Development of a primary care pharmacy outcomes framework: an umbrella literature review

Dr Natalie M. Weir; Ms Kate Preston; Dr Rosemary Newham; Professor Marion Bennie

Affiliations

a Strathclyde Institute of Pharmacy and Biomedical Science, Robertson Trust Wing, University of Strathclyde, 161 Cathedral Street, Glasgow, G4 0RE, United Kingdom.
b Public Health Scotland, National Services Scotland, Gyle Square, 1 South Gyle Crescent, Edinburgh, EH12 9EB

Corresponding author

Dr Natalie Weir
natalie.m.weir@strath.ac.uk

Strathclyde Institute of Pharmacy and Biomedical Science, Robertson Trust Wing, University of Strathclyde, 161 Cathedral Street, Glasgow, G4 0RE, United Kingdom.

Email addresses of authors:

Dr Natalie M. Weir: natalie.m.weir@strath.ac.uk
Ms Kate Preston: kate.preston@strath.ac.uk
Dr Rosemary Newham: rosemary.e.newham@strath.ac.uk
Prof Marion Bennie: marion.bennie@strath.ac.uk

Author statement (CRediT roles)

Natalie M. Weir: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing - Original Draft, Writing - Review & Editing, Visualization, Project administration;
Kate Preston: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing - Original Draft, Writing - Review & Editing, Visualization, Project administration;
Rosemary Newham: Conceptualization, Methodology, Formal analysis, Investigation, Writing - Review & Editing, Visualization, Supervision, Project administration, Funding acquisition;
Marion Bennie: Conceptualization, Methodology, Formal analysis, Investigation, Writing - Review & Editing, Visualization, Supervision, Project administration, Funding acquisition.

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Abstract

Background
An aging population and rising multi-morbidity has shifted healthcare provision from secondary to primary care. Pharmacy-led services have been introduced to support this. The development of an outcomes framework for these services would facilitate conclusions to be drawn on their effectiveness.

Objectives
To identify outcomes used to evaluate pharmacy-led medication therapy and disease management services within primary care settings to develop an outcomes framework for future studies.
Methods
An umbrella literature review was conducted. MEDLINE, EMBASE, The Cochrane Library and PsycINFO were searched in June 2020 to identify relevant articles. Eligible reviews were those including studies published from 2010 onwards which reported on the outcomes of pharmacy-led medication therapy and disease management services within primary care, excluding community pharmacy settings. Data were extracted and a content analysis, guided by the ECHO model, stratified the outcomes into four areas: economic, clinical, humanistic and service.

Results
Twenty-four reviews covering 52 unique studies were identified. Pharmacy-led services included: medication reviews (n=24, 46.2%), disease and therapy management (n=17, 32.7%), educational services (n=6, 11.5%), medicines reconciliation (n=3, 5.8%), and medication compliance support (n=1, 1.9%). Services were commonly targeted towards endocrine (n=23, 44.2%) or cardiovascular diseases (n=20, 38.5%). Outcomes most commonly explored were clinical (n=38, 73.1%) and service outcomes (n=37, 71.2%), followed by humanistic (n=23, 44.2%) and economic outcomes (n=13, 25.0%). Overall, 17 sub-categories of outcomes were identified; common sub-categories were: disease indicators [clinical]; medication use and healthcare utilisation [service]; adherence to medicines [humanistic]; and healthcare costs [economic].

Conclusions
The findings informed the development of an outcomes framework to guide the evaluation of medication therapy and disease management services, and facilitate international standardised outcome measures within primary care pharmacy to be developed. This could help offer vital evidence on the effectiveness of these services to ensure the pharmacy workforce is working optimally to support primary care.

Highlights
- Pharmacy-led services support primary care but lack systematic outcomes evaluation
- Common services include medication reviews and disease / therapy management
- Clinical and service outcomes are most commonly evaluated
- A framework of 17 clinical, humanistic, service and economic outcomes was created
- The framework will guide evaluations and development of standardised outcomes

Manuscript
Introduction
Historically pharmacists were considered dispensers, participating in the sale and distribution of medicines. However, since the 1980s, pharmacists have increasingly been involved in providing direct patient care and adopting clinical responsibilities. These pharmacy roles primarily involve the provision of medication therapy and disease management services such as disease-related clinics, in-depth medication reviews and prescribing medicines. The current evidence-base of pharmacists’ clinical roles exemplifies their benefit. Within hospital settings, pharmacists play a key role in identifying issues, reducing medication errors, offer cost-saving benefits, and can positively affect patient’s medication use. Furthermore, the involvement of pharmacists in hospital settings also results in benefits within primary care, as pharmacist-led medication reconciliation at hospital discharge facilitates the transition to primary care through the reduction of medication discrepancies. Within the community pharmacy setting, recent umbrella reviews highlight the effectiveness of pharmacy-led services. Jokanovic et al (2017) found that medication reviews improve several health-care conditions, for example through positive impacts on cholesterol and
blood pressure levels, and in 2018 San-Juan-Rodrigeuz et al evidenced that disease preventative services improve patient outcomes and increase immunization rates.9

Whilst there is a broad evidence base on the benefit of pharmacy-led services in hospital and community pharmacy settings, there is a paucity of research within the primary care setting - such as general practices, health centres and clinics - whereby pharmacists work alongside other primary care clinicians such as physicians and nurses.10 This is an evolving area of pharmacy practice, and is driven by the international burden associated with aging populations, the rise in multi-morbidity, and a general shift in healthcare provision from secondary to primary care.11, 12 Research suggests this pharmacy role can support general practitioners13-15 and may aid patient understanding of their medicines16; however, when compared to other areas of pharmacy practice, there is less compelling evidence on the benefit of pharmacists working within this setting. Systematic reviews have attempted to identify the effectiveness of primary care based pharmacy services but repeated efforts to conduct meta-analyses and offer general conclusions on effectiveness have been unsuccessful.17-19 This has been linked to the heterogeneity of the studies and the outcome measures which has complicated cross-comparison,17-19 and researchers have strongly advocated for the development of standardised outcomes to facilitate future cross-comparison of findings.18-20 The paucity of key conclusion on effectiveness may have a negative influence on the overall adoption of primary care based pharmacy services.17 Furthermore, the International Consortium for Health Outcome Measures (ICHOM) strongly advocates for standardisation of health-related outcome measures to facilitate cross comparisons and improve clinical decision making.21 Standardised outcome measures have been successfully developed for areas such as cancer care22 and mental health care.23

To address this, the development of an outcomes framework detailing outcome areas of interest would enable outcomes to be measured in a planned and systematic way.18, 19 This would facilitate appropriate evaluations to inform stakeholders (e.g. strategists, pharmacists, and patients) on the effectiveness of pharmacy-led services within primary care. The aim of this literature review was to identify outcomes used to evaluate pharmacy-led medication therapy and disease management services within primary care settings in order to develop an outcomes framework that can be utilised by future studies.

Methods

An umbrella literature review was conducted to identify systematic reviews, narrative reviews, and literature reviews which explored the outcomes associated with medication therapy and disease management services within primary care pharmacy settings.

Eligibility criteria

Eligible reviews were those which included studies reporting on any types of outcomes of pharmacy-led medication therapy and disease management services conducted within primary care settings (such as general practices, health centres and primary care clinics). Studies published in the last 10 years (from 2010 onwards) were included. Review articles with a wider scope than pharmacy – for example, if they explored nursing-led services alongside pharmacy-led services – were included providing it was possible to extract data pertaining to the pharmacy-led services. Reviews were included if they stratified studies to ensure only outcomes associated with medication therapy and disease management services were extracted. Studies were excluded if they focused solely on:
adoption and/or implementation of a service; patient-reported experience measures (e.g. satisfaction); dispensing medications; health promotion activities; settings outside of primary care (e.g. hospital settings); or the community pharmacy setting. Studies of services which were not pharmacy-led, and therefore had equal or greater contribution of other health care professionals, were also excluded as it would not have been possible to distinguish clearly the contribution of the pharmacy staff members and associated outcomes.

Search strategy

The databases MEDLINE, EMBASE, The Cochrane Library and PsycINFO were searched in June 2020. Search terms for ‘primary care’ and ‘pharmacy services’ were used with various synonyms, truncation codes and Boolean operators (see Appendix 1 for search strategy). The search was limited to the English language and for review articles. A supplementary search involved screening articles identified from a preliminary scoping review. When full texts were not obtainable the first authors were contacted up to two times to request full texts.

Article selection

Article selection was conducted using Covidence software. To ensure consistency in the study selection process 10% of the articles’ titles/abstracts and full texts were randomly selected and screened independently by two researchers (NW and KP). Within reviews only a sub-set of studies might be relevant therefore, for 10% of reviews, NW and KP conducted an independent screen of eligible studies. The percentage of agreement was calculated for all independent validation, with >80% considered adequate. Where dubiety arose over an article’s eligibility another reviewer was consulted (MB or RN).

Data extraction

Data were extracted from the reviews and any supplementary material using Microsoft Excel. A data extraction template was piloted with 10% of reviews by NW and agreed for use by all authors. 10% of reviews were randomly selected and underwent independent data extraction by NW, KP and RN; the percentage of agreement was calculated. Again, agreement >80% was considered adequate. Where dubiety arose over data extraction a second reviewer was consulted (NW, KP or RN). Data extracted from the reviews included: title; authors; year published; review type; search sources; date of search; aim of review; number of included studies in review; and number of studies of relevance. Data extracted from the relevant studies within the reviews included: geographical location of study; study type (e.g. randomised controlled trial); pharmacy setting; description of medication therapy and disease management service; patient eligibility criteria; therapeutic area(s); and outcomes(s). If specific study details were not presented on study type, pharmacy setting, target population or therapeutic area this was inferred from the review-level inclusion criteria where possible.

Data synthesis

A narrative synthesis method was used to present the characteristics of the reviews and studies identified. If a study was reported by more than one review the data presented were selected from the review offering the most comprehensive details, and if reviews reported differing study information the data were collated. The medication therapy and disease management services were categorised by definitions used to describe pharmacy-led services offered within Scotland’s primary
A deductive content analysis was conducted using the ECHO model. The ECHO model encompasses Economic, Clinical and Humanistic outcomes and explores patient-orientated outcomes. An initial scope of the literature identified that service-related outcomes were also of relevance to pharmacy-led services. Therefore the ECHO stratification of outcomes was supplemented by the inclusion of a “service” outcome category to allow for extraction of service outcomes of relevance to pharmacy-led services, such as health service utilisation and medication use. We were also open to the inclusion of other emergent outcome areas, however none emerged. Therefore, four outcome categories directed the analysis (Table 1). 10% of the studies underwent initial content analysis by NW to develop a coding framework which was approved for use by all authors. NW and KP applied the coding framework to three reviews independently to ensure consistency in coding. The remaining coding was conducted by one reviewer KP and a second opinion sought where required.

Table 1. Outcome categories [as adapted from 9, 31]

Results

Included reviews and studies

A total of 24 reviews were included within this umbrella review; see Figure 1 for the selection process. The 24 reviews included a total of 90 eligible studies, of which 38 (42.2%) appeared in more than one review. Therefore, 52 unique studies were identified.

Figure 1. PRISMA flow diagram of review selection process

Review characteristics

Of the 24 reviews, the majority (n=18, 75.0%) were described as ‘systematic reviews’. Twenty-three reviews (95.8%) reported the bibliographic and trial databases searched, and one review did not report this. Six (25.0%) of the reviews conducted a grey literature search. Further details of the reviews are presented in Appendix 3.

Study characteristics

Of the 52 studies, most were conducted within North America (n=22, 42.3%), followed by Europe (n=9, 17.3%), Asia (n=6, 11.5%), South America (n=4, 7.7%), and Australia (n=1, 1.9%). For 10 studies (19.2%) the geographical location was not reported on. Grouping of the medication therapy and disease management services identified five types (Table 2), with the most common service being medication reviews (n=24, 46.2%). Within the category of medication reviews, there were sub-categories depending on if they involved communication with a patient/carer and if drug therapy adjustments were initiated. For one study the service was referred to as ‘Pharmaceutical care’ which did not offer enough detail for categorisation to a specific service type. Most services were targeted towards patients with cardiovascular diseases (n=20, 38.5%) or endocrine diseases (n=23, 44.2%), and the most common mode of service delivery was solely face-to-face communication (n=21, 40.4%). For the majority of the studies the outcomes of the services were evaluated in a trial-based...
setting (n=38, 73.1%). Full details of the studies and their services is presented in Appendix 4.

Table 2. Medication therapy and disease management services

Outcomes

The content analysis of the outcomes identified 17 types of outcomes spanning across clinical, humanistic, economic and service outcomes (Table 3). Clinical outcomes were the most common outcomes reported by 38 studies out of 52 (73.1%). Of these, the majority were related to disease indicators such as blood pressure or lipid profile (n=26, 68.4%), followed by patients achieving specific monitoring targets (n=16, 42.1%). Clinical outcomes were closely followed by service outcomes (n=37, 71.2%). Within this area, the most common outcomes were related to medication optimisation, such as changes to medication regimes including discontinuation (n=30, 81.1%) and healthcare utilisation (n=15, 40.5%) such as hospital and/or primary care visits.

Humanistic outcomes were presented in 23 studies (44.2%). Of these, patients’ adherence to medicines was the most predominant outcome explored (n=18, 78.3%) while both generic and health-related quality of life were the next most common (n=6, 26.1%). The economic outcomes were least reported (n=13, 25.0%). Two types of economic outcomes were identified: cost of healthcare and cost-effectiveness. ‘Undefined outcomes’ were those which provided insufficient detail for categorisation (n=12, 23.1%).

Table 3. Full presentation of clinical, humanistic, service and economic outcomes

Discussion

This umbrella literature review drew upon the international literature to identify outcomes associated with pharmacy-led medication therapy and disease management services delivered in primary care settings. The findings reflect the level of interest in outcomes of these services in the last 10 years, and highlights that such services have been delivered worldwide across North America, Europe, Asia, South America, and Australia. Most services were clinical, evaluated in a trial-based setting, and occurred face-to-face. Disease-specific services predominately focused on cardiovascular or endocrine diseases. Clinical and service outcomes were most commonly explored; the least common was economic outcomes. Recurrent areas within these outcomes were: indicators of disease and achievement of specific monitoring targets [clinical]; medication use and healthcare utilisation [service]; patient adherence to medicines [humanistic]; and healthcare costs [economic].

Pharmacy-led services delivered

This review identified a range of clinical pharmacy services which have been evaluated internationally within primary care, which most commonly were medication reviews or disease and therapy management services. These findings align with other research indicating that pharmacists undertake a range of clinical tasks within primary care including medication reviews.
medicines reconciliation,\textsuperscript{19,113} polypharmacy management,\textsuperscript{113} long-term conditions management,\textsuperscript{113} and prescribing.\textsuperscript{3} However, it should be acknowledged that heterogeneous terminology used to describe pharmacy-led services made cross-comparison of our findings with previous studies difficult.\textsuperscript{114,115} This may be due to the challenge of stratifying pharmacy services to a single specific category; for example, it was identified that medication review services could additionally involve educational and medication compliance support. Future primary studies may benefit from applying the Descriptive Elements of Pharmacist Interventions Characterization (DEPICT) tool which offers a framework of how to adequately describe pharmacy services, which, if consistently used, would ensure consistency in terminology and support cross-comparison between studies.\textsuperscript{116} When describing pharmacy services the inherent complexity and adaptability should also be acknowledged, as the exact delivery of a service can vary between patients depending on their needs and emergent issues identified during consultations.\textsuperscript{117} For each type of service it is likely there are core elements which are delivered unanimously to all patients (e.g. systematic assessment of prescribed medications) and additional elements which are delivered depending on the individual patient needs (e.g. physical assessment and/or prescribing). This concept is defined within the Consolidated Framework of Implementation Research (CFIR), which acknowledges that healthcare services are adaptable with “core components” and “adaptable peripheries”.\textsuperscript{118} The CFIR stems from the field of Implementation Science and offers an understanding of the implementation and operationalisation of health care services, and is being increasingly applied within pharmacy research.\textsuperscript{119,120} Overall, future research would benefit from applying the DEPICT tool to adequately describe pharmacy services, as well as being acquainted with the CFIR to foster a clearer, more nuanced appreciation of the complexity and adaptability of pharmacy services.\textsuperscript{116,118}

\textbf{Outcomes}

The content analysis identified 17 types of outcomes spanning across clinical, service, humanistic, and economic outcomes, with a focus on clinical and service outcomes. This focus is unsurprising in light of the need within pharmacy services to consider the efficacy of therapeutic regimes on patient’s health while also appreciating the pharmacy’s contribution within the wider primary care service.\textsuperscript{13-15} Humanistic outcomes identified focused more so on medication use rather than quality of life, which may reflect a perceived emphasis on “taking the medicine” as being an indicator of success rather than acknowledging medicines’ impact on quality of life. Economic outcomes were the least reported, and mostly focused on the healthcare costs. While they are the least reported, economic outcomes allow an understanding of the cost-effectiveness ratio of pharmacy services and their value-for-money, ultimately leading to informed decisions about the delivery of pharmacy service in times of limited resources.\textsuperscript{121}

An overview of reviews from the period of 2000-2010 focusing on medication and patient-related outcomes of clinical pharmacy services identified that commonly explored outcomes related to disease indicators (e.g. blood pressure and lipid profile) and medication adherence,\textsuperscript{34} which closely mirrors the current review’s findings. An umbrella review by Newman et al (2019) on community pharmacist-led chronic disease management focused on clinical, economic and service utilisation outcomes, which likewise identified that the most common clinical outcome related to disease indicators (e.g. blood pressure and glycaemic control).\textsuperscript{32} This indicates that previous umbrella reviews in a similar realm have identified comparable findings, and the findings of this review builds
upon this as it identified a broader range of outcomes used to evaluate pharmacy-led services in primary care.

Proposed outcomes framework

The outcomes identified have been developed into an outcomes framework offering an evidence-based route map through which clinical, humanistic, service and economic outcomes of primary care pharmacy services can be explored (Figure 2). This framework expands on the existing ECHO model by the inclusion of service-related outcomes, which this umbrella review identified as being one of the most commonly applied type of outcome to evaluate primary care pharmacy-led services. Additionally, despite the existence of the ECHO model, we identified ongoing heterogeneity of outcome measures, suggesting that a more detailed outcomes framework may aid standardisation to facilitate comparison of outcomes of different services and from varying contexts.

This framework draws upon established outcome definitions and contextualises them to the primary care pharmacy setting with stratification as to whether the outcomes are framed at a patient-level or health service level.9, 31 We pose that economic outcomes could be considered at either a patient or health service level depending on local healthcare funding models, for example if pharmacy-led service is publicly or privately funded. The outcomes framework can facilitate the planning of outcome evaluations and is a living resource which will be continually updated to reflect the ever-changing primary care landscape. Previous efforts to develop standardised outcomes measures, led by the International Consortium for Health Outcome Measures (ICHOM), have focused on developing disease-specific outcome measures.21 Therefore, for pharmacy services targeted towards specific disease states the selection of clinical outcomes to explore could be informed by the framework developed as well as the disease-specific ICHOM measures.

Figure 2. Proposed outcomes framework for primary care pharmacy-led services

The Primary Care Pharmacy Outcomes Framework presents the clinical, humanistic, economic and service outcomes which can be used to evaluation primary care pharmacy-led services. It is posed that clinical and humanistic outcomes are patient-level outcomes, with service outcomes a health service level outcome. Economic outcomes could be considered at either a patient or health service level depending on local healthcare funding models.

The different outcomes presented in the framework may be of varying importance based on the priorities of different stakeholders – whether it be patients, pharmacists, other health care professionals, policy makers or strategists. It may be that clinical and humanistic outcomes are of greater interest to patients and pharmacists as these evidence the direct impact of care at a patient-level, whereas service and economic outcomes may be of greater importance to policy makers or strategists as these broadly relate to the benefit of pharmacy-led services to the wider health care environment. To explore the most salient outcomes there should be engagement with all stakeholders to ensure future evaluations are comprehensive and balanced.

Implications

There is international consensus that evaluating healthcare outcomes is crucial to appraise the effectiveness of healthcare.122, 123 This internationally-derived outcomes framework offers a route to evaluate medication and disease therapy management services in varying primary care contexts throughout the world. Internationally, pharmacists are increasingly working within general practice. Within Scotland pharmacy-led services were introduced from 2015 onwards to strengthen primary
Similarly, within Australia pharmacists are being integrated into general practice as part of a new funding model, whereas in the Netherlands new clinical pharmacy training programs have been designed to prepare pharmacists for their emergent role within general practice. Ultimately the collection of outcomes can be used to inform evaluations of different pharmacy-led services within primary care in different regions and their associated benefits, to ultimately inform future evidence-based service delivery. This would enable changes in practice – for example, due to the COVID-19 pandemic – to be evidence-based and targeted to meet emergent needs of local populations. Application of this outcomes framework to future research studies and systematic reviews would also allow for comparisons across contexts to be made. Additionally, this outcomes framework could be applied in both academic and real-world contexts to direct the selection of the most pertinent outcomes to evaluate primary care pharmacy services.

The outcomes framework will also aide in the development of international standardised outcome measures within clinical primary care pharmacy. Moving towards a set of standardised measures is a goal for many healthcare contexts, and within this context it will overcome the heterogeneity associated with previous outcome evaluations which have hindered the ability to offer overall conclusions. As it has been acknowledged that a paucity of key conclusions on effectiveness may impede the adoption of primary care services, the development of a standardised outcomes framework could ultimately support and facilitate future service development. This review is the first step in this direction, and operationalising the outcomes framework will require further work to decipher optimal outcome measurement approaches, alongside identification of the best timeframe and frequency of capturing these outcomes. There is a global drive for outcome measurements to become a routine and ubiquitous part of health care delivery, therefore outcomes must be assessed outside of trial-based settings in routine, clinical practice. In real-world settings it is likely that the populations receiving pharmacy-led services will be heterogeneous, and recording patient characteristics (such as multi-morbidity, age and ethnicity) will be crucial to interpret the outcome results and understand which patients benefit most. IT solutions should therefore enable the routine extraction of key patient characteristics alongside outcome measures, ultimately ensuring the outcome measurement and interpretation is a routine part of service delivery.

**Strengths and limitations**

This review utilised a well-established and recognised model (ECHO) to conduct a content analysis of the outcomes, which was conducted alongside an analysis of service outcomes. This ensured that patient-focused and health service-focused outcomes were captured and enabled the validation of the ECHO model within primary care pharmacy practice. A strength of this review was the breadth of the search strategy: four databases were searched, and authors were repeatedly contacted to obtain non-accessible papers. The search terms were broad to ensure reviews exploring various pharmacy sectors were identified. Additionally, various synonyms for ‘primary care’ were used to identify international studies, ensuring the framework developed is of international relevance. A limitation was the lack of grey literature search conducted or screening of included reviews’ reference lists. Additionally, the review stages were not conducted fully independently by two researches; instead, 10% of each review stage was conducted independently and validated with good or excellent levels of agreement achieved. The search only focused on studies published within the last 10 years; however, this ensured focus on the most recent and progressive advancements in pharmacy practice. The focus of this umbrella review was on outcome measures, therefore we do not report
on experience measures such as patient satisfaction, acceptability and feasibility.\textsuperscript{128,129} Whilst this was not in the scope of this review, we do believe that comprehensive evaluations should consider both outcome and experience measures. Lastly, as this review focused on the outcomes associated with pharmacy-led services specifically, it is unknown if these outcomes are applicable for services with significant multi-disciplinary input from other professionals, such as medical and social care staff.

**Conclusion**

This review identified the clinical, service, humanistic and economic outcomes associated with pharmacy-led clinical services delivered in primary care settings. The proposed outcomes framework could enable standardisation of outcome measures, and will guide the selection and operationalisation of outcomes to evaluate pharmacy-led services for future studies. It is anticipated that this will be a living resource and should be continually updated to reflect the ever-changing primary care context and priorities. Stakeholder engagement will be crucial in the steps moving forward so that outcomes of importance to pharmacy staff, strategists and patients are routinely collected within existing infrastructures.

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Kingsley C, Patel S. Patient-reported outcome measures and patient-reported experience measures. *BJA Education.* 2017;17:137-144.

Articles identified from database searches (n = 8,007) → Duplicate articles removed (n = 1,333) ↓

Title / abstracts screened (n = 6,674) → Irrelevant (n = 6,358) Full-text not obtainable for screening (n = 22) ↓

Articles identified from database searches (n = 294) ↓

Articles identified from supplementary search (n = 15) → Full-text articles assessed for eligibility (n = 309) → Articles excluded (n = 285) [see Appendix 2 for reasons] ↓

Reviews included in umbrella review (n = 24)

Figure 1. PRISMA flow diagram of review selection process
Figure 2. Proposed outcomes framework for primary care pharmacy-led services

The Primary Care Pharmacy Outcomes Framework presents the clinical, humanistic, economic and service outcomes which can be used to evaluate primary care pharmacy-led services. It is posed that clinical and humanistic outcomes are patient-level outcomes, with service outcomes a health service level outcome. Economic outcomes could be considered at either a patient or health service level depending on local healthcare funding models.
Table 1. Outcome categories [as adapted from 9,31]

<table>
<thead>
<tr>
<th>Outcome categories</th>
<th>Operational definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic outcomes</td>
<td>The direct, indirect and intangible costs of health care.</td>
<td>Intervention costs; medical/pharmaceutical costs; total health care costs</td>
</tr>
<tr>
<td>Clinical outcomes</td>
<td>Clinical events that occur as a result of health care provision.</td>
<td>Incidence/rates of disease; mortality</td>
</tr>
<tr>
<td>Humanistic outcomes</td>
<td>The impact of healthcare on patient functioning, quality of life, and general health and wellbeing.</td>
<td>Medication adherence; quality of life</td>
</tr>
<tr>
<td>Services outcomes</td>
<td>The impact of healthcare on subsequent utilisation of health care services, including medication.</td>
<td>Hospital visits/admissions; number of medication; number of medication issues</td>
</tr>
</tbody>
</table>
Table 2. Medication therapy and disease management services

<table>
<thead>
<tr>
<th>Service type</th>
<th>Definition</th>
<th>N (%)</th>
<th>Reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medication review</strong></td>
<td>A review of patient’s medication involving patient/carer communication.</td>
<td>23</td>
<td>60-66, 71, 73, 76-78, 83, 84, 91-94, 98, 102-104, 107</td>
</tr>
<tr>
<td></td>
<td>- <em>with drug therapy adjustments / recommendations</em></td>
<td>12</td>
<td>63, 65, 66, 73, 76, 77, 84, 91, 92, 94, 102, 103</td>
</tr>
<tr>
<td></td>
<td>- <em>without drug therapy adjustments / recommendations</em></td>
<td>11</td>
<td>60-62, 64, 71, 78, 83, 93, 98, 104, 107</td>
</tr>
<tr>
<td>A review of patient’s medication with reference to patient medication records only.</td>
<td>1</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td><strong>Disease and therapy management</strong></td>
<td>Comprehensive management of complex patients and their condition with an emphasis greater than just medicines management. Usually targeted towards patients with a specific disease (e.g. hypertension).</td>
<td>17</td>
<td>67-70, 74, 75, 82, 85, 86, 88-90, 95, 96, 101, 105, 108</td>
</tr>
<tr>
<td><strong>Educational Service</strong></td>
<td>Services which solely focus on patient education about medication and/or diseases.</td>
<td>6</td>
<td>81, 97, 99, 100, 109, 110</td>
</tr>
<tr>
<td><strong>Medicines reconciliation</strong></td>
<td>Development of an accurate and up-to-date list of a patient's medicines through discussion with patient/carer following hospital discharge.</td>
<td>3</td>
<td>59, 72, 79</td>
</tr>
<tr>
<td><strong>Medication compliance support</strong></td>
<td>Services which solely explore patient compliance and provision of support.</td>
<td>1</td>
<td>106</td>
</tr>
</tbody>
</table>
### CLINICAL OUTCOMES (n=38)

#### 1. DISEASE INDICATORS (n=26, 68.4%)

**CARDIOVASCULAR SYSTEM**
- **Blood Pressure** [n=6] 73, 74, 86, 88, 91, 103
  - Systolic [n=17] 61, 66, 68, 69, 71, 73, 74, 76, 78, 86, 88, 91, 93, 94, 97, 103, 109
  - Diastolic [n=16] 61, 66, 69, 71, 73-75, 78, 86, 88, 91, 93, 94, 97, 103, 109
  - Control [n=3] 66, 88, 110
- **Change in Blood Pressure** [n=4] 74, 85, 88, 91
  - Systolic Change [n=1] 86
  - Diastolic Change [n=1] 86
- **Lipid profile** [n=1] 91
  - Low-Density Lipoprotein [n=8] 61, 69, 75, 91, 93, 97, 103, 107
  - High-Density Lipoprotein [n=7] 61, 69, 91, 93, 97, 103, 107
  - Total Cholesterol [n=7] 61, 69, 91, 93, 97, 103, 107
  - Triglycerides [n=7] 61, 69, 91, 93, 97, 103, 107
  - Differences in lipid values [n=1] 105
  - Differences in triglycerides values [n=1] 105

**ENDOCRINE SYSTEM**
- **Hba1c** [n=9] 61, 69, 75, 77, 81, 95, 96, 101
  - Changes in HbA1c [n=2] 77, 101
- **Glycaemic control** [n=1] 90
  - Fasting Blood Glucose [n=5] 87, 91, 93, 94, 97

**NERVOUS SYSTEM**
- **Loss of consciousness** [n=1] 88
- **Fainting** [n=1] 88

#### 2. ACHIEVING MONITORING TARGETS (n=16, 42.1%)

**CARDIO- VASCULAR SYSTEM**
- Blood pressure [n=5] 74, 75, 85, 86, 88
- Hypertension [n=4] 66, 74, 85, 86
- Low-Density Lipoprotein [n=3] 75, 96, 107
- Dyslipidaemia [n=1] 105

**ENDOCRINE SYSTEM**
- Diabetes [n=7] 67, 75, 77, 81, 95, 96, 101
- HbA1c [n=2] 75, 108

**RENAL SYSTEM**
- Chronic Kidney Disease [n=1] 68

#### 3. DISEASE PRESENTATION (n=6, 15.8%)

**CARDIOVASCULAR SYSTEM**
- Hypertension [n=2] 81, 88

**ENDOCRINE SYSTEM**
- Diabetes Health Outcomes [n=1] 104
- Metabolic Syndrome Status [n=1] 71

**NERVOUS SYSTEM**
- **Pain**
  - Severity [n=1] 63
  - Chronic Pain Intensity [n=1] 63
- **Anxiety** [n=2] 63, 100
- **Depression** [n=1] 63
  - Clinical Severity [n=1] 100

**RESPIRATORY SYSTEM**

---

Table 3. Full presentation of clinical, humanistic, service and economic outcomes
4. DISEASE RISK (n=6, 15.8%)

**CARDIOVASCULAR SYSTEM**
- **Cardiovascular Risk** [n=3] 69, 82, 93
  - Coronary Heart Disease Risk [n=2] 97, 103
  - 10-Year Cardiovascular Risk Reduction [n=1] 69
  - Predicted 10-year risk of Cardiovascular Disease events [n=1] 82
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**ENDOCRINE SYSTEM**
- **Diabetes risk** [n=1] 103

5. MORTALITY (n=4, 10.5%)

- **Mortality rate** [n=3] 65, 67, 68
- **Death**
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6. PHYSICAL CHARACTERISTICS (n=3, 7.9%)

- **Body Mass Index** [n=2] 91, 93
- **Body Weight** [n=2] 97
- **Waist Circumference** [n=2] 93, 97

**SERVICE OUTCOMES** (n=37)

7. MEDICATION OPTIMISATION (n=30, 81.1%)

**MEDICATION CHANGES**
- **Medication Additions** [n=2] 66, 86
  - Antihypertensives [n=1] 86
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  - Blood pressure medication [n=1] 73
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- **Discontinuation**
  - Chronic opioid therapy [n=1] 76
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  - Inclusion of discontinued medication [n=1] 79
- Omissions [n=1] 79
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**MEDICATION USE**
- **Medication Use** [n=12] 67, 68, 75, 77, 78, 85, 86, 88, 91, 95, 96, 101, 105
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  - Anti-platelets [n=1] 70
  - Medication classes [n=1] 88
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  - Delaying a fill [n=1] 76
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- Medication-Related Problems [n=5] 59, 74, 83, 91, 93
  - Drug-drug interactions [n=1] 79
  - Potentially harmful medication discrepancies [n=1] 79
- Resolved medication related problems [n=1] 99

APPROPRIATENESS OF MEDICATIONS
- Medication Appropriateness [n=5] 60, 62, 64, 65, 98

8. HEALTH-CARE UTILISATION (n=15, 40.5%)
  HOSPITAL VISITS
  - Hospitalisations [n=7] 65, 73, 83, 84, 86, 88, 90, 102, 106
    - Urgent care/emergency room department visits [n=4] 86, 88, 90, 102
    - Pain-related [n=1] 92
    - Heart Failure-related [n=1] 84
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    - Emergency department attendance at 30 days [n=1] 72
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<td><strong>13. HEALTH STATUS</strong></td>
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<td>• General health and functioning [n=1] 63</td>
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<td>• Health status [n=1] 63</td>
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<td><strong>14. SELF EFFICACY</strong></td>
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<td>o for Blood Pressure measuring [n=1] 88</td>
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<td>o for monitoring home Blood Pressure tele-monitoring [n=1] 89</td>
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<td>*<em>15. LIFESTYLE</em> (n=1, 4.3%)</td>
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<td><strong>16. HEALTHCARE COSTS</strong> (n=11, 84.6%)</td>
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<td>o Per Patient Per Year [n=2] 90, 103</td>
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* Lifestyle-related outcomes emerged from the data even though this umbrella review did not seek to explore studies which focused on health promotion activities.
### Appendix 1: Search strategy

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**Combining the search**

- Health setting terms AND pharmacy setting terms
- Limited to English language and "review articles"
- Limit it to ‘Cochrane reviews’

- Health setting terms AND pharmacy setting terms
- Limited to English language and "review articles"
- Systematic reviews, literature reviews and meta-analysis
Appendix 2: Reasons for excluding articles during full-text screening

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<tr>
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<tr>
<td>Unable to solely extract data of relevance to current review’s aim</td>
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### Appendix 3: Characteristics of included reviews (n=24)

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<th>Bibliographic and trial databases searched</th>
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<th>Supplementary search?</th>
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<th>No of eligible studies (total studies)</th>
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<tr>
<td>Alshehri (2019)</td>
<td>This review, therefore, aims to assess the impact of pharmacists’ interventions focusing on the medical risk factors for the primary prevention of cardiovascular events in general practice by limiting the analysis to RCTs and by standardising the type of interventions used by pharmacists.</td>
<td>PubMed; MEDLINE; EMBASE; PsycINFO; Cochrane Library; CINAHL Plus; SCOPUS; Science Citation Index Expanded (WoS Core Collection)</td>
<td>NR</td>
<td>Yes</td>
<td>NR</td>
<td>12 (21)</td>
</tr>
<tr>
<td>Anthony (2019)</td>
<td>The aims of this systematic review were to review economic evaluations of nurses, pharmacists, and other allied health professionals working in primary care as substitutes for some of the tasks performed by GPs.</td>
<td>MEDLINE; CINAHL; NICE; CRD database.</td>
<td>NR</td>
<td>Yes</td>
<td>2017</td>
<td>1 (6)</td>
</tr>
<tr>
<td>Babar (2018)</td>
<td>The objective of this systematic review was to examine the effects of pharmaceutical care using patient outcomes (i.e. clinical and surrogate outcomes) in both the hospital and community setting.</td>
<td>MEDLINE; IPA; EMBASE.</td>
<td>NR</td>
<td>Yes</td>
<td>NR</td>
<td>2 (54)</td>
</tr>
<tr>
<td>Bridgewood (2018)</td>
<td>To assess the effects of stroke service interventions for implementing secondary stroke prevention strategies on modifiable risk factor control, including patient adherence to prescribed medications, and the occurrence of secondary cardiovascular events.</td>
<td>Cochrane Stroke Group Trials Register; EPOC Trials Register; CENTRAL; MEDLINE; EMBASE; CINAHL; AMED; BNI; WoS; BiblioMap; US National Institutes of Health Ongoing Trials Register; ClinicalTrials.gov; ISRCTN Registry; Stroke Trials Registry; WHO International Clinical Trials Registry</td>
<td>Yes</td>
<td>Yes</td>
<td>2017 (updated from 2014)</td>
<td>2 (42)</td>
</tr>
<tr>
<td>Brown (2019)</td>
<td>To examine the effects of pharmacy-based management interventions compared with active control, waiting list, or treatment as usual at improving depression outcomes in adults.</td>
<td>CCMD-CTR; CENTRAL, MEDLINE; EMBASE; PsycINFO (1967 onwards), ClinicalTrials.gov; ICTRIP</td>
<td>Yes</td>
<td>Yes</td>
<td>NR</td>
<td>1 (12)</td>
</tr>
<tr>
<td>Review</td>
<td>Review aim / objective (verbatim)</td>
<td>Bibliographic and trial databases searched</td>
<td>Grey literature search?</td>
<td>Supplemental search?</td>
<td>Search year</td>
<td>No of eligible studies (total studies)</td>
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<tr>
<td>Chin (2011) 40</td>
<td>Its aim was to provide the background for developing an evaluation strategy to assess the quality of care provided by the Nurse and Allied Health Clinic programmes offered by the Hospital Authority. Its specific focus was to identify the factors determining quality of care for nurse-led and allied health personnel-led clinics on six programmes developed by the Hospital Authority. These programmes addressed fall prevention, continence care, pulmonary rehabilitation, mental wellness, medication compliance, and wound care.</td>
<td>MEDLINE; Cochrane Database; RAND</td>
<td>Yes</td>
<td>NR</td>
<td>NR</td>
<td>2 (54)</td>
</tr>
<tr>
<td>Dawoud (2019) 41</td>
<td>This systematic review was undertaken to identify and assess the quality and applicability of the published economic evaluations of enhanced services provided by community-based pharmacists.</td>
<td>NHSEED; HTA; Health Economic Evaluations Database; MEDLINE; EMBASE</td>
<td>NR</td>
<td>NR</td>
<td>2018, updated from 2016</td>
<td>1 (13)</td>
</tr>
<tr>
<td>de Barra (2018) 42</td>
<td>To examine the effect of pharmacists’ non-dispensing services on non-hospitalised patient outcomes.</td>
<td>CENTRAL; DARE; HTA; NHSEED; MEDLINE; EMBASE; CINAHL; (ICTRP); ClinicalTrials.gov.</td>
<td>Yes</td>
<td>Yes</td>
<td>NR</td>
<td>9 (116)</td>
</tr>
<tr>
<td>Greer (2015) 43</td>
<td>What are the effectiveness and harms of pharmacist-led chronic disease management compared to usual care?</td>
<td>MEDLINE; CINAHL; the Cochrane Library; IPA</td>
<td>NR</td>
<td>Yes</td>
<td>NR</td>
<td>16 (70)</td>
</tr>
<tr>
<td>Hazen (2018) 44</td>
<td>This study investigates how the degree of integration of a non-dispensing pharmacist impacts medication related health outcomes in primary care.</td>
<td>PubMed; EMBASE.</td>
<td>NR</td>
<td>Yes</td>
<td>NR</td>
<td>10 (60)</td>
</tr>
<tr>
<td>Kee (2018) 45</td>
<td>This review article aims to examine the existing evidence on interventions to reduce medication discrepancies or errors in primary or ambulatory care setting during care transition from hospital to primary care.</td>
<td>PubMed; EMBASE.</td>
<td>NR</td>
<td>Yes</td>
<td>2017</td>
<td>1 (6)</td>
</tr>
<tr>
<td>Review</td>
<td>Review aim / objective (verbatim)</td>
<td>Bibliographic and trial databases searched</td>
<td>Grey literature search?</td>
<td>Supplementary search?</td>
<td>Search year</td>
<td>No of eligible studies (total studies)</td>
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<tr>
<td>Khalil (2017)</td>
<td>To determine the effectiveness of professional, organisational and structural interventions compared to standard care to reduce preventable medication errors by primary healthcare professionals that lead to hospital admissions, emergency department visits, and mortality in adults.</td>
<td>CENTRAL; MEDLINE; Embase; HTA; NHSEED; CINAHL; ICTRIP; ClinicalTrials.gov</td>
<td>Yes</td>
<td>Yes</td>
<td>2015</td>
<td>2 (30)</td>
</tr>
<tr>
<td>Lehnbom (2014)</td>
<td>The aim of this review was to evaluate how effective medication reconciliation and medication review are in identifying and rectifying harmful discrepancies and medication-related problems across a broad range of settings (hospitals, RACFs, and the community) and to assess their impact on clinical outcomes, such as length of stay, readmissions, and mortality.</td>
<td>MEDLINE; PsycINFO; CINAHL; EMBASE; The Cochrane Library</td>
<td>NR</td>
<td>Yes</td>
<td>NR</td>
<td>1 (83)</td>
</tr>
<tr>
<td>Loh (2016)</td>
<td>Aims to provide a timely evaluation of the evidence base for pharmacist-provided medication review in the elderly compared with usual care. Where possible, a meta-analysis of the relevant outcomes will be conducted to gain insight into the intervention’s benefits by pooling the results of the included studies. This review also aims to provide methodological recommendations for future studies that seek to evaluate the outcomes of medication review.</td>
<td>MEDLINE; EMBASE; CINAHL; WoS; Cochrane library</td>
<td>NR</td>
<td>Yes</td>
<td>NR</td>
<td>1 (25)</td>
</tr>
<tr>
<td>Review</td>
<td>Review aim / objective (verbatim)</td>
<td>Bibliographic and trial databases searched</td>
<td>Grey literature search?</td>
<td>Supplementary search?</td>
<td>Search year</td>
<td>No of eligible studies (total studies)</td>
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<tr>
<td>McNab (2018) 49</td>
<td>We aimed to focus, in depth, on medication reconciliation performed by community and primary care pharmacists after hospital discharge, by systematically reviewing published studies that compared this process with usual care. The aim was to determine the effectiveness of this intervention on overall discrepancy identification and resolution, the clinical relevance of resolved discrepancies and healthcare utilisation in terms of readmission rates, emergency department attendance and primary care workload.</td>
<td>MEDLINE; CINAHL; EMBASE; AMED; ERIC; NHS Evidence; Cochrane electronic databases; Scopus</td>
<td>NR</td>
<td>Yes</td>
<td>2017</td>
<td>1 (14)</td>
</tr>
<tr>
<td>Perrot (2019) 50</td>
<td>The main objective of this review was to analyse the state-of-the art of pharmacists' role in pain management self-medication.</td>
<td>PubMed; EMBASE.</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>1 (20)</td>
</tr>
<tr>
<td>Pousinho (2016) 51</td>
<td>The purpose of this systematic review is to give a global and comprehensive review of the effectiveness of pharmacist interventions in the management of type 2 diabetes specifically, focusing on clinical, humanistic, and economic outcomes and including only the most robust studies, that is, randomized controlled trials, without putting restrictions on the type of pharmacist interventions.</td>
<td>CENTRAL; PubMed; WoS.</td>
<td>NR</td>
<td>NR</td>
<td>2015</td>
<td>3 (36)</td>
</tr>
<tr>
<td>Rankin (2018) 52</td>
<td>To determine which interventions, alone or in combination, are effective in improving the appropriate use of polypharmacy and reducing medication-related problems in older people.</td>
<td>CENTRAL; MEDLINE; EMBASE; CINAHL; HTA; NHSEED.</td>
<td>NR</td>
<td>Yes</td>
<td>2018</td>
<td>1 (32)</td>
</tr>
<tr>
<td>Review</td>
<td>Review aim / objective (verbatim)</td>
<td>Bibliographic and trial databases searched</td>
<td>Grey literature search?</td>
<td>Supple-mentary search?</td>
<td>Search year</td>
<td>No of eligible studies (total studies)</td>
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<tr>
<td>Riordan (2016)</td>
<td>Therefore, the aim of this review is to evaluate studies of pharmacist-led interventions on medication prescribing among community-dwelling older adults receiving primary care to identify the components of a successful intervention.</td>
<td>PubMed, EMBASE, CINAHL, MEDLINE; TRIP; CRD Databases; CDSR; WoS, Science Direct; clinicaltrials.gov; mRCT</td>
<td>Yes</td>
<td>Yes</td>
<td>2015</td>
<td>2 (5)</td>
</tr>
<tr>
<td>Santschi (2014)</td>
<td>Therefore, we combined and updated BP data from these 2 previous systematic reviews to assess the effect of pharmacist interventions on BP among outpatients and to identify determinants of heterogeneity.</td>
<td>PubMed; EMBASE; CINAHL; CENTRAL</td>
<td>No</td>
<td>NR</td>
<td>2013</td>
<td>1 (39)</td>
</tr>
<tr>
<td>Tan (2014)</td>
<td>The aim of the current systematic review was to evaluate the role of pharmacists co-located with GPs and other health professionals within primary care general practice clinics (e.g. family practice clinics, community health centers or primary health care centers).</td>
<td>CENTRAL; MEDLINE; EMBASE; IPA.</td>
<td>No</td>
<td>Yes</td>
<td>2013</td>
<td>13 (38)</td>
</tr>
<tr>
<td>Tecklenborg (2020)</td>
<td>This systematic review examines interventions to reduce the incidence of ADE-associated health outcomes, including hospitalisation, mortality, quality of life (QoL), mental health and physical functioning in older adults in primary care settings.</td>
<td>MEDLINE; EMBASE; WoS; CINAH; CENTRAL; ClinicalTrials.gov</td>
<td>NR</td>
<td>Yes</td>
<td>NR</td>
<td>1 (7)</td>
</tr>
<tr>
<td>Wagner (2019)</td>
<td>Thus, the aim of this review is to discuss recent RCTs that support the expanding role of pharmacists in hypertension management and provide general guidance on collaborating with pharmacists.</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>1 (5)</td>
</tr>
<tr>
<td>Review</td>
<td>Review aim / objective (verbatim)</td>
<td>Bibliographic and trial databases searched</td>
<td>Grey literature search?</td>
<td>Supple-mentary search?</td>
<td>Search year</td>
<td>No of eligible studies (total studies)</td>
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<tr>
<td>Weeks (2016)</td>
<td>We systematically identified, reviewed, and updated the evidence from controlled studies and uncontrolled studies on the clinical, patient-reported and resource use outcomes of non-medical prescribing in primary and secondary care settings. This review considered any adverse effects of nonmedical prescribing which may be clinical (e.g. deterioration in care or incidence of adverse drugs reactions), patient-reported (e.g. decreased satisfaction), or resource-related (e.g. increased treatment costs).</td>
<td>CENTRAL; EPOC; Cochrane Methodology Register; CDSR; DARE; HTA, NHSEED; MEDLINE; EMBASE PsycINFO; CINAHL; ICTPR; ClinicalTrials.gov</td>
<td>Yes</td>
<td>Yes</td>
<td>2016</td>
<td>3 (46)</td>
</tr>
</tbody>
</table>

*Grey literature was considered as reports; dissertations/theses; searching of grey literature / conference abstract databases; and sourcing unpublished data by contacting authors/institutions.*

ADEs = adverse drug events; AMED = Allied and Complementary Medicine Database; BNI = British Nursing Index; BP = blood pressure; CCMD-CTR = Cochrane Common Mental Disorders Controlled Trials Register; CDSR = Cochrane Database of Systematic Reviews; CENTRAL = Cochrane Central Register of Controlled Trials; CINAHL = Cumulative Index to Nursing and Allied Health Literature; CRD = Centre for Reviews and Dissemination; DARE = Database of Abstracts and Reviews of Effects; EPOC = Effective Practice and Organisation of Care Register; ERIC = Education Resources Information Center; GPs = general practitioners; HTA = Health Technology Assessment Database; ICTRP = International Clinical Trials Registry Platform; IPA = International Pharmaceutical Abstracts; ISRCTN Registry = International Standard Randomised Controlled Trial Number Registry; mRCT = metaRegister of controlled trials; NHSEED = NHS Economic Evaluation Database; NICE = National Institute for Health and Care Excellence; NR = not reported; RACF = residential aged care facilities; RAND = Research and Development Corporation Health Database; RCT = randomised controlled trial; TRIP = Turning Research into Practice; WHO = World Health Organisation; WoS = Web of Science
### Appendix 4: Characteristics of eligible studies (n=52) identified from the reviews

<table>
<thead>
<tr>
<th>Study; [Citing review(s)]</th>
<th>Primary care setting</th>
<th>Country (Region)</th>
<th>Additional tasks</th>
<th>Clinical system (Specific therapeutic area)</th>
<th>Mode of service delivery</th>
<th>Patient eligibility criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MEDICINES RECONCILIATION</strong></td>
<td></td>
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</tr>
<tr>
<td>Armor, 2016 59</td>
<td>Family medicine centre</td>
<td>USA (Oklahoma)</td>
<td>NR (NR)</td>
<td>Face-to-face</td>
<td>&gt;18 years; non-pregnant; discharged from hospital to family medicine centre</td>
<td></td>
</tr>
<tr>
<td>Hawes, 2014 72</td>
<td>Primary care clinics</td>
<td>USA</td>
<td>Communication with other HCPs</td>
<td>Face-to-face</td>
<td>Discharged from hospital and either: long-term condition, more than 3 admissions, ≥8 medications</td>
<td></td>
</tr>
<tr>
<td>Kilcup, 2013 79</td>
<td>Community setting</td>
<td>NR</td>
<td>Communication with other HCPs</td>
<td>Telephone</td>
<td>Patients discharged from hospital</td>
<td></td>
</tr>
<tr>
<td><strong>MEDICATION REVIEW – WITH RECORDS ONLY</strong></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Kirwin, 2010 80</td>
<td>General practice clinics</td>
<td>USA</td>
<td>Communication with other HCPs</td>
<td>Endocrine system (Diabetes mellitus – type 1 or 2)</td>
<td>Review of records</td>
<td>≥18 years</td>
</tr>
<tr>
<td><strong>MEDICATION REVIEW - WITH PATIENT/CARER COMMUNICATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Tahaineh, 2011 107</td>
<td>Primary care practice / General practice clinics</td>
<td>Jordan</td>
<td>Education/counselling; Lifestyle assessment/advice; Adherence assessment; Communication with other HCPs</td>
<td>Cardiovascular system (Dyslipidaemia)</td>
<td>Face-to-face</td>
<td>≥18 years</td>
</tr>
<tr>
<td>Jamieson, 2010 78</td>
<td>General practice clinics</td>
<td>UK</td>
<td>Education/counselling; Adherence assessment; Lifestyle assessment/advice; Monitoring; Communication with other HCPs</td>
<td>Cardiovascular system (Hypertension)</td>
<td>Face-to-face</td>
<td>Adults; blood pressure &gt;140/85; on treatment</td>
</tr>
<tr>
<td>Obreli-Neto, 2011 93</td>
<td>Primary public health care unit / General Practice clinics</td>
<td>Brazil</td>
<td>Education/Counselling; Adherence assessment; Lifestyle assessment/advice; Communicating with other HCPs</td>
<td>Cardiovascular system (Hypertension) + Endocrine system (Diabetes)</td>
<td>Face-to-face</td>
<td>≥60 years; with diabetes and/or hypertension diagnosis and on therapy</td>
</tr>
<tr>
<td>Study; [Citing review(s)]</td>
<td>Primary care setting</td>
<td>Country (Region)</td>
<td>Additional tasks</td>
<td>Clinical system (Specific therapeutic area)</td>
<td>Mode of service delivery</td>
<td>Patient eligibility criteria</td>
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<tr>
<td><strong>Hammad, 2011</strong></td>
<td>General practice clinics / Primary care practice</td>
<td>Jordan</td>
<td>Education/Counselling; Adherence assessment; Lifestyle assessment/advice; Monitoring; Communication with other HCPs</td>
<td>Endocrine system (Metabolic syndrome)</td>
<td>Face-to-face</td>
<td>NR</td>
</tr>
<tr>
<td><strong>Ayadurai, 2018</strong></td>
<td>Primary care clinics</td>
<td>Malaysia</td>
<td>Education/Counselling; Adherence assessment; Lifestyle assessment/advice; Physical assessment</td>
<td>Endocrine system (Diabetes – type 2)</td>
<td>NR</td>
<td>&gt;18 years</td>
</tr>
<tr>
<td><strong>Skinner, 2015</strong></td>
<td>Community health clinic</td>
<td>NR</td>
<td>Education/Counselling; Lifestyle assessment/advice</td>
<td>Endocrine system (Diabetes – type 2)</td>
<td>NR</td>
<td>≥18 years; uncontrolled diabetes: ≥1 documented HbA1c&gt;7%, a risk factor for disease-related microvascular complications</td>
</tr>
<tr>
<td><strong>Avery, 2012</strong></td>
<td>General practice</td>
<td>UK</td>
<td>Education/Counselling; Monitoring; Communication with other HCPs</td>
<td>NR (NR)</td>
<td>Face-to-face</td>
<td>Any general practice patients</td>
</tr>
<tr>
<td><strong>Bryant, 2011</strong></td>
<td>General practice</td>
<td>New Zealand</td>
<td>Education/Counselling; Communication with other HCPs</td>
<td>NR (NR)</td>
<td>NR</td>
<td>≥65 years; community dwelling Exclusions: nursing home populations</td>
</tr>
<tr>
<td><strong>Lenander, 2014</strong></td>
<td>Primary care centres</td>
<td>Sweden (Stockholm)</td>
<td>NR (NR)</td>
<td>NR</td>
<td>Patients with drug-related problems</td>
<td></td>
</tr>
<tr>
<td><strong>Richmond, 2010</strong></td>
<td>General practices</td>
<td>UK (England)</td>
<td>Adherence assessment; Communication with other HCPs</td>
<td>NR (NR)</td>
<td>NR</td>
<td>≥75 years; community dwelling (nursing home populations excluded)</td>
</tr>
<tr>
<td><strong>Bojke, 2010</strong></td>
<td>General practice</td>
<td>NR</td>
<td>NR (NR)</td>
<td>NR</td>
<td>≥75 years</td>
<td></td>
</tr>
<tr>
<td>Study; [Citing review(s)]</td>
<td>Primary care setting</td>
<td>Country (Region)</td>
<td>Additional tasks</td>
<td>Clinical system (Specific therapeutic area)</td>
<td>Mode of service delivery</td>
<td>Patient eligibility criteria</td>
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<td><strong>MEDICATION COMPLIANCE SUPPORT</strong></td>
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<tr>
<td>Spence, 2014 [cited by: 43]</td>
<td>Outpatient pharmacy clinical service</td>
<td>NR</td>
<td>Referral</td>
<td>Cardiovascular system (Dyslipidaemia) + Endocrine system (Diabetes)</td>
<td>Face-to-face</td>
<td>age ≥18; non-adherent diabetes mellitus or CAD patients with HbA1c or LDL-C outside clinical goals</td>
</tr>
<tr>
<td><strong>MEDICATION REVIEW - WITH PATIENT/CARER COMMUNICATION AND DRUG THERAPY ADJUSTMENTS</strong></td>
<td></td>
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<tr>
<td>Lowrie, 2012 [cited by: 46, 55]</td>
<td>General practices</td>
<td>UK</td>
<td>Communication with other HCPs; Prescribing/Adjusting therapy</td>
<td>Cardiovascular system (Left ventricular systolic dysfunction)</td>
<td>NR</td>
<td>≥18 years</td>
</tr>
<tr>
<td>Heisler, 2012 [cited by: 35, 44, 55]</td>
<td>Outpatient primary care clinics / Primary care practice / General practice clinics</td>
<td>USA</td>
<td>Education/Counselling; Adherence assessment; Physical assessment; Monitoring; Prescribing/Adjusting therapy</td>
<td>Cardiovascular system (Hypertension) + Endocrine system (Diabetes mellitus)</td>
<td>NR</td>
<td>≥18 years</td>
</tr>
<tr>
<td>Obreli-Neto, 2015 [cited by: 35, 42, 48]</td>
<td>Primary health care unit</td>
<td>Brazil (Salto Grande, Sao Paulo state)</td>
<td>Adherence assessment; Recommendations; Lifestyle assessment/advice; Education/Counselling</td>
<td>Cardiovascular system (Hypertension) + Endocrine system (Diabetes)</td>
<td>NR</td>
<td>≥60 years; community dwelling</td>
</tr>
<tr>
<td>Study; [Citing review(s)]</td>
<td>Primary care setting</td>
<td>Country (Region)</td>
<td>Additional tasks</td>
<td>Clinical system (Specific therapeutic area)</td>
<td>Mode of service delivery</td>
<td>Patient eligibility criteria</td>
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<tr>
<td>Obreli-Neto, 2015 94 [cited by: 35, 42, 48]</td>
<td>Primary health care unit</td>
<td>Brazil (Salto Grande, Sao Paulo state)</td>
<td>Adherence assessment; Recommendations; Lifestyle assessment/advice; Education/Counselling</td>
<td>Cardiovascular system (Hypertension) + Endocrine system (Diabetes)</td>
<td>NR</td>
<td>≥60 years; community dwelling</td>
</tr>
<tr>
<td>Simpson, 2011 103 [cited by: 35, 42, 51, 55]</td>
<td>Primary care clinics / General practice clinics</td>
<td>Canada (Edmonton)</td>
<td>Physical assessment; Recommendations; Communication with other HCPs</td>
<td>Endocrine system (Diabetes – type 2)</td>
<td>Face-to-face</td>
<td>≥18 years</td>
</tr>
<tr>
<td>Mourao, 2013 91 [cited by: 35, 37, 44, 51, 54, 55]</td>
<td>Primary health care units / Primary care practice / General practice clinics</td>
<td>Brazil</td>
<td>Education/Counselling; Lifestyle assessment/advice; Care planning; Recommendations; Communication with other HCPs</td>
<td>Endocrine system (Diabetes – type 2, uncontrolled)</td>
<td>Face-to-face</td>
<td>≥18 years; HbA1c ≥7%; post-prandial capillary glucose ≥ 180 mg/dL; taking oral antidiabetic medications for at least 6 months before beginning the study;</td>
</tr>
<tr>
<td>Jameson, 2010 77 [cited by: 43, 44, 55]</td>
<td>Community based primary care group / Primary care practice / General practice clinics</td>
<td>USA</td>
<td>Adherence assessment; Education/counselling; Prescribing/adjusting therapy</td>
<td>Endocrine system (Diabetes)</td>
<td>Face-to-face; Telephone</td>
<td>≥18 years; HbA1c ≥9% Exclusions: being seen by an endocrinologist; not expected to live for duration of study</td>
</tr>
<tr>
<td>Simpson, 2015 102 [cited by: 35, 41]</td>
<td>General Practice surgery / Primary care clinic</td>
<td>Canada</td>
<td>Physical assessment; Lifestyle advice; Recommendations</td>
<td>Endocrine system (Diabetes – type 2)</td>
<td>NR</td>
<td>≥18 years</td>
</tr>
<tr>
<td>Study; [Citing review(s)]</td>
<td>Primary care setting</td>
<td>Country (Region)</td>
<td>Additional tasks</td>
<td>Clinical system (Specific therapeutic area)</td>
<td>Mode of service delivery</td>
<td>Patient eligibility criteria</td>
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<tr>
<td>Carter, 2015 [66] [cited by: 43, 57]</td>
<td>Primary care medical offices</td>
<td>USA</td>
<td>Recommendations; Education/Counselling; Adherence assessment; Care planning; Communication with other HCPs</td>
<td>Cardiovascular system (Hypertension – uncontrolled) + Endocrine system (Diabetes mellitus) + Renal system (Chronic Kidney Disease)</td>
<td>Face-to-face; Telephone</td>
<td>&gt;18 years; diverse ethnic and racial backgrounds; Exclusions: acute angina; stroke, renal failure; systolic &gt;200mmHg or diastolic &gt;114mmHg; history of MI, stroke, or angina (past 6 months); systolic dysfunction (LVEF &lt;35%); GFR &lt;20mL/min, cirrhosis; hepatitis B or C infection; laboratory abnormality in past 6 months; pregnancy; pulmonary hypertension; untreated sleep apnoea; life expectancy &lt;2 years; residence in nursing home; dementia; inability to give consent; impaired cognitive function</td>
</tr>
<tr>
<td>Jacobs, 2016 [76] [cited by: 50]</td>
<td>Primary care clinic</td>
<td>NR</td>
<td>Recommendations; Monitoring; Referral</td>
<td>Nervous system (Chronic non-malignant pain)</td>
<td>NR</td>
<td>Adults</td>
</tr>
<tr>
<td>Neilson, 2015 [52] [cited by: 36, 41]</td>
<td>General practice</td>
<td>UK</td>
<td>Prescribing/Adjusting therapy; Communication with other HCPs</td>
<td>Nervous system (Chronic pain)</td>
<td>Face-to-face</td>
<td>≥ 18 years; living in their own home; receiving medication for pain</td>
</tr>
<tr>
<td>Study; [Citing review(s)]</td>
<td>Primary care setting</td>
<td>Country (Region)</td>
<td>Additional tasks</td>
<td>Clinical system (Specific therapeutic area)</td>
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<td>Patient eligibility criteria</td>
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<tr>
<td><strong>MEDICATION REVIEW - WITH PATIENT/CARER COMMUNICATION AND DRUG THERAPY ADJUSTMENTS (cont.)</strong></td>
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<tr>
<td>Bruhn, 2013 63 [cited by: 42, 58]</td>
<td>General practice</td>
<td>UK (Grampian; East Anglia)</td>
<td>Prescribing/Adjusting therapy; Care planning; Lifestyle assessment/advice</td>
<td>Nervous system (Chronic pain)</td>
<td>Face-to-face</td>
<td>&gt;18 years; living in their own house; having received 2 or more acute prescriptions and/or one repeat prescription in the last 120 days for an analgesic and/or a non-steroidal anti-inflammatory drug</td>
</tr>
<tr>
<td>Campins, 2017 65 [cited by: 46, 52, 56]</td>
<td>Primary Health Care Centres</td>
<td>Spain (Mataró and Argentona)</td>
<td>Recommendations; Communication with other HCPs</td>
<td>NR (NR)</td>
<td>Face-to-face</td>
<td>≥70 years; community dwelling; polypharmacy (8 or more drugs)</td>
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<tr>
<td><strong>DISEASE AND THERAPY MANAGEMENT</strong></td>
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<tr>
<td>Evans, 2010 69 [cited by: 38, 44, 55]</td>
<td>Primary care medical clinic / Primary care practice / General practice clinic</td>
<td>Canada</td>
<td>Medication review; Risk assessment; Education/Counselling; Monitoring; Adherence assessment; Communication with other HCPs</td>
<td>Cardiovascular system (Cardiovascular disease)</td>
<td>Face-to-face; Telephone; Mailed letters</td>
<td>Framingham risk score ≥15% or coronary artery disease risk equivalent (coronary artery disease, peripheral artery disease, cerebrovascular disease, and diabetes mellitus). Exclusion: severe psychiatric conditions or dementia symptomatic heart failure; terminal illness.</td>
</tr>
<tr>
<td>Taveira, 2014 108 [cited by: 42]</td>
<td>Primary care clinic</td>
<td>USA</td>
<td>Education/counselling; Behavioural intervention; Risk assessment; Goal setting; Adherence assessment; Monitoring</td>
<td>Cardiovascular system (Cardiovascular disease)</td>
<td>Face-to-face</td>
<td>Patients at cardiovascular disease risk</td>
</tr>
<tr>
<td>Study; [Citing review(s)]</td>
<td>Primary care setting</td>
<td>Country (Region)</td>
<td>Additional tasks</td>
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<tr>
<td><strong>DISEASE AND THERAPY MANAGEMENT (cont.)</strong></td>
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<tr>
<td><strong>Hirsch, 2014</strong>&lt;sup&gt;74&lt;/sup&gt; [cited by: 42-44]</td>
<td>Primary care clinic / General internal medicine clinic / Primary care practice</td>
<td>USA (California)</td>
<td>Medication review; Education/counselling; Adherence assessment; Review of behaviour; Review of goals; Prescribing/Adjustment of therapy; Order tests and follow up on</td>
<td>Cardiovascular system (Hypertension – uncontrolled)</td>
<td>Face-to-face</td>
<td>≥18 years; continuous active status with the clinic (defined as having a record of at least 1 visit in the 6 months before); diagnosis of HTN with most recent BP measurement ≥140/≥90 mm Hg (≥130/≥80 mm Hg for DM); current treatment with ≥1 anti-HTN medication</td>
</tr>
<tr>
<td><strong>Magid, 2011</strong>&lt;sup&gt;55&lt;/sup&gt; [cited by: 43]</td>
<td>Health Maintenance Organisation based primary care clinic</td>
<td>NR</td>
<td>Management of disease; Education/Counselling; Monitoring; Adherence assessment; Prescribe/adjustment to therapy; Communication with other HCPs</td>
<td>Cardiovascular system (Hypertension)</td>
<td>NR</td>
<td>Taking ≤4 anti-HTN medicines; elevations in 2 of 3 most recent electronic BP measurements (&gt;140/&gt;90 mm Hg; for patients with DM/CKD, &gt;130/80 mm Hg</td>
</tr>
<tr>
<td><strong>Padiyara, 2011</strong>&lt;sup&gt;95&lt;/sup&gt; [cited by: 43]</td>
<td>Primary care clinic</td>
<td>NR</td>
<td>Education/counselling; Medication review; Prescribing/adjusting therapy; Order tests and follow up on</td>
<td>Endocrine system (Diabetes mellitus)</td>
<td>Face-to-face</td>
<td>≥18 years</td>
</tr>
<tr>
<td><strong>Salvo, 2012</strong>&lt;sup&gt;101&lt;/sup&gt; [cited by: 43]</td>
<td>County funded health centre</td>
<td>USA (St Louis)</td>
<td>Education/counselling; Medication review; Prescribing/adjustment of therapy; Order tests and follow up on; Adherence assessment; Lifestyle assessment/advice; Referral</td>
<td>Endocrine system (Diabetes)</td>
<td>Face-to-face; Telephone</td>
<td>18-64 years; English speaking; using insulin; diabetes diagnosis; indigent (low-income, minority). Exclusions: seeing an endocrinologist</td>
</tr>
<tr>
<td><strong>McAdam-Marx, 2015</strong>&lt;sup&gt;90&lt;/sup&gt; [cited by: 43]</td>
<td>Community-based primary care clinic</td>
<td>NR</td>
<td>Prescribing/adjustment of therapy; order tests; Education/counselling; Adherence assessment; Assessing if goals met</td>
<td>Endocrine system (Diabetes – type 2)</td>
<td>Face-to-face; telephone</td>
<td>≥18 years ;HbA1c ≥ 6%; treated at community clinic offering diabetes collaborative care management (DCCM) and referred by PCP; treated ≥180 days prior to index date</td>
</tr>
<tr>
<td>Study; [Citing review(s)]</td>
<td>Primary care setting</td>
<td>Country (Region)</td>
<td>Additional tasks</td>
<td>Clinical system (Specific therapeutic area)</td>
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<td><strong>DISEASE AND THERAPY MANAGEMENT (cont.)</strong></td>
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<tr>
<td>Gilani, 2013 70 [cited by: 35]</td>
<td>Primary care clinics</td>
<td>Canada</td>
<td>Medication review; Physical assessment; Lifestyle advice/assessment; Prescribing/Adjusting therapy; Management of disease.</td>
<td>Endocrine system (Diabetes – type 2)</td>
<td>NR</td>
<td>≥18 years</td>
</tr>
<tr>
<td>Ladhani, 2012 82 [cited by: 35]</td>
<td>Primary care clinics</td>
<td>Canada</td>
<td>Medication review; Physical assessment; Lifestyle assessment/advice; Prescribing/adjusting of therapy; Management of disease</td>
<td>Endocrine system (Diabetes – type 2)</td>
<td>NR</td>
<td>≥18 years</td>
</tr>
<tr>
<td>Cooney, 2015 68 [cited by: 41]</td>
<td>community-based outpatient clinic</td>
<td>USA (Cleveland)</td>
<td>Medication review; Education/counselling; Lifestyle assessment/advice; Order tests and follow up on; Referral; Prescribing/adjusting therapy; Recommendations; Communication with other HCPs</td>
<td>Renal system (Chronic Kidney Disease – moderate to severe)</td>
<td>Telephone</td>
<td>18-85 years; Glomerular filtration rate (GFR) &lt;60 between 90 days and 2 years prior; ≥1 primary care visit prior to study Exclusions: end-stage renal disease; if ever referred for hospice care</td>
</tr>
<tr>
<td>Study; [Citing review(s)]</td>
<td>Primary care setting</td>
<td>Country (Region)</td>
<td>Additional tasks</td>
<td>Clinical system (Specific therapeutic area)</td>
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<td><strong>DISEASE AND THERAPY MANAGEMENT (cont.)</strong></td>
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<tr>
<td>Magid, 2013 [cited by: 42, 43, 58]</td>
<td>Health Maintenance Organisation based primary care clinic</td>
<td>USA (Colorado)</td>
<td>Education/Counselling; Monitoring; Adherence assessment; Lifestyle assessment/advice; Prescribing/adjustment of therapy; Communication with other HCPs</td>
<td>Cardiovascular system (Hypertension)</td>
<td>Face-to-face; Tele-monitoring system; Telephone; Email</td>
<td>18-79 years; diagnosis of hypertension from 2 most recent BP readings ≥140/≥90 mmHg (≥130/≥80 mmHg for DM or CKD); English speaking; prescribed ≤3 anti-HTN medications; had a primary care provider at one of the 10 participating clinics and had access to a computer and internet. Patients excluded if: limited life expectancy, recent MI, stroke, percutaneous coronary intervention, or coronary artery bypass graft surgery, end-stage renal disease.</td>
</tr>
<tr>
<td>Margolis, 2015 [cited by: 35]</td>
<td>Primary health care clinics</td>
<td>USA</td>
<td>Monitoring; Education/Counselling; Prescribing/adjustment of therapy; Adherence assessment; Lifestyle assessment/advice.</td>
<td>Cardiovascular system (Hypertension)</td>
<td>Tele-monitoring system</td>
<td>≥18 years</td>
</tr>
<tr>
<td>Study; [Citing review(s)]</td>
<td>Primary care setting</td>
<td>Country (Region)</td>
<td>Additional tasks</td>
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<td><strong>DISEASE AND THERAPY MANAGEMENT (cont.)</strong></td>
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<tr>
<td><strong>Margolis, 2013</strong>&lt;sup&gt;88&lt;/sup&gt; [cited by: 35, 42, 43, 58]</td>
<td>Health Maintenance Organisation based primary care clinic</td>
<td>USA (Minnesota)</td>
<td>Monitoring; Education/counselling; Prescribing/adjustment of therapy; Adherence assessment; Lifestyle assessment/advice; Communication with other HCPs</td>
<td>Cardiovascular system (Hypertension)</td>
<td>Tele-monitoring system; telephone;</td>
<td>Uncontrolled hypertension (≥140/≥90 mm Hg or ≥130/≥80 mmHg for DM or CKD) at 2 most recent primary care visits in previous year. Exclusion: stage 4/5 kidney disease or ratio of albumin to creatinine of ≥700 mg/g; acute coronary syndrome, coronary revascularization, or stroke ≤3 months; known secondary causes of HTN; NYHA class III or IV CHF; known left ventricular ejection fraction &lt;30%; pregnant.</td>
</tr>
<tr>
<td><strong>Pape, 2011</strong>&lt;sup&gt;96&lt;/sup&gt; [cited by: 43]</td>
<td>Internal medicine family practice clinics</td>
<td>USA (Oregon)</td>
<td>Recommendations; Communication with other HCPs</td>
<td>Cardiovascular system (Dyslipidaemia)</td>
<td>Telephone</td>
<td>≥18 years; with elevated LDL-C level; problem list entry of diabetes on EMR</td>
</tr>
<tr>
<td><strong>Smith, 2013</strong>&lt;sup&gt;105&lt;/sup&gt; [cited by: 43]</td>
<td>Primary care centre</td>
<td>NR</td>
<td>Prescribing/Adjusting therapy; Monitoring; Collaboration with other HCPs</td>
<td>Cardiovascular system (Dyslipidaemia)</td>
<td>Face-to-face</td>
<td>Patients with uncontrolled LDL cholesterol</td>
</tr>
</tbody>
</table>
### DISEASE AND THERAPY MANAGEMENT (cont.)

<table>
<thead>
<tr>
<th>Study; [Citing review(s)]</th>
<th>Primary care setting</th>
<th>Country (Region)</th>
<th>Additional tasks</th>
<th>Clinical system (Specific therapeutic area)</th>
<th>Mode of service delivery</th>
<th>Patient eligibility criteria</th>
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</thead>
<tbody>
<tr>
<td>Jacobs, 2012[75] [cited by: 43, 55]</td>
<td>Ambulatory general international medicine setting / General practice clinics</td>
<td>USA (Burlington, Massachusetts)</td>
<td>Physical assessment; Education/Counselling; Order tests; Prescribing/Adjustment of therapy; Lifestyle assessment/advice; referral; communication with other HCPs</td>
<td>Endocrine system (Diabetes – type 2)</td>
<td>Face-to-face</td>
<td>&gt;18 years; HbA1C &gt;8% Exclusions: receive primary care outside clinic; enrolled in another pharmacy or diabetes study; diabetes management by an outside endocrinologist; or unable to adhere to study schedule</td>
</tr>
<tr>
<td>Cohen, 2011[67] [cited by: 43]</td>
<td>Primary care</td>
<td>NR</td>
<td>Education/Counselling; Behavioural intervention; Lifestyle assessment/advice; Prescribing/Adjusting therapy; Referral</td>
<td>Endocrine system (Diabetes – type 2)</td>
<td>Face-to-face</td>
<td>HbA1c&gt;7%; LDL&gt;100mg/dL or &gt;70mg/dL if CAD; BP&gt;130/80 mmHg; willing to discuss diabetes and cardiac risk factors in group setting. Exclusions: gestational diabetes; unable to attend sessions; condition precluding diabetes self-care</td>
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</table>

### PHARMACEUTICAL CARE

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<thead>
<tr>
<th>Study; [Citing review(s)]</th>
<th>Primary care setting</th>
<th>Country (Region)</th>
<th>Additional tasks</th>
<th>Clinical system (Specific therapeutic area)</th>
<th>Mode of service delivery</th>
<th>Patient eligibility criteria</th>
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</thead>
<tbody>
<tr>
<td>Mahwi, 2013[87] [cited by: 42]</td>
<td>Diabetic centre</td>
<td>Iraq (Sulaimany)</td>
<td></td>
<td>Endocrine system (Diabetes – type 2)</td>
<td>Face-to-Face; Telephone</td>
<td>NR</td>
</tr>
<tr>
<td>Study; [Citing review(s)]</td>
<td>Primary care setting</td>
<td>Country (Region)</td>
<td>Additional tasks</td>
<td>Clinical system (Specific therapeutic area)</td>
<td>Mode of service delivery</td>
<td>Patient eligibility criteria</td>
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<tr>
<td><strong>EDUCATIONAL SERVICE</strong></td>
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<tr>
<td>Koenigsfeld, 2012 81</td>
<td>Primary care practice</td>
<td>USA</td>
<td>Education/Counselling; Communication with other HCPs</td>
<td>Cardiovascular system (Hypertension, Dyslipidaemia) + Endocrine system (Diabetes) + Respiratory system (Asthma)</td>
<td>Face-to-face</td>
<td>NR</td>
</tr>
<tr>
<td>Wong, 2013 110</td>
<td>Primary care practice</td>
<td>Hong Kong</td>
<td>Education/Counselling</td>
<td>Cardiovascular system (Hypertension)</td>
<td>NR</td>
<td>NR</td>
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<tr>
<td>Tobari, 2010 109</td>
<td>General practice clinics</td>
<td>Japan</td>
<td>Education/Counselling; Lifestyle assessment/advice; Monitoring</td>
<td>Cardiovascular system (Hypertension)</td>
<td>NR</td>
<td>40–79 years; Systolic Blood Pressure 140–179 mmHg or Diastolic Blood Pressure 90–109 mm Hg; or on antihypertensives</td>
</tr>
<tr>
<td>Plaster, 2012 97</td>
<td>Community Health Centre</td>
<td>Brazil</td>
<td>Education/Counselling; Lifestyle assessment/advice; Communication with other HCPs</td>
<td>Endocrine system (Diabetes – type 2)</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Rubio-Valera, 2013 100</td>
<td>Primary healthcare centres</td>
<td>Spain (Barcelona)</td>
<td>Education/Counselling; Adherence assessment; Communication with other HCPs</td>
<td>Nervous system (Depression)</td>
<td>Face-to-face</td>
<td>18–75 years; clinical diagnosis of depression from a GP; beginning a pharmacological anti-depressant treatment</td>
</tr>
<tr>
<td>Roth, 2013 99</td>
<td>Primary care practice</td>
<td>USA</td>
<td>Education/Counselling; Communication with other HCPs</td>
<td>NR (NR)</td>
<td>NR</td>
<td>Older adults</td>
</tr>
</tbody>
</table>

HCPs = Health care professionals; NR = Not reported; BP = Blood pressure; CAD = Coronary artery disease; CHF = Congestive heart failure; CKD = Chronic kidney disease; DM = Diabetes mellitus; EMR = Electronic medical record; GFR = Glomerular filtration rate; HTN = Hypertension; LDL = Low density lipoprotein; LVEF = Left ventricular ejection fraction; MI = myocardial infarction; NYHA = New York Heart Association; PCP = Primary care provider