and a further £10 if antibiotic supply was required. It was calculated that the possible savings to the NHS in GP consultations avoided were £2747.

11.14.1 References of included studies

Klepser DG, Klepser ME, Dering-Anderson AM, Morse JA, Smith JK, Klepser SA (2016) Community pharmacist-physician collaborative streptococcal pharyngitis management program. *J Am Pharm Assoc* 56: 323-329.e321.

Thornley T, Marshall G, Howard P, et al. (2016) A feasibility service evaluation of screening and treatment of group A streptococcal pharyngitis in community pharmacies. *The Journal of Antimicrobial Chemotherapy* 71: 3293-3299.

11.15 Urinary tract infections (UTI)

Urinary tract infections (UTIs) are common infections, predominantly among women. In many cases, antibiotic treatment is not necessary as the patient will recover in a few days regardless. However, for moderate or severe UTIs, antibiotics may be used. One study was found. This explored whether community pharmacies could prescribe antibiotics for moderate/severe uncomplicated UTIs in adult women and compared GP and pharmacy patient pathways (Booth et al. 2013). This intervention aimed to improve patient access to treatment and was delivered by community pharmacists in independent pharmacies based on the high street or within supermarkets in the UK. The intervention involved the pharmacist supplying antibiotics to patients who met the specified inclusion criteria. Neither the duration of the intervention, staff training, nor cost information were provided. This study employed a single group design using cross-sectional data from patients presenting with GP prescriptions and those without prescriptions who presented with UTI symptoms. It explored patients' service use (duration of symptoms before seeking help and avoidance of GP consultation after intervention), physiological outcomes (time to symptom resolution after seeking care) and attitudinal outcomes (belief that an antibiotic was required for current symptoms). The study also explored the intervention's acceptability to both community pharmacists and patients, and access issues.

11.15.1 Reference list of included studies

Booth JL, Mullen AB, Thomson DA, et al. (2013) Antibiotic treatment of urinary tract infection by community pharmacists: a cross-sectional study. *British Journal of General Practice* 63: e244-249.

12 Community pharmacy for general / multiple public health issues

This chapter provides a descriptive overview of 49 studies that were identified as focusing on community pharmacy public health services that are general in scope or have aims that cut across several health condition areas. The intervention evaluations that fall into this category address the following topics: healthy living pharmacy (HLP) initiatives; wellness and life coaching; health education; oral health, and pharmacogenomics. This chapter also describes the UK-based studies of stakeholders' perspectives of community pharmacy for public health, where this, again is focused on services or public health in general terms, as opposed to being focused on a specific health condition area.

Table 12.1 shows the countries in which these studies were conducted.

Table 12.1: Cross-cutting community pharmacy public health studies

Cross-cutting public health initiatives	UK	USA	Canada
Healthy Living Pharmacy	9		
Wellness initiatives		3	
Health education	1	1	
Oral health	3		
Pharmacogenetics		1	1
Studies of stakeholder perspectives on community pharmacy for public health	30		

12.1 Healthy living pharmacy (HLP)

12.1.1 Introduction

This section presents a descriptive overview of studies investigating the delivery of public health services commissioned through the UK-based 'Healthy Living Pharmacy' (HLP) concept. The HLP initiative adopts a pro-active approach to promoting health and wellbeing interventions through qualified health champions helping to improve the health of people locally. The concept is underpinned by quality criteria and three enablers: workforce development; fit for purpose premises that facilitate health promoting interventions with a dedicated health promotion zone; and engagement with the local community and healthcare professionals, public health professionals and local authorities (PSNC, 2017a; PSNC, 2018).

12.1.2 Included Studies

Nine studies investigated the HLP model (Blenkinsopp and Silcock 2014, Cooper and Tsoneva 2017, Davies et al. 2013, Donovan and Paudyal 2016, Duggan et al. 2013, Harding et al. 2012, Hopgood et al. 2013, Langley et al. 2014, Royal Society for Public Health 2016)

None of the studies had a condition specific or targeted population focus, rather focused on the impact of HLP as a service provider. Three studies (Donovan and Paudyal 2016, Harding et al. 2012, Royal Society for Public Health 2016) did not carry out any intervention evaluations and will be not be discussed any further. The remaining six studies are evaluations of HLP and it is these studies that will be discussed for the remainder of this section.

12.1.2.1 Aims of the interventions

Each of the six studies reported that the overall aim of HLP was to improve the health and wellbeing outcomes of the local population and reduce health inequalities.

12.1.2.2 Study Setting

All studies investigated Healthy Living pharmacy programmes delivered in multiple community pharmacy settings, across different regions in England. These included Sheffield (Cooper and Tsoneva 2017), London (Davies et al. 2013), Birmingham (Langley et al. 2014) Portsmouth (Duggan et al. 2013), Plymouth (Hopgood et al. 2013) and West Yorkshire (Blenkinsopp and Silcock 2014)

12.1.2.3 Intervention components

One key intervention component of HLP was to increase access to health and well-being advice and provide signposting to additional services if not provided by themselves when required. This was achieved by having at least one staff member qualified as a 'health champion' who could provide brief but informed advice on a range of health issues such as healthy eating, physical activity, sexual health, and substance misuse (Cooper and Tsoneva 2017, Davies et al. 2013), (Blenkinsopp and Silcock 2014, Duggan et al. 2013, Hopgood et al. 2013, Langley et al. 2014). Another key component was the provision of public health services (Hopgood et al. 2013), early pregnancy testing (Langley et al. 2014), and provision of emergency hormonal contraceptives (Duggan et al. 2013, Hopgood et al. 2013)

12.1.2.4 Intervention timing

Only two studies describe duration and intensity of the initiatives although the descriptions were vague 'one off' and 'varied by service'. (Cooper and Tsoneva 2017, Davies et al. 2013)

12.1.2.5 People delivering the intervention

In addition to community pharmacists (Blenkinsopp and Silcock 2014, Davies et al. 2013, Duggan et al. 2013, Hopgood et al. 2013, Langley et al. 2014) healthy living pharmacy services, including advice and support, were also delivered by counter staff, pharmacy technicians and assistants and health champions (Duggan et al. 2013, Hopgood et al. 2013) students (Cooper and Tsoneva 2017, Duggan et al. 2013, Langley et al. 2014), and other health care professionals (Hopgood et al. 2013)

12.1.2.6 Training

Under the 2009 Healthy Living Pharmacy Framework, to provide consistent service, pharmacies are to have a trained health champion on site who has obtained the RSPH Level 2 award (PHE 2016). Only four studies provided information related to training. In the study (Cooper and Tsoneva 2017) the HLCs felt empowered in undertaking more formal continuing professional development... "Learning was described as an iterative process requiring ongoing activity and several examples of undertaking further training and qualifications were cited." Pharmacists were given access to an online learning package specifically designed for community pharmacists and their teams. The alcohol learning allowed them to self-accredit their competence in alcohol assessment and intervention. (Davies et al. 2013) In the study by Langley et al. (2014), community pharmacists gained 'Tier One' accreditation in the HLP programme by completing an assessment form, as part of the formal accreditation framework. Counter staff in the study by (Hopgood et al. 2013) received training to support them deliver 'brief health advice' as part of an e-learning package for clients. Two leader training sessions were also provided to pharmacy staff to ensure services were being delivered to a high standard.

12.1.2.7 Cost information

HLPs are commissioned to deliver public health services by various commissioning routes including local authorities, Clinical Commissioning Groups (CCGs) (PSNC, 2017a). Three studies provided information on costs (Blenkinsopp and Silcock 2014, Duggan et al. 2013, Hopgood et al. 2013, Langley et al. 2014) These reported that each month pharmacies received £3 for up to 150 consultations completed, and £1 per consultation thereafter. A cost analysis was also conducted by (Duggan et al. 2013, Hopgood et al. 2013), in each case providing an estimate of how much it would cost to deliver services, taking into account salaries, time spent, and initial start-up expenditures.

12.1.2.8 Details of the study design

As Table 12.2 indicates, one of the six evaluations used a controlled design (Hopgood et al. 2013).

The controlled evaluation compared the performance of HLP pharmacies against non-HLP pharmacies (control group). The remaining studies used a single-group design. In the evaluation by Cooper and Tsoneva (2017) a qualitative study was undertaken with a purposive sample of Health Champions working in pathfinder HCPs in the Sheffield area. In Davies et al. (2013) pharmacists proactively approached and encouraged members of the public to complete an alcohol awareness 'scratch card' that identified potentially high levels of alcohol consumption. In Duggan et al. (2013) a longitudinal design was used to compare the performance of Healthy Living Pharmacies pre- and post-HLP status. A study by Langley et al. (2014) was concerned with the implementation of Healthy Living Pharmacies; they collected service provision data for four healthcare services and conducted interviews with providers. The evaluation by Blenkinsopp and Silcock (2014) also focused on implementation priorities and whether team working and team development in HLP pharmacies reflected a commitment to establishing its community pharmacies in the area. Although all four studies used different designs, key outcome measures in both studies included service use referral rates, physiological changes, health behaviour, in addition to data on costs, reach and the acceptability to community pharmacists.

Table 12.2: Healthy living pharmacy evaluations – study design, sample size and setting (n=4)

Health condition	Study design		Sample size		No. pharmacies studied	
			< 100	100 +	Multi-centre	Single Centre
	Controlled	Non- Comparative				
Healthy Living Pharmacy	2 studies Hopgood (2013): Compares performance of HLP pharmacies (n=19) against non-HLP pharmacies (n=34). Langley (2014) Compares activity between each HLP and its equivalent non-HLP comparator across corresponding time spans	4	1	5	6	0

12.1.3 Reference list of included studies

Blenkinsopp A, Silcock J (2014) *Evaluation of the West Yorkshire Healthy Living Pharmacy Programme*. University of Bradford. <http://www.cpwv.org/doc/973.pdf>

Cooper RJ, Tsoneva J (2017) Benefits and tensions in delivering public health in community pharmacies - a qualitative study of healthy living pharmacy staff champions. *The International Journal of Pharmacy Practice* 25: 351-357.

Davies J, Gill J, Crisp M, et al. (2013) *Pan-London Pharmacy Alcohol Awareness Campaign*. London: UCL School of Pharmacy. <http://www.healthwatchsouthwark.co.uk/wp-content/uploads/2013/05/Alcohol-Final.pdf>

Donovan GR, Paudyal V (2016) England's Healthy Living Pharmacy (HLP) initiative: Facilitating the engagement of pharmacy support staff in public health. *Res Social Adm Pharm* 12: 281-292.

Duggan C, Evans D, Holden M, et al. (2013) *Evaluation of the Healthy Living Pharmacy Pathfinder Work Programme 2011-2012*. PSNC. <http://psnc.org.uk/wp-content/uploads/2013/08/HLP-evaluation.pdf>

Harding D, Stone M, Wilcock M (2012) Do community pharmacy counter staff have a public health role? *Pharmaceutical Journal* 289: 1-4.

Hopgood K, Stone M, Elliston K, et al. (2013) *Healthy Living Pharmacy Pathfinder Plymouth Evaluation 2012-2013*. Plymouth UK: NHS Plymouth.

Langley CA, Bush J, Patel A (2014) *An Evaluation: The Implementation and Impact of Healthy Living Pharmacies within the Heart of Birmingham*. Birmingham (UK): Aston University.
<https://research.aston.ac.uk/portal/en/researchoutput/an-evaluation--the-implementation-and-impact-of-healthy-living-pharmacies-within-the-heart-of-birmingham%28287898ba-d5b4-4ffe-b48e-176266a4023b%29.html>

Royal Society for Public Health (2016) *Building capacity: realising the potential of community pharmacy assets for improving the public's health*. London: Royal Society for Public Health.
<https://www.rsph.org.uk/uploads/assets/uploaded/f5aa43f0-4a27-4c69-959a6ea9ad7c06ba.pdf>

12.2 Wellness initiatives

12.2.1 Introduction

Wellness initiatives are an overarching approach for preventing a number chronic conditions such as heart disease, type 2 diabetes, strokes, and cancer (DiDonato et al. 2013, p15). Three studies were found, each taking a very different approach to wellness.

12.2.2 Included Studies

One study focused on annual wellness visits provided by clinical pharmacist to health centres (Alhossan et al. 2016). The second examined the role of the community pharmacist as a life coach to provide monitoring services in the workplace (DiDonato et al. 2013). The third explored point-of-care testing held at community health fairs (Palombi et al. 2014).

12.2.2.1 *Aims of the interventions*

In the Alhossan study (2016), clinical pharmacists collected information from patient charts. This included patient demographics, prevention initiatives that had been ordered, and medication changes organised during the visit. In the DiDonato study (2013), patients were stratified into monitoring groups according to baseline testing values for cholesterol, blood pressure, fasting blood glucose (FBG), body mass index (BMI), and waist circumference. The intervention evaluated by Palombi et al. (2014) used testing to identify dyslipidaemia, diabetes, hypertension, and osteoporosis for economically disadvantaged residents.

12.2.2.2 *Study Setting*

All of the studies were set in the USA (Alhossan et al. 2016, DiDonato et al. 2013, Palombi et al. 2014). All three involved outreach from a community pharmacy setting: one study to federally qualified health centres (Alhossan et al. 2016); the second study to a workplace setting. The details of type of workplace were not included by study authors (DiDonato et al. 2013). In the third, testing took place in settings such as shopping centres, churches, community pharmacies, senior residence facilities, critical-access hospitals and clinics (Palombi et al. 2014).

12.2.2.3 *Intervention components*

In one intervention, the clinical pharmacist carried out vaccinations, medicines management (e.g. dosage changes) and tested for in-house glycosylated haemoglobin and finger-stick tests (Alhossan et al. 2016, p226). In the second, the pharmacists provided wellness coaching by giving advice and information (including a documentation form and a variety of wellness topics corresponding to identified areas of a person, and patient education handouts) and testing for risk factors such as: cholesterol, blood pressure, blood glucose, weight, body mass index (BMI), and waist circumference (DiDonato et al. 2013, p16). After testing in the third study, recipients were informed of results and were referred to their general practitioner if these involved out-of-range test values.

12.2.2.4 *Intervention timing*

None of the studies provided detail about intervention timing.

12.2.2.5 *People delivering the intervention*

In the first study, a clinical pharmacist carried out the intervention (Alhossan et al. 2016). In the second study, two community pharmacists took on the role of coaches (DiDonato et al. 2013). In the third study, the initiative was led by a University pharmacy faculty and student pharmacists undertook the testing with support from University staff and pharmacists from the local community (Palombi et al. 2014).

12.2.2.6 *Training*

Two of the studies reported some form of training offered to staff. In one, it is noted that the pharmacy staff did not have to complete specific certificate training before participating, but were encouraged to review cholesterol, hypertension, diabetes, and obesity guidelines (DiDonato et al. 2013). The other reported that all providers had completed training on testing devices (Palombi et al. 2014).

12.2.2.7 *Cost information*

Only one study provided cost information. This was in relation to total revenue for the AWVs (annual wellness visits) conducted by pharmacists, and services completed during the visits which exceeded \$22,000). The total revenue from all other tests (in-house glycosylated haemoglobin and finger-stick tests), laboratory tests, and vaccinations given during the visits was \$36,379 (Alhossan et al. 2016, p227).

12.2.2.8 *Details of the study design*

All three studies used single group designs. Two looked retrospectively at patient data (Alhossan et al. 2016, Palombi et al. 2014). The other used a prospective interventional cohort (DiDonato et al. 2013).

12.2.3 Reference list of included studies

Alhossan A, Kennedy A, Leal S (2016) Outcomes of annual wellness visits provided by pharmacists in an accountable care organization associated with a federally qualified health center. *American Journal of Health-System Pharmacy* 73: 225-228.

DiDonato KL, May JR, Lindsey CC (2013) Impact of wellness coaching and monitoring services provided in a community pharmacy. *J Am Pharm Assoc*53: 14-21.

Palombi LC, Bastianelli K, Stratton T (2014) Point-of-care screenings at the University of Minnesota: mechanism for civic engagement. *J Am Pharm Assoc*54: 56-62.

12.3 Health education

In this section, a descriptive overview is presented of studies which focus on health education services provided to the public by community pharmacies where these are not specifically linked to a health condition.

We located two studies: one related to health education leaflet uptake (Lloyd-Williams 2003) and the other concerned menopause-related health education (Zeolla and Cerulli 2004). Each is described separately below.

An awareness intervention aimed to enhance the uptake of health-related leaflets by the general public and promote utilisation of pharmacists' health knowledge (Lloyd-Williams 2003). It was set across 12 independent and small chain community pharmacies in Staffordshire, England. The intervention provided pharmacy clients with leaflets and offers of advice from the pharmacist or other staff. The topic of heartburn and indigestion was chosen for the study. The intervention was evaluated using a controlled design to compare rates of leaflet and advice uptake across four different modes of provision. Pharmacists' opinions on the intervention were collected, including the feasibility, time and effectiveness of the intervention, and the extent to which their skills were used.

A menopause education intervention reported by Zeolla and Cerulli (2004) aimed to improve management of menopause using counselling and increase the rate of health provider discussions in middle-aged women. It also aimed to increase recipients' knowledge and changes in diet, lifestyle and medication use. The intervention took place in seven US independent and chain pharmacies and consisted of individualised verbal and written education prompted by a checklist on topics related to the management of menopause. This included benefits and risks of prevention and treatment options and referral as needed. Each appointment lasted 30 minutes and was provided by community pharmacists who had received six hours of training related to the intervention. This small pilot study utilised a single-group design, and measured knowledge and behaviour changes and patient satisfaction.

Table 12.3 Health education evaluations – study design, sample size and setting (n=2)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non Comparative	< 100	100 +	Multi-centre	Single Centre
Health Education	1 study: Lloyd-Williams (2003)	1	1	1	2	0

12.3.1 Reference list of included studies

Lloyd-Williams F (2003) The effect of an intervention programme to improve health education leaflet uptake and distribution in community pharmacies. *Patient Education and Counseling* 49: 27-33.

Zeolla MM, Cerulli J (2004) Assessment of the effects of a community pharmacy women's health education program on management of menopause survey scores. *Journal of Managed Care Pharmacy* 10: 442-448.

12.4 Oral health

12.4.1 Introduction

In this section, we provide a descriptive overview of studies which focus on oral and dental health services provided to the public by community pharmacies. Although not originally identified as a health priority for this project as identified by the advisory group, oral health has recently become as a firm priority for PHE. Oral and dental health interventions generally focus on improving oral health by the involvement of healthcare professionals, particularly to reach people who do not routinely visit a dentist (Chestnutt et al. 1998). Often it is disadvantaged people who are more likely to have untreated oral health problems and pain associated with dental health issues. Also, due to costs, people are more likely to forego seeking care from dentists, thus increasing the importance of other healthcare professionals, such as community pharmacists, as a source of consultation for advice (Cohen 2009).

12.4.2.1 The included studies

We located three studies that examined the role of community pharmacies in oral health. (NHS Forth Valley 2017, Steel and Wharton 2011, Sturrock et al. 2017). One study focused on gaining an understanding of how Smile4Life interventions are delivered to ORT patients, within the Community Pharmacy setting, in Forth Valley (NHS Forth Valley 2017). Another study delivered the intervention through the evaluation of pharmacy counter assistants in oral health promotion in the UK. Its aim was to examine whether pharmacy counter assistants (PCAs) have the opportunity to provide advice on oral health issues. (Steel and Wharton 2011). The last study carried out a pilot which explored whether community pharmacies are a suitable venue for a brief oral health intervention, barriers or facilitators for this brief intervention and finally exploring training needs required for the brief intervention.

12.4.2.1 Aims of the interventions

Only two studies fully described the aims of the interventions, in one study patients received ORT with a holistic Recovery Focussed Pharmaceutical package of care. Oral health was included within this service agreement and pharmacies agreed to “provide information and advice (with appropriate signposting) on oral health” to increase patients health outcomes and access to dental services under the Smile4Life programme (NHS Forth Valley 2017). In the other study it evaluated various processes with regard to the provision of oral health advice including acceptability to PCA, the level of knowledge and training of the PCAs on various oral health issues, perceived barriers to offering oral health advice; and how PCAs view their role in oral health care and how PCAs would like to expand their role (Steel and Wharton 2011).

12.4.2.2 Study Setting

All three studies were set in the UK (NHS Forth Valley 2017, Steel and Wharton 2011, Sturrock et al. 2017). All of the reported interventions were conducted in multi-centre community pharmacies which included 35 independent pharmacists (Steel and Wharton 2011) as well as community pharmacists unspecified (NHS Forth Valley 2017, Sturrock et al. 2017).

Two studies reported timelines of the interventions one was on an ad-hoc advice basis. (Steel and Wharton 2011) The other study was at three months and the interventions lasted approximately five to ten minutes (Sturrock et al. 2017).

12.4.2.3 People delivering the intervention

Only in one study was the intervention delivered by community pharmacists (NHS Forth Valley 2017). Two studies used counter staff (NHS Forth Valley 2017, Steel and Wharton 2011). Two studies used a range of trained staff who worked at the study site such as pharmacist technicians and dispensers (NHS Forth Valley 2017, Sturrock et al. 2017).

12.4.2.4 Training

Two studies discussed pharmacist training. (NHS Forth Valley 2017, Sturrock et al. 2017) Three pharmacies who took part in the evaluation had already received training from the Health Promotion Service on delivering Smile4Life interventions (NHS Forth Valley 2017). In the (Sturrock et al. 2017) study the County Durham and Darlington Foundation Trust (CDDFT) oral health promotion team provided training for all pharmacy staff before delivering the intervention. The training session was designed to enable pharmacy staff to provide the recommended advice specified by Public Health England, training session lasted for one hour and 45 minutes and was delivered by the CDDFT oral health promotion advisor.

12.4.2.5 Cost information

In all three studies no cost information was provided.

12.4.2.6 Details of the study design

As Table 12.1 indicates, all three studies were none comparative studies. All of the three were multi-centre studies with one sample size of less than 100 participants. (Steel and Wharton 2011). Two studies had a sample of more than 100 participants (NHS Forth Valley 2017, Sturrock et al. 2017).

Table 12.1: Oral health (n=3)

Health condition	Study design		Sample size		No. pharmacies studied	
	Controlled	Non-Comparative	< 100	100 +	Multi-centre	Single Centre
Oral health		3	1	2	3	0

12.4.3 Reference list of included studies

NHS Forth Valley (2017) *Community Pharmacy Smile4life Evaluation report*. NHS Forth Valley.

Steel BJ, Wharton C (2011) Pharmacy counter assistants and oral health promotion: an exploratory study. *British Dental Journal* 211: E19.

Sturrock A, Cussons H, Jones C, et al. (2017) Oral health promotion in the community pharmacy: an evaluation of a pilot oral health promotion intervention. *British Dental Journal* 223: 521-525.

12.5 Pharmacogenomics

Pharmacogenomics is the study of how an individual's genetic makeup influences their reactions to drug therapy, leading to the development of pharmacotherapy that is specific to a particular patient (personalised medicine). Although not a public health intervention per se, pharmacogenomics is a service provided which helps to maximize the possibility of therapeutic efficacy and minimizes the risk of drug toxicity (Xie and Frueh, 2005).

Two studies were included both are single group design study. One explored the practicalities and economic feasibility of a community pharmacy providing pharmacogenomics testing for its patrons (Ferreri et al. 2014). The other study evaluated the feasibility of implementing personalised medication services into community practice and quantifying the type of drug therapy problems identified by pharmacists as a result of PGx testing. (Papastergiou et al. 2017) One study involved a single pharmacy in the USA known for offering clinical services that was part of a larger regional chain. The other study had multiple sites and was set in Toronto, Canada offering clinical services in two busy urban community pharmacies.(Ferreri et al. 2014)

The intervention in the Ferreri et al. (2014) study provided CYP2C19 pharmacogenetic testing, which was delivered by two pharmacists. It aimed to identify genetic variants of alleles of elderly patients who were taking the drug clopidogrel by obtaining a buccal swab and sending this to a laboratory for testing (LabCorp). The interventions in the (Papastergiou et al. 2017) study provided referral where , significant drug therapy problems were identified and recommendations for medication optimisation were forwarded to the primary care physician, medicines management and pharmacogenomic testing.

A sample of 18 individuals enrolled and completed in the (Ferreri et al. 2014) study. A sample of 100 individuals enrolled in the (Papastergiou et al. 2017) study. Both studies reported frequency and duration of visits. In the (Ferreri et al. 2014) study the intervention required the recipient to attend two visits lasting 30 minutes. The first visit involved obtaining consent to access personal health records and perform the buccal swab. At the second visit, the test results were explained and suggested alterations to therapy were discussed, along with a comprehensive medicines review. In the second study the after the swab, reports were delivered to the pharmacist via a secure file- sharing portal within two weeks. The pharmacists invited patients back to the clinic to discuss the results (Papastergiou et al. 2017) Cost information was not provided in either study, other than a reference to charges for the visit which was billed to insurers where possible. Other feasibility issues regarding the provision of the testing service were investigated, including: acceptability to recipients, costs and resources, how many people accessed the service, the time taken to provide pharmacogenomics services and the percentage of filed claims that were reimbursed by medical insurance. Only one study provided staff training, participating pharmacists received comprehensive training in PGx. Training consisted of a combination of classroom sessions, online learning, and small-group interactive sessions, which allowed pharmacists to review clinical cases and discuss therapeutic interventions with consulting medical geneticists (Papastergiou et al. 2017).

12.5.1 Reference list of included studies

Ferreri SP, Greco AJ, Michaels NM, et al. (2014) Implementation of a pharmacogenomics service in a community pharmacy. *J Am Pharm Assoc* 54: 172-180.

Papastergiou J, Toliou P, Li W, et al. (2017) The Innovative Canadian Pharmacogenomic Screening Initiative in Community Pharmacy (ICANPIC) study. [J Am Pharm Assoc](#) 57: 624-629.

12.6 Stakeholder views on community pharmacy for public health in general

12.6.1 Included studies

A total of 30 UK-based studies investigated stakeholders' views on the public health role of community pharmacists (see reference list below). These studies complement, but are distinct from, the 29 studies referred to in Chapters 4-11 of UK stakeholder perspectives about community pharmacy that relate to specific health conditions.

The 30 studies addressed below drew on the perspectives of consumers as well as those of community pharmacists, counter staff and other health professionals and managers. Authors of these studies tended to conduct qualitative interviews to gather views about service provision in the UK, but fixed-response survey tools were also used.

12.6.2 Study focus

Fifteen studies explored patients' experiences of or public opinions about community pharmacy; four of these also included other groups views such as community pharmacists (Newlands et al. 2018, Ogunbayo 2015, Saramunee et al. 2014), GPs (Saramunee et al. 2014), health centre staff (Wilson et al. 2000) and lay representatives and other stakeholders (Newlands et al. 2018, Saramunee et al. 2014). Three studies explored lay perceptions of community pharmacy more generally (Kember et al. 2017, Lindsey et al. 2017, Saramunee et al. 2015). In the case of client perspectives, Gidman and Cowley (2013) aimed to explore public experiences and opinions of community pharmacy in Scotland after contractual changes through the use of focus groups. Iversen et al. (2001), (Bell et al. 2000) and also focused on consumers, however their studies focused on investigating consumer attitudes to current and future roles, or the proposed extended role of community pharmacists. Another study sought to understand the barriers to expanding the community pharmacists' role in public health by conducting focus group discussions with a range of pharmacy clients (Gidman et al. 2012). Newlands et al. (2018) involved community pharmacists, policymakers, lay and pharmacy organisation representatives in a Delphi exercise to prioritise areas for explore quality improvement. Another study conducted focus groups and interviews with the general public, community pharmacists, general practitioners and other stakeholders to explore experiences and views of public health service utilisation (Saramunee et al. 2014).

With respect to particular groups of clients, one study utilised focus groups with older people aged 65+ years to determine their opinions on the provision of community pharmacy services (Wood et al. 2015). Another study used focus groups to explore patient experiences of attending a community pharmacy to receive opiate replacement therapy (Radley et al. 2016). A PhD thesis describes use of a range of surveys and interviews with patients and community pharmacists about the role of pharmacies in supporting patients to achieve self-care for long term conditions (Ogunbayo 2015). Another study explored public attitudes to harm reduction services for drug users (Gidman Coomber 2014).

Fourteen studies explores community pharmacists' perceptions; four of these also incorporated others perceptions too (Agomo et al. 2016b, Anderson Rajyaguru 2002, Bradley et al. 2016, Milne 2013). Dewsbury et al. (2015) conducted a survey of community pharmacists in order to examine their views on service provision, the selection of services and views on public health service commissioning, provision and importance. Scott et al. (2007) focused on the views of community pharmacists, examining the strength of preference for existing and new roles based on policy documents for

Scotland, as defined by a number of job characteristics, such as workload, and current levels of activity, by applying a discrete choice experiment (DCE) which was a component of a larger questionnaire. Four studies sought community pharmacists' views on extending their public health role was explored (Agomo et al. 2016a, Agomo et al. 2016b, Inch et al. 2005, Morgan et al. 2010), as well as their views on the costs and resources they would need to expand their services (Morgan et al. 2010, Saramunee et al. 2014); their views on what would support greater access to community pharmacies (Saramunee et al. 2014); and the acceptability to recipients of community pharmacy programmes (Saramunee et al. 2014). One study explored pharmacists' perceptions around providing advice on women's health (McAree and Scott 2004). Another considered community pharmacists' and other pharmacy staff perceptions around support staff roles (Bradley et al. 2016).

Some studies focused on particular services or interventions. One study explored pharmacist and medicines counter assistants' views about a resource pack on folic acid (Anderson and Rajyaguru 2002). Another looked at patient and health care staff perceptions about a change in pharmacy location to within a new health centre (Wilson et al. 2000).

In terms of the perspectives of varied health care professionals, one PhD thesis used interviews and surveys to collect views from a range of pharmacy academics, directors and NHS Trust leads, and to ask community pharmacists their opinions of current and future provision (Bush 2008b). One study explored pharmacy managers' perceptions of their current role and aspirations (Rutter et al. 2000). One study sought views on the development and implementation of an extended UK-wide pharmacy policy by a national professional body (Rosenbloom 2002). Using a combination of survey and focus group methods, pharmacists from community, hospital, clinic and industrial settings were asked their views, as were members of the pharmacy professional body.

12.6.3 Reference list of included studies

Agomo C, Ogunleye J, Portlock J (2016a) A survey to identify barriers in the public health role of community pharmacists. *Journal of pharmaceutical health services research* 7: 253-261.

Agomo C, Ogunleye J, Portlock J (2016b) Strategies enhancing the public health role of community pharmacists: a qualitative study. *Journal of pharmaceutical health services research* 7: 97-104.

Anderson C, Rajyaguru R (2002) The role of community pharmacists and medicines counter assistants in health promotion: Reflections from a folic acid campaign. *International Journal of Pharmacy Practice* 10: 17-22.

Bell H, McElnay J, Hughes C (2000) Societal perspectives on the role of the community pharmacist and community-based pharmaceutical services. *Journal of Social and Administrative Pharmacy* 17: 119-128.

Bradley F, Willis S, Noyce P, et al. (2016) Restructuring supervision and reconfiguration of skill mix in community pharmacy: Classification of perceived safety and risk. *Res Social Adm Pharm* 12: 733-746.

Bush J (2008) *Pharmacy and public health: examining the link between strategy and practice [PhD Thesis]*. Aston University, UK.

Dewsbury C, Rodgers RM, Krska J (2015) Views of English Pharmacists on Providing Public Health Services. *Pharmacy* 3: 154-168.

- Gidman W, Ward P, McGregor L (2012) Understanding public trust in services provided by community pharmacists relative to those provided by general practitioners: a qualitative study. *BMJ open* 2: e000939.
- Gidman W, Cowley J (2013) A qualitative exploration of opinions on the community pharmacists' role amongst the general public in Scotland. *International Journal of Pharmacy Practice* 21: 288-296.
- Gidman W, Coomber R (2014) Contested space in the pharmacy: public attitudes to pharmacy harm reduction services in the West of Scotland. *Res Social Adm Pharm* 10: 576-587.
- Inch J, Bond C, Lee A, et al. (2005) Scottish community pharmacists' current involvement in and attitudes towards 'extended service' provision: A national survey. *International Journal of Pharmacy Practice* 13: 289-301.
- Iversen L, Mollison J, MacLeod TN (2001) Attitudes of the general public to the expanding role of community pharmacists: a pilot study. *Family Practice* 18: 534-536.
- Kember J, Hodson K, James D (2017) The public's perception of the role of community pharmacists in Wales. *The International Journal of Pharmacy Practice*: epub version.
- Lindsey L, Husband A, Steed L, et al. (2017) Helpful advice and hidden expertise: pharmacy users' experiences of community pharmacy accessibility. *Journal of public health* 39: 609-615.
- McAree D, Scott E (2004) Advice provision for women: Community pharmacists' attitudes and skills. *International Journal of Pharmacy Practice* 12: 37-42.
- Milne V (2013) *A Study of Pharmore+: Pharmacy Walk-in Services Pilots*.
- Morgan J, Cheung K, Thorp F (2010) How can primary care organisations better support community pharmacy development? *Pharmaceutical Journal* 284: 478-481.
- Newlands R, Power A, Young L, et al. (2018) Quality improvement of community pharmacy services: a prioritisation exercise. *The International Journal of Pharmacy Practice*: 39-48.
- Ogunbayo O (2015) *Self-care support of long-term conditions and community pharmacy [PhD Thesis]*. University of Manchester.
- Ogunbayo O, Schafheutle E, Cutts C, et al. (2017a). Self-care of long-term conditions: patients' perspectives and their (limited) use of community pharmacies. *International Journal of Clinical Pharmacy*, 39, pp.433-442.
- Ogunbayo O, Schafheutle E, Cutts C, et al. (2017b). How do community pharmacists conceptualise and operationalise self-care support of long-term conditions (LTCs)? An English cross-sectional survey. *The International journal of Pharmacy Practice*, 25, pp.121-132.
- Radley A, Melville K, Easton P, et al. (2016) 'Standing Outside the Junkie Door'-service users' experiences of using community pharmacies to access treatment for opioid dependency. *Journal of public health*.
- Rosenbloom EK (2002) *A policy analysis of the pharmacy in a new age initiative [PhD Thesis]*. University of Derby.
- Rutter PR, Hunt A, Jones I (2000) Exploring the gap: Community pharmacists' perceptions of their current role compared with their aspirations. *International Journal of Pharmacy Practice* 8: 204-208.
- Saramunee K, Krska J, Mackridge A, et al. (2014) How to enhance public health service utilization in community pharmacy?: general public and health providers' perspectives. *Res Social Adm Pharm* 10: 272-284.

Saramunee K, Krska J, Mackridge A, et al. (2015) General public's views on pharmacy public health services: current situation and opportunities in the future. *Public Health* 129: 705-715.

Scott A, Bond C, Inch J, et al. (2007) Preferences of community pharmacists for extended roles in primary care: a survey and discrete choice experiment. *Pharmacoeconomics* 25: 783-792.

Watson L, Bond C, Gault C (2003) A survey of community pharmacists on prevention of HIV and hepatitis B and C: current practice and attitudes in Grampian. *Journal of Public Health Medicine* 25: 13-18.

Wilson K, Jesson J, Staunton N (2000) Evaluation of a new health centre pharmacy: A case study. *International Journal of Pharmacy Practice* 8: 97-102.

Wood K, Gibson F, Radley A, et al. (2015) Pharmaceutical care of older people: what do older people want from community pharmacy? *International Journal of Pharmacy Practice* 23: 121-130.

13 Discussion and conclusions

This systematic map aimed to investigate the extent and nature of the available evidence including the types of community pharmacy public health services that have been studied; and the scope of public health service provision, research, costs and other aspects of service appropriateness. It identified a broad range of public health interventions that are being researched in the community pharmacy setting.

13.1 The extent and nature of the available evidence

Studies into public health interventions in the community pharmacy setting have increased greatly since 2009 with 193 occurring since 2009; of these, over half (n=99) were in the last three years indicating increased interest and investment in this field. The majority of included studies were set in the UK (n=156) followed by the USA (n=69) and Australia (n=19). However, the nature of the searching strategy and inclusion criteria must be taken into account. Studies were only included if they were carried out in OECD countries, were indexed in English language databases and reported in the English language. Despite the high proportion of UK studies, the evidence base for the provision of HIV testing in particular in community pharmacies is small, and there is a lack of studies conducted in the UK.

The breadth of public health interventions provided by community pharmacy studied is extensive. However, whilst this systematic map presents which interventions have been studied, it is not representative of the breadth of public health services that community pharmacies provide, as studies may not have been undertaken in particular areas, and indeed, numerous studies did not meet the eligibility criteria for inclusion in this review. This was often due to a lack of clarity in the reporting of the studies, especially in the writing of research abstracts where authors may have omitted to specify that the research was conducted in a community pharmacy setting. This suggests that there is a need for protocols for researchers who publish research on community pharmacies to follow reporting guidelines such as CONSORT and others available via initiatives such as the EQUATOR Network as a matter of course. Further, definitions of community pharmacy might differ by country, in that in the UK a pharmacy in a hospital can only be called a community pharmacy if it is registered as a community pharmacy with the General Pharmacy Council and fulfils specific criteria (GPhC, 2017). However, the range of services and interventions available at community pharmacies in other countries might exceed those presented in this systematic map of research evidence.

Whilst the nature of research evaluating public health interventions in community pharmacy is broad, studies were often focused on particular health topics. A large number of the identified studies were focused on diabetes and cardiovascular health (n=60), one of the identified priority health areas. Here, authors investigated interventions in the management of people who have diabetes or cardiovascular conditions, and also the identification of people at risk of diabetes or cardiovascular events. We also identified a high proportion of studies that focused on immunisation and sexual and reproductive health. Although not identified as priority areas, osteoporosis, respiratory health and cancer all emerged as areas where there had been a particular research focus. There were 11 other conditions where the mapping exercise had yielded one or two studies: bowel symptoms, chronic kidney disease; dementia/cognitive memory; depression; low back pain; migraine and headache; osteoarthritis, skin disorders; sleep disorders; management of infections including streptococcal pharyngitis; and urinary tract infection. The systematic map identified a paucity of research into public health interventions that address tackling antimicrobial resistance.

There were issues with regard to the often-poor reporting of the studies identified. Lack of detail or explicitness with regard to the study design often made it difficult for the reviewers to discern what type of studies had been conducted. In some instances, authors would describe their research as a randomised controlled trial but then provide no further information on processes involved, such as randomisation techniques, or the control group details. Further, selection bias was identified as an issue, for example evaluating interventions that were only delivered in HLP and not compared to standard community pharmacies.

A variety of different study designs were employed, dependent on the area under study and the type of intervention under investigation. The majority of included studies described interventions that had been offered at a particular community pharmacy setting, which were single group studies, rather than undertaking rigorous evaluations in the form of controlled trials. This might be attributable to the nature in which community pharmacies operate, which makes conducting controlled trials difficult. Of the 233 primary studies, reported in 289 citations that were included in the map, only 59 studies were 'controlled' trials. For example, in general, provision of emergency contraception appears to be a widely established intervention provided in community pharmacies. This type of provision has recently expanded to include routine contraception provision and education and referral for IUD insertion alongside oral EHC provision. However, the strength of evidence regarding the effectiveness or appropriateness of EHC interventions is somewhat limited. A lack of randomised control design was also evident in the wellness study set. Only one RCT has been conducted which looked at the effectiveness of the intervention; the remaining studies were less rigorous in their design. In studies that focused on services for people who inject drugs, only two of the eleven studies included in this set were randomised controlled trials. Again, with chlamydia studies, there are examples and evidence of the provision of chlamydia testing and referral treatment pathways via community pharmacies. However, with very few experimental studies, evidence to synthesise and judge the strength of evidence is limited. The majority of studies (n=179) were single-group or non-controlled designs, such as impact evaluations where data were collected and analysed after people had accessed or utilised an intervention provided by community pharmacies.

A large number of process evaluation studies were identified (n=180), which focused on investigating the views of intervention providers or recipients about specific services, and a further 56 studies were identified that explored views about public health provision by community pharmacy more generally. The studies included in this map, therefore, often assessed intervention feasibility and perceptions of the acceptability of services; however, only rarely can conclusions be drawn regarding the effectiveness of specific community pharmacy interventions, such as was demonstrated in the sexual health studies, as few bodies of studies contained many that used an experimental design. Whilst surveys can provide interesting information about the potential acceptability of services and their potential reach, conclusions about the strength of the effectiveness of community pharmacy services are subsequently limited.

In addition, the findings of any of the studies included in this map should be treated with caution until they are further assessed for their methodological quality and conclusions can be made about the robustness of each study. This map highlights the need for more controlled studies to provide evidence of the effectiveness of public health interventions provided by community pharmacy. These issues,

along with the lack of critical assessment of the study for systematic bias, should be borne in mind when considering the use of any public health intervention in pharmacies.

There was often heterogeneity between studies in a particular area, both in the execution of the research, and the area being studied. For example, the two included studies on wellness took different approaches when conducting wellness interventions. Both interventions had the potential to reach a wider group of people and both studies highlighted different areas of concern. All seven of the included studies that focused on health checks offered different types of health checks and employed a range of methods to collect the data. Interestingly, in one of the non-UK studies on health checks, the authors also reflected on the lack of opportunity to provide follow-up and measure longer term outcomes (Cerulli Malone 2008). From a disease-specific perspective, studies on carcinoma, which is a diverse condition presented under the catchall term of cancer, were also heterogeneous. Different types of cancer were addressed in these seven included studies, which evaluated a variety of interventions. This suggests that there is a wide margin for interpretation of data in the included studies on public health interventions in community pharmacy, due to the breadth in which a health topic can be interpreted, areas of health conditions that are addressed, and the target population which could benefit from the service

13.2 The scope of public health service provision, research, costs and other aspects of service appropriateness.

The various types of training of community pharmacists undertaken to deliver interventions was not always reported in studies. For example, in the health checks study set, training offered to staff varied from a web-based training module to an educational programme. In the HIV study set, pharmacists were sufficiently trained to conduct HIV tests without external support. Here training sessions were provided either in person, or via a webinar over a four to five hour period. In the case of chlamydia, authors were clear that staff had been trained in the acquisition and sequelae of chlamydia, and were skilled in providing advice and information, including treatment options. For the eight EHC studies, the nature of training also varied, but its reporting ranged from simply acknowledging that training occurred, to descriptions of more intensive sessions, some via 'accredited' courses. Training received during undergraduate, or graduate studies, local training initiatives, NHS Education Scotland courses, and pharmacy-industry organised events and certified training programmes were also mentioned in the studies that focused on sexual and reproductive health and immunisation.

For some interventions, time investment was extensive. For one migraine and headache study, the time required was estimated at two hours per session, which included time spent in the session, preparation and post processing the pharmaceutical care documentation. This is a significant time investment for a community pharmacist to allocate to one person. Conversely, it was suggested that the extent that HIV testing in community pharmacies could be a time-efficient service, suggests its potential to be delivered in a range of accessible settings, both for general, vulnerable and at-risk population groups. The time and information shared with patients in interventions providing osteoporosis testing was seen as being favourable and highly acceptable, and most studies showed that participants did follow up on referrals and felt more informed on diet, calcium intake and engaged in 'prevention strategies' (Brookhart et al. 2013). Further research could be conducted to evaluate participation in HIV testing, and to seek pharmacists and participants' views of maximising engagement when providing HIV testing services. The duration of studies varied greatly, but the majority of studies were one-time face-to-face interventions.

There was limited reporting of costs for intervention set up and costs to clients that should be considered when providing services where a fee might be required. One sexual health study utilised information on intervention components of advice, information and referral to inform a cost-effectiveness analysis of enhanced pharmacy services for sexual health (Chalati 2015).

Issues of sampling and sample size were identified in some studies. In the osteoporosis study set, authors suggested that a non-representative sample was an issue of concern as it might have impacted on the 'patients likely to self-select' for the intervention (Brookhart et al. 2013, Goode et al. 2004, Johnson et al. 2008, Naunton et al. 2006). Sample size was cited as an issue in the health checks study set, where it was highlighted that although a larger percentage of the men in the telephone intervention group did seek medical attention, the outcomes were not statistically significant (63% versus 57%) (Boyle et al. 2004). Here, authors argued that a larger sample size would have produced a statistically significant difference between groups if this difference were maintained. Sample size was also raised as an issue of concern by some authors investing in wellness, as the sample was limited by the number of employees in the company where the intervention took place. There was also a 'lack of randomised control design,' variations in coaching styles, knowledge and skills' (DiDonato et al. 2013, p20).

The target population was often difficult to discern or was not defined in the included studies, as the nature of community pharmacy is to serve a local population or catchment area and interactions are opportunistic as opposed to planned. Thus interventions often recruited interested recipients from their catchment area rather than in medical studies where target populations are recruited. It could be argued that the target population was often governed by pharmacy catchment and convenience. There were studies that focused on the elderly population; for example, most studies that focused on influenza focused on adult and elderly populations. Children were rarely identified at the target population, however the map identified two studies, Marra et al. (2014) and Warner et al. (2013) which included children and young people. The services described by Warner et al. (2013) initially included those aged 12 years and above, who met eligibility requirements, but this was expanded to paediatric populations, and also pregnant and immunocompromised patients. These services were available from pharmacists trained in paediatric life support and required a centralised appointment system to avoid wastage of vaccines. In the studies that focused on at-risk groups including carers and healthcare workers, the eligibility requirements differed between them. Most studies included large populations, with the exception of the early pilot study by Hind et al. (2004) and Evans et al. (2016), which interviewed 16 pharmacists.

Interventions for people who inject drugs overlap with services provided for other types of substance misuse (such as alcohol); however, the main focus on safe needle use to prevent blood borne diseases such as HIV, hepatitis B and hepatitis C led us to place these studies in with other sexual health promotion/disease prevention interventions. Targeting PWID in communities on practical matters such as needle and syringe programmes and methadone treatment provides opportunities for pharmacy staff to inquire about and help with other risk behaviours, such as risky sexual behaviour.

The majority of studies that focused on enhancing community pharmacy services were concerned with the potential of community pharmacies to provide a greater role in the delivery of public health services in the long term and/or shorter-term targeted public health campaigns. Studies used qualitative designs to explore feasibility and implementation, prior to any possible policy changes that would lead to new testing or health education programmes focused on any given health condition. Two studies noted how the demographics of the HLP meant that they could reach out to a wide range of communities such as

the sick, healthy, young and old (Duggan et al. 2013, Blenkinsopp et al. 2014). The role of HLP was perceived as a 'preferred provider' and 'help to the community' (Langley et al. 2014) and in one study it was an opportunity to trial new health interventions (Hopgood et al. 2013). Issues of concern raised in relation to HLPs were the greater pressures placed on pharmacists' workload, defined roles and poor recognition of the HLP brand (Langley et al. 2014).

Many of the interventions described in this report can be considered to be complex in the sense outlined in guidance produced for the Medical Research Council (Craig et al, 2008). Complexity might result, for example, when interventions contain several interacting components, when intervention tailoring by practitioners is permissible, or when the behaviours demanded of those delivering or receiving the intervention are numerous or difficult. The MRC guidance has been used to encourage strategic thinking around research prioritisation and funding for new health initiatives. The guidance identifies key aspects for consideration within consecutive stages of a cycle; of intervention development, feasibility piloting, evaluation, implementation, and then further development and so on. It makes clear the importance of developing theory and of modelling processes and outcomes prior to testing intervention feasibility through piloting, which itself ideally should be established prior to attempts to assess intervention effects. Arguably, the community pharmacy evidence-base as a whole, at least that which is most relevant for provision in the UK, consists mainly of research valuable for the purposes of developing theory about what might work and why, and establishing whether the delivery of a given intervention is possible.

13.3 Summary of the evidence

This systematic map has identified an expanding and diverse research literature seeking to provide evidence on public health interventions that are provided by community pharmacies in OECD countries. Research has developed significantly in the last 17 years, with particular growth in the last five years; with the UK and USA being the predominant source of research evidence.

Overall, we found that studies described a broad range of community pharmacy public health interventions. These were grouped into three domains: 1) DHSC/PHE health priority categories; 2) other health conditions; and 3) cross-cutting studies on community pharmacy for public health. The health priority categories were: health checks; sexual and reproductive health; immunisation; antimicrobial resistance; diabetes and cardiovascular health; alcohol and substance misuse and abuse; and obesity and weight management. Health priority areas were the source of the majority of research found (70%). Of these, approximately half of the studies were focused on diabetes, cardiovascular health, immunisation and travel health; and sexual and reproductive health. Indeed, one third of the studies were focused on diabetes and cardiovascular health alone. Alcohol abuse and misuse interventions were also a key focus of research in the UK. A noticeable lack of research was identified on antimicrobial resistance. Evaluation designs were varied but used predominantly single-group, or non-comparative, methodologies; approximately a third of the studies used a controlled design. A large proportion of evaluations examined the processes of providing specific public health interventions at community pharmacies. Studies were also found that focused on eliciting the views of service providers and service users from the UK on public health in community pharmacy more generally.

For a significant proportion of the included studies, the intervention involved testing for particular conditions, helping to identify those at-risk and those who might not readily consider seeking assistance from other healthcare sources.

13.4 Gaps in the evidence

Due to the nature of systematically mapping research evidence, it is not possible to make judgements about the quality or relevance of the included studies. Therefore, future systematic reviews that focus on particular health conditions and interventions provided in the community pharmacy will provide greater insight into the quality and relevance of studies and help to identify future areas for primary research.

However, after completing this systematic map, it is clear that very few RCTs were identified. Whilst it may be challenging to conduct RCTs in community pharmacy settings, community pharmacy would clearly benefit from a greater number of experimental studies, in order to provide clarity about the effectiveness of community pharmacy provision of public health interventions. Further, it appears likely that further primary research would be beneficial in the following areas:

- The impact of community pharmacy on interventions that focus on tackling antimicrobial resistance
- Particular hard to reach populations
- The provision of HIV testing in UK community pharmacies
- Dementia risk and identification of dementia in the elderly
- Cancer risk and identification
- Children

As with any body of research, there are limitations in the studies being reviewed such as varied approaches to reporting study designs, interventions and study participants.

13.5 Strengths and limitations

This is the first systematic map of research on public health services provided by community pharmacists. This map provides a unique resource for investigating the content of community pharmacy practice, and demonstrates the breadth of public health interventions that have been evaluated in formal evaluative studies and UK based evaluations of processes. This map provides a valuable foundation for researchers, commissioners and practitioners to develop an evidence-informed approach to identifying potential areas to commission further research and to impact on policy and practice in the field of community pharmacy.

The methods employed in producing this systematic map followed the standard procedure of conducting systematic reviews developed at the Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre) (Gough et al. 2017). This map has benefited from user involvement in the form of an advisory group of professionals working in the field of community pharmacy, commissioning and/or academics. However, there was not sufficient time to appropriately engage with other potential users of this systematic map, such as consumers of community pharmacy services, and the wider community.

To locate relevant research papers on public health interventions delivered in community pharmacies, we conducted a very comprehensive systematic search of electronic databases in the clinical sciences,

social sciences, economics, and health management. This was supplemented by searching relevant websites and checking the references of systematic reviews. The search strategy was designed to be both sensitive and exhaustive in order to gain insight into the range and diversity of interventions that have come under investigation. However, there is a possibility that not naming and searching for particular types of or named interventions increases the likelihood that the search may have missed some studies. Further, this systematic map did not assess the risk of bias of its included studies. Therefore, it is suggested that any further systematic reviews should be supplemented with additional focused searching to update any specific section of the map for in-depth review and synthesis and then assess the risks of bias of included studies.

The study inclusion criteria were broad, with no constraints placed on the type of intervention, health condition focus, or methodological design; we were interested in understanding the range of outcomes evaluated. However, despite attempts to be inclusive, the review did have language limitations as we only searched English language databases and included studies that were reported in English. This may be evident in the lack of studies identified from across Europe and other non-English speaking OECD countries.

This map is a complement to an online database which has further functionality to allow interested organisations or individuals to perform tailored searches and to retrieve studies matching various combinations of enquiry across study dimensions.

To ensure consistency and quality of screening, all reviewers performed a moderation screening exercise on both title and abstract and again for full text screening. Due to the nature and diversity of the studies identified by the search, approximately three quarters of the studies were double screened on title and abstract. However, reviewers conducted the full text screening of studies independently and although further samples of studies were screened, again independently by two reviewers, at various stages of the screening process, to look for any potential differences in interpretation of the criteria and refine guidance for the review team, there is the possibility that some studies may have been excluded which should have been included in the map.

Each topic was assigned to two reviewers both of whom initially coded two studies, however the majority were coded by a single reviewer who then contributed the written findings to the map. While initial quality assurances were in place with regard to testing the coding tools that were applied, by coding a random sample of studies, as coding was completed by individual reviewers, this leaves room for variations in coding strategies.

14 References

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Part II Technical description of the review

15 Detailed methods

This chapter describes in more detail the methods that were used to search for, identify and describe the studies relevant to the systematic map of the research literature. This systematic map adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance (Moher et al. 2009) provided in Appendix 1. Where necessary it has been adapted to accommodate the approach taken in this review. The protocol was published on PROSPERO which is available to view at:

http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42015029919.

15.1 Type of review

This review is in the form of a systematic map that identifies and summarises studies that examine the effectiveness and appropriateness of community pharmacies at providing public health services to local populations. Searches were broad and sensitive so as to cover a wide range of different public health services. This work was commissioned to inform further developments in this area and highlight potential gaps in research where particular services appear not to have been researched and service areas that show particular promise for further development.

Initially, this review was proposed as part of an in-depth review, however upon after completing the initial search and recognising the full extent and breadth of the public health services that were being provided, it was deemed of greater importance to provide a systematic map. The aim of the systematic map was to bring together all studies that met the inclusion criteria in a way to inform researchers, commissioners, practitioners, and the public of the research available and provide a means of navigating through the studies, to identify areas where research was being conducted, areas where research is needed, and the extent to which each public health service was being researched.

15.2 User involvement/Advisory Group

Plans for this systematic map were developed in consultation with members of the Policy Research Programme at the Department of Health. Two key advisors provided in-depth understanding of the community pharmacy landscape throughout the review process. Further, a stakeholder advisory group was convened, which had the role of: helping to identify relevant leading research teams and studies for analysis; providing a contextual understanding of UK-based community pharmacy practice; advising on the review's research questions; helping the review team to focus the scope of the review to ensure it addresses priority questions for the UK context; and finally commenting on initial findings in the draft final report.

The Advisory Group members were:

- invited to comment on the draft protocol by email;
- invited to attend a face-to-face meeting, which was held in February 2016, to discuss initial findings from the systematic mapping exercise about the nature and characteristics of located studies, and helped identify areas of public health service provision considered a priority

- provided with a draft report in order to comment on the emerging findings from the systematic map.

15.3 Inclusion/exclusion criteria

Inclusion/exclusion criteria were required for two different purposes:

- Initially, search results were screened to identify studies to include in a descriptive systematic map. With this we sought to provide an overview of the nature and extent of research, for example, the range of public health interventions delivered by community pharmacy that have been researched, which countries were the source of the research evidence, or which health topics or conditions had been the focus of the identified research. Our initial search excluded the health topics of: smoking cessation, minor ailments, alcohol abuse and misuse, and weight management.
- Following guidance from the review's advisory group, it was agreed that a detailed systematic map covering a wider range of health topics would prove to be a useful reference tool for researchers, commissioners, practitioners and the public. An additional search was then performed which included the health topics of alcohol abuse and misuse and weight management. Smoking cessation and minor ailments were still excluded from the review because these subjects were being covered by other review teams at Durham University and University College London and it was deemed that there was much research on community pharmacy smoking cessation interventions where community pharmacy is considered successful public health resource.

In order to be included in the systematic map, identified studies had to meet all of the following inclusion criteria:

- be conducted in 2000 or since (which allowed for five years before the changes in community pharmacy policy in 2005)
- be reported in the English language
- be a report of empirical research collecting data (systematic reviews that met all other criteria were not included but their reference lists were screened for other includable studies)
- be a report of community pharmacy public health interventions (excluding smoking cessation unless this involved e-cigarettes/vaping)
- have evaluated the effects on patient outcomes of one or more community pharmacy services OR have presented findings from studies conducted in the UK of stakeholders' perspectives on service appropriateness (e.g. reach, feasibility, cost, time) or on community pharmacy for public health more broadly.

15.4 Literature search

A search strategy was developed to seek literature from many databases, websites and other online resources, supplemented by checking references of relevant systematic reviews. Individual databases were searched using a combination of controlled vocabulary and free-text terms (the latter restricted to

the title or abstract fields). The database searches were run to capture citations for studies published from 1 January 2000 and were last run on 27 November 2017.

In order to seek literature from across the clinical disciplines as well as social sciences, we searched the following databases: Allied and Complementary Medicine (AMED), Applied Social Sciences Index and Abstracts (ASSIA), CINAHL, Cochrane Library databases, EconLit, EMBASE, Emerging Sources Citation Index, Health Management Information Consortium, International Pharmaceutical Abstracts, MEDLINE, PsycINFO, PubMed, Sociological Abstracts, Social Policy and Practice, Social Sciences Citation Index, and the EPPI Centre's Bibliomap, TRoPHI and DoPHER specialist registers. These were supplemented with searches of NHS Evidence, Google and a brief search for UK theses via Proquest Theses and Ethos, and 20 other websites, which are listed in Appendix 3.

Locating the literature on the nature, effectiveness and appropriateness of community pharmacy public health provision is challenging. There are disparities in how community pharmacies are described, with some described as pharmacies without using terms for community. There are many different services that are provided by community pharmacies, some of which will have a different focus from this review. Due to the nature of potential services that could be delivered within the remit of public health, we used broad terms to describe public health and pharmacy-delivered services. Despite this, it is possible that some relevant literature was not identified. In consideration of these issues, a search was designed that built on the following two concepts:

1) Pharmacy or pharmacist's or pharmacy shops;

2) One of the following concepts:

- community
- pharmacy shops;
- pharmacist led or managed;
- pharmacy screening or testing or promotion;
- public health, health promotion, health literacy; health information, primary or secondary prevention
- immunisation, vaccination, mass screening, emergency contraception
- alcohol misuse, weight management

To focus the search, some exclusions were made where the bibliographic database functions allow. This removed items that contained 'diagnosis' or 'hospitalised' or 'hospital' in the abstract, where they occurred without the terms 'community' or 'communities'. The search excluded some non-OECD countries and developing countries that appeared frequently when we conducted the test search. Studies that were solely indexed as being about animals were also excluded.

A date limit of 2000-2017 was applied to the search. Where possible, items were selected that were published in the English language. However, the number of citation records before and after this language restriction is recorded for reporting purposes.

The search terms were developed from scoping searches of the EPPI-Centre's public health trials database, 'TRoPHI'. The 'public health' terms were adapted from the search strategy used to populate TRoPHI. Terms for pharmacy and community were developed from PubMed and drawn from Todd et al. (2014b). A range of text analysis tools were used to help review the results of the search and refine the search strategy.

Appendix 3 provides a full list of the sources searched and the strategy used for the MEDLINE database. The initial searches were undertaken during October and early November 2015. These were updated at the end of May 2016. In addition, the update searches were modified to search for studies related to either alcohol misuse or weight management, as a decision to include these within the scope of this work was made after the original searches took place. A further update took place at the end of November 2017, and the website searches were undertaken in January 2018.

15.5 Screening of studies

All records of studies identified by searches were uploaded to the specialist systematic review software EPPI-Reviewer 4 (Thomas et al. 2010), where studies were duplicate stripped and screened. All reviewers initially worked together with a sample set of 20 identified studies, which were screened on title and abstract. These studies were used to pilot the inclusion criteria and to reach a high level of concordance between all reviewers in using the criteria to determine a study's eligibility for inclusion. The first sample set revealed that further information was required within the screening criteria, so rationales and information were refined and a second sample set of 30 studies were title and abstract screened using the refined screening tool, which produced an interrater agreement in excess of 90%. The remaining studies' titles and abstracts were then screened by one reviewer with samples checked by a second reviewer. Due to the nature and diversity of the studies identified by the search, approximately three quarters of the studies were double screened on title and abstract. For those studies that appeared to meet the inclusion criteria, or where there was insufficient information to confirm this, full reports were obtained. Relevant systematic reviews that were identified in the search (n=86) were citation searched to identify any primary studies that might not have identified. An additional 32 primary studies were identified for full text screening. Citation screening for the November update was not executed due to three reasons: 1) the updated search was comprehensive including an additional database; 2) resources were lower in the latter stages of the review process; and 3) the potential yield of studies was expected to be low based on the first execution of systematic review citation searching. A set of seven studies was full-text screened by all reviewers to ensure that the screening tool worked appropriately. The screening tool was refined and a further seven studies were full text screened by all reviewers until an interrater agreement in excess of 90% was reached. Reviewers full text screened the remaining studies independently. Further samples of studies were screened, again independently by two reviewers, at various stages of the screening process, to look for any potential differences in interpretation of the criteria and refine guidance for the review team if necessary.

15.6 Coding

All relevant studies were descriptively coded according to a standardised classification system developed specifically for this review. The coding tool was tested and all reviewers completed a sample set to ensure that coding had high interrater agreement. After it was felt that coding would be consistent between reviewers, each reviewer was given sets of studies to code that were organised by health/condition focus. For each health condition study set there was a lead coder and a 'buddy' coder. The lead coder coded all studies in the set and drafted the findings for the report. The buddy coder coded a minimum of two studies dependent on the size or complexity of the set, to ensure that coding was consistent. In addition, they acted as a consultant in instances where the lead coder had queries about particular studies. The coding tool was comprehensive and was applied to capture the key characteristics of the located studies.

- Codes used to describe the study context, included:
 - the country setting (e.g. OECD country/ies);
 - the setting type (e.g. healthy living pharmacy; independent pharmacy)
- Codes used to describe the intervention under study, included:
 - the intervention type (e.g. advice, testing, monitoring);
 - the health condition (e.g. diabetes, COPD, cardiovascular disease)
- Codes used to describe the study design, included:
 - The aims of the study and the aims of the intervention
 - The type of research undertaken (e.g. randomised controlled trial (RCT), non-randomised controlled trial (NRCT), evaluation of intervention process, other studies of stakeholder perspectives;
 - outcomes and processes measured;
 - the sample size;
 - characteristics of the sample (e.g. gender, age or socio-economic status, health status);
 - resource investment (e.g. costs; training);
 - who delivered the intervention;
 - mode of delivery;
 - the number of required interactions to deliver the intervention

Data were extracted from all publications but findings are cited by study. The detailed coding tool is provided in Appendix 4

15.7 Producing a systematic map of evidence

A common process in EPPI-Centre reviews is the 'mapping' of research activity, where studies are described and presented as a navigable report. This report is the written representation of an online searchable map. The online map is a partner to this report and will enable interested parties to produce tailored searches of the evidence. To ensure that the map is optimal we consulted with stakeholders (i.e. researchers, practitioners and commissioners), so as to create an accessible electronic resource which captures the range of uses that are applicable to their needs. We asked participants to: provide insight into how community pharmacy public health service providers might use an electronic searchable map; consider how such an electronic resource might be used; consider what could be done

to ensure that the tool is easily navigable; consider how the map would look; consider preferences for text or graphics. The online searchable map can be located at <http://eppi.ioe.ac.uk/webdatabases4/Intro.aspx?ID=15>.

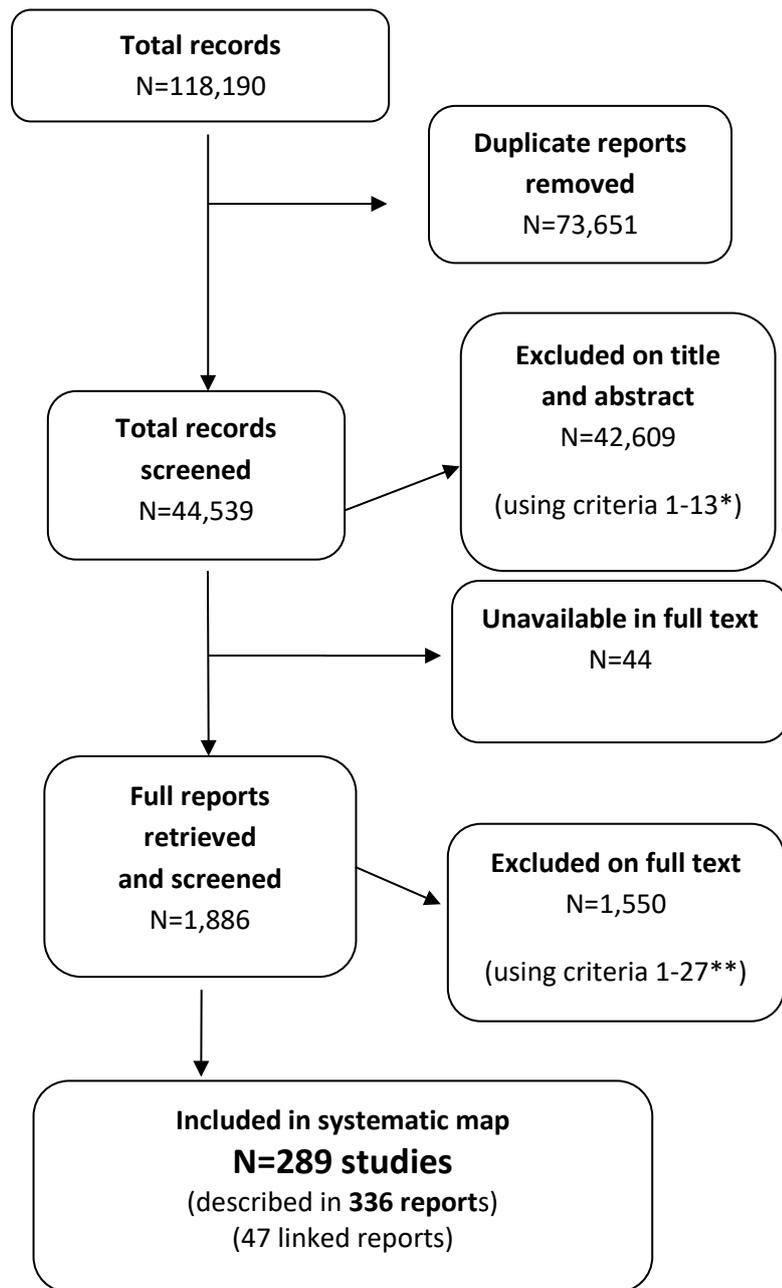
15.8 Flow of studies through the review

The identification of studies was undertaken in three phases. The first search was conducted in November 2015 and this was expanded and updated in June 2016 and again in November 2017. A total of 44,539 references were identified following duplicate removal, of which 467 were from sources outside of bibliographic databases. Of this, 336 reports were included in the systematic map.

The screening approach to identify these is described as follows, and shown in Figure 15.1: The references from the first two phases of searching (n=21,329) were screened first on title and abstract, and 767 of these were screened on full text, and this identified 256 reports for inclusion in the map. An automated classifier was developed based on the screening decisions of the search results from the first two phases, and used the title and abstract citations of the full-text includes and relevant systematic reviews (n=261) as the basis of an include decision, and the remaining citations as the basis of an exclude decision (n=21,068). The automated classifier was used to rank the references from the third update (n=23,208) in order of likely relevance by scoring them on a scale from 0-99, where 99 is highly relevance. Of these, 10,254 references were screened on title and abstract, and the remaining references, which had a low relevance score (13 or below) were not screened.

A final total of 289 studies were included in the map. These studies were described in a total of 336 reports. A list of the studies reported in more than one 'linked' report is provided in Appendix 2.

Figure 15.1 summarises this flow of studies through the review



* see next page (p186)

** see next page (p186)

Criteria on which reports were excluded

(* indicates the criterion was only applied when screening full text documents)

- Ex 1. Publication date: before 2000
- Ex 2. Language not English
- Ex 3. Country: Non- OECD
- Ex 4. Study type: Not empirical research involving humans
- Ex 5. Intervention: Not Community Pharmacy
- Ex 6. No mention of public health or public health intervention in abstract
- Ex 7. Training or research methods study, student training, or students' views of pharmacy
- Ex 8. Focus: Smoking Cessation only without ref to E-Cigarettes
- Ex 9. Focus: Minor ailments
- Ex 10. Focus: Medicines dispensing/prescription filling/medication advice meds management (except AMR)
- Ex 11. Focus: US & Canadian EHC dispensing attitudes
- Ex 12. Focus: Diagnostic tool reliability/development
- Ex 13. Publication type: not primary report of a study
- Ex 14. Setting NOT Community Pharmacy*
- Ex 15. Intervention not delivered by community pharmacist or pharmacy team*
- Ex 16. Studies solely of views that are not set in the UK*
- Ex 17. Focus: Medicine taking techniques/Medication education/counselling*
- Ex 18. Data collected before 1998*
- Ex 19. Data no longer relevant due to policy change*
- Ex 20. Process evaluation/feasibility study/needs assessment only, not UK focused*
- Ex 21. Intervention prevalence only*
- Ex 22. Scope is broader than CoP and CoP data not presented*
- Ex 23. Scope is broader than public health and public health data not presented*
- EX 24. Case studies of individuals*
- Ex 25. Comparison of views from one country to another*
- Ex 26. Duplicate*
- Ex 27. Cannot be located*

Appendices

Appendix 1: PRISMA checklist

Title	1	Identify the report as a systematic review, meta-analysis, or both.	<i>Title page</i>
Abstract			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number	Abstract
Introduction			
Rationale	3	Describe the rationale for the review in the context of what is already known.	<i>Part I: Chapter 1</i>
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	<i>Part I: Chapter 1</i>
Methods			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., web address), and, if available, provide registration information including registration number.	<i>Part I: Chapter 2; Part II</i>
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	<i>Part I: Chapter 2; Part II</i>
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	<i>Part I: Chapter 2; Part II, Appendix 3</i>
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	<i>Appendix 3</i>
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	<i>Part I: Chapter 2; Part II</i>
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	<i>Part I: Chapter 2; Part II</i>
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	<i>Part I: Chapter 2; Part II, Appendix 4</i>
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	<i>N/A Systematic Map</i>

Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	<i>N/A Systematic Map</i>
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I ²) for each meta-analysis.	<i>N/A Systematic Map</i>
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	<i>N/A Systematic Map</i>
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	<i>N/A Systematic Map</i>
Results			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	<i>Part I; Chapter 3</i>
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	<i>Part I: Chapters 4-12</i>
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	<i>N/A Systematic Map</i>
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	<i>N/A Systematic Map</i>
Synthesis of results	21	Present results of each analysis and meta-analysis done, including confidence intervals and measures of consistency.	<i>N/A Systematic Map</i>
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	<i>N/A Systematic Map</i>
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	<i>N/A Systematic Map</i>
Discussion			
Summary of evidence	24	Summarise the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	<i>Part 1: Chapters 4-12</i>
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	<i>Part 1: Chapter 13</i>
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	<i>Part 1: Chapter 13</i>
Funding			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	<i>Acknowledgements</i>

Appendix 2: Table of linked studies (n=47)

Linked studies are studies where the data source for the information published within different papers is the same.

Sexual and reproductive health	HIV	Fernandez-Balbuena S, Belza M J, Zulaica D, Martinez J L, Marcos H, Rifa B, Arrillaga A, Fuente de la L, and Hoyos J. (2015). Widening the Access to HIV Testing: The Contribution of Three In-Pharmacy Testing Programmes in Spain. PLoS ONE, 10(8), pp.1-11.	Fernandez-Balbuena S, Marcos H, Perez-Rubio A, Hoyos J, Belza MJ, and Fuente de la L. (2015). The rapid test in Spanish pharmacies: a novel programme to reach heterosexual men? HIV Medicine, 16(6), pp.362-9.
	EHC	Raine T R, Harper C C, Rocca C H, Fischer R, Padian N, Klausner J D, and Darney P D. (2005). Direct access to emergency contraception through pharmacies and effect on unintended pregnancy and STIs: a randomized controlled trial. JAMA, 293, pp.54-62.	Harper C C, Cheong M, Rocca C H, Darney P D, and Raine T R. (2005). The effect of increased access to emergency contraception among young adolescents. Obstetrics & Gynecology, 106, pp.483-91.
		Michie L, Cameron S T, Glasier A, Larke N, Muir A, and Lorimer A. (2014). Pharmacy-based interventions for initiating effective contraception following the use of emergency contraception: a pilot study. Contraception, 90, pp.447-53.	Michie L, Cameron S T, Glasier A, Chen Z E, Milne D, and Wilson S. (2016). Provision of contraception after emergency contraception from the pharmacy: evaluating the acceptability of pharmacy for providing sexual and reproductive health services. Public health, , pp..
Immunisation and travel health	Influenza	Healthwatch Norfolk (2014) <i>Patient Experience of the Community Pharmacy Flu Vaccination Service in Norfolk. An independent evaluation of patient experience.</i> Healthwatch Norfolk. http://www.healthwatchnorfolk.co.uk/wp-content/uploads/2015/11/14-04-Community-Pharmacy-Flu-Vaccination-Service.pdf	Revill S , (2015) Patient experience of the East Anglian Flu Vaccination Service. An evaluation of patient experience of the East Anglian Flu Vaccination Service delivered in community pharmacies and GP surgeries. Healthwatch Norfolk, pp1-19 http://www.healthwatchnorfolk.co.uk/wp-content/uploads/2015/11/15-04-Patient-Experience-of-East-Anglian-Flu-Vaccination-Service.pdf

		Local Pharmaceutical Committees of Cumbria and the North East (2015) NHS FLU VACCINATION – Evaluation Report 2014 to 15. pp1-5	Local Pharmaceutical Committees of CNTW (2014) NHS FLU VACCINATION – Evaluation Report (COMMUNITY PHARMACY DELIVERY IN CUMBRIA, NORTHUMBERLAND, TYNE & WEAR). pp 1-5
Diabetes and cardiovascular health	Diabetes	Botomino A, Bruppacher R, Krahenbuhl S, Hersberger KE (2008) Change of body weight and lifestyle of persons at risk for diabetes after screening and counselling in pharmacies. <i>Pharmacy World and Science</i> 30: 222-226	Hersberger KE, Botomino A, Mancini M, Bruppacher R (2006) Sequential screening for diabetes--evaluation of a campaign in Swiss community pharmacies. <i>Pharmacy World and Science</i> 28: 171-179.
		Cranor CW, Bunting BA, Christensen DB (2003) The asheville project: long-term clinical and economic outcomes of a community pharmacy diabetes care program. <i>J Am Pharm Assoc</i> 43: 173-184.	Cranor CW, Christensen DB (2003) The asheville project: factors associated with outcomes of a community pharmacy diabetes care program. <i>J Am Pharm Assoc</i> 43: 160-172. Garrett D G; Martin L A; (2003) The Asheville Project: participants' perceptions of factors contributing to the success of a patient self-management diabetes program. <i>Journal of the American Pharmaceutical Association</i> 43: 185-90.
		Fera T, Bluml BM, Ellis WM (2009) Diabetes Ten City Challenge: final economic and clinical results. <i>J Am Pharm Assoc</i> 49: 383-391.	Fera T, Bluml BM, Ellis WM, Schaller CW, Garrett DG (2008) The Diabetes Ten City Challenge: interim clinical and humanistic outcomes of a multisite community pharmacy diabetes care program. <i>J Am Pharm Assoc</i> 48: 181-190.
		McLean DL, McAlister FA, Johnson JA, King KM, Makowsky MJ, Jones CA, Tsuyuki RT, Investigators S-H (2008) A randomized trial of the effect of community pharmacist and nurse care on improving blood pressure	McLean DL, McAlister FA, Johnson JA, King KM, Jones CA, Tsuyuki RT (2006) Improving blood pressure management in patients with diabetes: The design of the SCRIP-

		management in patients with diabetes mellitus. <i>Archives of Internal Medicine</i> 168: 2355-2361.	HTN study. <i>Canadian Pharmacists Journal</i> 139: 36-39.
		Papastergiou J, Folkins C, Li W (2016) Community pharmacy-based A1c screening: a Canadian model for diabetes care. <i>International Journal of Pharmacy Practice</i> 24: 189-195.	Papastergiou J, Rajan A, Diamantouros A, Zervas J, Chow J, Tolios P (2012) HbA1c testing in the community pharmacy: A new strategy to improve care for patients with diabetes. <i>Canadian Pharmacists Journal</i> 145: 165-167.
		Sarkadi A, Veg A, Rosenqvist U (2005) The influence of participant's self-perceived role on metabolic outcomes in a diabetes group education program. <i>Patient Education and Counseling</i> 58: 137-145.	Veg A, Rosenqvist U, Sarkadi A (2006) Self-management profiles and metabolic outcomes in type 2 diabetes. <i>Journal of Advanced Nursing</i> 56: 44-54.
		Taylor SJ, Milanova T, Hourihan F, Krass I, Coleman C, Armour CL (2005) A cost-effectiveness analysis of a community pharmacist-initiated disease state management service for type 2 diabetes mellitus. <i>International Journal of Pharmacy Practice</i> 13: 33-40.	Taylor S, Hourihan F, Krass I, Armour C (2009) Measuring consumer preference for models of diabetes care delivered by pharmacists. <i>Pharmacy Practice</i> 7: 195-204.
	Cardiovascular	Amariles P, Sabater-Hernandez D, Garcia-Jimenez E, Rodriguez-Chamorro MA, Prats-Mas R, Marin-Magan F, Galan-Ceballos JA, Jimenez-Martin J, Faus MJ (2012) Effectiveness of Dader Method for pharmaceutical care on control of blood pressure and total cholesterol in outpatients with cardiovascular disease or cardiovascular risk: EMDADER-CV randomized controlled trial. <i>Journal of Managed Care Pharmacy</i> 18: 311-323.	Sabater-Hernandez D, Sendra-Lillo J, Jimenez-Monleon J J, Benrimoj S I, Durks D, Martinez-Martinez F, de la Sierra , A , and workgroup Mepafar study. (2015). Identifying masked uncontrolled hypertension in the community pharmacy setting. <i>Blood Pressure Monitoring</i> , 20(3), pp.138-43.

		<p>Tsuyuki RT, Olson KL, Dubyk AM, Schindel TJ, Johnson JA (2004) Effect of community pharmacist intervention on cholesterol levels in patients at high risk of cardiovascular events: the Second Study of Cardiovascular Risk Intervention by Pharmacists (SCRIP-plus). <i>American Journal of Medicine</i> 116: 130-133.</p>	<p>Yamada C, Johnson J A, Robertson P, Pearson G, and Tsuyuki R T. (2005). Long-term impact of a community pharmacist intervention on cholesterol levels in patients at high risk for cardiovascular events: extended follow-up of the second study of cardiovascular risk intervention by pharmacists (SCRIP-plus). <i>Pharmacotherapy: The Journal of Human Pharmacology & Drug Therapy</i>, 25(1), pp.110-5.</p>
		<p>Tsuyuki RT, Johnson JA, Teo KK, Simpson SH, Ackman ML, Biggs RS, Cave A, Chang WC, Dzavik V, Farris KB, Galvin D, Semchuk W, Taylor JG (2002) A randomized trial of the effect of community pharmacist intervention on cholesterol risk management: the Study of Cardiovascular Risk Intervention by Pharmacists (SCRIP). <i>Archives of Internal Medicine</i> 162: 1149-1155.</p>	<p>Simpson S H, Johnson J A, and Tsuyuki R T. (2001). Economic impact of community pharmacist intervention in cholesterol risk management: an evaluation of the study of cardiovascular risk intervention by pharmacists. <i>Pharmacotherapy: The Journal of Human Pharmacology & Drug Therapy</i>, 21, pp.627-35.</p> <p>Simpson S H, Johnson J A, Biggs R S, Tsuyuki R T. (2004) Greater effect of enhanced pharmacist-care on cholesterol management in patients with diabetes mellitus: A planned subgroup analysis of the Study of Cardiovascular Risk Intervention by Pharmacists (SCRIP). <i>Pharmacotherapy</i>, 24 pp 389-394.</p>
		<p>Tsuyuki R T; Al Hamarneh Y N ; Jones Charlotte A; Hemmelgarn Brenda R; (2016) Effectiveness of Community Pharmacist Prescribing and Care on Cardiovascular Risk Reduction: Randomized Controlled RxEACH Trial. <i>Journal of the American College of Cardiology</i>. (accepted manuscript) pp1-33</p>	<p>Al Hamarneh Y N , Hemmelgarn B , Curtis C , Balint C , Jones C A, Tsuyuki R T, (2016) Community pharmacist targeted screening for chronic kidney disease. <i>Canadian Pharmacists Journal</i>. 149 pp13-17</p> <p>Al Hamarneh Y N, Hemmelgarn B, Hassan I, Jones C, Tsuyuki R T. (2017) The Effectiveness of Pharmacist</p>

		<p>Interventions on Cardiovascular Risk in Adult Patients with Type 2 Diabetes: The Multicentre Randomized Controlled RxEACH Trial. Canadian journal of diabetes 41, pp 580-586.</p> <p>Al Hamarneh Y N, Tsuyuki R T, Jones C A, Manns B, Tonelli M, Scott-Douglass N, Jindal K ; Tink W, Hemmelgarn B R, (2017) Effectiveness of Pharmacist Interventions on Cardiovascular Risk in Patients With CKD: A Subgroup Analysis of the Randomized Controlled RxEACH Trial.71 pp42-51.</p> <p>Tsuyuki R T, Al Hamarneh , Yazid N , Jones C A, Hemmelgarn B R; The Effectiveness of Pharmacist Interventions on Cardiovascular Risk: The Multicenter Randomized Controlled RxEACH Trial, 67 pp 2846-2854.</p>	
		<p>Lowres N, Neubeck L, Salkeld G, Krass I, McLachlan A J, Redfern J, Bennett A A, Briffa T, Bauman A, Martinez C, Wallenhorst C, Lau J K, Brieger D B, Sy R W, and Freedman S B. (2014). Feasibility and cost effectiveness of stroke prevention through community screening for atrial fibrillation using iPhone ECG in pharmacies: the SEARCH-AF study. <i>Thrombosis and Haemostasis</i>, 111, pp.1167-1176.</p>	<p>Lowres N, Freedman S B, Redfern J, McLachlan A, Krass I, Bennett A, Briffa T, Bauman A, and Neubeck L. (2012). Screening Education And Recognition in Community Pharmacies of Atrial Fibrillation to prevent stroke in an ambulant population aged ≥ 65 years (SEARCH-AF stroke prevention study): a cross-sectional study protocol. <i>BMJ Open</i>, 2(3), pp..</p>
		<p>McNamara KP, O'Reilly SL, George J, Peterson GM, Jackson SL, Duncan G, Howarth H, Dunbar JA (2015) Intervention fidelity for a complex behaviour change intervention in community pharmacy addressing cardiovascular disease risk. <i>Health Education Research</i> 30: 897-909.</p>	<p>McNamara K P, O'Reilly S L, Dunbar J A, Bailey M J, George J, Peterson G M, Jackson S L, Janus E D, Bunker S, Duncan G, and Howarth H. (2012). A pilot study evaluating multiple risk factor interventions by community pharmacists to prevent cardiovascular disease: the PAART</p>

			CVD pilot project. <i>Annals of Pharmacotherapy</i> , 46, pp.183-91.
		Liu Y, McDonough RP, Carruthers KM, Doucette WR (2009) Identifying patients at risk of cardiovascular disease: a pharmacist-managed screening event for union workers and their dependents. <i>J Am Pharm Assoc</i> 49: 549-553.	Liu Y, Mentele L J, McDonough R P, Carruthers K M, and Doucette W R. (2008). Community pharmacist assessment of 10-year risk of coronary heart disease for union workers and their dependents. <i>Journal of the American Pharmacists Association: JAPhA</i> , 48(4), pp.515-7.
Alcohol and substance misuse/abuse	Alcohol	Dhital R, Whittlesea CM, Milligan P, Khan NS, Norman IJ (2013) The impact of training and delivering alcohol brief intervention on the knowledge and attitudes of community pharmacists: a before and after study. <i>Drug and Alcohol Review</i> 32: 147-156.	Khan NS, Norman IJ, Dhital R, McCrone P, Milligan P, Whittlesea CM (2013) Alcohol brief intervention in community pharmacies: a feasibility study of outcomes and customer experiences. <i>International Journal of Clinical Pharmacy</i> 35: 1178-1187.
		Dhital R, Norman I, Whittlesea C, Murrells T, McCambridge J (2015) The effectiveness of brief alcohol interventions delivered by community pharmacists: randomized controlled trial. <i>Addiction</i> 110: 1586-1594.	Quirk A, MacNeil V, Dhital R, Whittlesea C, Norman I, McCambridge J (2016) Qualitative process study of community pharmacist brief alcohol intervention effectiveness trial: Can research participation effects explain a null finding? <i>Drug And Alcohol Dependence</i> 161: 36-41.
		Gray JN, Wilson SE, Cook PA, Mackridge AJ, Blenkinsopp A, Prescott J, Stokes LC, Morleo MJ, Heim D, Krska J, Stafford L (2012) <i>Understanding and optimising an identification/brief advice (IBA) service about alcohol in the community pharmacy setting</i> . Liverpool: Liverpool Primary Care Trust. http://clock.uclan.ac.uk/5972/3/Final%20full%20report%2025th%20october%202012.pdf	Mackridge AJ, Krska J, Stokes EC, Heim D (2016) Towards improving service delivery in screening and intervention services in community pharmacies: a case study of an alcohol IBA service. <i>Journal of Public Health</i> 38: 92-98.

		Fitzgerald N ; Stewart G ; (2005) Development, implementation and evaluation of a pilot project to deliver interventions on alcohol issues in community pharmacies: 'Drinking in Pharmacies' The School of Pharmacy, The Robert Gordon University, UK. pp1-66	Fitzgerald N, McCaig D J, Watson H, Thomson D, Stewart D C. (2008) Development, implementation and evaluation of a pilot project to deliver interventions on alcohol issues in community pharmacies International Journal of Pharmacy Practice. 16 pp17-22
	Services for PWID	Crawford ND, Amesty S, Rivera AV, Harripersaud K, Turner A, and Fuller CM. (2013). Randomized, community-based pharmacy intervention to expand services beyond sale of sterile syringes to injection drug users in pharmacies in New York City. American Journal of Public Health, 103, pp.1579-82.	Crawford N D, Amesty S, Rivera A V, Harripersaud K, Turner A, and Fuller C M. (2014). Community Impact of Pharmacy-Randomized Intervention to Improve Access to Syringes and Services for Injection Drug Users. Health Education & Behavior, 41, pp.397-405. Deren S, Fuller C, Pouget E R, Blaney S, Tortu S, Kang S, McMahon J M, Andia J F, Des Jarlais , D C, Johnson B, Rosenblum A, and Vlahov D. (2003). Impact of expanding syringe access in New York on sources of syringes for injection drug users in Harlem and the Bronx, NYC, USA. International Journal of Drug Policy, 14, pp.373-379 7p. Lewis C F, Rivera A V, Crawford N D, DeCuir J, and Amesty S. (2015). Pharmacy-randomized intervention delivering HIV prevention services during the syringe sale to people who inject drugs in New York City. Drug & Alcohol Dependence, 153, pp.72-77. Rudolph A E, Standish K, Amesty S, Crawford N D, Stern R J, Badillo W E, Boyer A, Brown D, Ranger N, Orduna J

			M, Lasenburg L, Lippek S, and Fuller C M. (2010). A community-based approach to linking injection drug users with needed services through pharmacies: an evaluation of a pilot intervention in New York City. <i>AIDS Education & Prevention</i> , 22, pp.238-51.
		Fisher D G, Fenaughty A M, Cagle H H, and Wells R S. (2003). Needle exchange and injection drug use frequency: a randomized clinical trial. <i>Journal of Acquired Immune Deficiency Syndromes: JAIDS</i> , 33, pp.199-205.	Fisher D G, Fenaughty A M, Cagle H H, and Reynolds G L. (2003). Injection drug users' use of pharmacies for purchasing needles in Anchorage, Alaska. <i>International Journal of Drug Policy</i> , 14, pp.381-387 7p.
		Jaffray M, Matheson C, Bond CM, Lee AJ, McLernon DJ, Johnstone A, Skea L, and Davidson B. (2014). Does training in motivational interviewing for community pharmacists improve outcomes for methadone patients? A cluster randomised controlled trial. <i>International Journal of Pharmacy Practice</i> , 22, pp.4-12.	Lawrie T, Matheson C, Bond C, and Roberts K. (2003). Pharmacy customers' views and experiences of using pharmacies which provide needle exchange services in Aberdeen and Glasgow, Scotland. <i>International Journal of Drug Policy</i> , 14, pp.445-447 3p. Lawrie T, Matheson C, Bond C M, and Roberts K. (2004). Pharmacy customers' views and experiences of using pharmacies which provide drug misuse services. <i>Drug & Alcohol Review</i> , 23, pp.195-202. Matheson C, Bond C M, and Pitcairn J. (2002). Community pharmacy services for drug misusers in Scotland: what difference does 5

			<p>years make? <i>Addiction</i>, 97, pp.1405-11.</p> <p>Matheson Catriona, Thiruvethiyur Manimekhalai, Robertson Helen, and Bond Christine. (2016). Community pharmacy services for people with drug problems over two decades in Scotland: Implications for future development. <i>The International Journal On Drug Policy</i>, 27, pp.105-112.</p>
		<p>Sheridan J, Manning V, Ridge G, Mayet S, and Strang J. (2007). Community pharmacies and the provision of opioid substitution services for drug misusers: changes in activity and attitudes of community pharmacists across England 1995-2005. <i>Addiction</i>, 102, pp.1824-30.</p>	<p>Sheridan J, and Cronin F. (2002). Supervised self-administration of methadone at community pharmacies: the introduction of a new service. <i>Pharmaceutical Journal</i>, 268, pp.471-474.</p> <p>Sheridan J, Lovell S, Turnbull P, Parsons J, Stimson G, and Strang J. (2000). Pharmacy-based needle exchange (PBNX) schemes in south east England: a survey of service providers. <i>Addiction</i>, 95, pp.1551-60.</p>
Obesity and weight management	Obesity	<p>Bush J, Langley C, Mills S, Hindle L (2014) A comparison of the provision of the My Choice Weight Management Programme via general practitioner practices and community pharmacies in the United Kingdom. <i>Clinical Obesity</i> 4: 91-100.</p>	<p>Bush J, Langley CA, Patel A, Harvey JE (2011) Evaluation of the Heart of Birmingham teaching Primary Care Trust (HoBtPCT) Weight Management Programme. Birmingham, UK: Aston University. http://eprints.aston.ac.uk/16563/1/My_Choice_Project_Report_Final.pdf</p>
		<p>Morrison D, McLoone P, Brosnahan N, McCombie L, Smith A, Gordon J (2013) A community pharmacy weight management programme: an</p>	<p>Counterweight Project T (2012) The implementation of the Counterweight Programme in</p>

		evaluation of effectiveness. BMC Public Health 13: 282.	Scotland, UK. Family Practice 29 Suppl 1: i139-i144.
	Osteoarthritis	Marra C A, Cibere J, Grubisic M, Grindrod K A, Gastonguay L, Thomas J M, Embley P, Colley L, Tsuyuki R T, Khan K M, and Esdaile J M. (2012). Pharmacist-initiated Intervention Trial in Osteoarthritis: a multidisciplinary intervention for knee osteoarthritis. Arthritis Care & Research, 64(12), pp.1837-45.	Marra C, Tsuyuki R, Soon J, Grubisic M, Grindrod K (2010) Pharmacist-initiated Intervention Trial in Osteoarthritis (PhIT-OA). Canadian Pharmacists Journal 143: e4. Marra C A, Grubisic M, Cibere J, Grindrod K A, Woolcott J C, Gastonguay L, and Esdaile J M. (2014). Cost-Utility Analysis of a Multidisciplinary Strategy to Manage Osteoarthritis of the Knee: Economic Evaluation of a Cluster Randomized Controlled Trial Study. Arthritis Care & Research, 66(6), pp.810-816.
	Osteoporosis	Elliott M E; Meek P D; Kanous N L; Schill G R; Weinswig P A; Bohlman J P; Zimpel C L; Jensen B C; Walters D R; Sutter S L; Peterson A N; Peterson R M; Binkley N C; (2002) Osteoporosis screening by community pharmacists: use of National Osteoporosis Foundation resources. Journal of the American Pharmaceutical Association 42: 101-10	Elliott M E, Meek P D, Kanous N L, Schill G R, Weinswig P A, Bohlman J P, Zimpel C L, Jensen B C, Walters D R, Sutter S L, Peterson A N, Peterson R M, Binkley N C (2002) Pharmacy-based bone mass measurement to assess osteoporosis risk. Annals of Pharmacotherapy 36: 571-7
		Yuksel N ; Majumdar S R; Biggs C ; Tsuyuki R T (2010) Community pharmacist-initiated screening program for osteoporosis: randomized controlled trial. Osteoporosis International 21: 391-8	Yuksel N, Tsuyuki R T, Majumdar S R (2012) Predictors of bone mineral density testing in patients at high risk of osteoporosis: secondary analyses from the OSTEOPHARM randomized trial. Journal of Clinical Densitometry 15: 61-6
Stakeholder Survey about community pharmacy and		Agomo C O, Ogunleye J, Portlock J, (2016) A survey to identify barriers in the public health role of community pharmacists. Journal of	Agomo C O, Portlock J, Ogunleye J, (2017) Barriers in the public health role of community pharmacists: a qualitative study. Journal of

public health generally		pharmaceutical health services research. 7 pp253-261	Pharmaceutical Health Services Research. 8 pp261-267
Hepatitis C		Kugelmas M, Pedicone L, Lio I , Simon S, Pietrandoni G, (2016) Hepatitis C antibody screening in a retail pharmacy setting: Local testing and linkage to care via an HCV management specialist. Gastroenterology. S1060-S1061	Kugelmas M, Pedicone L D; Lio I , Simon S , Pietrandoni G , (2017) Hepatitis C Point-of-Care Screening in Retail Pharmacies in the United States. Gastroenterology & hepatology. 13 pp 98-104

Appendix 3: List of resources searched and MEDLINE search strategy

1) The following 24 databases from the clinical disciplines and social sciences were searched, and the searches were last run at the end of November 2017:

- Allied and Complementary Medicine (AMED) (OVID)
- Applied Social Sciences Index and Abstracts (ASSIA) (Proquest)
- Bibliomap (EPPI-Centre)
- CENTRAL (Cochrane Library)
- CINAHL PLUS (EBSCO)
- Cochrane Library Database of Systematic Reviews (Cochrane Library)
- DARE (Cochrane Library)
- Database of Promoting Health Effectiveness Reviews (DoPHER) (EPPI-Centre)
- EconLit (EBSCO)
- Emerging Sources Citation Index (Web of Science)
- EMBASE (OVID)
- HMIC (OVID)
- International Pharmaceutical Abstracts (OVID)
- MEDLINE (EBSCO) Pubmed not Medline, and medline in process only)
- MEDLINE (OVID)
- NHS EED (Cochrane Library)
- NHS HTA(Cochrane Library)
- ProQuest Theses (Proquest)
- PsycINFO (OVID)
- Pubmed (brief top up search only, NLM)
- Social Policy and Practice (OVID)
- Social Science Citation Index (Web of Science)
- Sociological Abstracts (Proquest)
- Trials Register of Promoting Health Interventions (TRoPHI) (EPPI-Centre)

2) The references within relevant systematic reviews identified from the first two phases of the searching were checked for references of primary studies.

3) The following websites and other online resources were last searched or browsed, as appropriate, during January 2018:

- American Association of Pharmaceutical Scientists <http://www.aaps.org/>
- American Pharmacist Association <http://www.pharmacist.com>
- British Library EThOS <http://ethos.bl.uk>
- Community Pharmacy Foundation Community
<http://communitypharmacyfoundation.org/prl/resources.asp>
- Community Pharmacy West Yorkshire <http://www.cpwyo.org>
- Department of Health <https://www.gov.uk/government/publications>
- General Pharmaceutical Council <https://www.pharmacyregulation.org/>
- Google <http://www.google.co.uk>

- Kings Fund Library Catalogue <https://koha.kingsfund.org.uk/>
- NHS Evidence <https://www.evidence.nhs.uk/>
- OpenGrey <http://www.opengrey.net>
- Pharmaceutical Service Negotiating Committee (PSNC) <http://www.psn.org.uk>
- Pharmaceutical Society of Australia <http://www.psa.org.au>
- Pharmaceutical Society of New Zealand <http://www.psnz.org.nz>
- Pharmaceutical Society of Western Australia <http://www.pswa.org.au>
- Pharmacy Council of New Zealand <http://www.pharmacycouncil.org.nz>
- Pharmacy Research UK <http://www.pharmacyresearchuk.org/>
- PSSA: Pharmaceutical Society of South Africa <http://www.pssa.org.za>
- Public Health England library <http://phe.baileysolutions.co.uk>
- Royal Pharmaceutical Society <http://www.rpharms.com/support/our-library.asp>
- South African Pharmacy Council <http://www.pharmcouncil.co.za>
- UK Faculty of Public Health http://www.fph.org.uk/about_us
- UK government publications <https://www.gov.uk/government/publications/>
- UK Health Forum prevention and evidence library
<http://www.ukhealthforum.org.uk/prevention/pie/>

MEDLINE (OVID) search strategy

Database: Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) <1946 to Present>

The search was last run on 27/11/2018 to yield 13,306 records and the strategy is presented below. The results were de-duplicated with the results from the earlier two searches. The initial search was undertaken on 28/10/16, yielding 10,082 citations, and the first update search undertaken on 31/5/2016, which was expended to search for alcohol misuse and weight management, yielded an additional 1624 citations.

Terms for Pharmacy or pharmacist's or pharmacy shops

1 (Drugstore or "Drug store" or Drugstores or "Drug stores" or Pharmacy or pharmacies or pharmacists or druggist or druggists or chemist's or "chemist shop" or "chemist shops" or "chemist store" or "chemist stores" or "high street chemist?").ti,ab. (58433)

2 pharmacists/ or pharmacist's aides/ or Pharmaceutical Services/ or Pharmacies/ or community pharmacy services/ (26695)

3 1 or 2 (67763)

Terms for community, community pharmacy services or pharmacy shops

4 ((pharmacy adj2 led) or (pharmacy adj2 managed) or (pharmacy adj2 service?) or (pharmacies adj2 led) or (pharmacies adj2 managed) or (pharmacies adj2 service?) or (pharmacist* adj2 led) or (pharmacist* adj2 managed) or (pharmacist* adj2 service?)).ti,ab. (4272)

5 ((community or communities) and (pharmacy or pharmacies or pharmacist*)).ti. (3021)

6 (community adj10 (pharmacy or pharmacies or pharmacist*)).ti,ab. (6317)

7 ("community pharmacy" or "community pharmacies").kf. (660)

8 ("community setting" or "community member?" or (community adj2 service?) or (community adj2 (screen* or test* or promot* or prevent*))).ti,ab. (24495)

9 ((pharmacy or pharmacies) and (screen* or test* or promot* or prevent*)).ti. (517)

10 ((pharmacy or pharmacies) adj3 (screen* or test* or promot* or prevent*)).ab. (447)

11 ((pharmacist* or druggist* or chemist? or chemist's) and (screen* or test* or promot* or prevent* or delivered)).ti. (476)

12 ((pharmacist* or druggist* or chemist? or chemist's) adj2 (screen* or test* or promot* or prevent* or delivered)).ab. (442)

13 ("Lay pharmacist" or "volunteer pharmacist" or "Lay pharmacists" or "volunteer pharmacists" or "non dispensing" or "Lay pharmacy" or "volunteer pharmacy" or "Lay pharmacies" or "volunteer pharmacies" or Drugstore or "Drug store" or Drugstores or "Drug stores" or "chain stores" or "pharmacy shops" or "pharmacy stores" or "chemist shop" or "chemist shops" or "chemist store" or "chemist stores" or "high street chemist" or communities or "local area" or "local service" or "local services" or "local pharmacy" or "local pharmacist" or "local pharmacies" or "local pharmacists" or locality or "high street" or "high streets" or shopping or "high street" or "high streets" or precinct or precincts or parade or parades or shops or mall or malls or supermarket or supermarkets or "chain pharmacy" or "chain pharmacies" or "retail pharmacy" or "local population" or "local populations" or "general population" or "geographic location" or "general

public" or "population level" or neighbourhood or neighbourhoods or neighborhood or neighborhoods).ti,ab. (282516)

14 ((pharmacy or pharmacies or pharmacist*) and (city or cities or village? or town?)).ti. (157)

15 ((pharmacy or pharmacies or pharmacist*) adj5 (city or cities or village? or town?)).ab. (351)

16 (pharmacies adj2 (screen* or test* or promot* or prevent*)).ti,ab. (73)

17 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 (311905)

18 community pharmacy services/ (4023)

19 health services accessibility/ not (prescription drugs/ or prescriptions/ or prescription fees/ or drug costs/ or "drugs, essential"/ or drug prescriptions/) (66164)

20 17 or 18 or 19 (373170)

Terms for public health interventions, immunisation, vaccination, mass screening, emergency contraception

21 ("Health literacy" or "health education" or "health promotion" or "preventive health" or "primary prevention" or "health information" or (expanded adj2 service?) or "healthy living" or "healthful living" or "lifestyle" or "life style" or "public health" or "population health" or "promoting health" or "health promoting" or "health promotion" or "health maintenance" or "secondary prevention" or vaccination? or immuni?ation? or screening or "emergency contracept*").ti,ab,kf. (1067429)

22 Public Health/ or Health Education/ or health behavior/ or Primary Prevention/ or Preventive Health Services/ or Health Promotion/ or Public Health Practice/ or Primary Prevention/ or Preventive Health Services/ or life style/ or health behaviour/ or secondary prevention/ or Patient Medication Knowledge/ or Consumer Health Information/ or Patient Medication Knowledge/ or Mass Screening/ or Substance Abuse Detection/ or exp Immunization/ or Needle-Exchange Programs/ or Immunization Programs/ or exp Mass Vaccination/ or Contraception, Postcoital/ or Contraceptives, Postcoital/ (589522)

23 21 or 22 (1362597)

24 20 or 23 (1660742)

25 3 and 24 (19441)

Exclusions

26 ((diagnose* or hospital*) not (community or communities)).ti. (315876)

27 (Brasil or Brazil or Malaysia or Thailand or India or China or Nigeria or Pakistan or Tanzania or Kenya).ti. (197167)

28 ((developing adj2 countr*) or (developing adj2 nation?)).ti. (11360)

29 25 not 26 (18445)

30 27 or 28 (208136)

31 29 not 30 (17900)

32 exp developing countries/ or (exp Africa/ not exp South Africa/) (267422)

33 31 not 32 (17394)

34 exp animals/ not (exp humans/ and exp animals/) (4743200)

35 33 not 34 (17324)

36 limit 35 to yr="2000 -Current" (13712)

37 limit 36 to (afrikaans or albanian or arabic or armenian or azerbaijani or belorussian or bengali or bosnian or bulgarian or burmese or catalan or chinese or croatian or czech or danish or dutch or

esperanto or estonian or finnish or flemish or french or gaelic, scots or georgian or german or greek or hausa or hebrew or hindi or hungarian or icelandic or indonesian or interlingua or italian or japanese or kirghiz or korean or latin or latvian or lithuanian or macedonian or malay or marathi or masai or multilingual or norwegian or persian or polish or portuguese or pushto or rumanian or russian or serbian or slovak or slovene or spanish or swahili or swedish or tagalog or tamil or telugu or thai or turkish or ukrainian or urdu or vietnamese or welsh) (969)

38 36 not 37 (12743) [results from main search]

Terms for alcohol misuse and weight management

39 (((reduc* or decreas* or treat* or manag* or control* or improv*) adj6 (obes* or "weight gain" or "weight loss" or overweight or "over weight" or "under weight" or underweight)) or (weight adj1 (manag* or reduc* or control* or maintain* or improv* or treat* or decreas*))).ti,ab. (105835)

40 ((weight or obesity) adj3 (advice or consult* or counsel* or coach* or mentor* or assess* or issues or conversation* or enquir* or inquir* or intervention* or program* or project or model* or scheme* or initiative* or service* or group or groups or class or classes or club or clubs or camp or camps or consum* or educat* or biofeedback or support* or test* or monitor* or assess* or screen* or information or program* or access* or communicat* or refer or referral*)).ti,ab. (64024)

41 ((alcohol or drinking) adj3 (advice or consult* or counsel* or coach* or mentor* or assess* or issues or conversation* or enquir* or inquir* intervention* or program* or project or model* or scheme* or initiative* or service* or group or groups or class or classes or club or clubs or camp or camps or consum* or educat* or biofeedback or test* or monitor* or assess* or screen* or information or program* or access* or communicat* or refer or referral*)).ti,ab. (66569)

42 ((drinking or alcohol*) adj2 (abus* or misuse* or excess* or binge or problem* or risk* or habit* or control or manag* or reduc* or improve*)).ti,ab. (53857)

43 (alcoholic? or alcoholism).ti,ab. (78884)

44 drinking behavior/ or alcohol abstinence/ or alcohol drinking/ or binge drinking/ or alcohol drinking in college/ or underage drinking/ or alcoholic intoxication/ or alcohol drinking patterns/ or alcohol-related disorders/ or alcohol-induced disorders/ or alcoholic intoxication/ or alcoholism/ or binge drinking/ (145509)

45 exp body weight changes/ or weight gain/ or weight loss/ or overweight/ or thinness/ or Ideal Body Weight/ or body weight/ or body size/ or exp obesity/ or exp pediatric obesity/ or exp Weight reduction programs/ or exp overweight/ (426185)

46 39 or 40 or 41 or 42 or 43 or 44 or 45 (707254)

47 3 and 46 (815)

48 47 not 26 (799)

49 48 not 30 (789)

50 49 not 32 (779)

51 50 not 34 (767)

52 limit 51 to yr="2000 -Current" (641)

53 limit 52 to (afrikaans or albanian or arabic or armenian or azerbaijani or belorussian or bengali or bosnian or bulgarian or burmese or catalan or chinese or croatian or czech or danish or dutch or esperanto or estonian or finnish or flemish or french or gaelic, scots or georgian or german or greek or

hausa or hebrew or hindi or hungarian or icelandic or indonesian or interlingua or italian or japanese or kirghiz or korean or latin or latvian or lithuanian or macedonian or malay or marathi or masai or multilingual or norwegian or persian or polish or portuguese or pushto or rumanian or russian or serbian or slovak or slovene or spanish or swahili or swedish or tagalog or tamil or telugu or thai or turkish or ukrainian or urdu or vietnamese or welsh) (45)

54 52 not 53 (596) **[alcohol misuse and weight management search]**

Combining the main search and the alcohol misuse and weight management search

55 54 or 38 (13036)

Appendix 4: Coding tool applied to studies included at full text

- Country (by OECD)
- Standalone or linked study
- Aim of study
- Study design
 - Controlled design; Non-comparative/single group design study; Other; Not an intervention evaluation of any kind (stop coding here)
- Comparison condition (if RCT or CT only)
- Outcomes measured
 - Results of screening; service use/referral outcomes; physiological changes; health behaviour outcomes; psychosocial outcomes; knowledge and attitudinal outcomes
- Processes measured
 - acceptability to community pharmacists; acceptability to recipients; acceptability to others; access issues; costs/resources; implementation issues; reach/uptake; training/support; other processes
- Cost information
- Name of intervention
- Aims of intervention
- Setting single or multiple
 - Setting - Single centre; Setting – Multi-centre
- Intervention Setting
 - Healthy living pharmacy (HLP); High street or supermarket pharmacy chain; Independent pharmacy; Community pharmacy (Unspecified); Outreach from a CP; Several pharmacy settings (including CP); CP and other non-public health service settings; Can't tell/Not reported; N/A not a study of a specific CP intervention
- Intervention condition focus
 - Life stage (Please specify); General health checks; Alcohol abuse and misuse; Allergies (Please specify); Alzheimer's/Dementia and other cognitive degenerative diseases; Angina; Antibiotic use/knowledge; Anticoagulation; Arthritis - Osteo and rheumatoid; Asthma; Atrial fibrillation; Benign prostatic hyperplasia; Bowel disease; Cancer (Please specify); CKD and renal impairment; CVD in general; COPD; Chronic cough/bronchitis; Chronic Kidney Disease; Cognitive memory/dementia; Diabetes/Metabolic syndrome;

Diarrhoea; Drug misuse/abuse; Dyspepsia; Dyslipidaemia; Emergency hormonal contraception (EHC); Erectile Dysfunction; Healthy Living Pharmacy (HLP); Hepatitis B; Hepatitis C; Herpes Simplex Virus 1; HIV; HPV; HSV1; Hypercholesterolemia (High cholesterol)/hyperlipidaemia; Hypertension; Hypogonadism (androgen deficiency); IDU risk management; Immunizations/Inoculations/Vaccinations unspecific; Infections general (perceived or otherwise); Influenza; Ischemic heart failure; Long term/chronic conditions; Lyme Disease; Men's Health; Mental health (Please specify); Migraine; Opioid/methadone replacement; OTC drug misuse/abuse; Oral/Dental health; Osteoporosis; Pain management; Peripheral arterial disease (PAD); Peripheral neuropathy; Pharmacogenetic testing; Pharyngitis; Risk of falls; Service priorities; Sexual health; STIs (excluding HIV); Shingles; Skin conditions (unspecified); Sleep disorders; Stroke; Thrombosis; Travel health; TB; Weight management; Women's Health; New Medication Service

- Is this an HLP initiative?
 - Yes; No
- Intervention components
 - Advice; Bio feedback; Counselling; Education; Immunisation; Information; Incentives; Referral or communication with other professionals; Medicines management; Resource access; Screening for risk factors or signs; Service access; Skill development; Social support; Testing;
- People delivering the intervention (Tick all that apply)
 - Community pharmacist; Health champion/ peer/community member (pls specify); Counter staff; Nurse; Pharmacy Technician; Healthcare practitioner (other); Automated provider; Student; Local organisations; Other (please specify); Provider N/A - eg. no specific intervention; Can't tell/Not reported
- Intervention mode of delivery (Tick all that apply)
 - Face-to-face (individual); Face-to-face (Group); Internet; App; Telephone; Booth or kiosk; Other (please specify in info box); Not described
- Frequency/intensity/duration of intervention
 - Described (pls describe); Not described
- Staff training for intervention
 - Training mentioned (please describe); Not mentioned
- Number of participants
 - No. of participants - 100+ (Please specify); No. of participants - fewer than 100
- Target population health/group status (Tick all that apply)

- Community pharmacist; General population; At risk for a target/condition (pls specify in info box); Disabled people; Economically disadvantaged populations; Hard to reach populations; Healthcare providers; IDU (Injecting Drug Users); MSM; Parents/Carers; People challenged by addiction; People with long term conditions (specify); People with mental health issues; Pregnant or lactating women; Rural populations; Sexually active young people; Specific ethnic group (Please specify); Stakeholders; Service Users; Sex workers; Urban population; Veterans; Women at risk of unintended pregnancy; Women identified by their menopause status; Popn N/A - no specific intervention; Can't tell/Not reported
- Target population gender
 - Both genders (OR presume if not specified); Women only; Men only; Other (please specify)
- Target population age
 - Target age not specified (but presume full range of adult ages 18+); Adults; Children; Young people; Elderly

Appendix 5: Systematic reviews screened for primary studies (n=86)

- Adunlin G, Mahdavian S (2012) The Effectiveness of Pharmacist Interventions on Asthma Management: A Systematic Review. *Journal of Asthma and Allergy Educators* 3:264-273.
- Agomo CO (2012) The role of community pharmacists in public health: A scoping review of the literature. *Journal of Pharmaceutical Health Services Research* 3:25-33.
- Agomo CO, Ogunleye J (2014) An investigation of strategies enhancing the public health role of community pharmacists: A review of knowledge and information. *Journal of Pharmaceutical Health Services Research* 5:135-145.
- Alonso-Perales MD, Lasheras B, Beitia G, et al. (2015) Barriers to promote cardiovascular health in community pharmacies: a systematic review. *Health Promot Int.*
- Anderson C, Blenkinsopp A, Armstrong M (2004) Feedback from community pharmacy users on the contribution of community pharmacy to improving the public's health: a systematic review of the peer reviewed and non-peer reviewed literature 1990-2002. *Health Expectations* 7:191-202.
- Anderson C, Blenkinsopp A (2006) Community pharmacy supply of emergency hormonal contraception: a structured literature review of international evidence. *Human Reproduction* 21:272-84.
- Ayorinde AA, Porteous T, Sharma P (2013) Screening for major diseases in community pharmacies: a systematic review. *International Journal of Pharmacy Practice* 21:349-61.
- Benavides S, Rodriguez JC, and Maniscalco-Feichtl M (2009) Pharmacist involvement in improving asthma outcomes in various healthcare settings: 1997 to present. *Annals of Pharmacotherapy* 43:85-97.
- Bennett MI, Bagnall AM, Raine G, et al. (2011) Educational interventions by pharmacists to patients with chronic pain: systematic review and meta-analysis. *Clinical Journal of Pain* 27:623-30.
- Blalock SJ, Roberts AW, Lauffenburger JC, et al. (2013) The effect of community pharmacy-based interventions on patient health outcomes: a systematic review. *Medical Care Research & Review* 70:235-66.
- Blenkinsopp A, Anderson C, and Armstrong M (2003) Systematic review of the effectiveness of community pharmacy-based interventions to reduce risk behaviours and risk factors for coronary heart disease. *Journal of Public Health Medicine* 25:144-153.
- Brown D, Portlock J, Rutter P (2012) Review of services provided by pharmacies that promote healthy living. *International Journal of Clinical Pharmacy* 34:399-409.
- Brown Tamara J, Todd Adam, O'Malley Claire, et al. (2016) Community pharmacy-delivered interventions for public health priorities: a systematic review of interventions for alcohol reduction, smoking cessation and weight management, including meta-analysis for smoking cessation. *BMJ Open* 6, pp.e009828-e009828.

- Brown TJ, Todd A, O'Malley CL, et al. (2016) Community pharmacy interventions for public health priorities: a systematic review of community pharmacy-delivered smoking, alcohol and weight management interventions. *Public Health Research*
- Cai H, Dai H, Hu Y, et al. (2013) Pharmacist care and the management of coronary heart disease: a systematic review of randomized controlled trials. *BMC Health Services Research* 13:461.
- Carter BL, Rogers M, Daly J, et al. (2009) The potency of team-based care interventions for hypertension: a meta-analysis. *Archives of Internal Medicine* 169:1748-55.
- Cawley MJ, Warning WJ (2015) Pharmacists performing quality spirometry testing: an evidence based review. *International Journal of Clinical Pharmacy* 37:726-33.
- Cawley MJ, Warning WJ (2016) A systematic review of pharmacists performing obstructive sleep apnea screening services. *Int J Clin Pharm* 38:752-760.
- Chapman JL, Zechel A, Carter YH et al. (2004) Systematic review of recent innovations in service provision to improve access to primary care. *British Journal of General Practice* 54:374-81.
- Cheema E, Sutcliffe P, Singer DR (2014) The impact of interventions by pharmacists in community pharmacies on control of hypertension: a systematic review and meta-analysis of randomized controlled trials. *British Journal of Clinical Pharmacology* 78:1238-47.
- Church D, Johnson S, Raman-Wilms L, et al. (2016) A literature review of the impact of pharmacy students in immunization initiatives. *Canadian Pharmacists Journal*, 149:153-165.
- Clark C, Smith L, Cloutier L, et al. (2015) Lb01.01: Allied Health Professional-Led Interventions for Improving Control of Blood Pressure in Patients with Hypertension: A Cochrane Systematic Review and Meta-Analysis. *Journal of Hypertension* 33 Suppl 1:e44.
- Deas C, and McCree DH (2010) Pharmacists and HIV/AIDS prevention: review of the literature. *J Am Pharm Assoc* 50:411-5.
- Dennis S, May J, Perkins D, et al. (2009) What evidence is there to support skill mix changes between GPs, pharmacists and practice nurses in the care of elderly people living in the community? [Aust New Zealand Health Policy](#) 6:23.
- Eades CE, Ferguson JS, O'Carroll RE (2011) Public health in community pharmacy: a systematic review of pharmacist and consumer views. *BMC Public Health* 11:582.
- Earl GL, Henstenburg JA (2012) Dietary approaches to hypertension: a call to pharmacists to promote lifestyle changes. *Journal of the American Pharmacists Association* 52:637-45.
- Eid DD, Meagher RC, Lengel AJ (2015) The Impact of Pharmacist Interventions on Herpes Zoster Vaccination Rates. *Consultant Pharmacist* 30:459-62.
- Elias M, Burden AM, Cadarette SM (2010) Systematic review of osteoporosis interventions in pharmacy practice. *Canadian Pharmacists Journal* 143(5)e2.
- Elias MN, Burden AM, Cadarette SM (2011) The impact of pharmacist interventions on osteoporosis management: a systematic review. *Osteoporosis International* 22:2587-96.

- Ellitt GR, Brien JA E Aslani P, and Chen TF (2009) Quality Patient Care and Pharmacists' Role in Its Continuity-A Systematic Review. *Annals of Pharmacotherapy*, 43, pp.677-691.
- Evans CD, Watson E, Eurich DT, et al. (2011) Diabetes and cardiovascular disease interventions by community pharmacists: a systematic review. *Annals of Pharmacotherapy* 45:615-28.
- Fathima M, Naik-Panvelkar P, Saini B, et al. (2013) The role of community pharmacists in screening and subsequent management of chronic respiratory diseases: a systematic review. *Pharmacy Practice* 11:228-45.
- Fleming S, Atherton H, McCartney D, et al. (2015) Self-Screening and Non-Physician Screening for Hypertension in Communities: A Systematic Review. *American Journal of Hypertension* 28:1316-24.
- Francis M, and Hinchliffe A. (2010) Vaccination services through community pharmacy: a literature review. Available at:
[http://www2.nphs.wales.nhs.uk:8080/pharmaceuticalphtdocs.nsf/c944d98bdfffc718802570050043d5cd/b16d4a1e2295dcbf802577830030f109/\\$FILE/Vaccination%20services%20through%20community%20pharmacy%20v1a.pdf](http://www2.nphs.wales.nhs.uk:8080/pharmaceuticalphtdocs.nsf/c944d98bdfffc718802570050043d5cd/b16d4a1e2295dcbf802577830030f109/$FILE/Vaccination%20services%20through%20community%20pharmacy%20v1a.pdf).
- Ganguli A, Clewell J, Shillington AC (2016) The impact of patient support programs on adherence, clinical, humanistic, and economic patient outcomes: A targeted systematic review. *Patient Preference and Adherence* 10:711-725.
- George J, McNamara K, Stewart K (2011) The roles of community pharmacists in cardiovascular disease prevention and management. *The Australasian Medical Journal* 4:266-72.
- Gordon J, Watson M, Avenell A (2011) Lightening the load? A systematic review of community pharmacy-based weight management interventions. *Obesity Reviews* 12:897-911.
- Greer Nancy, Bolduc Jennifer, Geurkink Eric, et al. (2016) Pharmacist-led Chronic Disease Management: A Systematic Review of Effectiveness and Harms Compared With Usual Care. *Annals of internal medicine*.
- Gudka S, Afuwape FE, Wong B, et al. (2013) Chlamydia screening interventions from community pharmacies: a systematic review. *Sexual Health* 10:229-39.
- Haddad AR, Coover K, and Faulkner M (2007) A pharmacist's introduction to the effects of aging on patients with cerebral palsy. *American Society of Consultant Pharmacists* 22:669-674.
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