



INSTITUTE  
FOR EVIDENCE  
BASED HEALTH

Advancing Knowledge  
Transforming Healthcare

# **PHARMACY SERVICES IN EUROPE: EVALUATING TRENDS AND VALUE REPORT**

December 2020



**INSTITUTO DE SAÚDE BASEADA NA EVIDÊNCIA**

**INSTITUTE FOR EVIDENCE-BASED HEALTH**

Faculdade de Medicina da Universidade de Lisboa

Av. Prof. Egas Moniz

1649-028 Lisboa, PORTUGAL

[isbe@isbe.pt](mailto:isbe@isbe.pt) | <http://isbe.pt>

Copyright © 2020, by the Institute for Evidence-Based Health (ISBE) – All rights reserved.

## TABLE OF CONTENTS

|  |           |
|--|-----------|
| <b>FOREWORD</b>  | <b>5</b>  |
| <b>RESEARCH TEAM &amp; EXPERT PANEL</b>                      | <b>6</b>  |
| <b>ACKNOWLEDGEMENTS</b>                                      | <b>7</b>  |
| <b>ACRONYMS AND ABBREVIATIONS</b>                            | <b>9</b>  |
| <b>EXECUTIVE SUMMARY</b>                                     | <b>11</b> |
| <b>1. INTRODUCTION</b>                                       | <b>14</b> |
| 1.1. Rationale   | 14        |
| 1.2. Background  | 17        |
| 1.3. Research Questions                                      | 18        |
| <b>2. BRIEF METHODS</b>                                      | <b>19</b> |
| 2.1. Part 1 – Pharmacy Services                              | 19        |
| 2.1.1. Mapping of current pharmacy services provided         | 19        |
| 2.1.2. Evidence on pharmacy services                         | 20        |
| 2.2. Part 2 – Pharmacy interventions on COVID-19             | 22        |
| 2.2.1. Mapping of current pharmacy interventions on COVID-19 | 22        |
| 2.2.2. Evidence on pharmacy interventions on COVID-19        | 23        |
| <b>3. RESULTS - EVIDENCE AND TRENDS</b>                      | <b>25</b> |
| 3.1. Part 1 – Pharmacy Services                              | 25        |
| 3.1.1. Mapping of current pharmacy services provided         | 25        |
| 3.1.2. Evidence on pharmacy services                         | 37        |
| 3.2. Part 2 – Pharmacy interventions on COVID-19             | 58        |
| 3.2.1. Mapping of current pharmacy interventions on COVID-19 | 58        |
| 3.2.2. Evidence on pharmacy interventions on COVID-19        | 64        |



INSTITUTE  
FOR EVIDENCE  
BASED HEALTH  
Advancing Knowledge  
Transforming Healthcare

|   |            |
|---|------------|
| <b>4. DISCUSSION</b>  | <b>69</b>  |
| <b>4.1. Summary of key findings</b>   | <b>69</b>  |
| 4.1.1. Pharmacy services  | 69         |
| 4.1.2. Pharmacy interventions on COVID-19                                     | 72         |
| <b>4.2. Strengths and limitations</b>   | <b>74</b>  |
| 4.2.1. Strengths  | 74         |
| 4.2.2. Limitations  | 75         |
| <b>4.3. Implications for research</b>   | <b>77</b>  |
| <b>4.4. Implications for policy and practice</b>                              | <b>78</b>  |
| <b>4.5. Final remarks</b>   | <b>79</b>  |
| <b>5. REFERENCES</b>  | <b>80</b>  |
| <b>APPENDICES</b>   | <b>97</b>  |
| <b>Appendix 1 – Country Survey Part 1: Pharmacy Services</b>                  | <b>98</b>  |
| <b>Appendix 2 – Glossary of Pharmacy Services</b>                             | <b>101</b> |
| <b>Appendix 3 – Search strategy</b>   | <b>104</b> |
| <b>Appendix 4 – Country Survey Part 2: Pharmacy Interventions on COVID-19</b> | <b>105</b> |

## **FOREWORD**

This report is independent research commissioned by the Pharmaceutical Group of the European Union (PGEU) and prepared by a Research Team from Portugal led by the Institute for Evidence-Based Health (ISBE), assisted by an Expert Panel of Researchers from Italy and UK.

ISBE is a private independent non-profit research umbrella organization that bridges Researchers, Academia, Private Partners and Patients' Representatives, and is dedicated to the purpose of synthesizing, generating, disseminating, and translating the most relevant and high-quality scientific knowledge in health into practice.

The Pharmaceutical Group of the European Union (PGEU) is the association representing Europe's community pharmacists. PGEU members are the national associations and professional bodies of community pharmacists in 32 European countries, including EU Member States, EU candidate countries and EFTA members, representing more than 160,000 community pharmacies.

PGEU leadership and staff members were consulted to understand the context of the issue under study and collaborated on the development of the research questions and focus of this report, glossary of services and country data collection.

## RESEARCH TEAM & EXPERT PANEL

### Research Team

Suzete COSTA<sup>1</sup>, PharmD, MPH (Principal Investigator)

Mariana ROMÃO<sup>1,2</sup>, PharmD

Maria MENDES<sup>1,3</sup>, PharmD

Rute HORTA<sup>1,3</sup>, PharmD

António TEIXEIRA RODRIGUES<sup>1,2</sup>, PharmD, PhD

António VAZ CARNEIRO<sup>1,4</sup>, MD, PhD, FACP, FESC

Ana Paula MARTINS<sup>1,5</sup>, PharmD, MSc, PhD

1 Institute for Evidence-Based Health (ISBE), Portugal

2 Centre for Health Evaluation & Research (CEFAR), National Association of Pharmacies, Portugal

3 Centre for Medicines Information and Health Interventions (CEDIME), National Association of Pharmacies, Portugal

4 Institute for Preventive Medicine and Public Health, Faculty of Medicine of the Universidade de Lisboa, Portugal

5 Social Pharmacy Department, Faculty of Pharmacy of the Universidade de Lisboa, Portugal

### Expert Panel

Zaheer BABAR<sup>6</sup>, BPharm, MPharm, PhD, SFHEA (Pharmaceutical Policy & Practice)

Erika MALLARINI<sup>7</sup>, MSc (Business Economics/Health Management)

Huseyin NACI<sup>8</sup>, MHS, PhD (Health Policy/Health Services Research)

6 Department of Pharmacy, University Huddersfield, UK

7 SDA Bocconi School of Management, Italy

8 Department of Health Policy, London School of Economics (LSE), UK

## ACKNOWLEDGEMENTS

The Research Team & Expert Panel would like to acknowledge the contribution of the following PGEU member associations in providing country replies and additional information used in this research:

|                |   |
|----------------|---|
| Austria        | Österreichische Apothekerkammer   |
| Austria        | Österreichischer Apothekerverband   |
| Belgium        | A.P.B - Association Pharmaceutique Belge/Algemene Pharmaceutische Bond    |
| Belgium        | Orde der Apothekers – Ordre des Pharmaciens                               |
| Bulgaria       | Български фармацевтичен съюз  |
| Croatia        | Hrvatska Ljekarnička Komora   |
| Croatia        | Hrvatsko Farmaceutsko Društvo   |
| Cyprus         | Παγκύπριος Φαρμακευτικός Σύλλογος (ΠΦΣ)                                   |
| Czech Republic | Česká lékárnická komora   |
| Denmark        | Danmarks Apotekerforening   |
| Estonia        | Eesti Proviisorapteekide Liit   |
| Finland        | Suomen Apteekkariliitto / Finlands Apotekareförbund                       |
| France         | Fédération des Syndicats Pharmaceutiques de France                        |
| France         | Ordre National des Pharmaciens - Conseil Central A                        |
| France         | USPO - Union des Syndicats de pharmaciens d'officine                      |
| Germany        | ABDA - Bundesvereinigung Deutscher Apothekerverbände                      |
| Greece         | Πανελλήνιος Φαρμακευτικός Σύλλογος  |
| Hungary        | Magyar Gyógyszerész Kamara  |
| Ireland        | Irish Pharmacy Union  |
| Italy          | Federazione Ordini Farmacisti Italiani (FOFI)                             |
| Italy          | Federfarma  |
| Kosovo         | Oda e Farmacistëve të Kosovës   |
| Latvia         | Aptieku īpašnieku asociācija  |
| Luxemburg      | Syndicat des Pharmaciens Luxembourgeois a.s.b.l.                          |
| Malta          | Kamra ta' l-Ispizjara ta' Malta   |
| Netherlands    | KNMP - Koninklijke Nederlandse Maatschappij ter bevordering der Pharmacie |

|                 |   |
|-----------------|---|
| North Macedonia | Фармацевтска комора на Македонија                             |
| Norway          | NAF – Apotekforeningen  |
| Poland          | Naczelna Izba Aptekarska                                      |
| Portugal        | Associação Nacional das Farmácias                             |
| Portugal        | Ordem dos Farmacêuticos                                       |
| Romania         | Colegiul Farmacistilor din Romania                            |
| Serbia          | Farmaceutska komora Srbije                                    |
| Serbia          | Savez farmaceutske udruženja Srbije                           |
| Slovakia        | Slovenská Lekárnická Komora                                   |
| Slovenia        | Lekarniška Zbornica Slovenije                                 |
| Spain           | Consejo General de Colegios Oficiales de Farmaceuticos España |
| Sweden          | Sveriges Apoteksforening                                      |
| Turkey          | Türk Eczacıları Birliği                                       |
| United Kingdom  | National Pharmacy Association                                 |
| United Kingdom  | Pharmaceutical Society of Northern Ireland                    |
| United Kingdom  | Royal Pharmaceutical Society                                  |

The Research Team & Expert Panel also wishes to express its gratitude to: Dr. Ilaria PASSARANI, PhD, Secretary General PGEU; Mr. Jan de BELIE, MPharm, Professional Affairs Advisor PGEU, for their role in face validation and pretest of country surveys, assisting in the development of glossary of pharmacy services, and overseeing country response; Ms. Sónia Romano, PharmD, senior researcher at CEFAR and Ms. Telma Escada, PharmD, scientific information manager at CEDIME, for assisting the research team in data extraction.

Finally, ISBE would like to thank Mr. Duarte SANTOS, PharmD, President PGEU 2020 for challenging us to present a proposal for leading this research and, not least, for the confidence expressed in the Research Team & Expert Panel.



## ACRONYMS AND ABBREVIATIONS

AT – Austria  
 BE – Belgium  
 BG – Bulgaria  
 CBA – Controlled Before After study  
 CCA – Corrected Covered Area  
 CDSR - Cochrane Database of Systematic Reviews  
 CEDIME – Centre for Medicines Information and Health Interventions  
 CEFAR – Centre for Health Evaluation & Research  
 CHD – coronary heart disease  
 COPD – Chronic Obstructive Pulmonary Disease  
 COVID – Corona Virus Disease  
 CP – Community Pharmacy  
 CRD – Centre for Reviews and Dissemination  
 CS – Cross-Sectional study  
 CY – Cyprus  
 CZ – Czech Republic  
 DARE - Database of Abstracts of Reviews of Effects  
 DE – Germany  
 DK – Denmark  
 EE – Economic Evaluation study  
 EE – Estonia  
 EL– Greece  
 EPOC - Cochrane Effective Practice and Organisation of Care  
 ES – Spain  
 FI – Finland  
 FIP – International Pharmaceutical Federation  
 FR – France  
 GP – General Practitioner  
 Hep – Hepatitis  
 HF – Heart Failure  
 HIV – Human Immunodeficiency Virus  
 HR – Croatia  
 HTA – Health Technology Assessment  
 HU – Hungary  
 IE – Ireland  
 ISBE – Institute for Evidence-Based Health  
 IT – Information Technology  
 IT – Italy  
 LU – Luxembourg  
 LV – Latvia



INSTITUTE  
FOR EVIDENCE  
BASED HEALTH  
Advancing Knowledge  
Transforming Healthcare

MI – Myocardial Infarction  
Mix – Mixed or unclear direction of findings  
MK – North Macedonia  
MT – Malta  
NA – Not Available  
Neg – Negative direction of findings  
NHS EED – National Health Service Economic Evaluation Database  
NL – The Netherlands  
NO – Norway  
NOAC – Novel Oral Anticoagulants  
NR – Not Reported  
NRCT – Nonrandomized Controlled Trial  
OBS – Observation  
OTC – Over-The-Counter  
PGEU – Pharmaceutical Group of the European Union  
PL – Poland  
Pos – Positive direction of findings  
PPE – Personal Protective Equipment  
PT – Portugal  
RCT – Randomized Controlled Trial  
RM – Repeated Measures study  
RO – Romania  
RS – Serbia  
SE – Sweden  
SI – Slovenia  
SK – Slovakia  
SR – Systematic Review  
TR – Turkey  
UK – United Kingdom  
UTI – Urinary Tract Infection  
WHO – World Health Organization  
WPC – World Pharmacy Council  
XK – Kosovo

## **EXECUTIVE SUMMARY**

This research is, to our best knowledge, the first using a comprehensive mixed methods approach combining mapping of current practices of pharmacy services including interventions on COVID-19 in 32 countries in Europe with review of published evidence, hence providing a near accurate portrayal of current practices, trends and evidence of pharmacy services in Europe.

We mapped current practices on 38 pharmacy services and 30 pharmacy interventions on COVID-19 in 32 countries in Europe. We also reviewed the evidence on pharmacy services targetting more than 25 health conditions stemming from 38 systematic reviews comprising 149 primary studies. These studies were conducted in community pharmacies across Europe.

The country mapping portrays numerous and diverse pharmacy services provided in Europe. This is far beyond the dispensing roles and some services are already reimbursed in some countries. This also acknowledges the roles of pharmacies in health promotion, screening, disease, as well as in case management.

Such services reflect priorities given to efficiency (generic substitution), safety (pharmacovigilance), pharmacy expertise in preparing individualized or short expiry therapy (galenic formulation), access to medicines during out-of-hours (night services), access to chronic medication (repeat dispensing and high-cost therapy dispensing and management), ensuring safety (emergency supply, urgent supply, refusal to dispense for safety reasons), adherence (dose administration aid, instruction on the use of devices, supervised consumption of medicines, first time dispensing intervention), integrated care pathways with primary care, health promotion activities (pharmacist-delivered vaccination, smoking cessation), chronic disease management, screening and referral (screening individuals at-risk, common and minor ailment management).

The findings on current practices are aligned with recommendations described in policy papers on integrated models of primary care, patient centered, and with more economic incentives that pursue expanded roles of pharmacy services.

There is substantial evidence on pharmacy services in systematic reviews covered in this research. However, this is not without methodological challenges. This is typical of complex health interventions which operate at different levels (health systems, pharmacy settings, pharmacists, and patients) but there is room for improvement.

Positive evidence of pharmacy services stemming from systematic reviews is fairly established for screening and referral (cardiovascular risk, diabetes, asthma and COPD, depression, osteoporosis, cancers). Also, it is well established for chronic disease management (e.g. cardiovascular risk, hypertension, diabetes, lipid, asthma), medication review or medication management, smoking cessation, and therapeutic adherence support.

The findings of this overview are consistent with reported results and issues described in the other overviews of systematic reviews. In addition, these other overviews have also showed positive evidence for pharmacist-delivered flu vaccination and for pharmacists' delivered needle exchange services.

These findings are also aligned with recommendations of pursuing expanded roles and adequate remuneration of pharmacy services described in other overviews.

The European country reports portray a wide array of pharmacy interventions on COVID-19 implemented in most pharmacies. This was done in several countries within a very short time frame and reflects the highly reactive and adaptative character of pharmacies in response to the pandemic outbreak.

All 30 mapped pharmacy interventions and measures on COVID-19 have been provided throughout Europe although some more extensively than the others.

Almost all preventive measures to reduce health risks of COVID-19 (patient information, protocols for disinfection of surfaces, use of disposable masks, floor marking, and barrier at counters) have been provided in most countries.

Other frequent interventions reflected the pharmacies preparedness for stockpiling and increased demand for services and products (stock and supply of medicines,

hand sanitizers and masks), and important patient care interventions exceeding pharmacist's traditional dispensing role (symptom-based referral pathways for suspected cases, increased demand to home delivery of medicines, pharmacy telephone support to vulnerable patients during isolation and dealing with the new vulnerable patients).

Expanded powers granted to pharmacies and legislation passed in view of COVID-19 allowed pharmacies to provide services to improve access to medication and relevant products, patient screening and referral, and support to vulnerable patients.

Emergency temporary closures of pharmacies also occurred in several countries.

Research on pharmacy interventions on COVID-19 is still in its infancy stage. However, the literature has confirmed the wide array of interventions provided and expanded powers granted to pharmacies to combat COVID-19.

Pharmacy associations played an important supporting role to pharmacists by developing and updating guidance and emergency plans to assist community pharmacists.

We hope these findings may assist in improving the design, implementation, and research on pharmacy services, and in raising relevant policy questions. This could drive value-based health care that make the best use of community pharmacies.

## **1. INTRODUCTION**

### **1.1. Rationale**

Community pharmacy is more overt in portraying the marriage of profession and business than most other professions. Community pharmacy exhibits all the six characteristics of a profession – provides high skilled pharmacists based on theoretical knowledge; ensures training and learning; tests the competence of pharmacists; possesses organizational structure; requires adherence to a code of conduct; and encourages altruistic service. But community pharmacy is also a trading profession, as it operates to a large extent in the public eye, in the high-street, by purchasing (and pre-financing), stocking, and supplying medicines with highly qualified healthcare professionals [1].

Medication supply is the most important role of community pharmacies as it ensures safe, timely and equitable access to medicines through a trusted and reliable network and high skilled pharmacists subject to regulations, ethics, and standards of practice in all countries around the globe.

Moreover, community pharmacists have been pursuing additional complementary roles over the last 50 years. Several policy papers have also acknowledged, in recent years, the need to expand the role of community pharmacists to support healthcare systems. There are multiple reasons for this: this may be in response to inadequacies of primary health care services in health systems; pressures and budget constraints require a more effective use of health care capacities with a relevant outreach in the community; new public health challenges require a better use of health care resources.

The Joint FIP/WHO Guidelines published in 2011 already identified the mission of pharmacy practice as to contribute to health improvement and to help patients with health problems to make the best use of their medicines. These guidelines identify 6 components to this mission: 1) being readily available to patients with or without an appointment; 2) identifying and managing or triaging health-related problems; 3) health promotion; 4) assuring effectiveness of medicines; 5)

preventing harm from medicines; and 6) making responsible use of limited health-care resources [2].

Mossialos and colleagues published a landmark policy paper in 2015 that reviewed strategies to expand the role of community pharmacists in 6 countries, 3 of them in England, the Netherlands and Scotland, and recommends that future policies should focus on integrating community pharmacists into primary care, developing a shared vision for different levels of services, and devising new incentive mechanisms for improving quality and outcomes [3].

The 2019 Report from the WHO Regional Office for Europe acknowledges that the community pharmacists are the most accessible health professionals to the public and are a cornerstone of primary health care. This report also outlines that the role of community pharmacists is expanding globally. It emphasizes the population should benefit from the full potential of community pharmacies by defining roles and services aligned with healthcare needs of the community, as well as by ensuring effective remuneration for these activities [4].

The 2019 Report from OECD and the European Commission already acknowledges that the role of the community pharmacist has changed over recent years. Although their main role is to dispense medications, pharmacists are increasingly providing direct care to patients, both in community pharmacies and as part of integrated health care provider teams [5].

More recently, the 2020 Report from the OECD on primary health care recognized that even before the COVID-19 pandemic, health systems in OECD countries faced significant challenges and that in a complex context, primary health care plays a key role for health systems to deliver more and better services. The report identifies pharmacists as primary care providers in its definition of primary health care and outlines there is ample scope for further developing the role of pharmacists and develop more effective collaboration with general practitioners and other health services. The report goes further in pointing out process changes that are key to improve care: better use of digital technology, and ability to link

datasets across primary care and other part of the health systems; payment instruments linked to outcomes or desired activities; better measurement of the inputs, outputs and outcomes of the primary health care sector; patient access and interaction to their health records and accreditation of providers. The report highlights these messages are as important as ever in the light of the COVID-19 pandemic which has, in many cases, accelerated the implementation of promising innovations in primary health care to achieve a system-wide transformation of care, such as expanding the role of pharmacists. Promoting the continuity of these practices and their wider adoption as health systems move into the pandemic recovery phase is critical for making health systems more resilient to health crisis [6].

Finally, the PGEU Position Paper on a vision for Community Pharmacy in Europe for 2030 [7] outlines 10 key recommendations aligned with previous policy papers:

1. Maximise the benefits of the community pharmacist's intervention for patients and healthcare systems by promoting pharmaceutical services to improve treatment outcomes, and adherence and to minimise risks.
2. Involve community pharmacists in collaborative care models.
3. Grant community pharmacists access to all relevant patients' health information and the list of medications they are taking.
4. Consult pharmacists on the integration of new digital solutions in healthcare.
5. Allow pharmacists to help progress the digitalisation of healthcare as trusted sources for health information.
6. Support pharmacists in integrating pharmacogenomics, validated clinical rules and real-world data in their daily practice to improve patient safety.
7. Support community pharmacists in offering health screening, medicines management, health promotion and education to help reduce the overall burden of chronic diseases.



8. Establish regulatory frameworks to maximise the value of the highly accessible community pharmacies network to the communities they serve.
9. Ensure that community pharmacists can provide patients with the full range of medicines and medical devices they need.
10. Ensure that remuneration for community pharmacists properly reflects their contribution to improving pharmaceutical care, reducing the burden on other health services, and supporting the sustainability of health systems.

## **1.2. Background**

There is a need to bring healthcare closer to primary, community and self-care [8]. This requires policies able to face the next public health challenges which, in turn, require health governance aligned with rational evidence-based decisions and multidisciplinary healthcare planning and delivery that truly apply the Kaiser pyramid care model.

The Kaiser pyramid care model illustrates that the population is stratified based on the complexity of their disease condition, for purposes of healthcare management at the community setting (self-care; disease management; and case management). This is done by using the most effective and least expensive resources by multi-professional teams in a non-integrated setting [9].

Pharmacy-based public health interventions can be defined as complex health interventions, in health promotion, disease prevention, and disease/medication management. This is provided by pharmacists to patients in the community pharmacy setting, with the aim of preventing disease, promoting health (and quality-of-life), and prolonging life, which are beyond, but not necessarily excluding, the medication supply role [10].

There is evidence of improvements in health outcomes of certain public health interventions provided by community pharmacists in appropriate collaborative

environments with physicians, however this is not without methodological challenges.

In the context of limited and scarce resources, it may be relevant to invest in public health interventions that make use of the walk-in access of pharmacies, equitable geographical distribution, high frequency of patient interactions, patients' trust, long opening hours and high skilled pharmacist workforce. This is in the context that they contribute to optimize the medicines benefits (compliance, safety, and effectiveness) and improve health outcomes at acceptable costs.

We will use interchangeably the terms pharmacy-based public health interventions and pharmacy services in this report, since the term "pharmacy services" is more frequently used by researchers in pharmacy practice and the term "public health interventions" is used more frequently in the context of health technology assessment and economic evaluation [10].

The aim of this research was to evaluate and synthesize state-of-the-art evidence, current practice, and trends in community pharmacy-based services in Europe.

### **1.3. Research Questions**

This report attempts to answer the following research questions:

1. What is the current practice and trends in pharmacy-based public health interventions provided in community pharmacies in Europe, including recent interventions on COVID-19?
2. What is the recent evidence based on the health and economic benefits of community pharmacy patient care interventions, including recent interventions on COVID-19?
3. What are the characteristics of these studies (e.g. country, population, intervention, outcomes, study design) and direction of findings reported?
4. What are the gaps in research evidence for community pharmacy-based public health interventions?

## **2. BRIEF METHODS**

### **2.1. Part 1 – Pharmacy Services**

#### **2.1.1. Mapping of current pharmacy services provided**

We mapped 38 pharmacy services beyond the medication supply core role using insights from the literature and our own experience. We then, further validated this with PGEU.

These services were organized and hierarchized under the following categories adapted from the Kaiser pyramid care model according to which the population is stratified based on the complexity of their disease condition, for purposes of healthcare management at the community setting using the most effective and least expensive resources [9]:

- Dispensing related services to promote access to medicines.
- Health promotion and disease prevention services.
- Screening and referral services.
- Disease management services.
- Individual case management services.

We then added data collection on the effectiveness of new medicines, acknowledging pharmacies' role in real-world health technology assessment.

We defined key parameters to collect for each pharmacy service previously mapped and ranked.

This was the basis for the survey design for mapping country practices on pharmacy services. A glossary was included to assist in replies whilst ensuring some degree of standardization in concepts.

We pretested with PGEU, refined, and then performed the final version of country survey on current practices and trends in community pharmacy services. Replies were filled primarily by PGEU staff, based on available data, and further validated by each PGEU Member Association.

A template adapted from the survey was developed to assist in data extraction. Data was extracted by one researcher (MM) with assistance of an external researcher and reviewed by two researchers (MRH, SC).

See list of 38 mapped pharmacy services, **Appendix 1** – Country Survey Part 1: Pharmacy Services.

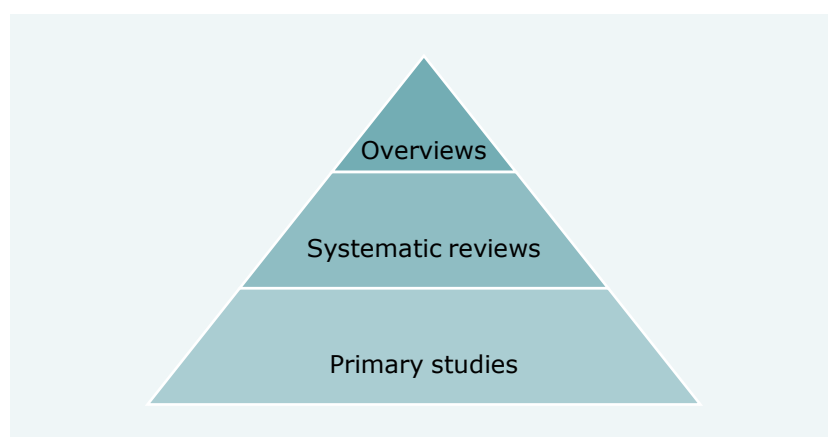
See glossary explaining these services and containing frequent synonyms used, **Appendix 2** – Glossary of Pharmacy Services.

### **2.1.2. Evidence on pharmacy services**

We used a 3-level hierarchy of evidence comprising: overviews (or umbrella reviews) of systematic reviews; systematic reviews of primary studies; primary studies included in systematic reviews.

Box 1 depicts the hierarchical evidence of studies used in this research.

**Box. 1.** Hierarchical evidence of studies used



We performed a comprehensive review of overviews and of systematic reviews (reviews of primary studies) published between 2013 and August 2020. Reviews were included if they met the following criteria: 1) Systematic reviews, systematic reviews with meta-analysis, meta-analysis, or overview of systematic reviews; 2) Containing at least one study conducted in one European country; 3) Containing at least one community pharmacy or community pharmacist-based or led study

(not provided in hospital setting, clinic nor ambulatory care); 4) Focusing on patient-care interventions, services, programs, or management; 5) Reporting data on effectiveness, impact (e.g. on patient-reported outcomes and process measures), cost, cost and outcomes, cost-effectiveness, cost-utility, or cost-benefit; 6) Published as full research article.

A comprehensive search was performed by one researcher (MR) in the following databases: MEDLINE® (via Pubmed®); Cochrane Database of Systematic Reviews (CDSR); Database of Abstracts of Reviews of Effects (DARE), NHS Economic Evaluation Database (NHS EED), and HTA, via the CRD database. This search was complemented with scanning reference lists of more recent overviews. A further search was performed in Google® Scholar for recent reviews.

See search strategy, **Appendix 3** – Search strategy.

Screening of titles, abstracts and full papers was performed by one researcher (MR). Full papers were reviewed by Principal Investigator (SC). Disagreements were resolved through discussion.

A template adapted from the data extraction form was used in when a recent overview was developed and prepiloted to assist in data extraction. Data was extracted by two researchers (MR, ATR) with assistance of an external researcher and reviewed by Principal Investigator (SC).

The list of references of primary studies included in the systematic reviews was also recorded in this extraction form. We extracted data of primary studies meeting inclusion criteria provided data were reported in the systematic review, in accordance with guidelines for overviews.

Since primary studies are often included in more than one review, the degree of overlap was determined using the corrected covered area (CCA) method of Pieper et al. A CCA value lower than 5% is considered a slight overlap [11].

We assessed the overall quality of evidence: 1) for deriving effectiveness of included primary studies assisted by the Cochrane Effective Practice and

Organisation of Care (EPOC) guidelines “What study designs should be included in an EPOC review” [12]; 2) the heterogeneity of populations, interventions, outcomes, and setting, as described by Mossialos *et al* [13] and recommended by CRD for systematic reviews of public health interventions [14].

Quality assessment of included primary studies in terms of study design was first assessed based on reported information in systematic reviews and then confirmed through abstract reviews of primary studies. Quality assessment was performed by one researcher (MR) and reviewed by another (SC).

A narrative synthesis was performed. We first reported key findings of overviews and then results of systematic reviews. For systematic reviews, whenever results described countries outside Europe and/or multiple settings, we limited synthesis to the subset in community pharmacy in Europe.

## **2.2. Part 2 – Pharmacy interventions on COVID-19**

### **2.2.1. Mapping of current pharmacy interventions on COVID-19**

We mapped 30 pharmacy interventions on COVID-19 and further organized them under categories which correspond to the steps in response to public health emergencies. This was based on Cadogan and colleagues [15] who followed on earlier work of Watson [16] and FIP [17], and using insights from our experience:

- Prevention: measures to reduce health risks of COVID-19 pandemic.
- Preparedness: measures to ensure timely and effectively responses from the health care system.
- Response: immediate actions in response to COVID-19 pandemic.
- Recovery: measures to return to “normal” activities post-pandemic.

We also added data collection on: expanded powers granted to pharmacies; and new pharmacy services initiated.

Besides pharmacy measures and interventions on COVID-19 we were interested in understanding the economic and social impact on pharmacies by adding two

further questions on emerging temporary closures of pharmacies and deaths of pharmacy staff due to COVID-19.

We then defined key parameters to collect for each intervention previously mapped and classified.

This was the basis for the survey design for mapping country practices on COVID-19.

We pretested with PGEU, refined, and then performed the final version of country survey on current practices and trends in pharmacy interventions on COVID-19. Replies were filled primarily by PGEU staff, based on available data. This was further validated by each PGEU Member Association.

A template adapted from the survey was developed to assist in data extraction. Data was extracted by one researcher (MM) with assistance of an external researcher and reviewed by two researchers (MRH, SC).

See list of 30 pharmacy interventions on COVID-19, **Appendix 4** – Country Survey Part 2: Pharmacy Interventions on COVID-19.

### **2.2.2. Evidence on pharmacy interventions on COVID-19**

We performed a second review of primary studies published until August 2020. Studies were included if they met the following criteria: 1) Study conducted in a European country; 2) Study reporting on community pharmacy (not hospital setting, clinic nor ambulatory care); 3) Focusing on pharmacy interventions on COVID-19; 4) Full research articles, protocols, poster abstracts, conference abstracts.

A search was performed in MEDLINE® (via Pubmed) by one researcher (MR). A further search was performed in Google® Scholar for recent studies.

Screening of titles, abstracts and full research articles was performed by one researcher (MM). Full research articles were reviewed by another researcher (SC). Disagreements were resolved through discussion.

A template adapted from the country survey was developed and prepiloted to assist in extraction. Data was extracted by one researcher (MM) and reviewed by another (SC).

We did not assess the overall quality of evidence as we have not restricted search to papers describing pharmacy interventions on COVID-19 but rather adopted a more inclusive perspective (e.g. perspectives on the role of pharmacy in COVID-19). However, we identified the design of each study.

A narrative synthesis was performed.



## **3. RESULTS - EVIDENCE AND TRENDS**

### **3.1. Part 1 – Pharmacy Services**

#### **3.1.1. Mapping of current pharmacy services provided**

We have received replies to Country Survey Part 1: Pharmacy Services from 32 PGEU member countries.

The top 7 most frequent pharmacy services provided in most pharmacies within the country under contract, agreement, legislation, or regulation were mostly dispensing related. This includes: generic substitution (27 countries); pharmacovigilance for medicines under additional monitoring (27 countries); galenic formulation (24 countries); repeat dispensing for chronic long-term medications (22 countries); handling and disposal of expired or unwanted medicines (20 countries); night services (19 countries); and high-cost therapy dispensing and management such as for oncology, HIV, rheumatoid arthritis, multiple sclerosis (18 countries). Some of these services were reimbursed by the government or health care payer in some (but not all) countries outside the standard pharmacy dispensing remuneration. These include: galenic formulation; repeat dispensing for chronic medications; high-cost therapy dispensing and management; night services. A few countries remunerate generic substitution.

The next tier of the 5 most frequent pharmacy services provided in most pharmacies within the country under contract, agreement, legislation, or regulation were also dispensing related (with one exception of medication review): emergency supply of prescription-only medicines without prescription such as adrenalin or salbutamol (12 countries); medication review (11 countries); urgent supply of prescription only-medicines without prescription (10 countries); refusal to dispense due to safety reasons (10 countries); and home delivery (10 countries). Medication review – the only service in this set beyond the dispensing role - is already reimbursed by the government or health care payer outside the standard pharmacy dispensing remuneration in 7 out of 11 countries providing this

service in most pharmacies. Home delivery is also reimbursed in 4 countries with a relevant regulatory upgrade in Germany due to the COVID-19 pandemic.

The third tier of the 8 most frequent pharmacy services provided in most pharmacies within the country under contract, agreement, legislation, or regulation embraces a very different and wide spectrum which goes far beyond the dispensing role. This includes: dose administration aid (8 countries); instruction on the use of therapeutic or self-monitoring devices (8 countries); needle/syringe exchange (8 countries); pharmacist-delivered vaccination (7 countries); directly observed treatment / supervised consumption of medicines (7 countries); first time dispensing intervention (5 countries); therapeutic adherence support (5 countries); integrated care pathways, protocols or quality circles with primary care (5 countries). This is a very different set of services and all are already reimbursed by the government or health care payer outside the standard pharmacy dispensing remuneration although in some (but not all) countries.

The last tier of pharmacy services provided in most pharmacies within the country under contract, agreement, legislation, or regulation includes: smoking cessation (4 countries); chronic disease management (3 countries); therapeutic substitution (3 countries); health education (3 countries); teleconsultations by pharmacists (3 countries); common / minor ailment management schemes (2 countries); screening at-risk individuals (2 countries); home or nursing home medication review (2 countries); medication reconciliation (2 countries); scheduling visits / exams, delivery of reports (2 countries); weight management (2 countries). Smoking cessation, chronic disease management, common/minor ailment management, home or nursing home medication review and weight management are reimbursed by the government or health care payer outside the standard pharmacy dispensing remuneration in at least one country.

Table 1 provides an overview of current pharmacy services provided in Europe.

Table 2 provides an overview per country.

**Table 1.** Current pharmacy services provided in Europe

| Pharmacy Services   | Provided in most pharmacies under contract, agreement, regulation                                       | Provided in some pharmacies as a pilot  | Remunerated by Govn / Health Payer   | Provided individually by some pharmacies | Regulatory limitations            | Observations  |
|---|---|---|--|--|-----------------------------------|---|
| <b>DISPENSING RELATED SERVICES</b>  |   |   |  |  |                                   |   |
| <b>1</b> Night services   | 19 countries:<br>AT; BE; HR; FR;<br>IT; NL; MK; CZ;<br>XK; LU; PT; ES;<br>UK; EL; SK; TR;<br>DE; CY; HU | 13 countries:<br>BE; HR; FR;<br>IT; NL; LU;<br>SI; ES; UK;<br>DE; CY; MT;<br>CZ | 16 countries:<br>BG; DK; NO; FI;<br>XK; PL; PT; RO; SI;<br>SE; ES; UK; RS;<br>EE; LV; MT | 2 countries:<br>PL; SK                   |                                   | <b>DK; PL</b> - service paid for by patients. <b>AT</b> - This legally obliged service is not paid for by the public, on-call services cost pharmacies around 35 Mio. Euro; <b>BE</b> - fixed fee per night (65€) + supplementary fee (5.42€) per reimbursed delivery; patient does not pay a special fee if he has a prescription. The concept of urgency no longer exists. <b>BG</b> - All pharmacies are free to validate their work time. <b>PT</b> - Optional fee of 2.50€ per package paid for by patients when the prescription is not prescribed in the same day or the day before; night shift starts after 10pm. <b>IT</b> - Recently the payment for this service (at patient or NHS charge) has been updated. <b>NO</b> - The pharmacy may charge a fee on the purchase, which is paid for by the customer. <b>PL</b> - There is a maximum amount charged for night dispensing, pharmacists adds this to patient's drug bill. <b>SI</b> - The fee is set flat for each pharmacy and is paid monthly. <b>CZ</b> - Yes (from 2020), 10 mil. Kč fund is divided between these pharmacies (1815€/month/pharmacy). <b>SK</b> - Self-governing region pursuant legislation, in cooperation with the Slovak Chamber of Pharmacists, organizes the provision of emergency pharmaceutical services; the emergency pharmacy service is served from 16:00 to 22:00 during working days and 8:00 - 22:00 during weekends and non-working days. Upon agreement, LPS can also be used until 20:00. <b>EE</b> - in some cases remunerated. <b>DE</b> - remunerated by NNF: A share of the price of each POM package dispensed in pharmacies goes to the night-time and emergency services fund (NNF); currently 0.21 € / package. Fee calculated quarterly. <b>MT</b> - paid for by patients and Health Insurance Funds. |
| <b>2</b> Emergency supply of prescription-only medicines without prescription (e.g. adrenaline, salbutamol) | 12 countries:<br>AT; DK; FR; IT;<br>NO; IE; XK; PL;<br>RO; UK; CY; MT                                   |   | 1 country:<br>MT   | 2 countries:<br>BE, PT                   | 4 countries:<br>FI; IE; TR;<br>PT | <b>NO</b> - The pharmacy may charge a fee. <b>UK</b> - paid for by patients. <b>MT</b> - paid for by patients and Health Insurance Funds. <b>PT</b> - No fee-for-service. Pharmacy is entitled to the margin fixed by medicines' pricing.   |
| <b>3</b> Urgent supply of prescription-only medicines without prescription (e.g. patient on holiday)        | 11 countries:<br>AT; DK; IT; NL;<br>IE; XK; PL; RO;<br>UK; CY; PT                                       |   | 1 country:<br>UK   | 1 country:<br>BE                         | 2 countries:<br>FI; IE            | <b>NO</b> - Prescriptions are electronic and accessible for all Norwegian pharmacies. This service not needed.  |

| Pharmacy Services                                   | Provided in most pharmacies under contract, agreement, regulation   | Provided in some pharmacies as a pilot | Remunerated by Govn / Health Payer                                   | Provided individually by some pharmacies  | Regulatory limitations            | Observations   |
|---|---|--|--|---|-----------------------------------|--|
| 4 Repeat dispensing (chronic long-term medications) | 22 countries:<br>BE; BG; HR; DK;<br>FR; NL; NO; CZ;<br>FI; IE; XK; SI;<br>SE; ES; UK; EL;<br>SK; TR; RS; CY;<br>EE; MT                        |  | 11 countries:<br>BG; HR; FR;<br>CZ; IE; SI;<br>SE; ES; UK;<br>CY; EE | 2 countries:<br>RO; ES  | 3 countries:<br>DK; IE; SK        | <b>IE</b> - paid only if covered in a reimbursement scheme. <b>UK</b> - remunerated by the health service. <b>ES</b> - Co-payments by patients applies. Product margin. GPPs are voluntary remunerated by patient or Health Service. <b>CZ</b> - remunerated by Health Insurance Companies as service fee. <b>DE</b> - There is a new legislation in place that basically sets the framework for repeated dispensing. Details on implementation currently under discussion. <b>EE</b> - paid for by patients and Health Insurance Fund. <b>SE</b> - paid for by patients and Health Service.   |
| 5 Generic Substitution                              | 27 countries:<br>BE; DK; FR; IT;<br>NL; MK; NO; CZ;<br>FI; IE; XK; LU;<br>PL; PT; RO; SI;<br>SE; ES; UK; EL;<br>SK; TR; DE; RS;<br>CY; HU; MT |  | 5 countries:<br>FR; IT; IE; SE;<br>EL                                | 2 countries:<br>PT; LV  | 4 countries:<br>BE; IE; XK;<br>PT | <b>IE</b> - paid only if covered in a reimbursement scheme. <b>FR</b> - Incentives to reach specific public health goals (ROSP – Rémunération sur objectifs de santé publique). <b>PT</b> - As a mechanism to keep increasing generics market share and reduce the financial impact to pharmacies, the government introduced a financial incentive to pharmacies: 0.35€ per pack dispensed (applied to the 4 cheapest medicines in each reference group – same INN, same strength, same pack size). This fee is linked to generated savings; It is up to the Portuguese Medicines Authority to keep an online updated list of the medicines. <b>IT</b> - Pharmacy has an incentive to dispense the cheapest drug inside each transparency list. <b>SE</b> - remuneration considered to be part of the dispensing fee. <b>EL</b> - If the value of generic medicines exceeds the mean generic substitution performed, a 0.3% of the exceeding value should be paid to the pharmacy. |
| 6 Refusal to dispense due to safety reasons         | 10 countries:<br>BE; FR; NL; NO;<br>FI; IE; SI; ES;<br>SK; RS   |  | 1 country:<br>FR   | 20 countries:<br>AT; BG; DK; IT;<br>MK; NO; CZ; XK;<br>LU; PL; PT; RO; UK;<br>EL; DE; CY; EE; HU;<br>LV; MT | 2 countries:<br>SI; SK            | <b>TR</b> - According to the regulation the pharmacists should get in touch with the doctor to clarify the safety reasons (dosage/medicine etc.)   |
| 7 Home delivery                                     | 10 countries:<br>BE; DK; FR; IT;<br>NL; NO; SE; UK;<br>DE; MT   |  | 4 countries:<br>NL; UK; DE;<br>MT                                    | 19 countries:<br>AT; MK; NO; CZ;<br>FI; IE; XK; LU; PL;<br>RO; SI; SE; ES; SK;<br>TR; EE; HU; LV; PT        | 2 countries:<br>CZ; PT            | <b>DK; FI; PT; SE; EE; HU</b> - paid for by patients. <b>MT</b> - paid for by patients, health Service and Health Insurance Funds. <b>DE</b> - During the peak phase of the corona pandemic between Apr and Sept 2020, pharmacists received an expense of 5€ + VAT for each medicine delivery. As of October 1, the remuneration will be reduced to 2.50€ + VAT and is valid until 31 Dec 2020. Regulation: Ordinance on the Operation of Pharmacies (§ 17 (2)). <b>EE</b> - 1 of 521 pharmacies. <b>HU</b> - This service is provided voluntarily by pharmacies (5%).   |
| 8 Other _____                                       | 5 countries:<br>AT; FR; NL; IE;<br>UK   |  | 2 countries:<br>NL; IE   |   |                                   | <b>NL</b> - Fee for pharmaceutical care like clinical rules implementation, measurement of kidney function with point-of-care testing, etc. (depending which contract the community pharmacist has with the health insurer. <b>IE</b> - Pharmacy receives consultation fee plus dispensing fee when Emergency Contraception Service (EHC) supplied to eligible patients. <b>UK</b> - EHC remunerated by local authorities  |

| Pharmacy Services   | Provided in most pharmacies under contract, agreement, regulation                               | Provided in some pharmacies as a pilot | Remunerated by Govn / Health Payer  | Provided individually by some pharmacies   | Regulatory limitations | Observations  |
|---|---|--|-------------------------------------|--|------------------------|---|
| <b>HEALTH PROMOTION SERVICES</b>                                |   |  |                                     |  |                        |   |
| <b>9</b> Handling and Disposal of Expired or Unwanted Medicines | 20 countries:<br>BE; HR; DK; FR; NL; NO; CZ; FI; LU; PT; RO; SE; ES; UK; EL; SK; RS; EE; HU; MT |  | 3 countries:<br>IE; SE; UK          | 9 countries:<br>AT; IT; IE; XK; PL; PT; TR; DE; LV   | 1 country:<br>SK       | <b>IE</b> - Some health boards pay for the service, otherwise, pharmacies pay for the collection themselves. <b>MT</b> - paid for by patients   |
| <b>10</b> Needle/Syringe Exchange                               | 8 countries:<br>AT; HR; FR; NL; PT; ES; SK; CY  | 1 country:<br>IE                       | 4 countries:<br>IE; PT; ES; UK      | 5 countries:<br>BE; DK; FI; PT; UK   | 1 country:<br>SK       | <b>PT</b> - Remunerated by the National Health Service: After a one-year evaluation of the programme by an independent entity (Faculty of Economics of University of Porto) and also by a consortium ANF CEFAR/Univ. Lisbon CEMBE, Portuguese pharmacies are (since 01/01/2017) remunerated by Portuguese Health Service, in 2.40 € for each kit dispensed.   |
| <b>11</b> Pharmacy Travel Health                                | 1 country:<br>NL  |  |                                     | 29 countries:<br>AT; BE; BG; HR; DK; FR; IT; NL; MK; NO; CZ; IE; LU; PL; RO; SI; SE; ES; UK; EL; SK; TR; DE; RS; CY; HU; LV; MT ; PT |                        |   |
| <b>12</b> Pharmacist-delivered vaccination (e.g. Flu)           | 7 countries:<br>DK; FR; NO; IE; PT; UK; EL  | 2 countries:<br>LU; DE                 | 5 countries:<br>DK; FR; IE; UK; DE; | 3 countries:<br>NO; PT; MT   | 1 country:<br>FI       | <b>PT</b> -paid for by patients; Flu vaccination in pharmacies as vaccination points of public NHS under an agreement with the Ministry of Health to further integrate them into the public National Health Service (NHS), the Directorate-General for Health convened a group of 39 community pharmacies to collaborate as vaccination points against influenza. The pilot took place in the municipality of Loures, in Lisbon, between 15th Oct and 31st Dec 2018. This pilot aimed at increasing the flu vaccination in people aged ≥65 years by improving access to the vaccination through pharmacies with no need for a vaccine prescription. The project was financed by ANF. <b>SK</b> - The Slovak Chamber of Pharmacists supports the introduction of influenza vaccination in pharmacies. However, pharmacists in SK do not yet have this competence. <b>MT</b> - paid for by patients. <b>NO</b> - service paid for by patients |
| <b>13</b> Weight Management                                     | 2 countries:<br>IE; PT  |  | 1 country:<br>UK                    | 23 countries:<br>AT; BE; BG; HR; IT; MK; FI; LU; PT; RO; SI; SE; ES; UK; EL; SK; TR; DE; RS; EE; HU; LV; MT                          |                        | <b>PT</b> - paid by patients in some cases. <b>SE</b> - 80 SEK, paid by patients. <b>UK</b> - remunerated by CCG.   |

| Pharmacy Services   | Provided in most pharmacies under contract, agreement, regulation  | Provided in some pharmacies as a pilot  | Remunerated by Govn / Health Payer | Provided individually by some pharmacies   | Regulatory limitations | Observations  |
|---|--|---|------------------------------------|--|------------------------|---|
| 14 Smoking Cessation  | 4 countries: FR; IE; PT; UK  | 1 country: NO                           | 2 countries: UK; DK                | 23 countries: AT; BE; BG; HR; DK; IT; NL; MK; CZ; FI; XK; PT; RO; SI; SE; ES; EL; SK; TR; DE; RS; EE; HU                         |                        | <b>DK</b> - paid for by patients or municipality. <b>FI</b> - In some cases paid for by patients. <b>CZ</b> - remunerated by Health Insurance Companies as fee. <b>SE</b> - paid for by patients. <b>UK</b> - commissioned and remunerated locally  |
| 15 Health education   | 4 countries: HR; FR; IE; PT  |   | 1 country: FR                      | 29 countries: AT; BE; BG; DK; IT; NL; MK; NO; CZ; FI; XK; LU; PL; PT; RO; SI; SE; ES; UK; EL; SK; TR; DE; RS; CY; EE; HU; LV; MT |                        | <b>FR</b> - remunerated by the Regional Health Agency   |
| 16 Other _____  |  | 1 country: IE                           |                                    |  |                        |   |
| <b>SCREENING AND REFERRAL SERVICES</b>  |  |   |                                    |  |                        |   |
| 17 Common Ailment Management Schemes (e.g Strep-A, UTI / Cystitis)  | 2 countries: FR; UK  | 1 country: RS                           | 1 country: UK                      | 5 countries: SE; ES; SK; RS; PT  |                        | <b>SE</b> - Allergy check up – 450 SEK (patient); Birth mark control (300 - 350 SEK).   |
| 18 Screening individuals at-risk not on medication (e.g. for diabetes, hypertension, lipid disorder, HIV, Hep B, Hep C, colon cancer) | 2 countries: PT; ES  | 7 countries: BE; FR; IT; IE; PL; PT; RS | 2 countries: FR; IT                | 26 countries: AT; BG; HR; DK; FR; IT; NL; NO; CZ; IE; XK; LU; PL; PT; SI; SE; ES; UK; EL; SK; TR; DE; EE; HU; LV; MT             |                        | <b>FR</b> - by the Regional Health Agency, in case of regional screening campaigns involving pharmacists. <b>IT</b> – The colo-rectal screening service (18% of pharmacies). is remunerated by the Health Service. Other screening services such as for diabetes are remunerated by patients. <b>SE</b> - paid for by patients - Diabetes 125 SEK, Hypertension 60 – 80 SEK (discount for “club members”), Spirometry 80 SEK. <b>UK</b> - In some cases paid for by patients. |
| 19 Predictive medicine (e.g. genetic risk)  |  | 1 country: NL                           |                                    |  |                        |   |
| 20 Pharmacovigilance for medicines under additional monitoring (e.g. screening questions for black triangle medicines)                | 27 countries: BE; DK; FR; IT; NL; MK; NO; CZ; FI; IE; XK; LU; PL; PT; RO; SI; ES; UK; EL; SK; TR; DE; RS; EE; HU; LV; MT |   |                                    | 1 country: XK  |                        |   |
| 21 Scheduling visits / exams, delivery of reports   | 2 countries: ES; IT  | 2 countries: SK; RS                     |                                    | 5 countries: CZ; IE; ES; SK; RS  |                        | <b>CZ</b> - In some cases, paid for by patients.  |

| Pharmacy Services   | Provided in most pharmacies under contract, agreement, regulation | Provided in some pharmacies as a pilot           | Remunerated by Govn / Health Payer        | Provided individually by some pharmacies   | Regulatory limitations | Observations   |
|---|---|--|---|--|------------------------|--|
| <b>22</b> Referral to other healthcare providers (e.g. nurses and nutritionists)  | 2 countries:<br>BG; ES  |  |   | 29 countries:<br>AT; BE; HR; DK;<br>FR; IT; NL; MK; NO;<br>CZ; FI; IE; XK; LU;<br>PL; PT; RO; SE; UK;<br>EL; SK; TR; DE; RS;<br>CY; EE; HU; LV; MT |                        |  |
| <b>23</b> Other: Sale / supply of self-test kits to patients / public   | 10 countries:<br>FR; IT; NO; FI;<br>LU; PT; SE; ES;<br>TR; MT     |  | 2 countries:<br>FR; CZ                    | 10 countries:<br>IT; NL; CZ; FI; PT;<br>SI; SE; SK; EE; HU   |                        | <b>NO</b> - Sale / supply of self-test kits are paid by the patients. <b>FI</b> - In pharmacy point of patient access to health services: remunerated by patient. <b>SK</b> - paid for by patients; Remuneration is based on the margin. <b>TR; EE</b> - paid for by patients. <b>MT</b> - Sale / supply of self-test kits to patients / public: paid for by patients or Health Service; In pharmacy point of patient access to health services: remunerated by Health Service |
| <b>DISEASE MANAGEMENT SERVICES</b>  |   |  |   |  |                        |  |
| <b>24</b> Administering injectable medicines (e.g. antibiotics)   | 1 country:<br>PT  |  |   | 1 country:<br>PT   | 1 country:<br>PT       | <b>SK</b> - Intravenous administration of drugs is performed only in hospitals or outpatient clinics.  |
| <b>25</b> Directly observed treatment/ Supervised Consumption of Medicines  | 7 countries:<br>AT; BE; FR; NL;<br>NO; ES; UK                     |  | 6 countries:<br>AT; BE; FR;<br>NO; IE; UK | 7 countries:<br>DK; IE; PL; SE; ES;<br>DE; MT  | 1 country:<br>IE       | <b>DK; MT</b> - paid for by patients   |
| <b>26</b> First time dispensing intervention (e.g New Medicines Service)  | 5 countries:<br>BE; DK; NL; NO;<br>UK                             | 7 countries:<br>ES; IT; NO;<br>FI; IE; PT;<br>SE | 5 countries:<br>BE; NL; UK;<br>DK; NO     | 5 countries:<br>DK; ES; FI; PT; MT   | 1 country:<br>BE       | <b>UK</b> - remunerated by National Health Service. <b>DK</b> - Remunerated according to the agreement with the Ministry of health   |
| <b>27</b> Instruction on use of therapeutic, self-monitoring device or medical aid (e.g. stoma appliance, inhaler, insulin device, self-monitoring blood glucose) | 9 countries:<br>FR; NL; NO; IE;<br>SI; SE; ES; EL;<br>PT          | 2 countries:<br>PT; RS                           | 3 countries:<br>FR; NL; NO                | 25 countries:<br>AT; BE; BG; HR;<br>DK; IT; MK; CZ; FI;<br>XK; LU; PL; PT; RO;<br>ES; UK; SK; TR;<br>DE; RS; CY; EE;<br>HU; LV; MT                 |                        | <b>AT; BE; BG</b> - This can be part of standard pharmacy practice but there is no structural framework or regulations around this service. <b>NL</b> - this included in the fee for first time dispensing   |
| <b>28</b> Therapeutic adherence support   | 4 countries:<br>BE; DK; NL; IE                                    | 1 country:<br>RS                                 | 2 countries:<br>DK; PT                    | 17 countries:<br>ES; IT; MK; NO; FI;<br>XK; LU; PT; RO;<br>UK; EL; SK; TR;<br>DE; RS; LV; MT   | 2 countries:<br>BE; SK | <b>PT</b> - Preparation of personalized dosage systems paid by Águeda Municipality   |
| <b>29</b> Teleconsultations by pharmacists  | 3 countries:<br>FR; NL; SE  | 2 countries:<br>IT; IE                           | 1 country:<br>FR                          | 13 countries:<br>BG; ES; DK; IT;<br>NO; CZ; XK; SI;<br>SK; DE; RS; EE; MT  |                        | <b>BG</b> - This can be part of standard pharmacy practice but there is no structural framework or regulations around this service.  |

| Pharmacy Services  | Provided in most pharmacies under contract, agreement, regulation | Provided in some pharmacies as a pilot | Remunerated by Govn / Health Payer      | Provided individually by some pharmacies   | Regulatory limitations | Observations  |
|--|---|--|---|--|------------------------|---|
| <b>30</b> Chronic disease management (e.g. hypertension, hyperlipidemia, diabetes, asthma, COPD, NOAC) | 3 countries: BE; FR; NL   | 2 countries: LU; RS                    | 3 countries: AT; BE; FR                 | 25 countries: AT; BG; HR; DK; IT; MK; CZ; FI; LU; PT; RO; SI; SE; ES; UK; EL; SK; TR; DE; RS; CY; EE; HU; LV; MT |                        | <b>AT</b> - remuneration in some cases: Management of hypertension could be remunerated partly by health insurance. <b>BG</b> - This can be part of standard pharmacy practice but there is no structural framework or regulations around this service. <b>CZ; DE; MT</b> - In some cases paid for by patients.   |
| <b>31</b> Other: Information to patients on conditions / treatments                                    | 3 countries: FI; UK; TR   |  | 1 country: NO                           | 6 countries: NL; NO; CZ; PL; SK; HU  |                        | <b>CZ</b> - Wound healing: In some cases, paid for by patients.   |
| <b>INDIVIDUAL CASE MANAGEMENT SERVICES</b>   |   |  |   |  |                        |   |
| <b>32</b> Dose Administration Aid  | 8 countries: BE; DK; FR; NL; NO; FI; IE; UK                       | 1 country: HR                          | 5 countries: NL; FI; IE; LU; SE         | 11 countries: AT; IT; MK; LU; PT; SE; ES; SK; EE; HU; MT   |                        | <b>AT</b> - paid for by patients or free service from pharmacy. <b>IE</b> - remunerated if patient is accepted by reimbursement scheme. <b>PL</b> - In community pharmacy pillboxes are not available. Few hospital pharmacies using the unit-dose system. <b>TR</b> - This service may refer to broken bulk dispensing which can be provided only by hospital pharmacies. <b>MT</b> - paid for by patients and Care Homes. <b>SE</b> - It is also available as a "private customer service" paid for by patients and Health Service; private consumers pay 99 SEK/month. |
| <b>33</b> Medication Review  | 11 countries: DK; FR; IT; NL; NO; CZ; PT; SI; ES; UK; DE          | 4 countries: NO; LU; DE; RS            | 7 countries: AT; DK; FR; NL; LU; SI; UK | 7 countries: AT; FI; SE; SK; RS; EE; MT  |                        | <b>AT</b> - Remunerated by patients or private health insurance. <b>DK</b> - paid for by patients or municipality. <b>CZ</b> -. In some cases, paid for by patients. <b>DE</b> - So far only remunerated in pilot: <u>ARMIN</u> . <b>LU</b> - only for asthma <b>FI</b> - paid for by patients. <b>SI</b> - This service is regulated by the Pharmacy Practice Act and based on doctor's referral <b>TR</b> - There is no structural framework or regulations, but it is supported and done by volunteer pharmacists.   |
| <b>34</b> Home or Nursing Home Medication Review   | 2 countries: DK; NL   | 1 country: AT                          | 3 countries: DK; NL; FI                 | 7 countries: FR; IT; NO; FI; IE; PT; DE  | 1 country: CZ          | <b>FI</b> - fee based on contracts with care units. <b>PT</b> - paid for by patients.   |
| <b>35</b> Medication Reconciliation  | 3 countries: NL; IE; PT   | 1 country: ES                          |   | 3 countries: BE; FI; SE  |                        | <b>NL</b> - Admission and discharge fees for pharmaceutical care at hospital treatment that does not include hospital admission but no remuneration for community pharmacist.   |
| <b>36</b> Therapeutic Substitution   | 3 countries: FR; NL; ES   |  |   | 3 countries: FR; TR; CY  |                        |   |
| <b>37</b> Deprescribing (e.g. benzodiazepines, antidepressants)  |   | 3 countries: ES; NL; DE                |   | 2 countries: IE; ES  |                        |   |
| <b>38</b> Integrated care pathways / protocols or Quality Circles in place with primary care           | 4 countries: BE; FR; NL; MT                                       | 2 countries: PT; DE                    | 2 countries: BE; FR                     | 3 countries: FR; NO; TR  |                        | <b>BE</b> - A financial incentive is foreseen on the one hand for local CMP meetings ("CMP projects") and on the other hand for quality promotion programs.   |



| Pharmacy Services  | Provided in most pharmacies under contract, agreement, regulation  | Provided in some pharmacies as a pilot | Remunerated by Govn / Health Payer  | Provided individually by some pharmacies      | Regulatory limitations | Observations   |
|--|--|--|---|---|------------------------|--|
| <b>39</b> High-Cost Therapy Dispensing and Management (e.g. Oncology, HIV, Rheumatoid Arthritis, Multiple Sclerosis) | 18 countries:<br>AT; BE; HR; FR;<br>IT; NL; NO; FI;<br>IE; LU; PL; SE;<br>UK; EL; TR; DE;<br>HU; MT                            | 3 countries:<br>ES; HR; PT             | 14 countries:<br>BE; BG; HR;<br>FR; IT; NL;<br>NO; IE; PL;<br>ES; UK; DE;<br>HU; MT                               | 6 countries:<br>BG; ES; IE; RS; CY;<br>HU     |                        | <b>IE</b> - paid for by patients or Health Service if on the High-Tech scheme. <b>CZ</b> - This service is provided only in hospital pharmacies. <b>SK</b> - We do not have a definition of high-cost therapy. These drugs are routinely dispensed but dispensing and management are not defined. <b>HU</b> - paid for by patients and Health Service. <b>MT</b> - paid for by patients and/or National Health Service in private practice and Government by contract for National Health Service patients. <b>DE</b> - Regular medicines remuneration scheme. <b>SE</b> - paid for by patients or Health Service. |
| <b>40</b> Drug dose titration (e.g. Insulin)   | 1 country:<br>NL   |  |   |   |                        |  |
| <b>41</b> Galenic formulation  | 24 countries:<br>AT; BE; DK; FR;<br>IT; NL; MK; NO;<br>CZ; FI; XK; LU;<br>PL; PT; RO; SI;<br>SE; ES; EL; SK;<br>TR; DE; LV; MT |  | 20 countries:<br>BE; NL; MK;<br>NO; CZ; FI;<br>XK; LU; PL;<br>PT; RO; SI;<br>SE; ES; EL;<br>SK; TR; DE;<br>LV; MT | 4 countries:<br>BG; HR; IE; RS                | 1 country:<br>SK       | <b>RS</b> - paid for by patients. <b>PT</b> - the price is established by decree-law nr. 769/2004 and it includes a fee regarding preparation.   |
| <b>42</b> Other _____  | 3 countries:<br>FR; NL; SI   |  |   | 7 countries:<br>FR; IT; NO; FI; PL;<br>TR; HU |                        |  |
| <b>SERVICES BASED ON HEALTH TECHNOLOGY ASSESSMENT (HTA)</b>  |  |  |   |   |                        |  |
| <b>43</b> Data collection on the effectiveness of new medicines  |  |  |   | 1 country:<br>NL                              |                        | <b>SK</b> - The pharmacy is obliged to report side effects to the State Institute for Drug Control.  |
| <b>44</b> Other _____  | 7 countries:<br>AT; FR; NL; LU;<br>PL; SE; SK  | 1 country:<br>LU                       | 1 country:<br>FR  | 7 countries:<br>CZ; PL; PT; UK; TR;<br>EE; HU |                        |  |

AT: Austria; BE: Belgium; BG: Bulgaria; CZ: Czech Republic; CY: Cyprus; DK: Denmark; DE: Germany; EE: Estonia; IE: Ireland; EL: Greece; ES: Spain; FI: Finland; FR: France; HR: Croatia; HU: Hungary; IT: Italy; LV: Latvia; LU: Luxembourg; MK: North Macedonia; MT: Malta; NL: The Netherlands; NO: Norway; PL: Poland; PT: Portugal; RO: Romania; RS: Serbia; SE: Sweden; SI: Slovenia; SK: Slovakia; TR: Turkey; UK: United Kingdom; XK: Kosovo

UTI: Urinary Tract Infection; Hep: Hepatitis; COPD: Chronic Obstructive Pulmonary Disease; NOAC: Novel Oral Anticoagulants

**Table 2.** Current pharmacy services in Europe – country overview

|  | Country |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |
|--|---------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|--|
| Service  | AT      | BE | BG | CY | CZ | DE | DK | EE | EL | ES | FI | FR | HR | HU | IE | IT | LU | LV | MK | MT | NL | NO | PL | PT | RO | RS | SE | SI | SK | TR | UK | XK |  |  |
| DISPENSING SERVICES  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |
| Night services   |         | €  |    | €  | €  | €  |    |    |    | €  |    | €  | €  |    |    | €  | €  |    |    | €  | €  |    | ♦  |    |    |    | €  | ♦  |    | €  |    |    |  |  |
| Emergency supply of prescription-only medicines without prescription |         |    |    |    |    |    |    |    |    |    | ♦  |    |    |    | ♦  |    |    |    |    | €  |    |    |    | ♦  |    |    |    |    |    | ♦  |    |    |  |  |
| Urgent supply of prescription-only medicines without prescription    |         |    |    |    |    |    |    |    |    |    | ♦  |    |    |    | ♦  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | €  |    |  |  |
| Repeat dispensing  |         |    | €  | €  | €  |    | ♦  | €  |    | €  |    | €  | €  |    | €  | ♦  |    |    |    |    |    |    |    |    |    |    | €  | €  | ♦  |    | €  |    |  |  |
| Generic Substitution   |         | ♦  |    |    |    |    |    |    | €  |    |    | €  |    |    | €  | ♦  | €  |    |    |    |    |    |    | ♦  |    |    | €  |    |    |    |    | ♦  |  |  |
| Refusal to dispense due to safety reasons                            |         |    |    |    |    |    |    |    |    |    |    | €  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | ♦  | ♦  |    |    |    |  |  |
| Home delivery  |         |    |    |    | ♦  | €  |    |    |    |    |    |    |    |    |    |    |    |    |    |    | €  | €  |    | ♦  |    |    |    |    |    |    | €  |    |  |  |
| Other  |         |    |    |    |    |    |    |    |    |    |    |    |    |    | €  |    |    |    |    |    | €  |    |    |    |    |    |    |    |    |    |    |    |  |  |
| HEALTH PROMOTION SERVICES  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |
| Handling and Disposal of Expired or Unwanted Medicines               |         |    |    |    |    |    |    |    |    |    |    |    |    |    | €  |    |    |    |    |    |    |    |    |    |    |    | €  |    | ♦  |    | €  |    |  |  |
| Needle/Syringe Exchange  |         |    |    |    |    |    |    |    |    | €  |    |    |    |    | €  |    |    |    |    |    |    |    |    | €  |    |    |    |    | ♦  |    | €  |    |  |  |
| Pharmacy Travel Health   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |
| Pharmacist-delivered vaccination                                     |         |    |    |    |    | €  | €  |    |    |    | ♦  | €  |    |    | €  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | €  |    |  |  |
| Weight Management  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | €  |    |  |  |
| Smoking Cessation  |         |    |    |    |    |    | €  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | €  |    |  |  |
| Health education   |         |    |    |    |    |    |    |    |    |    |    | €  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |
| Other  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |
| Continues on the next page   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |  |




*Continues on the next page*




| (Continuation)   | Country |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
|--|---------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| Service  | AT      | BE | BG | CY | CZ | DE | DK | EE | EL | ES | FI | FR | HR | HU | IE | IT | LU | LV | MK | MT | NL | NO | PL | PT | RO | RS | SE | SI | SK | TR | UK | XK |  |
| SCREENING AND REFERRAL SERVICES  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Common Ailment Management Schemes  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Screening individuals at-risk not on medication                          |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Predictive medicine  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Pharmacovigilance for medicines under additional monitoring              |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Scheduling visits / exams, delivery of reports                           |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Referral to other healthcare providers                                   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Other  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| DISEASE MANAGEMENT SERVICES  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Administering injectable medicines                                       |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Directly observed treatment/ Supervised Consumption of Medicines         |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| First time dispensing intervention                                       |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Instruction on use of therapeutic, self-monitoring device or medical aid |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Therapeutic adherence support  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Teleconsultations by pharmacists   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Chronic disease management   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Other  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Continues on the next page   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |

Continues on the next page

| (Continuation)   | Country |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
|--|---------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| Service  | AT      | BE | BG | CY | CZ | DE | DK | EE | EL | ES | FI | FR | HR | HU | IE | IT | LU | LV | MK | MT | NL | NO | PL | PT | RO | RS | SE | SI | SK | TR | UK | XK |  |
| INDIVIDUAL CASE MANAGEMENT SERVICES  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Dose Administration Aid  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Medication Review  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Home or Nursing Home Medication Review   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Medication Reconciliation  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Therapeutic Substitution   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Deprescribing  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Integrated care pathways / protocols or Quality Circles in place with primary care |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| High-Cost Therapy Dispensing and Management  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Drug dose titration  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Galenic formulation  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Other  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| SERVICES BASED ON HTA  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Data collection on the effectiveness of new medicines                              |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
| Other  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |

AT: Austria; BE: Belgium; BG: Bulgaria; CZ: Czech Republic; CY: Cyprus; DK: Denmark; DE: Germany; EE: Estonia; IE: Ireland; EL: Greece; ES: Spain; FI: Finland; FR: France; HR: Croatia; HU: Hungary; IT: Italy; LV: Latvia; LU: Luxembourg; MK: North Macedonia; MT: Malta; NL: The Netherlands; NO: Norway; PL: Poland; PT: Portugal; RO: Romania; RS: Serbia; SE: Sweden; SI: Slovenia; SK: Slovakia; TR: Turkey; UK: United Kingdom; XK: Kosovo

 Provided in most pharmacies under contract, agreement, regulation  
 Provided in some pharmacies as a pilot  
 Remunerated by Government / Payer

 Provided individually by some pharmacies  
 Provided in some pharmacies as a pilot and individually by some pharmacies  
 Regulatory limitations

### **3.1.2. Evidence on pharmacy services**

#### **Overviews of systematic reviews**

We identified 4 umbrella reviews (overviews) of systematic reviews – 3 on the effectiveness, and 1 on the economic evaluation of community pharmacy services. This included 111 systematic reviews (including possible duplicates). We did not assess degree of overlap in systematic reviews across overviews.

Mossialos et al. reviewed 33 systematic reviews published between 2000 and 2012 evaluating the effectiveness of community pharmacists in achieving expanded roles. Systematic reviews addressed disease management (11), medication monitoring (11), medication adherence (8), smoking cessation, weight management and immunization (5), screening and referral (3), and appropriate use of medications (2). Some reviews covered more than one pharmacy service. Findings were positive in: disease management (cardiovascular risk, diabetes, hypertension, lipid management, asthma, adherence to antihypertensive medication, and prescribing for mental health conditions); screening and referral (symptom management and continuity of care); and smoking cessation. Mixed or inconclusive findings were found for: weight management; medication monitoring; adherence to antidepressant medications; clinical decision support systems on recommending additional or alternative medications for chronic conditions; and impact of collaboration between general practitioners and pharmacists. Most reviews were not exclusive of community pharmacy and included diverse populations, interventions, and outcomes [13].

Rotta et al. reviewed 49 systematic reviews published between 2000 and 2010 (containing 269 unique randomized controlled trials) evaluating the effectiveness of clinical pharmacy services on the medication use process and on patients' health outcomes. Reviews included community pharmacy but were not exclusive of this setting. Systematic reviews addressed appropriateness of medication (16) of which 7 in the elderly, medication adherence (14), disease management (13), smoking

cessation (2), and miscellaneous interventions (5). Findings were positive in disease management, e.g. hypertension and diabetes. Medication adherence presented mixed results, the most successful interventions included electronic devices, reminders, blister packs (dose administration aids) and regular scheduled consultations with the pharmacist at prescription refill dates. Mixed findings were observed regarding appropriateness of medication in the elderly due to the different criteria in defining polypharmacy. This also includes different instruments to measure appropriateness which do not allow for comparison. Also, most remaining reviews did not focus on the elderly and showed positive results. Mixed findings were also found in smoking cessation [18].

Thomson et al. reviewed 15 systematic reviews published until January 2018 (containing 157 primary studies) evaluating the effectiveness of community pharmacy public health interventions in health promotion and disease prevention, and in screening. This overview excluded, however, pharmacy interventions on medication adherence, medication management and disease management. The systematic reviews addressed: smoking cessation, weight management, alcohol misuse, needle exchange, and immunization (7); screening (6). Two reviews were having multicomponent interventions. Positive findings were found for smoking cessation, flu immunization, and needle exchange. Pharmacy increased flu vaccination rates among people who had missed vaccination the previous year or would not have received otherwise a vaccine. Evidence also showed that one third of the vaccines were administered outside working days highlighting the accessibility of the community pharmacies network.

Positive evidence was also found for screening and referral covering a wide spectrum of diseases including cardiovascular, osteoporosis, diabetes, depression, sleep disorders, respiratory diseases, cancers, and chlamydia. Although many studies were not able to demonstrate confirming of early diagnosis by physicians [19].

Costa et al. reviewed 14 systematic reviews published until July 2017 (containing 75 primary studies) on the economic evaluation of community pharmacy public health interventions. Although this overview focused on methods, it included some findings. Nearly 44% of primary studies on the economic evaluation of pharmacy services were conducted in Europe. Primary studies included in systematic reviews addressed: diabetes, hypertension, hyperlipidemia, asthma and smoking cessation (40); medication management (13); high cost / case management, especially for the elderly on multiple medication (10 studies); adherence in new-to-therapy (5); screening (4); and immunization (2). Overall reviews reported favorable economic findings for 71% of studies with full economic evaluations, cost-consequence, or cost-minimization analysis [10].

Although overviews are quite different between one another and have different objectives, disease management, screening and referral, and smoking cessation seem very consistent in positive trend emerging from systematic reviews assessed by these overviews.

Degree of overlap in primary studies using CCA was reported for Costa et al. (4.4%) indicating just a slight degree of overlap.

Table 3 presents a summary of findings of overviews.

**Table 3.** Summary of findings of included overviews

| First author (year) [REF] | Search period   | Objective   | No. included systematic reviews (n) | Interventions + trend  | Interventions +/- trend   |
|---------------------------|-----------------|---|-------------------------------------|--|---|
| Mossialos (2013) [13]     | 2000-2012       | Effectiveness   | 33                                  | Disease management (cardiovascular risk, diabetes, hypertension, lipid management, asthma, adherence to antihypertensive medication, prescribing for mental health)<br>Screening and referral<br>Smoking cessation | Weight management<br>Medication monitoring<br>Adherence antidepressants<br>Clinical decision support systems on medications for chronic conditions<br>Impact of collaboration GPs and pharmacists |
| Rotta (2015) [18]         | 2000-2010       | Effectiveness   | 49 (~ 269 RCT)                      | Disease management (e.g hypertension and diabetes)<br>Medication review not on the elderly   | Medication adherence<br>Appropriate medication in the elderly<br>Smoking cessation  |
| Thomson (2019) [19]       | Until Jan 2018  | Effectiveness in health promotion, disease prevention, screening<br>OBS: Medication and disease management excluded | 15 (~ 157 primary studies)          | Smoking cessation<br>Flu immunization<br>Needle exchange<br>Screening and referral (cardiovascular, osteoporosis, diabetes, depression, sleep disorders, respiratory diseases, some cancers, chlamydia)            | <i>In screening, many studies not able to demonstrate confirming of early diagnosis by physicians.</i>  |
| Costa (2019) [10]         | Until July 2017 | Economic evaluation OBS: Focusing on methods  | 14 (~ 75 primary studies)           | In 71% of studies with full economic evaluations, cost-consequence, or cost-minimization analysis  | In remaining 29%.   |

+: Positive; +/-: Mixed or unclear; OBS: Observation; RCT: Randomized Controlled Trial; GP: General Practitioner



## **Systematic reviews**

### ***Description of included systematic reviews***

Our search identified 38 systematic reviews containing 242 included publications (including overlapping) corresponding to 149 unique primary studies meeting the inclusion criteria. A Corrected Covered Area (CCA) value of 2% was obtained, indicating a minimal degree of overlap of primary studies in systematic reviews.

Search dates of systematic reviews varied from inception to March 2020.

The reviews were published in 28 different journals: 11 in disease / medical journals; 9 in pharmacy journals; 4 in health economics journals; 3 in health policy journals; and 1 in epidemiology journal.

With a few exceptions, most systematic reviews tend to include studies addressing diverse settings, populations, interventions, outcomes, and study designs.

Only 2 reviews focused exclusively on the community pharmacy setting [20][21]. The included primary studies were, on average, 33% of all studies included in systematic reviews.

These systematic reviews address interventions provided in European community pharmacies covering more than 25 different health conditions or risks, namely: diabetes; polypharmacy and/or elderly; hyperlipidemia; hypertension; asthma and chronic obstructive pulmonary disease (COPD); depression; common / minor ailments (covering more than 40 minor conditions); smoking, overweight / obesity and/or alcohol disorder; coronary heart disease (CHD); heart failure (HF) and myocardial infarction (MI); chronic pain, headache and migraine; dementia in institutionalized patients; osteoporosis; sleep disorder; metabolic syndrome; HIV; cancer (prostate, colorectal, cervix); Parkinson's disease; etc.

Disease management and individual case management services represented most interventions addressed in systematic reviews, followed by screening and referral services. A few reviews described health promotion and disease prevention

services. We did not find reviews including primary studies addressing dispensing related services.

Twenty-one systematic reviews reported including studies with a comparator, 10 reviews did not report on comparator, and 9 reviews reported no comparator in included studies.

Outcomes are very diverse, across and within interventions, and include metrics captured at the pharmacy either through patient measurements or patient reported outcomes using validated health scales or surveys, or through electronic data capturing, such as: surrogate clinical outcomes (e.g. blood pressure, blood glucose, lipids, weight, cardiovascular risk assessment; diabetes risk assessment, asthma control test, minor ailment assessment, quit rates, etc); health services utilization and economic outcomes (emergency room visits, hospital admissions, costs, costs and outcomes, cost-effectiveness, cost-utility, etc); and humanistic outcomes (quality-of-life, health status, disease symptoms, satisfaction, etc). Process indicators were also frequently reported, including: medication adherence; drug-related problems; adverse events; etc.

Twenty-one reviews included randomized controlled trials (RCTs and cluster RCTs), nonrandomized controlled trials (NRCT), and repeated measures (RM). Nineteen reviews included economic studies (EE) of which 10 are including economic evaluation studies only.

Table 4 summarizes the characteristics of included systematic reviews.

**Table 4.** Characteristics of included systematic reviews

| First author, Year [REF] | Search period             | Objective (short)  | No. (%) incl. studies | Countries of origin                            | Populations   | Pharmacy-based or -led Interventions  | Comparators          | Outcomes   | Study designs      |
|--------------------------|---------------------------|--|-----------------------|--|---|---|----------------------|--|--------------------|
| McDerby, 2020 [22]       | Until Nov 2018            | To evaluate outcomes associated with pharmacist-led medication reviews in residential aged care facility residents with dementia.  | 3 (50%)               | Denmark; Netherlands; UK                       | Residential aged care facility residents with dementia  | Medication review by community pharmacist for residents with dementia and pain  | No                   | Pain intensity scores; Number of pharmacist recommendations; Recommendation acceptance rate by GPs | 2 Non EPOC, 1 RCTs |
| Reeves, 2020 [23]        | 1 Jan 1995 to 31 Jan 2018 | To review reports of RCTs on the effectiveness of pharmacists' intervention to improve BP control and medication adherence in patients with hypertension.                  | 2 (6%)                | Portugal; Spain                                | Adult patients with Type 2 diabetes; adults with hypertension treated for less than 6 months  | Chronic disease management (hypertension)   | Yes                  | BP   | 2 RCTs             |
| Sanyal, 2019 [24]        | Until 5 Feb 2019          | To conduct a systematic review of cost-utility studies of community-based services provided by pharmacists and to examine reporting and methodological quality.            | 12 (60%)              | Belgium; France; Italy; Netherlands; Spain; UK | Patients with polypharmacy or chronic diseases (respiratory disease, depression, osteoporosis), smokers or patients on lipid-lowering therapy | Medication review, chronic disease management in primary care, smoking cessation, reducing medication errors, screening | Yes, some usual care | Almost all ICER (2 exceptions: QALYs and QALDs)  | 12 EE              |
| Sanyal, 2020 [25]        | Until Feb 2019            | To review the reporting and methodological quality of full economic evaluations of services provided by community pharmacists.   | 9 (45%)               | Netherlands; UK                                | Elderly patients at high risk of potentially serious medication errors, patients with depression, smokers, chronic conditions                 | Chronic disease management, medication review, smoking cessation, medication management                                 | Yes, usual care      | ICER; costs; costs/life-year; cost-savings; life-years gained; adherence; hospital admissions      | 9 EE               |
| Dann-Reed, 2020 [26]     | 1974 to Jul 2016          | To identify, describe, and evaluate the quality of the research for dementia-specific pharmacy-based interventions with potential for delivery through community pharmacy. | 2 (7%)                | UK   | People with dementia  | Chronic disease management  | Not reported         | Not reported   | 2 Non EPOC         |

| First author, Year [REF]   | Search period                    | Objective (short)   | No. (%) incl. studies | Countries of origin  | Populations   | Pharmacy-based or -led Interventions  | Comparators                                      | Outcomes  | Study designs                    |
|----------------------------|----------------------------------|---|-----------------------|--|---|---|--|---|----------------------------------|
| Gudi, 2019 [27]            | 1 Jan 2008 to 31 Dec 2018        | To address the impact of pharmacist-led home medicines review services on identifying drug-related problems among the elderly population in home care.              | 1 (10%)               | Germany  | Elderly population (not institutionalized)                      | Medication review (inappropriate medicines, drug-drug interactions)   | No comparator                                    | Drug-drug interactions (DDIs)   | 1 Non EPOC                       |
| Anthony, 2019 [28]         | Not reported                     | To review economic evaluations of nurses, pharmacists, and other allied health professionals in primary care as substitutes for some of the tasks performed by GPs. | 1 (17%)               | UK   | Patients consulting in primary care with coronary heart disease | Medication management   | Yes, usual care from GP                          | Appropriate treatment; SF-36 and EQ-5D; total NHS costs; intervention direct costs and NHS treatment costs; indirect costs of training. | 1 EE                             |
| Buss, 2018 [29]            | Until Nov 2017                   | To evaluate the effectiveness and analytical quality of point-of-care tests performed in the community pharmacy.  | 1 (9%)                | Spain  | Not reported  | Point-of-care testing (HIV)   | Yes, regional surveillance for new HIV diagnoses | Test result   | 1 NRCT                           |
| Singh, 2018 [30]           | 2000 to 2018                     | To synthesize the available empirical evidence regarding pharmacy health coaching and to define it.   | 4 (40%)               | Denmark; Netherlands   | Patients with hypertension or depression                        | Health coaching   | Not reported                                     | Health outcomes; cost-effectiveness; drug attitude; medication management/adherence; relationship between professionals                 | 1 EE, 2 RCTs, 1 Non EPOC         |
| Crespo-Gonzalez, 2018 [31] | Not reported. Search in Dec 2016 | To analyze the intervention dose, and core components of the intervention provided by pharmacists in asthma management.   | 9 (29%)               | Belgium; Bulgaria; Denmark; Finland; France; Germany; Malta; Spain | Asthma patients   | Chronic disease management; counseling sessions on disease, medication, symptoms, adherence, triggers, inhaler technique; Peak Flow Meter, referral to GP | Not reported                                     | Number of patients referred; duration and frequency of intervention; number of patients receiving the intervention, etc                 | 1 Non EPOC, 1 RM, 5 RCTs, 2 NRCT |

| First author, Year [REF]     | Search period                                  | Objective (short)  | No. (%) incl. studies | Countries of origin                               | Populations   | Pharmacy-based or -led Interventions   | Comparators  | Outcomes   | Study designs  |
|------------------------------|--|--|-----------------------|---|---|--|--------------|--|----------------|
| Deters, 2018 [32]            | Jan 2000 to Feb (PubMed) / Apr (Cochrane) 2016 | To evaluate randomized controlled trials that included interventions provided by community pharmacists for patients with type 1 and 2 diabetes.                                  | 3 (27%)               | Belgium; Spain; UK                                | Type 2 diabetes patients  | Medication therapy management  | Not reported | HbA1c; BG; BP; lipid profile; weight; diabetes knowledge; health status; patients' satisfaction; medication beliefs; drug-related outcomes; adherence  | 3 RCTs         |
| Teljeur, 2017 [33]           | Until 4 Mar 2015                               | To review the evidence on the costs and cost-effectiveness of self-management support interventions for people with diabetes.  | 1 (3%)                | Bulgaria  | Patients with type 2 diabetes   | Chronic disease management; educational programme  | No           | BG; QoL; costs   | 1 EE           |
| Mohammed, 2016 [34]          | 2005 to Sept 2015                              | To evaluate the impact of pharmaceutical care interventions on health-related quality of life.   | 7 (15%)               | Belgium; Germany; Spain; UK                       | Chronic disease (headache, migraine, Parkinson's disease, asthma, stroke, diabetes, COPD, depression)                         | Pharmaceutical care  | Yes          | HRQoL (generic and disease-specific)   | 3 NRCT, 4 RCTs |
| McCullough, 2016 [35]        | Until Mar 2015                                 | To describe behavioral change theories used in adherence interventions in adults with chronic respiratory disease, content, provider, delivery, setting, frequency and duration. | 2 (4%)                | Belgium   | Adults with COPD with daily maintenance medication in community setting   | Education and monitoring: leaflets, demonstration inhalers, nonadherence, COPD medication, self-management, smoking cessation.       | Yes          | Adherence (medication possession ratio)  | 2 RCTs         |
| Sabater-Hernández, 2016 [36] | Until 30 Nov 2014                              | To identify community pharmacy evidence-based services designed to help prevent CVD.   | 11 (69%)              | Belgium; Netherlands; Portugal; Spain; Sweden; UK | Patients with cardiovascular risk factors (type 2 diabetes, hypertension, dyslipidaemia, overweight/obese, smokers), HF or MI | Prevention of CVD: activities directed at patients, at health care professionals, and assessments to support the previous activities | Yes          | BP; BG; HbA1c; hypo- and hyperglycemic episodes; TC; TG; HDL-C; LDL-C; BMI; albumin-creatinine ratio; CV risk; health status; adverse drug reactions; drug-related problems. Process, patient behaviors (incl. adherence), determinants of behaviors assessed. | 11 RCTs        |

| First author, Year [REF] | Search period                      | Objective (short)   | No. (%) incl. studies | Countries of origin                  | Populations  | Pharmacy-based or -led Interventions   | Comparators                                 | Outcomes   | Study designs            |
|--------------------------|------------------------------------|---|-----------------------|--------------------------------------|--|--|---|--|--------------------------|
| Brown, 2016 [37]         | Until May 2014                     | To review the effectiveness of community pharmacy-delivered interventions for alcohol reduction, smoking cessation and weight management.                   | 9 (39%)               | Netherlands; UK                      | Adults with alcohol use disorders, smokers or overweight   | Brief alcohol advice; smoking cessation intervention 12 weeks; smoking cessation advice; computer-generated tailored advice to aid smoking cessation; "My Choice Weight management programme". | Yes, usual care or group-based intervention | AUDIT scores, % harmful drinkers; consumption, problems and dependence; EQ-5D; FAST score; number of alcohol-free days per week; barriers/ facilitators; CO-validated quit rates; self-reported quits (or abstinence or point prevalence); cessation aids; pharmacy staff perceptions; weight; BMI; waist circumference; physical activity; SF-12; costs; cost-effectiveness; cost-utility | 5 EE, 4 RCTs             |
| Lindsey, 2015 [38]       | Until Jun 2015                     | To review the literature to identify and assess the current evidence for the role of community pharmacies in delivering early cancer detection initiatives. | 4 (33%)               | Germany; Italy; Spain                | Patients at-risk for cancer (prostate, colorectal, cervix) | Screening (cancer)   | Yes, some                                   | Increasing awareness and knowledge; referral; influencing patient's behavior; outcomes (FOB/FIT, PSA, Pap/HPV DNA); health outcomes (cancer diagnosis). Number of positive test results, detection rate, acceptance, participation   | 3 CS, 1 RCTs             |
| Antoine, 2014 [39]       | Not reported. Search in March 2013 | To analyze the effectiveness of adherence-enhancing pharmacist interventions for oral medication in type 2 diabetes mellitus.                               | 1 (17%)               | Belgium                              | Type 2 diabetes patients                                   | Chronic disease management (education & reminders for annual eye and foot examinations (baseline, at refill, for 6 months)   | Yes, usual care                             | Prescription refill rate & self-reported adherence   | 1 RCTs                   |
| Bolen, 2014 [40]         | Until Nov 2011                     | To evaluate the effectiveness and safety of interventions for adults with type 2 diabetes.  | 2 (1%)                | Spain; Sweden                        | Type 2 diabetes patients                                   | Chronic disease management   | Yes, usual care                             | Changes in: HbA1c; systolic BP; body weight; lipids  | 2 RCTs                   |
| Fathima, 2013 [41]       | Jan 2003 to Mar 2013               | To evaluate the role of community pharmacists in provision of screening with/without management of undiagnosed COPD and uncontrolled asthma.                | 9 (53%)               | Belgium; France; Portugal; Spain; UK | Not reported   | Screening of disease control/risk factors in asthma and COPD; chronic disease management   | Not reported                                | Asthma control; patients' perception; controller medication and physician visits; knowledge and attitudes; inhaler technique; adherence; asthma exacerbation; asthma QoL; patients at high risk of COPD  | 5 CS, 2 RCTs, 2 Non EPOC |

| First author, Year [REF] | Search period                         | Objective (short)   | No. (%) incl. studies | Countries of origin              | Populations  | Pharmacy-based or -led Interventions  | Comparators                                  | Outcomes  | Study designs           |
|--------------------------|---------------------------------------|---|-----------------------|----------------------------------|--|---|--|---|-------------------------|
| Paudyal, 2013 [20]       | 2001 to 2011                          | To explore the effect of pharmacy-based minor ailment schemes on patient health- and cost-related outcomes; and impact on general practices.                                    | 31 (100%)             | UK                               | Not reported   | Minor ailment schemes (wide range of conditions (>40), most frequent: head lice, diarrhoea, constipation, Vaginal candidiasis)  | Not reported                                 | % patients with improvement following consultation; types of minor ailments in reconsultation or referral; impact on GP costs for minor ailments; no. GP or nurse consultations for minor ailments in same area as pharmacies; no. medicines supplied for minor ailments; patient and stakeholder perspectives / satisfaction | 6 CS, 1 Non EPOC, 24 EE |
| Ayorinde, 2013 [42]      | Jan 1990 to Aug 2012                  | To assess the evidence about the feasibility and acceptability of community pharmacy-based screening for major diseases.  | 11 (22%)              | Ireland; Spain; Switzerland ; UK | General public or patients at risk                                   | Screening: CV disease (high BP, high TC, 10-year risk of CV disease, diabetes (incl. high BG), sleep disorder, COPD (incl. spirometry), osteoporosis (incl. bone mineral density), smoking. | No   | % of participants at risk; referrals to other healthcare providers; accuracy of screening tests; awareness of disease; perceptions including satisfaction; economic outcomes  | 11 CS                   |
| Gudka, 2013 [43]         | Until 30 Oct 2011                     | To determine types of pharmacy-based chlamydia screening interventions, uptake rates, acceptability issues, and barriers.   | 7 (58%)               | Netherlands; UK                  | Clients requesting a test or when dispensing emergency contraception | Screening for chlamydia   | No   | Uptake of screening; acceptability or barriers to screening   | 5 CS, 1 Non EPOC, 1 EE  |
| Kapadia, 2013 [44]       | 1 Jan 1995 to 30 Jun 2011             | To estimate the prevalence of Chlamydia infection among those screened in community pharmacies.   | 8 (73%)               | Netherlands; UK                  | Clients requesting a test or when dispensing emergency contraception | Screening for chlamydia   | No   | Test kit acceptance rate or return rate   | 7 CS, 1 EE              |
| Brown, 2019 [45]         | Until Dec 2018 (CCMD-CTR to Jun 2016) | 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. | 2 (17%)               | Netherlands; Spain               | Adult patients with depression beginning treatment                   | Patient education on disease and medication use; medical and pharmaceutical care plus support programme; patient education and adherence  | Yes, usual care from pharmacist or physician | Medication adherence; self-rated mental health; drug attitude; attrition (acceptability); cost-effectiveness; clinical severity (PQ-9); anxiety (STAI-S); EQ-5D; satisfaction; adverse effects  | 2 RCTs                  |
| van Driel, 2016 [46]     | Until Feb (databases) and Jul         | To assess the effects of interventions aimed at improving adherence to lipid-lowering drugs,  | 3 (9%)                | Belgium; Netherlands             | Patients average age 60; and new users of statins age 18 and above   | 5 counselling sessions on adherence, benefits of statin use with electronic   | Yes, usual care                              | Adherence (time to discontinuation, medication possession ratio); lipid levels; persistence   | 3 RCTs                  |

| First author, Year [REF] | Search period                         | Objective (short)   | No. (%) incl. studies | Countries of origin                               | Populations  | Pharmacy-based or -led Interventions   | Comparators                      | Outcomes  | Study designs        |
|--------------------------|---------------------------------------|---|-----------------------|---|--|--|----------------------------------|---|----------------------|
|                          | (registries) 2016                     | focusing on adherence and clinical outcomes.  |                       |   |  | reminder; review of dosing history using reminders                                       |                                  |   |                      |
| Hatah, 2014 [47]         | Until Feb 2011                        | To examine the impact of fee-for-service pharmacist-led medication review on patient outcomes and quantify this according to the type of review undertaken.         | 12 (38%)              | Belgium; Denmark; Germany; Malta; Netherlands; UK | Elderly or chronic disease patients (asthma, CHD, HF on loop diuretics, dyslipidaemia on atorvastatin), previous transient ischaemic attack or ischaemic stroke, or discharged from hospital | Medication reviews: clinical medication reviews; adherence reviews; other type of review | Not reported                     | Disease control (asthma control/severity), self-reported symptoms, hospitalization, mortality; adherence, medication and medical costs, healthcare resource use, QoL  | 3 EE, 8 RCTs, 1 NRCT |
| Altowaijri, 2013 [48]    | Until Feb 2011                        | To perform a systematic review assessing the effectiveness of clinical pharmacist interventions within a multidisciplinary team in the secondary prevention of CVD. | 10 (19%)              | Netherlands; Spain; Sweden; UK                    | Patients with heart failure, CHD, or with CV risk factors  | Medication management; educational intervention  | Yes, usual care/no intervention  | CVD; CVD risk factors (diabetes control, smoking cessation, blood pressure control, lipid control); adherence; knowledge; satisfaction; quality-of-life; drug-related problems; hospitalization, ER visits, costs | 5 RCTs, 5 EE         |
| Cai, 2013 [49]           | Until Jul 2012 (updated in Sept 2013) | To evaluate the role of pharmacist care on mortality, morbidity, and the CHD management.  | 1 (20%)               | UK  | CHD patients; patients on: aspirin, lipid-lowering drug, $\beta$ -blocker, or ACE inhibitor  | MEDMAN (medicines management)  | Yes, usual care                  | Adherence and BP control  | 1 EE                 |
| Hadi, 2014 [50]          | Until Jun 2012 (for most databases)   | To evaluate the effectiveness of pharmacist-led medication review in chronic pain management.   | 1 (20%)               | Germany   | Patients with chronic pain (headache and migraine) age $\geq 18$ years   | Face-to-face medication review plus advice on pacing activities and goal setting         | Yes, usual care with no training | Pain intensity; physical functioning (subscale of SF-36); QoL (SF-36)   | 1 RCTs               |
| Al Adawi, 2020 [51]      | Jan 2008 to Mar 2020                  | To review the evidence on pharmacists' input to the screening, prevention, and management of metabolic syndrome.  | 1 (10%)               | Spain   | Adult patients screened for metabolic syndrome risk factors.   | Screening for pre-metabolic syndrome and cardiovascular risk factors                     | No                               | Prevalence of MetS, presence of CV risk and factor; facilitators and barriers of effective implementation   | 1 CS                 |



| First author, Year [REF] | Search period        | Objective (short)   | No. (%) incl. studies | Countries of origin                                 | Populations  | Pharmacy-based or -led Interventions  | Comparators  | Outcomes  | Study designs |
|--------------------------|----------------------|---|-----------------------|---|--|---|--|---|---------------|
| Wang, 2016 [52]          | Jan 2006 to Dec 2014 | To review and evaluate the most recent literature on the economic outcomes of pharmacist-managed services in people with diabetes.                                  | 1 (4%)                | Bulgaria  | Type 2 diabetes with no severe complications, on monotherapy, no insulin   | Five education sessions on: type 2 diabetes and self-monitoring; effect of obesity on insulin sensitivity and advantages of weight reduction; foot care; diabetes-related eye diseases; possible adverse drug reactions | Yes, historical self-control (usual care primary care) | Economic  | 1 EE          |
| Peletidi, 2016 [53]      | 1990 to 2014         | To evaluate the evidence on training, interventions, outcomes, and cost-effectiveness of pharmacy-led smoking cessation services within the UK.                     | 5 (83%)               | UK  | Smokers  | One-to-one counselling; smoking programs  | Yes, group therapy or as control                       | Cessation rates; training; cost per participant; cost-effectiveness | 2 EE, 3 RCTs  |
| Perraudin, 2016 [21]     | From 1 Jan 2004      | To synthesize cost-effectiveness analyses on professional pharmacy services in Europe in order to contribute to current debates on their funding and reimbursement. | 21 (100%)             | Belgium; Denmark; France; Netherlands; Spain; UK    | Patients: at risk of serious medication errors; with minor illness; elderly with polypharmacy; COPD; initiating lipid-lowering therapy; with chronic pain; prescribed new antidepressant; with CHD; smokers; at risk for sleep apnea; young women requesting contraceptive | Interventions to: enhance medicine safety and access to medicines; improve outcomes; improve public health. No studies on interventions to improve the efficiency and quality of the health system.                     | Yes, usual care/feedback to the GP/self-quit scenario  | Effectiveness and economic outcomes                                 | 21 EE         |
| Loh, 2016 [54]           | Until 31 Aug 2015    | To evaluate the effects of medication review on health-related quality-of-life and healthcare costs in the elderly.   | 7 (28%)               | Belgium; Multiple countries; Netherlands; Spain; UK | Community dwelling patients with specific disease states and participants with non-specific conditions   | Medication review, patient-directed education addressing drug-related problems, subsequent follow-up  | Not reported   | Economic and humanistic (e.g HRQoL)                                 | 4 EE, 3 RCTs  |
| Malet-Larrea, 2016 [55]  | Until Sept 2015      | To determine cost-effectiveness of professional pharmacy services to patients attending community pharmacies.   | 9 (39%)               | Belgium; Multiple countries; Netherlands; Spain; UK | Not systematically reported  | Pharmacy face-to-face interaction (and telephone-based intervention in one study).  | Yes, usual care  | Costs and outcomes; ICER  | 9 EE          |

| First author, Year [REF] | Search period | Objective (short)   | No. (%) incl. studies | Countries of origin | Populations  | Pharmacy-based or -led Interventions  | Comparators  | Outcomes  | Study designs |
|--------------------------|---------------|---|-----------------------|---------------------|--|---|--------------|---|---------------|
| Gammie, 2017 [56]        | 2010 to 2015  | To review the literature on methods of economic evaluations of hospital and community pharmacy services in publicly funded health systems, clinical outcomes, and economic effectiveness. | 7 (50%)               | France; Spain; UK   | Not reported   | Medication or disease-specific education to patients and GPs, medication management programs, review of physician-implemented medicine plans, or follow-up support to patients. | Not reported | Improvements in patient health outcomes; reductions in nonscheduled GP visits, ER visits, hospital bed days, medication errors, and adverse events; and increases in HRQoL. | 7 EE          |
| Elliott, 2014 [57]       | 2003 to 2013  | To set out the methodological strengths, weaknesses and challenges associated with analysing the cost effectiveness of pharmacist interventions.  | 12 (39%)              | Netherlands; UK     | Patients with chronic disease (CV disease, asthma, depression, HIV 1), smokers, elderly, with minor ailments; chlamydia screening participants | Interventions focusing on supporting the prescribing of medicines; use of medicines; screening and education programs and a combination of all.                                 | Not reported | Economic  | 12 EE         |

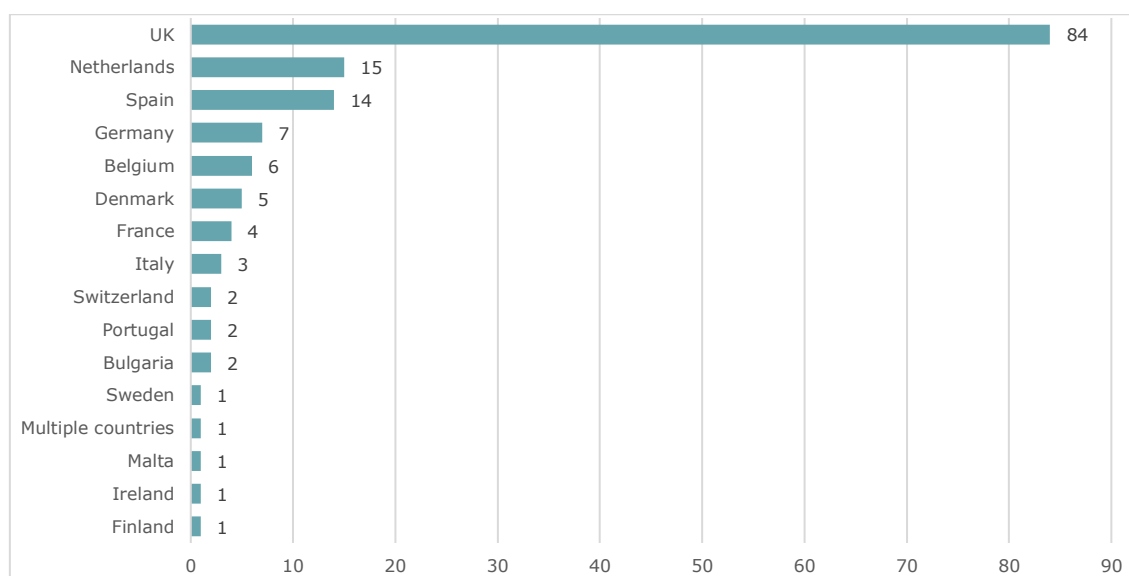
CS: Cross-sectional study; EE: Economic Evaluation; Non EPOC: NON EPOC; NRCT; Non-randomized trial; RCT: Randomized trial; RM: Repeated Measures

## ***Description of European community pharmacy primary studies reported in systematic reviews***

Nearly 56% of primary studies in community pharmacy (CP) in Europe covered in systematic reviews were from the UK, 10% from the Netherlands, 9% from Spain, 5% from Germany, 4% from Belgium, 3% from Denmark, and 2.7% from France. These 7 countries have around 90% of research in Europe on community pharmacy interventions. These primary studies were included in systematic reviews.

Figure 1 illustrates countries of research origin of community pharmacy studies in Europe.

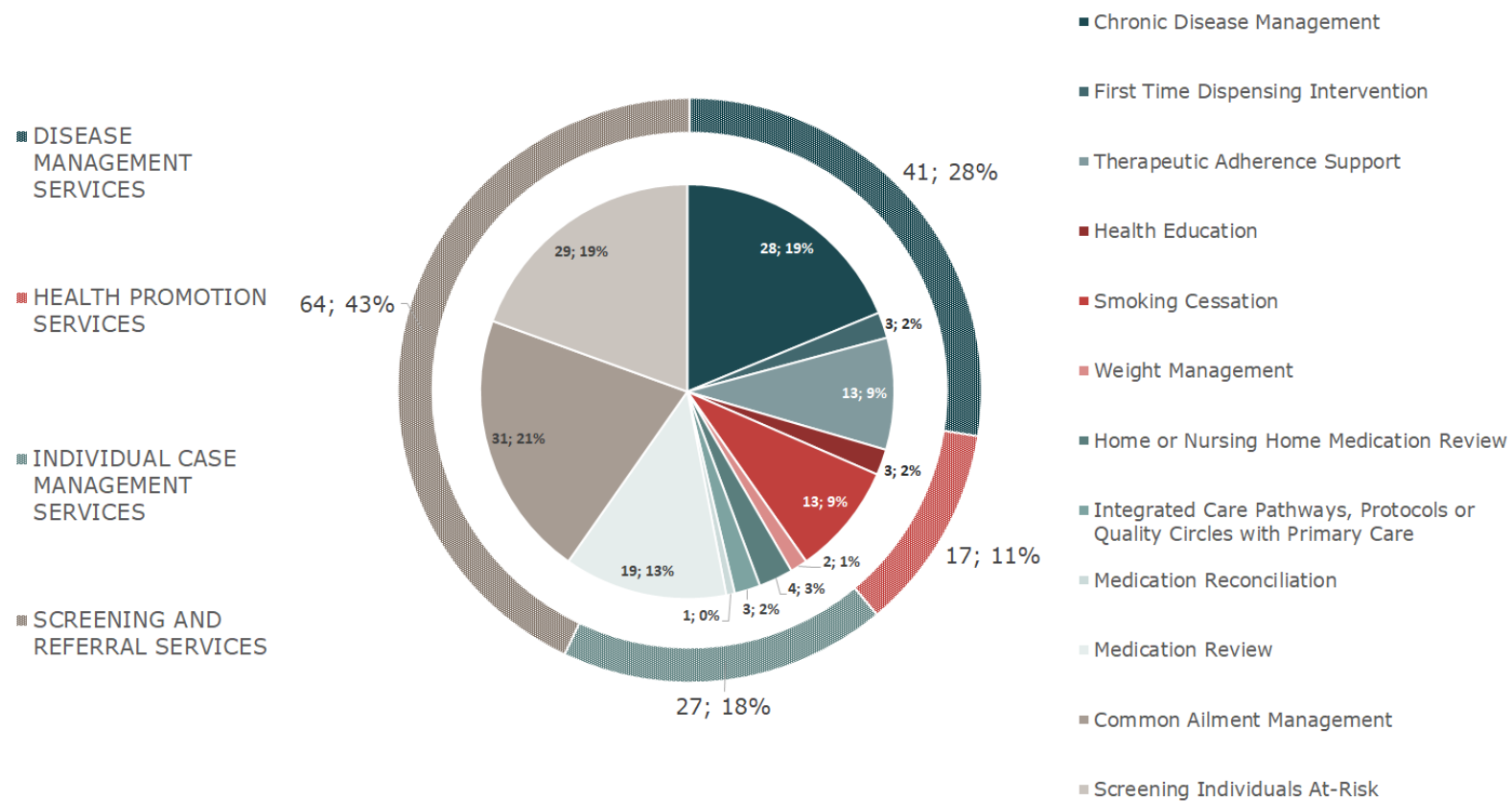
**Fig. 1.** No. community pharmacy (CP) primary studies in Europe per country of research origin



Screening and referral services were the most frequent intervention category in primary studies in Europe included in reviews (64 studies, 43%), followed by disease management services (41 studies, 28%), individual case management services (27 studies, 18%), and health promotion services (11%).

Figure 2 illustrates the number and type of CP primary studies in Europe. This is per intervention category and per service.

**Fig. 2.** No. CP primary studies in Europe per intervention



The top 6 researched pharmacy-based interventions represent 89% of the primary studies in Europe. This includes: screening at-risk individuals (22% of primary studies); common / minor ailment screening and treatment (21%); chronic disease management (17%); medication review and medication therapy management (13%); therapeutic adherence support (9%); and smoking cessation (8%).

Integrated care pathways with primary care, medication reconciliation, and first-time dispensing already appeared in few studies included in the systematic reviews.

It was observed that the chronic disease management and screening at-risk individuals were the two interventions in primary studies conducted across a wide number of countries.

Table 5 provides an overview of country of research origin per intervention.

**Table 5.** Country of research origin of interventions in CP primary studies in Europe

| Intervention   | BE       | BG       | DK       | FI       | FR       | DE       | IE       | IT       | MT       | NL        | PT       | ES        | SE       | CH       | UK        | Mult*    | Grand Total | CP primary studies included (REFs) |
|--|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|-----------|----------|----------|-----------|----------|-------------|------------------------------------|
| <b>HEALTH PROMOTION SERVICES</b>   |          |          | 1        |          |          |          |          |          |          | 1         | 1        |           |          |          | 14        |          | 17          |                                    |
| Health education   |          |          |          |          |          |          |          |          |          |           | 1        |           |          |          | 2         |          | 3           | [58–60]                            |
| Smoking Cessation  |          |          | 1        |          |          |          |          |          |          | 1         |          |           |          |          | 10        |          | 12          | [61–72]                            |
| Weight Management  |          |          |          |          |          |          |          |          |          |           |          |           |          |          | 2         |          | 2           | [73,74]                            |
| <b>SCREENING AND REFERRAL SERVICES</b>                                   | 1        |          |          |          | 2        | 1        | 1        | 2        |          | 1         | 1        | 5         |          | 2        | 48        |          | 64          |                                    |
| Common / Minor Ailment Management  |          |          |          |          |          |          |          |          |          |           |          |           |          |          | 31        |          | 31          | [75–105]                           |
| Screening Individuals At-Risk  | 1        |          |          |          | 2        | 1        | 1        | 2        |          | 1         | 1        | 5         |          | 2        | 17        |          | 33          | [106–138]                          |
| <b>DISEASE MANAGEMENT SERVICES</b>                                       | 4        | 2        | 3        | 1        | 2        | 2        |          |          | 1        | 8         |          | 7         | 1        |          | 10        |          | 41          |                                    |
| Chronic disease management   | 3        | 2        | 1        | 1        | 2        | 2        |          |          | 1        | 1         |          | 5         | 1        |          | 6         |          | 25          | [139–163]                          |
| First Time Dispensing Intervention                                       |          |          |          |          |          |          |          |          |          |           |          | 1         |          |          | 2         |          | 3           | [164–166]                          |
| Therapeutic adherence support  | 1        |          | 2        |          |          |          |          |          |          | 7         |          | 1         |          |          | 2         |          | 13          | [166–178]                          |
| <b>INDIVIDUAL CASE MANAGEMENT SERVICES</b>                               | 1        |          | 1        |          |          | 4        |          | 1        |          | 5         |          | 2         |          |          | 12        | 1        | 27          |                                    |
| Home or Nursing Home Medication Review                                   |          |          | 1        |          |          |          |          |          |          | 1         |          |           |          |          | 2         |          | 4           | [179–182]                          |
| Integrated Care Pathways, Protocols or Quality Circles with Primary Care |          |          |          |          |          |          |          |          |          |           |          |           |          |          | 3         |          | 3           | [183–185]                          |
| Medication Reconciliation  |          |          |          |          |          |          |          |          |          | 1         |          |           |          |          |           |          | 1           | [186]                              |
| Medication Review and Medication Therapy Management                      | 1        |          |          |          |          | 4        |          | 1        |          | 3         |          | 2         |          |          | 7         | 1        | 19          | [187–204]                          |
| <b>Total</b>   | <b>6</b> | <b>2</b> | <b>5</b> | <b>1</b> | <b>4</b> | <b>7</b> | <b>1</b> | <b>3</b> | <b>1</b> | <b>15</b> | <b>2</b> | <b>14</b> | <b>1</b> | <b>2</b> | <b>84</b> | <b>1</b> | <b>149</b>  |                                    |

BE: Belgium; BG: Bulgaria; DK: Denmark; FI: Finland; FR: France; DE: Germany; IE: Ireland; IT: Italy; MT: Malta; NL: The Netherlands; PT: Portugal; ES: Spain; SE: Sweden; CH: Switzerland; UK: United Kingdom; \* Multiple countries: DH, DE, NL, UK, PT, IE, SE

CP: Community Pharmacy

Primary studies comprise 149 studies of which 85 studies addressing effectiveness or impact and 64 economic evaluations. Of 85 studies, 36 are randomized controlled trials (RCTs), 5 non-randomized trials (NRCTs), 1 repeated measures, 33 cross-sectional studies, and 10 other non-EPOC design (before-after and cohort studies). Of 64 economic evaluations, 59 obtained effectiveness estimates from studies that adopted an EPOC design.

Sixty-nine (46.3%) studies present a positive trend (effectiveness, impact, patient reported outcomes, economic outcomes, etc), 27 (18.1%) studies have mixed or inconclusive results, 6 (4%) have a negative trend, and trend is not reported in 8 (5.4%) studies. Some of these studies with no reported trend are cross-sectional (e.g. screening) where outcome of screening could not be captured. Twenty-four primary studies included in systematic reviews, mostly derived from grey literature on minor ailments, could not be found in electronic search.

Twenty-seven economic evaluations of 59 (46%) presented a positive trend, 10 (17%) are mixed or unclear, and 4 (7%) are negative. In further 18 studies (30%) the economic trend is not available because they derive from grey literature on minor ailments which could not be found in electronic search.

Screening at-risk individuals, chronic disease management, medication review, therapeutic adherence support and smoking cessation present a high proportion of positive trend on total studies within the intervention.

Table 6 provides an overview of direction of findings per pharmacy service.

**Table 6.** Characteristics of interventions in primary studies in community pharmacy in Europe

| Interventions  | CP primary studies (n) | Direction of findings |     |     |    |    |    | OBS  | CP primary studies included (REFs) |
|--|------------------------|-----------------------|-----|-----|----|----|----|--|------------------------------------|
|  |                        | Pos                   | Mix | Neg | NE | NA | NR |  |                                    |
| HEALTH PROMOTION SERVICES  |                        |                       |     |     |    |    |    |  |                                    |
| Health education   | 3                      | 1                     | 2   |     |    |    |    |  | [58–60]                            |
| Smoking Cessation  | 12                     | 10                    | 2   |     |    |    |    |  | [61–72]                            |
| Weight Management  | 2                      |                       | 2   |     |    |    |    |  | [73,74]                            |
| SCREENING AND REFERRAL SERVICES  |                        |                       |     |     |    |    |    |  |                                    |
| Common/Minor Ailment Management  | 31                     | 4                     | 1   |     | 5  | 21 |    | Several primary studies reported in grey literature referenced in SR but no longer available | [75–105]                           |
| Screening Individuals At-Risk  | 33                     | 19                    | 3   |     | 1  | 2  | 8  | Not reported likely due to no referral information or no confirmation of diagnosis           | [106–138]                          |
| DISEASE MANAGEMENT SERVICES  |                        |                       |     |     |    |    |    |  |                                    |
| Chronic disease management   | 25                     | 13                    | 4   | 3   | 4  | 1  |    |  | [139–163]                          |
| First Time Dispensing Intervention   | 3                      | 2                     | 1   |     |    |    |    |  | [164–166]                          |
| Therapeutic adherence support  | 13                     | 8                     | 3   | 1   | 1  |    |    |  | [166–178]                          |
| INDIVIDUAL CASE MANAGEMENT SERVICES  |                        |                       |     |     |    |    |    |  |                                    |
| Home or Nursing Home Medication Review   | 4                      | 1                     | 1   |     | 2  |    |    |  | [179–182]                          |
| Integrated Care Pathways / protocols or Quality Circles in place with primary care | 3                      | 1                     | 1   |     | 1  |    |    |  | [183–185]                          |
| Medication Reconciliation  | 1                      |                       | 1   |     |    |    |    |  | [186]                              |
| Medication Review  | 19                     | 10                    | 6   | 2   | 1  |    |    |  | [187–204]                          |
| Total  | 149                    | 69                    | 27  | 6   | 15 | 24 | 8  |  |                                    |

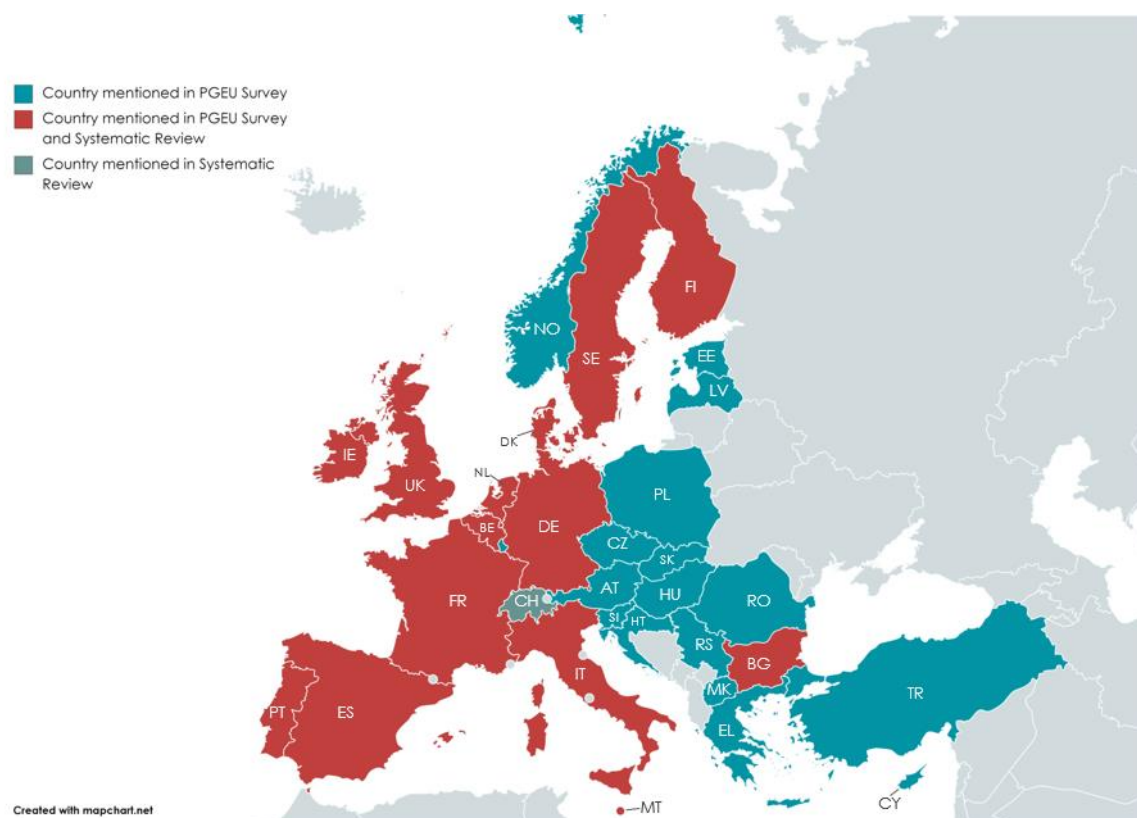
CP: Community Pharmacy; Pos: Positive; Mix: Mixed or unclear; Neg: Negative; NE: Non-EPOC; NA: Not Available; NR: Not Reported; OBS: Observations; SR: Systematic Review



While mapping current practices of pharmacy services reflects replies from 32 countries in Europe, however it is important to note that the available evidence on some of these services came from studies conducted in 15 countries in Europe.

Figure 3 illustrates the contribution of country research described in primary studies included in systematic reviews.

**Fig. 3.** Map of countries with research vs. practices of pharmacy services in primary studies of systematic reviews



## **3.2. Part 2 – Pharmacy interventions on COVID-19**

### **3.2.1. Mapping of current pharmacy interventions on COVID-19**

We have received replies to Country Survey Part 2: Pharmacy Interventions on COVID-19 from 32 PGEU member countries.

The most common pharmacy measures and interventions on COVID-19 in place in all 32 European countries were: patient information and education on preventive measures; queue management in pharmacies; floor marking inside pharmacies; and barriers at counters in pharmacies.

The second tier was in place in 26-31 countries. This included: protocols for disinfection of surfaces; use of masks by staff; stock and supply of hand sanitizers; stock and supply of protective masks; symptom-based referral pathways for suspected cases; increased demand / changes to home delivery of medicines; and reestablishing patient care services and stock levels.

The third tier was in place in 14-25 countries and included: stock and supply of essential medicines; dealing with the supply of medicines shortages; preparing alcohol-based hand sanitizer formulations; and pharmacy telephone support to vulnerable patients during isolation / lockdown.

The fourth tier was in place in 6-13 countries: 1st and 2nd line pharmacy staff; quantity limits dispensed; increased demand / changes to repeat dispensing; emergency supply of medicines, supply of medicines usually supplied in the hospital setting; hotline numbers for home delivery of medicines; and protocol for pharmacies for reporting on domestic violence during isolation / lockdown.

The least frequent interventions on COVID-19 (practiced in less than 6 countries) include: use of other Personal Protective Equipment (PPE) by staff; restriction in opening hours; temporary suspension of patient care services; point-of-care antigen test-based referral pathways for suspected cases; temporary waived prescription copayments for vulnerable patients; drive thru pharmacy services;

and referral pathways of exposed patients to antibody testing for immunity assessment against COVID-19.

Seventeen interventions had expanded powers granted to pharmacists in 16 countries including: increased demand / changes to repeat dispensing; dealing with the supply of medicines shortages; supply of medicines usually supplied in hospital; preparing alcohol-based hand sanitizers; protocol for pharmacies for reporting on domestic violence during isolation / lockdown; temporary waived prescription copayments for vulnerable patients; use of masks by staff; stock and supply of essential medicines; point-of-care antigen test-based referral pathways for suspected cases; emergency supply of medications; increased demand / changes to home delivery of medicines; pharmacy telephone support to vulnerable patients during isolation / lockdown; dealing with new vulnerable patients and referral pathways of exposed patients to antibody testing.

Twenty countries passed legislation in view of COVID-19 for 23 interventions, including: stock and supply of hand sanitizers; preparing alcohol hand sanitizers; increased demand / changes to repeat dispensing; stock and supply of essential medicines; supply of medicines usually supplied in hospital, just to mention the most frequent.

At the time of reply (September 2020) emergency temporary closures of pharmacies had occurred in Germany (30 pharmacies), Spain (20), Sweden (10-20), Portugal (15), Croatia, Luxembourg, and Poland (2), Belgium (1). Czech Republic, Ireland, Norway, and Greece also reported temporary closures of pharmacies. These figures may have increased or changed.

Deaths of pharmacy staff due to COVID-19 were reported to have occurred in Spain (19), Turkey (15), Italy (16), UK (3), North Macedonia (1). However, not all countries were able to report on this. These figures may have increased.

Table 7 provides a summary of current pharmacy measures and interventions on COVID-19 in Europe.

**Table 7.** Current pharmacy interventions on COVID-19 in Europe

|   | Pharmacy interventions on COVID-19   | Provided in most (≥80%) pharmacies   | Expanded powers granted to pharmacists | Remunerated by Government / Health Payer | Extra legislation passed in view of COVID-19 |
|---|--|--|--|--|--|
| <b>PREVENTION: Measures to reduce health risks of COVID-19 pandemic</b>                           |  |  |  |  |  |
| 1   | Patient information and education on preventive measures                               | 32 countries:<br>AT; BE; BG; HR; CZ; FI; FR; IE; IT; XK; LU; NL; MK; NO; PL; PT; RO; SI; ES; SE; UK; DK; EL; SK; TR; DE; RS; CY; EE; HU; LV; MT  | PL                                     |  | PL; RS                                       |
| 2   | Protocols in place for disinfection of pharmacy surfaces                               | 31 countries:<br>AT; BE; BG; HR; CZ; FI; FR; IE; IT; XK; LU; NL; MK; NO; PT; RO; SI; ES; SE; UK; DK; EL; SK; TR; DE; RS; CY; EE; HU; LV; MT      |  |  | RS   |
| 3   | Use of disposable masks by pharmacy staff  | 30 countries:<br>AT; BE; BG; HR; CZ; FR; IE; IT; XK; LU; NL; MK; NO; PL; PT; RO; SI; ES; UK; DK; EL; SK; TR; DE; RS; CY; EE; HU; LV; MT          | BE; IE                                 | BE; IT; LU; PL; SI                       | SI   |
| 4   | Use of other Personal Protective Equipment by pharmacy staff                           | 3 countries:<br>IE; PL; EL   |  |  |  |
| 5   | Queue management in pharmacy   | 32 countries:<br>AT; BE; BG; HR; CZ; FI; FR; IE; IT; XK; LU; NL; MK; NO; PL; PT; RO; SI; ES; SE; UK; DK; EL; SK; TR; DE; RS; CY; EE; HU; LV; MT  |  |  | RS   |
| 6   | Floor marking inside pharmacy  | 32 countries:<br>AT; BE; BG; HR; CZ; FI; FR; IE; IT; XK; LU; NL; MK; NO; PL; PT; RO; SI; ES; SE; UK; DK; EL; SK; TR; DE; RS; CY; EE; HU; LV; MT  |  |  |  |
| 7   | Restriction in pharmacy opening hours  | 5 countries:<br>BG; HR; EL; TR; RS   |  |  | XK; RS                                       |
| 8   | Barriers at counters in pharmacies   | 32 countries:<br>AT; BE; BG; HR; CZ; FI; FR; IE; IT; XK; LU; NL; MK; NO; PL; PT; RO; SI; ES; SE; UK; DK; EL; SK; TR; DE ; RS; CY; EE; HU; LV; MT |  |  | RS   |
| 9   | Temporary suspension of patient care services  | 1 country:<br>SE   |  |  |  |
| <b>PREPAREDNESS: Measures to ensure timely and effective responses from the healthcare system</b> |  |  |  |  |  |
| 10  | Business continuity plan - for 1 <sup>st</sup> and 2 <sup>nd</sup> line pharmacy staff | 10 countries:<br>CZ; FI; IE; XK; LU; NO; SE; UK; RS; PT  |  |  |  |
| 11  | Stock and supply of essential medicines (as defined in your country)                   | 20 countries:<br>BE; HR; FI; FR; IE; LU; MK; NO; PT; RO; SI; SE; DK; EL; TR; DE; RS; EE; LV; MT  | FI; IE                                 | LU; MK; RO; SI; EL; TR; DE; RS; EE; MT   | FI; IE; SK                                   |
| 12  | Stock and supply of hand sanitizers  | 26 countries:<br>BE; CZ; FI; FR; IE; XK; LU; NL; MK; NO; PL; PT; RO; SI; ES; SE; UK ; EL; SK; TR; DE; RS; EE; HU; LV; MT                         | BE                                     |  | CZ; NL; PL; EL; SK; TR; DE; RS               |
| 13  | Stock and supply of protective masks   | 28 countries:<br>BE; HR; CZ; FI; FR; IE; IT; XK; LU; NL; MK; NO; PL; PT; RO; SI; ES; SE; UK; EL; SK; TR; DE; RS; EE; HU; LV; MT                  | BE                                     | BE; FR                                   | FR   |
| 14  | Quantity limits for patient for the supply of individual medicines                     | 11 countries:<br>BE; HR; FI; FR; IE; NL; NO; PT; SI; SE; SK  |  |  | FI; SI; SE                                   |

|  | Pharmacy interventions on COVID-19  | Provided in most (≥80%) pharmacies  | Expanded powers granted to pharmacists | Remunerated by Government / Health Payer | Extra legislation passed in view of COVID-19 |
|--|---|---|--|--|--|
| <b>RESPONSE: Immediate actions in response to COVID-19 pandemic</b>      |   |   |  |  |  |
| 15   | Symptom-based referral pathways for suspected cases   | 31 countries:<br>AT; BE; BG; HR; CZ; FI; FR; IE; IT; XK; LU; NL; MK; NO; PL; PT; RO; ES; SE; UK; DK; EL; SK; TR; DE; RS; CY; EE; HU; LV; MT |  |  |  |
| 16   | Point-of-care antigen test-based referral pathways for suspected cases  | 3 countries:<br>SE; UK; HU  | FR; UK                                 |  | FR   |
| 17   | Increased demand / changes to repeat dispensing (=prescription renewal of chronic medications)                | 7 countries:<br>AT; FR; IE; IT; PT; UK; RS  | FR; IE; IT; PT; RS                     | IT; UK                                   | FR; IE; PT; UK                               |
| 18   | Emergency supply of medications (without prescription)  | 7 countries:<br>AT; BE; IE; IT; NO; PL; PT  | IE; ES                                 | ES                                       | IE   |
| 19   | Supply of those medicines, which are usually supplied in the hospital setting (e.g. oncology, antiretroviral) | 7 countries:<br>HR; FR; IE; XK; PT; ES; SE  | HR; FR; PT; ES                         | HR; ES                                   | FR; PT; ES                                   |
| 20   | Increased demand / changes to home delivery of medicines  | 27 countries:<br>AT; BE; HR; CZ; FI; FR; IE; IT; LU; NL; MK; NO; PT; RO; SI; ES; SE; UK; DK; TR; DE; RS; CY; EE; HU; LV; MT                 | ES; DE                                 | FI; DK; DE; LV                           | CZ; LV                                       |
| 21   | Hotline numbers for home delivery of medicines  | 8 countries:<br>HR; FI; IE; IT; PT; SI; DE; LV  |  |  | LV   |
| 22   | Dealing with the supply of medicines shortages  | 15 countries:<br>AT; BE; ES; HR; FI; IE; IT; LU; NL; NO; PT; UK; EL; SK; DE   | BE; HR; NL; PT; UK                     | NL; DE                                   | DE   |
| 23   | Preparing alcohol-based hand sanitizer formulations   | 19 countries:<br>AT; BE; BG; HR; CZ; FR; IT; XK; LU; NL; PL; SI; ES; DK; EL; SK; TR; DE; CY   | BE; CZ; FI; FR                         | HR; CZ; FI; SI; ES; DK; TR; DE; CY       | NL; EL; SK; TR; DE                           |
| 24   | Pharmacy telephone support to vulnerable patients during isolation / lockdown                                 | 25 countries:<br>HR; CZ; FI; FR; IT; XK; LU; NL; MK; NO; PL; RO; SI; ES; SE; UK; EL; TR; DE; RS; EE; HU; LV; MT; PT                         | FI; NL                                 |  | LU   |
| 25   | Hotline numbers / protocol for pharmacies for reporting on domestic violence during isolation / lockdown      | 6 countries:<br>AT; IT; NL; PT; ES; EL  | BE; FR; MT                             |  | FR; NL                                       |
| 26   | Temporary waived prescription copayments for vulnerable patients  | 3 countries:<br>BE; DK; RS  | BE; FR; RS                             |  | FR   |
| 27   | Drive thru pharmacy services (initiated or increased)   | 1 country:<br>SE  |  |  |  |
| <b>RECOVERY: Measures to return to "normal" activities post-pandemic</b> |   |   |  |  |  |
| 28   | Reestablishing normal patient care services and stock levels  | 31 countries:<br>AT; BE; BG; HR; CZ; FI; FR; IT; XK; LU; NL; MK; NO; PL; PT; RO; SI; ES; SE; UK; DK; EL; SK; TR; DE; RS; CY; EE; HU; LV; MT |  |  | UK   |
| 29   | Dealing with the new vulnerable patients due to pandemic  | 30 countries:<br>AT; BE; BG; HR; CZ; FI; FR; IT; XK; LU; NL; MK; NO; PL; PT; RO; ES; SE; UK ; DK; EL; SK; TR; DE; RS; CY; EE; HU; LV; MT    | UK                                     | UK                                       |  |
| 30   | Referral pathways of exposed patients to antibody testing for immunity assessment against COVID-19            | 3 countries:<br>PL; SE; DK  | FR                                     | IT (regional scheme)                     | FR   |

AT: Austria; BE: Belgium; BG: Bulgaria; CZ: Czech Republic; CY: Cyprus; DK: Denmark; DE: Germany; EE: Estonia; IE: Ireland; EL: Greece; ES: Spain; FI: Finland; FR: France; HR: Croatia; HU: Hungary; IT: Italy; LV: Latvia; LU: Luxembourg; MK: North Macedonia; MT: Malta; NL: The Netherlands; NO: Norway; PL: Poland; PT: Portugal; RO: Romania; RS: Serbia; SE: Sweden; SI: Slovenia; SK: Slovakia; TR: Turkey; UK: United Kingdom; XK: Kosovo






**Table 8.** Current pharmacy interventions on COVID-19 in Europe – country overview

|   | Country |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
|---|---------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| Pandemic response stage   | AT      | BE | BG | CY | CZ | DE | DK | EE | EL | ES | FI | FR | HR | HU | IE | IT | LU | LV | MK | MT | NL | NO | PL | PT | RO | RS | SE | SI | SK | TR | UK | XK |   |
| <b>PREVENTION:</b> Measures to reduce health risks of COVID-19 pandemic                           |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Patient information and education on preventive measures  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | €  |    |    | ♦  |    |    |    |    |    |    |   |
| Protocols in place for disinfection of pharmacy surfaces  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | ♦  |    |    |    |    |    |    |   |
| Use of disposable masks by pharmacy staff   |         | €  |    |    |    |    |    |    |    |    |    |    |    |    |    |    | €  | €  |    |    |    |    |    | €  |    |    |    |    | €  | ♦  |    |    |   |
| Use of other Personal Protective Equipment by pharmacy staff                                      |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Queue management in pharmacy  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | ♦  |    |    |    |    |    |   |
| Floor marking inside pharmacy   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Restriction in pharmacy opening hours   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | ♦  |    |    |    |    |    | ♦ |
| Barriers at counters in pharmacies  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | ♦  |    |    |    |    |    |   |
| Temporary suspension of patient care services   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| <b>PREPAREDNESS:</b> Measures to ensure timely and effective responses from the healthcare system |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Business continuity plan - for 1 <sup>st</sup> and 2 <sup>nd</sup> line pharmacy staff            |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Stock and supply of essential medicines (as defined in your country)                              |         |    |    |    |    | €  |    | €  | €  |    |    |    |    |    |    |    | €  |    | €  | €  |    |    |    |    | €  | €  |    | €  | ♦  | €  |    |    |   |
| Stock and supply of hand sanitizers   |         |    |    |    | €  | ♦  | ♦  | €  | ♦  | €  | €  |    |    | €  |    |    | €  | €  |    | €  | ♦  | €  | €  |    | €  | ♦  | €  | €  |    | ♦  | €  | €  |   |
| Stock and supply of protective masks  |         |    |    |    | €  |    |    | €  |    |    | €  | €  |    | €  |    |    | €  | €  |    | €  |    | €  | €  |    |    | €  | €  | €  |    | €  | €  |    |   |
| Quantity limits for patient for the supply of individual medicines                                |         |    |    |    |    |    |    |    |    |    | ♦  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | ♦  | ♦  |    |    |    |    |   |
| continues on the next page  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |

continues on the next page

| (Continuation)  | Country |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
|---|---------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|
| Pandemic response stage   | AT      | BE | BG | CY | CZ | DE | DK | EE | EL | ES | FI | FR | HR | HU | IE | IT | LU | LV | MK | MT | NL | NO | PL | PT | RO | RS | SE | SI | SK | TR | UK | XK |   |
| RESPONSE: Immediate actions in response to COVID-19 pandemic  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Symptom-based referral pathways for suspected cases   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Point-of-care antigen test-based referral pathways for suspected cases  |         |    |    |    |    |    |    |    |    |    |    | ♦  |    |    |    |    |    |    |    |    |    |    |    |    |    | €  |    |    |    |    |    |    |   |
| Increased demand / changes to repeat dispensing (=prescription renewal of chronic medications)                |         |    |    |    |    |    |    |    |    |    |    | ♦  |    |    | ♦  | €  |    |    |    |    |    |    |    |    | ♦  |    |    |    |    |    |    | €  | ♦ |
| Emergency supply of medications (without prescription)  |         |    |    |    |    |    |    |    |    | €  |    |    |    |    | ♦  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Supply of those medicines, which are usually supplied in the hospital setting (e.g. oncology, antiretroviral) |         |    |    |    |    |    |    |    |    | €  | ♦  | ♦  | €  |    |    |    |    |    |    |    |    |    |    |    | ♦  |    |    |    |    |    |    |    |   |
| Increased demand / changes to home delivery of medicines  |         |    |    |    | ♦  | €  | €  |    |    |    |    | €  |    |    |    |    |    | €  | ♦  |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Hotline numbers for home delivery of medicines  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | ♦  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Dealing with the supply of medicines shortages  |         |    |    |    |    | €  | ♦  |    |    |    |    |    |    |    |    |    |    |    |    |    |    | €  |    |    |    |    |    |    |    |    |    |    |   |
| Preparing alcohol-based hand sanitizer formulations   |         |    |    | €  | €  | €  | ♦  | €  |    | ♦  | €  | €  |    | €  |    |    |    |    |    |    |    | ♦  |    |    |    |    |    |    | €  | ♦  | €  | ♦  |   |
| Pharmacy telephone support to vulnerable patients during isolation / lockdown                                 |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | ♦  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Hotline numbers / protocol for pharmacies for reporting on domestic violence during isolation / lockdown      |         |    |    |    |    |    |    |    |    |    |    | €  | ♦  |    |    |    |    |    |    |    |    |    | ♦  |    |    |    |    |    |    |    |    |    |   |
| Temporary waived prescription copayments for vulnerable patients  |         |    |    |    |    |    |    |    |    |    |    | €  | ♦  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Drive thru pharmacy services (initiated or increased)   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| RECOVERY: Measures to return to “normal” activities post-pandemic   |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Reestablishing normal patient care services and stock levels  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Dealing with the new vulnerable patients due to pandemic  |         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |
| Referral pathways of exposed patients to antibody testing for immunity assessment against COVID-19            |         |    |    |    |    |    |    |    |    |    |    | ♦  |    |    |    | €  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |   |

AT: Austria; BE: Belgium; BG: Bulgaria; CZ: Czech Republic; CY: Cyprus; DK: Denmark; DE: Germany; EE: Estonia; IE: Ireland; EL: Greece; ES: Spain; FI: Finland; FR: France; HR: Croatia; HU: Hungary; IT: Italy; LV: Latvia; LU: Luxembourg; MK: North Macedonia; MT: Malta; NL: The Netherlands; NO: Norway; PL: Poland; PT: Portugal; RO: Romania; RS: Serbia; SE: Sweden; SI: Slovenia; SK: Slovakia; TR: Turkey; UK: United Kingdom; XK: Kosovo

 Provided in most (≥80%) pharmacies 
  Expanded powers granted to pharmacists 
  Provided in most (≥80%) pharmacies and expanded powers granted to pharmacists 
  Remunerated by Government / Payer 
  Extra legislation passed in view of COVID-19

### **3.2.2. Evidence on pharmacy interventions on COVID-19**

We identified 5 studies meeting inclusion criteria published between March and July 2020 and further 2 using hand search [15,205–210].

Three studies were from the UK, 2 from Ireland, 1 from Croatia, 1 from Poland.

The studies were published in 4 different journals: 2 in pharmacy journals; 1 in disease / medical journals; and 1 in patient experience journal.

Two studies were cross-sectional studies using surveys in community pharmacies during pandemic onset, 2 were literature reviews, and 3 were perspective papers reflecting on enhanced roles based on pharmacy interventions on COVID-19 undertaken by pharmacists.

The cross-sectional studies conducted in community pharmacies and the reviews identified a wide range of pharmacy measures and interventions on COVID-19 that were put in place within a short time. This include: 1) prevention measures to reduce health risks, such as: patient information and education not only on preventive strategies but also dealing with misinformation and questions on potential COVID-19 treatments; protocols for disinfection of pharmacy premises; use of masks and PPE; restrictions in opening hours; 2) preparedness measures to ensure timely and effective responses, such as: division of staff into teams, when possible; stock and supply of medicines; stock and supply of hand sanitizers and masks; limited quantity dispensed; 3) Immediate actions as response measures, such as: point-of-care antigen test-based referral pathways for suspected cases; increased demand or changes to repeat dispensing; changes in emergency supply; supply of certain hospital medicines; changes in home delivery; dealing with shortages; preparing alcohol-based hand sanitizer; remote support to vulnerable patients; protocol for reporting on domestic violence, and referral pathways of exposed patients to antibody testing for immunity assessment against COVID-19 [206,209].



Merks et al. review novel legal authorizations granted to community pharmacists during COVID-19 pandemic which include the following in 11 European countries: e-prescribing; relaxation of regulations on controlled drugs; right to prepare alcohol-based and hand sanitizers; substitution right when in short supply due to shortages; dispensing certain hospital medicines; changes to emergency supply; changes to repeat dispensing of chronic medication; home delivery to vulnerable patients [205].

Finally, perspective commentaries offer a reflection on additional new roles for pharmacy relevant in public health crisis including most already reported in cross-sectional studies and reviews. Other roles could include: managing common ailments at reduced costs for patients; promoting medication adherence, medication review and disease management. These are all ways to alleviate pressure on health services; and to explore the opportunities in drive-thru pharmacy services [15,208,210].

Three papers reported difficulties experienced by pharmacies. This included: failure to obtain PPE from the health services to pharmacy staff; price increases by the wholesalers and suppliers; frequent inspections from authorities; extended working hours; dealing with angry patients; financial loss in the pharmacy; reimbursement delays to pharmacies; and staff mental health [206,208,209].

Table 9 summarizes the findings of our review of studies addressing pharmacy interventions on COVID-19 in Europe.

**Table 9.** Summary of findings of studies on pharmacy measures and interventions on COVID-19 in Europe

| First author<br>(month yr)<br>[REF] | Objective   | Country<br>of origin | Study<br>design               | Pharmacy interventions on COVID-19  | Other key findings  |
|-------------------------------------|---|----------------------|-------------------------------|---|---|
| Cadogan CA<br>(March 2020)<br>[15]  | To highlight additional roles that can be undertaken by community pharmacists in public health crisis and could help to alleviate pressure on general practice and other health areas | IE                   | Perspective paper             | Additional roles for pharmacists relevant in public health crisis: 1) Managing minor ailments with OTC treatment at reduced costs for patients. 2) Extended prescribing roles, repeat dispensing, or emergency supplies at patient's request. 3) Stock supply and management, limiting quantity dispensed. 4) Promoting medication adherence in asymptomatic chronic disease patients, particularly in case of loss of income. 5) Pharmacist-provided medication reviews and chronic disease management supported by health services. | NR  |
| Parkhurst C<br>(May 2020)<br>[208]  | Describe the importance of community pharmacies during a public health crisis and the main difficulties experienced   | UK                   | Perspective paper             | Interventions provided by CP in UK: 1) Increasing number of patients in pharmacy for chronic disease management because of closed GP. 2) Stockpiling of medicines both prescription and OTC. 3) Restricted operating hours allowed. 4) Phone calls to GPs. 5) Home deliveries increased.  | 1) Queue management difficult to manage. 2) Failure of PPE to pharmacy staff by NHS. 3) Closure of pharmacies, financial impact; 4) Reimbursement delays to pharmacies. 5) Angered patients   |
| Hayden JC<br>(May 2020)<br>[207]    | To review the pandemic-related challenges and responses by pharmacists, as well as recommend areas of professional support and role expansion, particularly in mental health.         | IE                   | Review                        | 1) Pharmacy premises adapted. 2) Restricted opening hours. 3) Patient information on COVID-19, misinformation, preventive measures. 4) Division of staff into teams. 5) Stock management of medicines and sanitizers. 6) Sourcing alternatives for shortages. 7) Referral pathways for suspected cases. 7) Extended validity of prescriptions. 8) Expanded emergency supply. 9) Emergency supply of controlled drugs. 10) Delivery services. 11) Telephone / email for requests of vulnerable patients.                               | NR  |
| Hoti K<br>(June 2020)<br>[206]      | To explore the experiences of community pharmacists in relation to provision of community pharmacy services during COVID-19 pandemic  | XK                   | Cross-sectional study (April) | 1) Informing patients on medication currently being discussed for COVID-19. 2) monitoring patients for non-COVID health conditions. 3) Patient information on preventive measures. 4) Protocols in place for disinfection of surfaces. 5) Use of disposable masks by staff. 6) Use of PPE by staff. 7) Queue management. 8) Barriers at counters. 9) Increased demand of medication.  | <b>Negative:</b> 1) Price increases; 2) Patient panic, stockpiling; 3) Worrying about getting infected; 4) Frequent pharmacy inspections; 5) Negative financial impact; 6) Extended working hours.<br><b>Positive:</b> 1) Moral and sense of duty; 2) Opportunity to align with other providers |

| First author<br>(month yr)<br>[REF] | Objective   | Country<br>of origin | Study<br>design                     | Pharmacy interventions on COVID-19   | Other key findings   |
|-------------------------------------|---|----------------------|-------------------------------------|--|--|
| Zaidi STR<br>(July 2020)<br>[209]   | To understand the protective practices and well-being of pharmacists, and the delivery of pharmacy services during the COVID 19 pandemic. | UK                   | Cross-sectional study<br>(May/June) | 1) Increased number of patients. 2) Patient information on potential medicines for COVID-19. 3) Pharmacy premises reorganization. 4) Use of mask or PPE by pharmacy staff. 5) Limiting quantity dispensed. 6) Stock management. 7) Symptom-based referral pathway for suspected cases. 8) Dealing with significant or critical drug shortages. 9) Dealing with inappropriate behavior from patients or carers  | Anxiety issues reported by pharmacy staff  |
| Hussain R<br>(July 2020)<br>[210]   | To provide an overview of opportunities and challenges of "drive-thru pharmacy services" in improving public health during this crisis.   | UK                   | Perspective paper                   | Drive thru pharmacy services and enhanced IT enablers as an opportunity to improve protection and safety for staff and patients, faster dispensing, and convenience during COVID-19 pandemic   |  |
| Merks P<br>(June 2020)<br>[205]     | To review the legal extension of the role of pharmacists in light of the COVID-19 pandemic  | PL                   | Review                              | Novel legal authorizations granted to community pharmacists: <b>AT</b> : e-prescribing, relaxation of regulations on dispensing controlled medicines; <b>BE</b> : preparing alcohol, exclusive right to sell PPE, masks and alcoholgel. <b>HR</b> : Substitution of medicine in short supply, home delivery to vulnerable patients, increased quantity of haemophilia medication dispensed. <b>CZ</b> : Compounding antiseptic solutions, hand sanitizers, alcoholic gels, renewal of chronic treatment, protocol for reporting domestic violence. <b>DE</b> : preparation of alcoholic gel. <b>IT</b> : Administration of oxygen to patients, e-prescribing, home delivery to vulnerable patients, preparation of disinfectants. <b>NL</b> : video, telephone, email consultations, protocol for reporting domestic violence, preparation of disinfectant. <b>PL</b> : preparation of alcohol sanitizers, home delivery of medical devices, some prescribing authority. <b>PT</b> : Extension of emergency medicine delivery line to the whole country. <b>ES</b> : Home delivery to vulnerable and affected patients, dispensing hospital medicines in pharmacies. <b>UK</b> : extension of Minor Ailment Service and access to Emergency Care Summary Data, right to supply certain controlled drugs without prescription, home delivery to self-isolating patients | Several European countries adopted new legal solutions to mitigate drug shortages. |

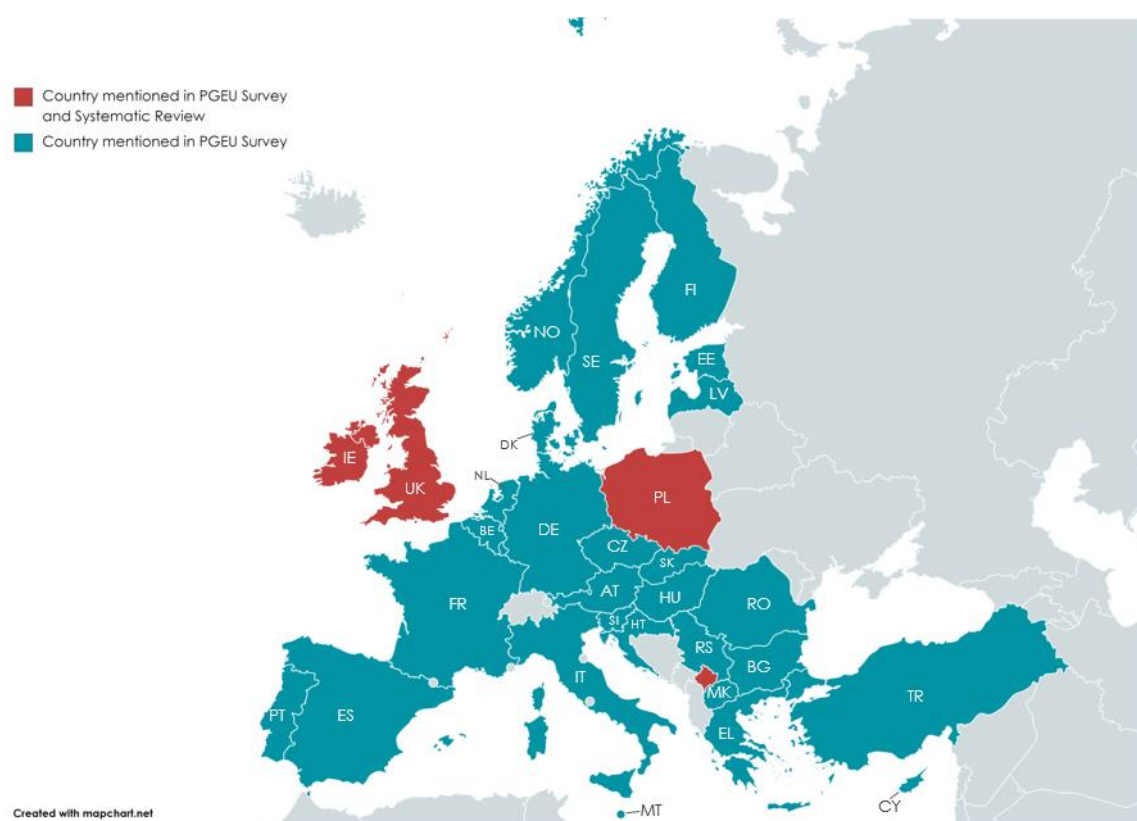
OTC: Over-The-Counter Medicines; CP: Community Pharmacies; PPE: Personal Protective Equipment; IT: Information Technology

AT: Austria; BE: Belgium; CZ: Czech Republic; DE: Germany; ES: Spain; HR: Croatia; IE: Ireland; IT: Italy; NL: The Netherlands; PL: Poland; PT: Portugal; UK: United Kingdom; XK: Kosovo; NR: Not Reported.

While mapping current practices of pharmacy interventions on COVID-19 in 32 countries in Europe was possible, however it was observed that the studies were published in 4 countries in Europe. It is, however, likely that the research on pharmacy interventions on COVID-19 will expand in the coming months.

Figure 4 illustrates the (still) scarce country research.

**Fig. 4.** Map of countries with research vs. practices of pharmacy interventions on COVID-19



## **4. DISCUSSION**

### **4.1. Summary of key findings**

In this research, we mapped current practices on 38 pharmacy services and 30 pharmacy interventions on COVID-19 in 32 countries in Europe. We also reviewed the evidence on pharmacy services targetting more than 25 health conditions stemming from 38 systematic reviews comprising 149 primary studies. These studies were conducted in community pharmacies across Europe.

#### **4.1.1. Pharmacy services**

The most frequent pharmacy services provided in a vast majority of countries in most pharmacies under contract, agreement, legislation, and regulation were mostly related to dispensing as this is the core role of pharmacies. Some of these services are reimbursed by the government or the health care payer outside the standard pharmacy dispensing remuneration. These services reflect priorities given to efficiency (generic substitution), safety (pharmacovigilance), pharmacy expertise in preparing individualized or short expiry therapy (galenic formulation), and access to medicines during out-of-hours (night services). Most used and reimbursed services in most countries also reflect prioritization related to access to medication (repeat dispensing and high-cost therapy dispensing and management).

The second tier of most frequent pharmacy services in countries provided under a regulatory framework acknowledges the role of pharmacies in ensuring safety (emergency supply, urgent supply, refusal to dispense for safety reasons). This tier includes the first patient care service, medication review, not dispensing related, which is already reimbursed in most countries.

The third tier embraces a very different and wide spectrum of services provided and reimbursed outside the standard pharmacy dispensing remuneration in some countries. This goes far beyond the dispensing role, acknowledging the role of

pharmacies in adherence (dose administration aid, instruction on the use of devices, supervised consumption of medicines, first time dispensing intervention), integrated care pathways with primary care, and includes health promotion activities including pharmacist-delivered vaccination.

The fourth tier of services provided and already reimbursed within a regulatory framework in some countries includes newer roles for pharmacies in health promotion, screening, and disease management, such as smoking cessation, chronic disease management, common/minor ailment management, home or nursing home medication review and weight management.

In summary, the country mapping portrays numerous and diverse pharmacy services currently provided in Europe. This is far beyond the dispensing roles and some services are already reimbursed in some countries. This acknowledges the roles of pharmacies in health promotion, screening, disease, and in case management.

These findings are aligned with recommendations described in policy papers on integrated models of primary care, patient centered, and with more economic incentives that pursue expanded roles of pharmacy services [2–7].

There is substantial evidence on pharmacy services in systematic reviews covered in this research. However, this is not without methodological challenges. This is of typical of complex health interventions which operate at different levels (health systems, pharmacy settings, pharmacist, and patients).

Positive evidence of pharmacy services stemming from systematic reviews is fairly established for screening and referral (cardiovascular risk, diabetes, asthma and COPD, depression, osteoporosis, some cancers). Also, it well established for chronic disease management (e.g. cardiovascular risk, hypertension, diabetes, lipid, asthma), medication review or medication management, smoking cessation, and therapeutic adherence support. However, some studies present mixed or unclear results which may be due to: poor study designs; using broader scope of

population, intervention, and diverse outcomes.; and some interventions are poorly defined or presenting implementation issues, especially in standardization.

The systematic reviews also included studies on first time dispensing; integrated care pathways with primary care; medication reconciliation; common / minor ailments. However, they are few in numbers. The sparse evidence on these services may exist because some are either recent and/or limited to only few countries.

Systematic reviews covered in this research did not include primary studies addressing dispensing related services or for few other services (e.g. needle exchange, deprescribing, handling and disposal of expired or unwanted medicines). This is despite published studies available on some of these services however these were not included in these systematic reviews. This is likely due to limitations of our methodology (overview of systematic reviews) and/or limitations of our search strategy.

The overview of research conducted sought to include relevant overviews and systematic reviews complying with inclusion criteria with no restrictions on populations, interventions, comparators, or outcomes. This was done in attempt to be inclusive.

We identified the study design of primary studies included in systematic reviews using Cochrane EPOC study designs. We also assessed the direction of findings of effectiveness, impact, and economic evaluation studies. This assessment was performed for EPOC study designs and for cross-sectional screenings that reported referral performed by pharmacist.

The findings of this overview are consistent with reported results and issues described in the other overviews of systematic reviews [10,13,18,19]. In addition, these other overviews have also showed positive evidence for pharmacist-delivered flu vaccination and for pharmacists' delivered needle exchange services.

The proportion of economic evaluation studies with positive trend on total economic evaluation studies covered in these systematic reviews is lower (46%) than reported results in overview of Costa (71%) [10]. This is most likely because our overview was restricted to Europe and not focused on systematic evaluations of economic evaluation of pharmacy services and hence did not include many published studies on economic evaluation of pharmacy services.

The findings of this overview are aligned with recommendations of pursuing expanded roles and adequate remuneration of pharmacy services described in other overviews: policy changes favouring expanded roles of pharmacists require the integration of community pharmacists within the health system, a public informed about the new roles; performance-based incentives; and information systems in place [13]; complex health interventions delivered by pharmacists should be better standardized in future to reduce the variability which requires a closer collaboration between researchers and practitioners [18]; there is evidence that supports expanded roles of community pharmacists in health promotion and disease prevention public health programs, future studies should report impact of community pharmacy services on health inequalities [19].

#### **4.1.2. Pharmacy interventions on COVID-19**

The European country reports portray a wide array of pharmacy interventions on COVID-19 implemented in most pharmacies. This was done in several countries within a very short time frame. This reflects the highly reactive and adaptative character of pharmacies in response to the pandemic outbreak.

All 30 mapped pharmacy interventions and measures on COVID-19 have been provided throughout Europe although some more extensively than the others.

Almost all preventive measures to reduce health risks of COVID-19 (patient information, protocols for disinfection of surfaces, use of disposable masks, floor marking, and barrier at counters) have been the most frequent interventions



provided in most pharmacies in almost every country. Conversely, the use of PPE by staff, restricted opening hours, and temporary suspension of patient care services were not applied in most countries with a few exceptions. This is coherent with possible difficulties in accessing PPE, extended operations in response to stockpiling and may reflect, to a certain degree, a shift of some primary care patient care services to pharmacies.

The most frequent reported measures to ensure timely and effective responses from the healthcare system included stock and supply of medicines, as well as hand sanitizers and masks. This reflected the pharmacies preparedness for stockpiling and increased demand for services and products.

It is also interesting to note that most frequent immediate actions in response to pandemic include symptom-based referral pathways for suspected cases, increased demand to home delivery of medicines, pharmacy telephone support to vulnerable patients during isolation and dealing with the new vulnerable patients. These are all important patient care interventions in screening, access, and vulnerable patient support. This exceeds far beyond pharmacist's traditional dispensing role.

Even more interesting are expanded powers granted to pharmacies and legislation passed in view of COVID-19. This allowed pharmacies to provide certain services reflecting the need to provide improved and faster access to medication and relevant products, patient screening as well as referral. This also included support to vulnerable patients through an organized, reliable, and safe network.

Emergency temporary closures of pharmacies also occurred in several countries. This impacted on patients' access and patient care and have a negative economic impact. In small towns this also means that this could be a risk of reputation damage, when temporary closures occur.

Research on pharmacy interventions on COVID-19 is still scarce and it is in its infancy stage. However, the literature has confirmed the wide array of

interventions provided and expanded powers granted to pharmacies to combat COVID-19.

Pharmacy associations also played an important supporting role to pharmacists by developing and updating guidance and emergency plans to assist community pharmacists. An editorial paper from April 2020 outlines how countries outside Europe learned from guidance developed by pharmacy associations in Europe. This paper highlighted the role of pharmacists in the COVID-19 pandemic, namely by providing services amidst pandemic, including screening, seeing patients and reducing the patients' burden on health care facilities such as hospitals and General Practitioner (GP) practices, providing home deliveries, as well as dealing with the increasing number of patients coming through to pharmacies with the other ailments. Guidelines from pharmacy associations have been adopted and adapted by other countries [211], including by the International Pharmaceutical Federation (FIP) which created a hub of information for pharmacists worldwide [212].

The World Pharmacy Council (WPC) also released an important report in September 2020 highlighting the frontline role of community pharmacy during the COVID-19 pandemic, examining the learnings so far, and making recommendations for the future [213].

## **4.2. Strengths and limitations**

### **4.2.1. Strengths**

This research is, to our best knowledge, the first using a comprehensive mixed methods approach combining mapping of current practices of pharmacy services and interventions on COVID-19 in 32 countries in Europe.

We generated a list of 38 pharmacy services and further hierarchized them under the Kaiser pyramid care model. This enabled to interpret findings on pharmacy services in terms of stratified population health management.

Similarly, we generated a list of 30 pharmacy interventions on COVID-19 and further classified them under the categories which correspond to the steps in response to public health emergencies, building on the work of previous authors. This enabled to interpret findings on pharmacy interventions on COVID-19 in terms of stages used in response to public health emergencies.

We used the overview of existing overviews and systematic reviews of pharmacy services meeting inclusion criteria as a method to collect robust evidence within a short period of time available for this research. We prioritized the evidence by first looking at existing overviews (reviews of systematic reviews), at included systematic reviews and, where necessary, at included primary studies of pharmacy services. For interventions on COVID-19 we used a review of primary studies as there are no systematic reviews yet available.

Randomized trials are the gold standard in assessing efficacy. However, they may not fully capture effectiveness in real-world practice and may be impractical. Hence, study designs for the effectiveness of health care interventions tend to be more flexible. However, there must be a balance between acceptable and robust study designs under real-world constraints vs accepting all evidence regardless of study design. The direction of effect reported for the evidence on pharmacy services used a conservative approach and was performed on studies that followed Cochrane EPOC study designs and cross-sectional when reporting referral performed for high-risk patients, in attempt to report results of more robust study designs.

#### **4.2.2. Limitations**

Mapping current practices relied on reported data from one or two individuals, hence, this could vary from the real practice. However, it would have been impractical to perform surveys to a representative sample of pharmacies in all 32 countries and it is acknowledged that country pharmacy organizations tend to have a fair knowledge on current practices of most pharmacy services.

Pharmacy services are complex health interventions which operate at different levels. In complex health interventions, variations exist for the same intervention under different health systems, different pharmacies, different pharmacists within the same pharmacy, and real-world patients. This is different to the controlled environments such as clinical trials. This creates challenges not only in terms of diverse practices but also researching complex health interventions, including pharmacy, as this tends to present heterogeneity.

While an overview of systematic reviews allows for a quicker method to collect robust evidence within a short period of time, it is also not without challenges. As the detail available in original primary studies may not be reported in systematic reviews containing these studies, there is a risk for incomplete relevant data. In fact, in this research abstracts of primary studies were reviewed to collect accurate data on study designs and trend.

This overview also presents very diverse populations, interventions, and outcomes. In particular, the heterogeneity in outcomes within and across interventions did not enable to present trends per outcome.

Most systematic reviews were not exclusive to community pharmacy. In fact, most addressed a specific health condition or intervention in different settings, including community pharmacy. This may explain the reason for these reviews not including some pharmacy services, albeit existing studies in the literature but probably not included in these reviews.

Most systematic reviews did not restrict to community pharmacy nor to Europe, allowing for different settings and geographies. We tried to overcome this issue by selecting primary studies of systematic reviews performed in community pharmacy in Europe. We could have restricted systematic reviews to the community pharmacy setting only. However, this would also result in a narrower selection which could have excluded relevant primary studies and interventions.

We found some conflicting evidence or relevant missing data across retrieved systematic reviews containing the same primary studies. We tried to address this issue by reviewing abstracts of primary studies where conflicting evidence or missing data existed. This was in attempt to present more accurate results.

This overview did not include grey literature due to time constraints. Hence, we may have missed additional relevant evidence on pharmacy services and, especially, on pharmacy interventions on COVID-19.

### **4.3. Implications for research**

There is room for improvement in future research to fill in some gaps and provide additional evidence.

While mapping of current practices of pharmacy services reflects data from 32 countries in Europe, our overview derived evidence from systematic reviews that included primary studies conducted only in just 15 countries.

This is relevant because there is an efficacy-effectiveness gap around certain pharmacy services, with a substantial amount of efficacy studies available for certain established interventions but fewer studies performed in different jurisdictions to assess the effectiveness in different real-world health systems, pharmacy settings, pharmacists and staff, and populations.

The gap between practices and research on pharmacy interventions on COVID-19 is wider although it will reduce, as more research gets published.

Further research is required for recent interventions, such as first time dispensing in selected therapies, integrated care pathways with primary care, medication reconciliation at patient discharge, common / minor ailments, as these interventions help to move forward integrated care and improve patient outcomes.

We recommend researchers adopt EPOC study designs in future evaluations; defining standard sets of outcomes per intervention valid yet feasible to collect

through pharmacies; addressing equity issues by assessing the impact of pharmacy services on vulnerable patient subgroups; and including experimental remuneration of pharmacies in research studies.

Finally, although economic evaluations of pharmacy services are more recent in Europe there is already some evidence on the cost-effectiveness and cost-utility of certain services. There is also room for improvement, but methods and designs have improved substantially in the last 5 years, supporting reimbursement decisions for health care payers, as this is highly relevant for policymaking

#### **4.4. Implications for policy and practice**

Practice tends to precede research and moves forward at a much faster pace. So is the case with pharmacy services and pharmacy interventions on COVID-19. Current practices portray a wide spectrum of interventions, some of them reimbursed or, in the case of pandemic, with expanded powers granted or legislation changes in response to the needs arising from the course of events.

In recent years, profound changes in pharmacy remuneration systems have happened several European countries. The major component remunerates for dispensing, acknowledging the core role of pharmacies for providing equitable, safe, quality access, and pre-financing of medicines and other health products on behalf of payers at the point of delivery. Other components include efficiency and/or quality incentives. In recent years, some pharmacy services have been reimbursed by payers acknowledging newer roles of pharmacies in health promotion, screening, disease management, and case management.

Implications for policy and practice may include: targeting interventions with high potential to add value to society; standardizing population, intervention and outcomes to reduce heterogeneity; developing digital-driven communication between pharmacies and other providers in interventions with referral or integrated care pathways; considering joint research efforts in countries interested

in building evidence around a particular intervention seeking to pursue a more combined strategy while taking into account country specifics; reflecting on possible payment models remunerating for value-added patient care services beyond dispensing linked to outcomes.

Finally, pharmacies have been able to implement a wide array of interventions on COVID-19, some of them beyond dispensing and which may have contributed to alleviate the burden on other health care services and provide valuable support to patients. Expanded powers granted and legislation passed acknowledge that contribution, which could be extended to other countries and pave the way to explore further roles in vaccine administration (when it becomes available), point-of-care antigen-based test screening and referral, and referral pathways of exposed patients to antibody testing for immunity assessment against COVID-19.

Lessons learned from pharmacies' involvement in response to this pandemic crisis should also raise questions on the relevance of involving this network of health care providers in future country preparedness plans for public health emergencies.

#### **4.5. Final remarks**

This research is, to our best knowledge, the first using a comprehensive mixed methods approach combining mapping of current practices of pharmacy services and interventions on COVID-19 in 32 countries in Europe with review of published evidence, hence providing a near accurate portrayal of current practices, trends and evidence of pharmacy services in Europe.

We hope it may assist in improving the design, implementation, and research on pharmacy services, and in raising relevant policy questions. This could drive value-based health care that make the best use of community pharmacies.

## 5. REFERENCES

1. Caldwell I. Professionalism and business practice. Kayne S, editor. London: Pharmaceutical Press; 2005. 3–20 p.
2. World Health Organization. Joint FIP/WHO guidelines on Good Pharmacy Practice: standards for quality of pharmacy services [Internet]. Geneva; 2011 [cited 2020 Nov 12]. Available from: [http://whqlibdoc.who.int/trs/WHO\\_TRS\\_961\\_eng.pdf](http://whqlibdoc.who.int/trs/WHO_TRS_961_eng.pdf)
3. Mossialos E, Courtin E, Naci H, Benrimoj S, Bouvy M, Farris K, et al. From “retailers” to health care providers: Transforming the role of community pharmacists in chronic disease management. *Health Policy (New York)* [Internet]. 2015 [cited 2020 Nov 16];119(5):628–39. Available from: <https://pubmed.ncbi.nlm.nih.gov/25747809/>
4. Health Organization W. The legal and regulatory framework for community pharmacies in the WHO European Region [Internet]. 2019 [cited 2020 Nov 12]. Available from: <http://apps.who.int/bookorders>.
5. OECD. Pharmacists and pharmacies. In: *Health at a Glance 2019: OECD Indicators*. Paris; 2019.
6. OECD. Realising the Potential of Primary Health Care [Internet]. Paris; 2020 [cited 2020 Nov 12]. Available from: <https://doi.org/10.1787/a92adee4-en>.
7. PGEU. Pharmacy 2030: A Vision for Community Pharmacy in Europe.
8. World Health Organization and the United Nations Children’s Fund (UNICEF). A vision for primary health care in the 21st century: Towards universal health coverage and the Sustainable Development Goals . Geneva; 2018.
9. WHO Regional Office for Europe. Integrated care models: an overview. 2016 [cited 2020 Nov 12]; Available from: <http://www.euro.who.int/pubrequest>
10. Costa S, Cary M, Helling DK, Pereira J, Mateus C. An overview of systematic reviews of economic evaluations of pharmacy-based public health interventions: Addressing methodological challenges. *Syst Rev*. 2019;8(1).
11. Pieper D, Antoine SL, Mathes T, Neugebauer EAM, Eikermann M. Systematic review finds overlapping reviews were not mentioned in every other overview [Internet]. Vol. 67, *Journal of Clinical Epidemiology*. J Clin Epidemiol; 2014 [cited 2020 Nov 13]. p. 368–75. Available from: <https://pubmed.ncbi.nlm.nih.gov/24581293/>
12. Cochrane Effective Practice and Organisation of Care (EPOC). What study designs can be considered for inclusion in an EPOC review and what should they be called? In: *EPOC Resources for review authors* [Internet]. 2017 [cited 2020 Nov 13]. Available from: <http://epoc.cochrane.org/epoc-specific-resources-review-authors>
13. Mossialos E, Naci H, Courtin E. Expanding the role of community pharmacists: Policymaking in the absence of policy-relevant evidence? *Health Policy (New York)* [Internet]. 2013;111(2):135–48. Available from: <http://dx.doi.org/10.1016/j.healthpol.2013.04.003>
14. Centre for Reviews and Dissemination. Systematic Reviews: CRD’s guidance for undertaking reviews in health care [Internet]. 2009 Jan [cited 2020 Nov 13]. Available from: [www.york.ac.uk/inst/crd](http://www.york.ac.uk/inst/crd)
15. Cadogan CA, Hughes CM. On the frontline against COVID-19: Community pharmacists’ contribution during a public health crisis. *Res Soc Adm Pharm* [Internet]. 2020;(January).



Available from: <https://doi.org/10.1016/j.sapharm.2020.03.015>

16. Watson KE, Singleton JA, Tippet V, Nissen LM. Defining pharmacists' roles in disasters: A Delphi study. Murakami M, editor. PLoS One [Internet]. 2019 Dec 26 [cited 2020 Nov 14];14(12):e0227132. Available from: <https://dx.plos.org/10.1371/journal.pone.0227132>
17. International Pharmaceutical Federation (FIP Health Advisory). Information and interim guidelines for pharmacists and the pharmacy workforce [Internet]. 2020 [cited 2020 Nov 14]. Available from: <https://www.fip.org/files/>
18. Rotta I, Salgado TM, Silva ML, Correr CJ, Fernandez-Llimos F. Effectiveness of clinical pharmacy services: an overview of systematic reviews (2000–2010). *Int J Clin Pharm*. 2015;37(5):687–97.
19. Thomson K, Hillier-Brown F, Walton N, Bilaj M, Bambra C, Todd A. The effects of community pharmacy-delivered public health interventions on population health and health inequalities: A review of reviews. *Prev Med (Baltim)*. 2019 Jul;124:98–109.
20. Paudyal V, Watson MC, Sach T, Porteous T, Bond CM, Wright DJ, et al. Are pharmacy-based minor ailment schemes a substitute for other service providers? A systematic review [Internet]. Vol. 63, *British Journal of General Practice*. Br J Gen Pract; 2013 [cited 2020 Nov 12]. Available from: <https://pubmed.ncbi.nlm.nih.gov/23834884/>
21. Perraudin C, Bugnon O, Pelletier-Fleury N. Expanding professional pharmacy services in European community setting: Is it cost-effective? A systematic review for health policy considerations. *Health Policy*. 2016 Dec;120(12):1350–62.
22. McDerby N, Kosari S, Bail K, Shield A, Peterson G, Naunton M. Pharmacist-led medication reviews in aged care residents with dementia: A systematic review [Internet]. *Australasian Journal on Ageing*. Blackwell Publishing; 2020 [cited 2020 Nov 12]. Available from: <https://pubmed.ncbi.nlm.nih.gov/32748980/>
23. Reeves L, Robinson K, McClelland T, Adedoyin CA, Broeseker A, Adunlin G. Pharmacist Interventions in the Management of Blood Pressure Control and Adherence to Antihypertensive Medications: A Systematic Review of Randomized Controlled Trials [Internet]. *Journal of Pharmacy Practice*. SAGE Publications Inc.; 2020 [cited 2020 Nov 12]. Available from: <https://pubmed.ncbi.nlm.nih.gov/32067555/>
24. Sanyal C, Husereau DR. Community-Based Services by Pharmacists: A Systematic Review of Cost-Utility Analyses [Internet]. Vol. 22, *Value in Health*. Elsevier Ltd; 2019 [cited 2020 Nov 12]. p. 1450–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/31806202/>
25. Sanyal C, Husereau D. Systematic Review of Economic Evaluations of Services Provided by Community Pharmacists [Internet]. Vol. 18, *Applied Health Economics and Health Policy*. Adis; 2020 [cited 2020 Nov 12]. p. 375–92. Available from: <https://pubmed.ncbi.nlm.nih.gov/31755015/>
26. Dann-Reed E, Poland F, Wright D. Systematic review to inform the development of a community pharmacy-based intervention for people affected by dementia [Internet]. Vol. 28, *International Journal of Pharmacy Practice*. Wiley-Blackwell Publishing Ltd; 2020 [cited 2020 Nov 12]. p. 233–45. Available from: <https://pubmed.ncbi.nlm.nih.gov/31621974/>
27. Gudi SK, Kashyap A, Chhabra M, Rashid M, Tiwari KK. Impact of pharmacist-led home medicines review services on drug-related problems among the elderly population: a systematic review. *Epidemiol Health [Internet]*. 2019 [cited 2020 Nov 12];41:e2019020. Available from: <https://pubmed.ncbi.nlm.nih.gov/31096747/>
28. Anthony BF, Surgey A, Hiscock J, Williams NH, Charles JM. General medical services by non-

- medical health professionals: a systematic quantitative review of economic evaluations in primary care. *Br J Gen Pract J R Coll Gen Pract*. 2019 May;69(682):e304–13.
29. Buss VH, Deeks LS, Shield A, Kosari S, Naunton M. Analytical quality and effectiveness of point-of-care testing in community pharmacies: A systematic literature review [Internet]. Vol. 15, *Research in Social and Administrative Pharmacy*. Elsevier Inc.; 2019 [cited 2020 Nov 12]. p. 483–95. Available from: <https://pubmed.ncbi.nlm.nih.gov/30057328/>
  30. Singh HK, Kennedy GA, Stupans I. A systematic review of pharmacy health coaching and an evaluation of patient outcomes [Internet]. Vol. 15, *Research in Social and Administrative Pharmacy*. Elsevier Inc.; 2019 [cited 2020 Nov 12]. p. 244–51. Available from: <https://pubmed.ncbi.nlm.nih.gov/29703656/>
  31. Crespo-Gonzalez C, Fernandez-Llimos F, Rotta I, Correr CJ, Benrimoj SI, Garcia-Cardenas V. Characterization of pharmacists' interventions in asthma management: A systematic review. *J Am Pharm Assoc* (2003). 2018;58(2):210–9.
  32. Deters MA, Laven A, Castejon A, Doucette WR, Ev LS, Krass I, et al. Effective Interventions for Diabetes Patients by Community Pharmacists: A Meta-analysis of Pharmaceutical Care Components. *Ann Pharmacother*. 2018 Feb;52(2):198–211.
  33. Teljeur C, Moran PS, Walshe S, Smith SM, Cianci F, Murphy L, et al. Economic evaluation of chronic disease self-management for people with diabetes: a systematic review [Internet]. Vol. 34, *Diabetic Medicine*. Blackwell Publishing Ltd; 2017 [cited 2020 Nov 12]. p. 1040–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/27770591/>
  34. Mohammed MA, Moles RJ, Chen TF. Impact of Pharmaceutical Care Interventions on Health-Related Quality-of-Life Outcomes: A Systematic Review and Meta-analysis [Internet]. Vol. 50, *Annals of Pharmacotherapy*. SAGE Publications Inc.; 2016 [cited 2020 Nov 12]. p. 862–81. Available from: <https://pubmed.ncbi.nlm.nih.gov/27363846/>
  35. McCullough AR, Ryan C, Macindoe C, Yii N, Bradley JM, O'Neill B, et al. Behavior change theory, content and delivery of interventions to enhance adherence in chronic respiratory disease: A systematic review. *Respir Med* [Internet]. 2016 Jul 1 [cited 2020 Nov 12];116:78–84. Available from: <https://pubmed.ncbi.nlm.nih.gov/27296825/>
  36. Sabater-Hernández D, Sabater-Galindo M, Fernandez-Llimos F, Rotta I, Hossain LN, Durks D, et al. A Systematic Review of Evidence-Based Community Pharmacy Services Aimed at the Prevention of Cardiovascular Disease. *J Manag care Spec Pharm*. 2016 Jun;22(6):699–713.
  37. Brown TJ, Todd A, O'Malley C, Moore HJ, Husband AK, Bambra C, et al. 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*. 2016 Feb;6(2):e009828.
  38. Lindsey L, Husband A, Nazar H, Todd A. Promoting the early detection of cancer: a systematic review of community pharmacy-based education and screening interventions. *Cancer Epidemiol*. 2015 Oct;39(5):673–81.
  39. Antoine SL, Pieper D, Mathes T, Eikermann M. Improving the adherence of type 2 diabetes mellitus patients with pharmacy care: A systematic review of randomized controlled trials. *BMC Endocr Disord* [Internet]. 2014 Jul 7 [cited 2020 Nov 12];14. Available from: <https://pubmed.ncbi.nlm.nih.gov/25001374/>
  40. Bolen SD, Chandar A, Falck-Ytter C, Tyler C, Perzynski AT, Gertz AM, et al. Effectiveness and safety of patient activation interventions for adults with type 2 diabetes: Systematic review, meta-analysis, and meta-regression [Internet]. Vol. 29, *Journal of General Internal Medicine*.

- Springer New York LLC; 2014 [cited 2020 Nov 12]. p. 1166–76. Available from: <https://pubmed.ncbi.nlm.nih.gov/24733301/>
41. Fathima M, Naik-Panvelkar P, Saini B, Armour CL. The role of community pharmacists in screening and subsequent management of chronic respiratory diseases: A systematic review. *Pharm Pract (Granada)* [Internet]. 2013 [cited 2020 Nov 12];11(4):228–45. Available from: <https://pubmed.ncbi.nlm.nih.gov/24367463/>
  42. Ayorinde AA, Porteous T, Sharma P. Screening for major diseases in community pharmacies: A systematic review [Internet]. Vol. 21, *International Journal of Pharmacy Practice*. Int J Pharm Pract; 2013 [cited 2020 Nov 12]. p. 349–61. Available from: <https://pubmed.ncbi.nlm.nih.gov/23683090/>
  43. Gudka S, Afuwape FE, Wong B, Yow XL, Anderson C, Clifford RM. Chlamydia screening interventions from community pharmacies: A systematic review [Internet]. Vol. 10, *Sexual Health*. Sex Health; 2013 [cited 2020 Nov 12]. p. 229–39. Available from: <https://pubmed.ncbi.nlm.nih.gov/23651619/>
  44. Kapadia MZ. Chlamydia screening in community pharmacies: A systematic literature review of the characteristics of service users and a meta-analysis of chlamydia prevalence [Internet]. Vol. 10, *Sexual Health*. Sex Health; 2013 [cited 2020 Nov 12]. p. 1–8. Available from: <https://pubmed.ncbi.nlm.nih.gov/23256953/>
  45. Brown JVE, Walton N, Meader N, Todd A, Webster LAD, Steele R, et al. Pharmacy-based management for depression in adults [Internet]. Vol. 2019, *Cochrane Database of Systematic Reviews*. John Wiley and Sons Ltd; 2019 [cited 2020 Nov 12]. Available from: <https://pubmed.ncbi.nlm.nih.gov/31868236/>
  46. van Driel ML, Morledge MD, Ulep R, Shaffer JP, Davies P, Deichmann R. Interventions to improve adherence to lipid-lowering medication [Internet]. Vol. 2016, *Cochrane Database of Systematic Reviews*. John Wiley and Sons Ltd; 2016 [cited 2020 Nov 12]. Available from: <https://pubmed.ncbi.nlm.nih.gov/28000212/>
  47. Hatah E, Braund R, Tordoff J, Duffull SB. A systematic review and meta-analysis of pharmacist-led fee-for-services medication review [Internet]. Vol. 77, *British Journal of Clinical Pharmacology*. Br J Clin Pharmacol; 2014 [cited 2020 Nov 12]. p. 102–15. Available from: <https://pubmed.ncbi.nlm.nih.gov/23594037/>
  48. Altowaijri A, Phillips CJ, Fitzsimmons D. A systematic review of the clinical and economic effectiveness of clinical pharmacist intervention in secondary prevention of cardiovascular disease [Internet]. Vol. 19, *Journal of Managed Care Pharmacy*. Academy of Managed Care Pharmacy (AMCP); 2013 [cited 2020 Nov 12]. p. 408–16. Available from: <https://pubmed.ncbi.nlm.nih.gov/23697478/>
  49. Cai H, Dai H, Hu Y, Yan X, Xu H. Pharmacist care and the management of coronary heart disease: A systematic review of randomized controlled trials. *BMC Health Serv Res* [Internet]. 2013 [cited 2020 Nov 12];13(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/24188540/>
  50. Hadi MA, Alldred DP, Briggs M, Munyombwe T, José Closs S. Effectiveness of pharmacist-led medication review in chronic pain management: Systematic review and meta-analysis. *Clin J Pain* [Internet]. 2014 [cited 2020 Nov 12];30(11):1006–14. Available from: <https://pubmed.ncbi.nlm.nih.gov/24480911/>
  51. Al Adawi RM, Stewart D, Ryan C, Tonna AP. A systematic review of pharmacist input to metabolic syndrome screening, management and prevention [Internet]. Vol. 42, *International Journal of Clinical Pharmacy*. Springer; 2020 [cited 2020 Nov 12]. p. 995–1015. Available

from: <https://pubmed.ncbi.nlm.nih.gov/32607719/>

52. Wang Y, Yeo QQ, Ko Y. Economic evaluations of pharmacist-managed services in people with diabetes mellitus: A systematic review. *Diabet Med* [Internet]. 2016 Apr 1 [cited 2020 Nov 12];33(4):421–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/26433008/>
53. Peletidi A, Nabhani-Gebara S, Kayyali R. Smoking cessation support services at community pharmacies in the UK: A systematic review [Internet]. Vol. 57, *Hellenic Journal of Cardiology*. Hellenic Cardiological Society; 2016 [cited 2020 Nov 12]. p. 7–15. Available from: <https://pubmed.ncbi.nlm.nih.gov/26856195/>
54. Loh ZWR, Cheen MHH, Wee HL. Humanistic and economic outcomes of pharmacist-provided medication review in the community-dwelling elderly: A systematic review and meta-analysis [Internet]. Vol. 41, *Journal of Clinical Pharmacy and Therapeutics*. Blackwell Publishing Ltd; 2016 [cited 2020 Nov 12]. p. 621–33. Available from: <https://pubmed.ncbi.nlm.nih.gov/27696540/>
55. Malet-Larrea A, García-Cárdenas V, Sáez-Benito L, Benrimoj S, Calvo B, Goyenechea E. Cost-effectiveness of professional pharmacy services in community pharmacy: a systematic review [Internet]. Vol. 16, *Expert Review of Pharmacoeconomics and Outcomes Research*. Taylor and Francis Ltd; 2016 [cited 2020 Nov 12]. p. 747–58. Available from: <https://pubmed.ncbi.nlm.nih.gov/27828725/>
56. Gammie T, Vogler S, Babar Z-U-D. Economic Evaluation of Hospital and Community Pharmacy Services. *Ann Pharmacother* [Internet]. 2017 Jan 1 [cited 2020 Nov 12];51(1):54–65. Available from: <http://journals.sagepub.com/doi/10.1177/1060028016667741>
57. Elliott RA, Putman K, Davies J, Annemans L. A Review of the Methodological Challenges in Assessing the Cost Effectiveness of Pharmacist Interventions [Internet]. Vol. 32, *PharmacoEconomics*. Springer International Publishing; 2014 [cited 2020 Nov 12]. p. 1185–99. Available from: <https://pubmed.ncbi.nlm.nih.gov/25145799/>
58. Garção JA, Cabrita J. Evaluation of a pharmaceutical care program for hypertensive patients in rural portugal. *J Am Pharm Assoc* (Washington, DC 1996) [Internet]. 2002 [cited 2020 Nov 12];42(6):858–64. Available from: <https://pubmed.ncbi.nlm.nih.gov/12482009/>
59. Watson M, Stewart D. Screening and brief interventions for alcohol misuse delivered in the community pharmacy setting: a pilot study. 2011.
60. Dhital R, Norman I, Whittlesea C, Murrells T, Mccambridge J. The effectiveness of brief alcohol interventions delivered by community pharmacists: Randomized controlled trial. *Addiction* [Internet]. 2015 Oct 1 [cited 2020 Nov 12];110(10):1586–94. Available from: <https://pubmed.ncbi.nlm.nih.gov/25988589/>
61. Bauld L, Chesterman J, Ferguson J, Judge K. A comparison of the effectiveness of group-based and pharmacy-led smoking cessation treatment in Glasgow. *Addiction* [Internet]. 2009 Feb [cited 2020 Nov 12];104(2):308–16. Available from: <https://pubmed.ncbi.nlm.nih.gov/19149828/>
62. Maguire TA, McElnay JC, Drummond A. A randomized controlled trial of a smoking cessation intervention based in community pharmacies. *Addiction* [Internet]. 2001 Jan 1 [cited 2020 Nov 12];96(2):325–31. Available from: <https://pubmed.ncbi.nlm.nih.gov/11182878/>
63. Csikar JI, Douglas G V., Pavitt S, Hulme C. The cost-effectiveness of smoking cessation services provided by general dental practice, general medical practice, pharmacy and NHS Stop Smoking Services in the North of England. *Community Dent Oral Epidemiol* [Internet]. 2016 Apr 1 [cited 2020 Nov 12];44(2):119–27. Available from:

<http://doi.wiley.com/10.1111/cdoe.12195>

64. Sinclair HK, Bond CM, Lennox AS, Silcock J, Winfield AJ, Donnan PT. Training pharmacists and pharmacy assistants in the stage-of-change model of smoking cessation: A randomised controlled trial in Scotland. *Tob Control* [Internet]. 1998 [cited 2020 Nov 12];7(3):253–61. Available from: <https://pubmed.ncbi.nlm.nih.gov/9825420/>
65. Cramp GJ, Mitchell C, Steer C, Pflieger S. An evaluation of a rural community pharmacy-based smoking-cessation counselling and nicotine replacement therapy initiative. *Int J Pharm Pract* [Internet]. 2007 Jun 1 [cited 2020 Nov 12];15(2):113–21. Available from: <http://doi.wiley.com/10.1211/ijpp.15.2.0006>
66. Boyd KA, Briggs AH. Cost-effectiveness of pharmacy and group behavioural support smoking cessation services in Glasgow. *Addiction* [Internet]. 2009 Feb [cited 2020 Nov 12];104(2):317–25. Available from: <https://pubmed.ncbi.nlm.nih.gov/19149829/>
67. Olsen KR, Bilde L, Juhl HH, Kjaer NT, Mosbech H, Evald T, et al. Cost-effectiveness of the Danish smoking cessation interventions: Subgroup analysis based on the Danish Smoking Cessation Database. *Eur J Heal Econ* [Internet]. 2006 Dec [cited 2020 Nov 12];7(4):255–64. Available from: <https://pubmed.ncbi.nlm.nih.gov/16816946/>
68. Crealey GE, McElnay JC, Maguire TA, O'Neill C. Costs and effects associated with a community pharmacy-based smoking-cessation programme. *Pharmacoeconomics* [Internet]. 1998 [cited 2020 Nov 12];14(3):323–33. Available from: <https://pubmed.ncbi.nlm.nih.gov/10186470/>
69. Hoving C, Mudde AN, Dijk F, de Vries H. Effectiveness of a smoking cessation intervention in Dutch pharmacies and general practices. *Health Educ*. 2010 Jan 1;110(1):17–29.
70. Bauld L, Boyd KA, Briggs AH, Chesterman J, Ferguson J, Judge K, et al. One-year outcomes and a cost-effectiveness analysis for smokers accessing group-based and pharmacy-led cessation services. *Nicotine Tob Res* [Internet]. 2011 [cited 2020 Nov 12];13(2):135–45. Available from: <https://pubmed.ncbi.nlm.nih.gov/21196451/>
71. Ormston R, Van Der Pol M, Ludbrook A, McConville S, Amos A. Quit4u: The effectiveness of combining behavioural support, pharmacotherapy and financial incentives to support smoking cessation. *Health Educ Res* [Internet]. 2015 Feb 1 [cited 2020 Nov 12];30(1):121–33. Available from: <https://pubmed.ncbi.nlm.nih.gov/24848555/>
72. Sinclair HK, Silcock J, Bond CM, Lennox AS, Winfield AJ. The cost-effectiveness of intensive pharmaceutical intervention in assisting people to stop smoking. *Int J Pharm Pract* [Internet]. 1999 Jun 1 [cited 2020 Nov 12];7(2):107–12. Available from: <http://doi.wiley.com/10.1111/j.2042-7174.1999.tb00957.x>
73. Jolly K, Lewis A, Beach J, Denley J, Adab P, Deeks JJ, et al. 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* [Internet]. 2011 Nov 19 [cited 2020 Nov 12];343(7832):1035. Available from: <http://www.bmj.com/>
74. Bush J, Langley C, Patel A, Harvey J. Evaluation of the Heart of Birmingham teaching Primary Care Trust (HoBtPCT): My Choice Weight Management Programme: report commissioned by Heart of Birmingham teaching Primary Care Trust. undefined. 2011;
75. Duggan C. Direct care at the pharmacy'. Management of minor ailments in pharmacies: evaluating pilot service development. London; 2004.
76. Magirr P. A community pharmacist service to treat minor ailments. Sheffield. 2003.
77. Baqir W, Learoyd T, Sim A, Todd A. Cost analysis of a community pharmacy "minor ailment

- scheme" across three primary care trusts in the North East of England. *J Public Health (Bangkok)* [Internet]. 2011 Dec [cited 2020 Nov 12];33(4):551–5. Available from: <https://pubmed.ncbi.nlm.nih.gov/21339201/>
78. Baqir W, Todd A, Learoyd T, et al. Cost-effectiveness of community pharmacy minor ailment schemes. *Int J Pharm Pr.* 2010;18(3).
  79. Schafheutle E, Noyce P, Sheehy C, Jones L. Direct supply of medicines by community pharmacists. Edinburgh; 2002.
  80. Walker R, Evans S, Kirkland D. Evaluation of 'Care at the pharmacy' in Gwent on the management of self-limiting conditions and workload of a general medical practice. *Int J Pharm Pr.* 2003;11(R7).
  81. Hackney NC and. Evaluation of pharmacy first Minor Ailments Scheme. London; 2006.
  82. Gray N. Evaluation of the Bolton 'Pharmacy First' Minor Ailments Service. Bolton; 2008.
  83. Celino G, Gray N. Evaluation of the Minor Ailment Scheme. Harrow; 2009.
  84. Flint L, Rivers P. Evaluation of the Pharmacy First Scheme provided by the Central Derby Primary Care Trust. Derby; 2003.
  85. Bojke C, Gravelle H, Hassell K, Whittington Z. Increasing patient choice in primary care: The management of minor ailments. *Health Econ* [Internet]. 2004 Jan [cited 2020 Nov 12];13(1):73–86. Available from: <https://pubmed.ncbi.nlm.nih.gov/14724895/>
  86. NHS Islington. Islington Minor Ailments Pilot Scheme evaluation report. Islington; 2004.
  87. Sewak N. A cost minimisation analysis of a national minor ailments scheme in community pharmacies in England. London: City University; 2009.
  88. Horgan J, McKieran A. Management of minor ailments through community pharmacy. Birmingham; 2006.
  89. Banjo K. Minor Ailments Scheme — a community pharmacy service to manage self-limiting conditions illnesses in Canvey Island. Rayleigh; 2005.
  90. Gandecha R, Butt A. Minor Ailments Scheme evaluation. London; 2008.
  91. Anonymous. Minor Ailments Scheme roll out evaluation report. Islington; 2005.
  92. Camden Clinical Commissioning Group. Minor ailments scheme. [Internet]. Camden; Available from: <http://www.camdenccg.nhs.uk/minor-ailments-scheme>
  93. Parkinson J. Minor ailments schemes can improve patients' access to treatment and advice. *Pharm Pr* [Internet]. 2005 May [cited 2020 Nov 12];2015–7. Available from: [https://www.researchgate.net/publication/290599155\\_Minor\\_ailments\\_schemes\\_can\\_improve\\_patients\\_access\\_to\\_treatment\\_and\\_advice](https://www.researchgate.net/publication/290599155_Minor_ailments_schemes_can_improve_patients_access_to_treatment_and_advice)
  94. Anonymous. Minor ailments trial shows no extra cost to NHS. *Chem Drug.* 2001;255(5).
  95. Information Service Division. Prescribing and Medicines: Minor Ailments Service (MAS). 2011.
  96. Black M. Review of Minor Ailments Scheme (community pharmacy enhanced service) and proposal for future of the service. Sheffield; 2008.
  97. Proprietary Association of Great Britain and Working in Partnership Programme. Self care aware: joining up self care in the NHS. 2006.



98. Whittington Z, Hassell K, Cantrill J, Noyce P. A feasibility study comparing community pharmacist and general practice management of minor ailments. Manchester; 2001.
99. Mary Seacole Research Centre. The Pharmacy First Minor Ailments Scheme in Leicester. Leicester; 2011.
100. Pumtong S, Boardman HF, Anderson CW. A multi-method evaluation of the Pharmacy First Minor Ailments scheme. *Int J Clin Pharm* [Internet]. 2011 Jun [cited 2020 Nov 12];33(3):573–81. Available from: <https://pubmed.ncbi.nlm.nih.gov/21526411/>
101. Davidson M, Bennett S, Cubbin I, Vickers S. An early evaluation of the use made by patients in Cheshire of the pharmacy minor ailments scheme and its costs and impact on patient care. *Int J Pharm Pract* [Internet]. 2009 [cited 2020 Nov 12];17. Available from: <https://www.networks.nhs.uk/nhs-networks/primary-care-transformation/access-and-urgent-care/academic-evidence/an-early-evaluation-of-the-use-made-by-patients-in-cheshire-of-the-pharmacy-minor-ailments-scheme-and-its-costs-and-impact-on-patient-care>
102. Sim A. An evaluation of the Community Pharmacy Minor Ailment Scheme in North of Tyne. Sunderland; 2010.
103. Parkinson J. Community pharmacies can treat minor ailments successfully. *Pharm Pr*. 2004;January/Fe:20–21.
104. Leeds N. Community Pharmacy Minor Ailments Scheme (evaluation). Leeds; 2009.
105. Petrou K. Community pharmacy Minor Ailments Scheme. London; 2010.
106. Taylor J, Krska J, MacKridge A. A community pharmacy-based cardiovascular screening service: Views of service users and the public. *Int J Pharm Pract* [Internet]. 2012 Oct [cited 2020 Nov 12];20(5):277–84. Available from: <https://pubmed.ncbi.nlm.nih.gov/22953766/>
107. Anderson C, Thornley T. A pharmacy-based private chlamydia screening programme: Results from the first 2 years of screening and treatment. *Int J Clin Pharm* [Internet]. 2011 Feb [cited 2020 Nov 12];33(1):88–91. Available from: <https://pubmed.ncbi.nlm.nih.gov/21365400/>
108. Castillo D, Guayta R, Giner J, Burgos F, Capdevila C, Soriano JB, et al. COPD case finding by spirometry in high-risk customers of urban community pharmacies: A pilot study. *Respir Med* [Internet]. 2009 [cited 2020 Nov 12];103(6):839–45. Available from: <https://pubmed.ncbi.nlm.nih.gov/19200706/>
109. Donyai P, Van Den Berg M. Coronary heart disease risk screening: The community pharmacy Healthy Heart Assessment Service. *Pharm World Sci* [Internet]. 2009 Dec [cited 2020 Nov 12];31(6):643–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/19809888/>
110. Perraudin C, Le Vaillant M, Pelletier-Fleury N. Cost-Effectiveness of a Community Pharmacist-Led Sleep Apnea Screening Program - A Markov Model. *PLoS One* [Internet]. 2013 Jun 21 [cited 2020 Nov 12];8(6). Available from: <https://pubmed.ncbi.nlm.nih.gov/23805176/>
111. Brabin L, Thomas G, Hopkins M, O'Brien K, Roberts SA. Delivery of chlamydia screening to young women requesting emergency hormonal contraception at pharmacies in Manchester, UK: A prospective study. *BMC Womens Health* [Internet]. 2009 Mar 26 [cited 2020 Nov 12];9. Available from: <https://pubmed.ncbi.nlm.nih.gov/19323804/>
112. Van Bergen JEAM, Postma MJ, Peerbooms PGH, Spangenberg AC, Tjen-A-Tak J, Bindels PJE. Effectiveness and cost-effectiveness of a pharmacy-based screening programme for Chlamydia trachomatis in a high-risk health centre population in Amsterdam using mailed home-collected urine samples. *Int J STD AIDS* [Internet]. 2004 Dec [cited 2020 Nov

- 12];15(12):797–802. Available from: <https://pubmed.ncbi.nlm.nih.gov/15601485/>
113. Horgan JMP, Blenkinsopp A, McManus RJ. Evaluation of a cardiovascular disease opportunistic risk assessment pilot (“Heart MOT” service) in community pharmacies. *J Public Health (Bangkok)* [Internet]. 2010 Mar [cited 2020 Nov 12];32(1):110–6. Available from: <https://pubmed.ncbi.nlm.nih.gov/19864496/>
  114. Pippa G, Ferrara M, Valle S, Diego B, Alessandra B, Apuzzo M, et al. Feasibility of colorectal cancer screening with fecal occult blood test distributed by public pharmacies. *Recent Prog Med*. 2009;100:348–51.
  115. Watson M. Final report: chlamydia testing in community and primary care settings. Aberdeen; 2008.
  116. Watson M. Final report: chlamydia testing in community and primary care settings. Grampian; 2008.
  117. Hampton A, Wilson A, Hussain M. Measuring blood pressure in an inner city pharmacy: an attempt at coordination with general practice. *Fam Pract* [Internet]. 1990 [cited 2020 Nov 12];7(1):52–5. Available from: <https://pubmed.ncbi.nlm.nih.gov/2318374/>
  118. Earle KA, Taylor P, Wyatt S, Burnett S, Ray J. A physician-pharmacist model for the surveillance of blood pressure in the community: A feasibility study. *J Hum Hypertens* [Internet]. 2001 [cited 2020 Nov 12];15(8):529–33. Available from: <https://pubmed.ncbi.nlm.nih.gov/11494090/>
  119. Mehuys E, Van Bortel L, Annemans L, Remon JP, Van Tongelen I, Van Ganse E, et al. Medication use and disease control of asthmatic patients in Flanders: A cross-sectional community pharmacy study. *Respir Med* [Internet]. 2006 Aug [cited 2020 Nov 12];100(8):1407–14. Available from: <https://pubmed.ncbi.nlm.nih.gov/16386885/>
  120. National Chlamydia Screening Programme (NCSP). NCSP five years: the fifth annual report of the National Chlamydia Screening Programme 2007/08 [Internet]. 2008 [cited 2020 Nov 12]. Available from: <https://www.yumpu.com/en/document/view/34610137/2007-08-a-ncsp-five-years>
  121. Taylor Nelson Sofres Healthcare. Pharmacy chlamydia screening pathfinder evaluation (PCSPf). Final. London; 2007.
  122. Muir A. Pilot of chlamydia testing and treatment in community pharmacies. 2008.
  123. Berg W, Linder C, Eschholz G, Schubert J. Pilot study of the practical relevance of a one-step test for prostate-specific antigen in capillary blood to improve the acceptance rate in the early detection program of prostate carcinoma. *Int Urol Nephrol* [Internet]. 2001 [cited 2020 Nov 12];32(3):381–8. Available from: <https://pubmed.ncbi.nlm.nih.gov/11583357/>
  124. Barris Blundell D, Rodríguez Zarzuelo C, Sabio Sánchez B, Gutiérrez Álvarez JL, Navarro Visa E, Muñoz Valdés O, et al. Screening for osteoporosis among post-menopausal women in community pharmacy. *Pharm Pract (Granada)* [Internet]. 2006 Apr [cited 2020 Nov 12];4(2):95–101. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25247006>
  125. Hersberger KE, Renggli VP, Nirkko AC, Mathis J, Schwegler K, Bloch KE. Screening for sleep disorders in community pharmacies - Evaluation of a campaign in Switzerland. *J Clin Pharm Ther* [Internet]. 2006 Feb [cited 2020 Nov 12];31(1):35–41. Available from: <https://pubmed.ncbi.nlm.nih.gov/16476118/>
  126. Via-Sosa MA, Toro C, Travé P, March MA. Screening premorbid metabolic syndrome in community pharmacies: A cross-sectional descriptive study. *BMC Public Health* [Internet].



- 2014 May 22 [cited 2020 Nov 12];14(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/24885099/>
127. Giorgi Rossi P, Fortunato C, Barbarino P, Boveri S, Caroli S, Del Mistro A, et al. Self-sampling to increase participation in cervical cancer screening: An RCT comparing home mailing, distribution in pharmacies, and recall letter. *Br J Cancer* [Internet]. 2015 Feb 17 [cited 2020 Nov 12];112(4):667–75. Available from: <https://pubmed.ncbi.nlm.nih.gov/25633037/>
  128. Hersberger KE, Botomino A, Mancini M, Bruppacher R. Sequential screening for diabetes - Evaluation of a campaign in Swiss community pharmacies. *Pharm World Sci* [Internet]. 2006 Jun [cited 2020 Nov 12];28(3):171–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/17004016/>
  129. Thomas G, Humphris G, Ozakinci G, O'Brien K, Roberts SA, Hopkins M, et al. A qualitative study of pharmacists' views on offering chlamydia screening to women requesting emergency hormonal contraception. *BJOG An Int J Obstet Gynaecol* [Internet]. 2010 Jan [cited 2020 Nov 12];117(1):109–13. Available from: <https://pubmed.ncbi.nlm.nih.gov/19775305/>
  130. Nishiyama T, Chrystyn H. The Jones Morbidity Index as an aid for community pharmacists to identify poor asthma control during the dispensing process. *Int J Pharm Pract* [Internet]. 2003 Mar 1 [cited 2020 Nov 12];11(1):41–6. Available from: <http://doi.wiley.com/10.1211/002235702874>
  131. Fernández-Balbuena S, Marcos H, Pérez-Rubio A, Hoyos J, Belza MJ, de la Fuente L. The rapid test in Spanish pharmacies: A novel programme to reach heterosexual men? *HIV Med* [Internet]. 2015 Jul 1 [cited 2020 Nov 12];16(6):362–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/25689242/>
  132. Clarke A. Type 2 diabetes: Awareness and screening in the community pharmacy setting. *J Diabetes Nurs* [Internet]. 2007 [cited 2020 Nov 12];11:128–34. Available from: [https://www.researchgate.net/publication/286123844\\_Type\\_2\\_diabetes\\_Awareness\\_and\\_screening\\_in\\_the\\_community\\_pharmacy\\_setting](https://www.researchgate.net/publication/286123844_Type_2_diabetes_Awareness_and_screening_in_the_community_pharmacy_setting)
  133. Zilda Mendes, Anabela Madeira, Suzete Costa, Sónia Inácio, Marianela Vaz, Artur Teles Araújo, et al. Asthma control assessment using the Asthma Control Test in Portuguese pharmacies. *Rev Port Imunoalergologia*. 2010 Jun 11;18(4):313–30.
  134. Laforest L, Van Ganse E, Devouassoux G, Osman LM, Brice K, Massol J, et al. Asthmatic patients' poor awareness of inadequate disease control: A pharmacy-based survey. *Ann Allergy, Asthma Immunol* [Internet]. 2007 [cited 2020 Nov 12];98(2):146–52. Available from: <https://pubmed.ncbi.nlm.nih.gov/17304881/>
  135. King M, et al. Blood glucose measurement in the community pharmacy. *Pharm J*. 1993;250:808–10.
  136. Baraitser P, Pearce V, Holmes J, Horne N, Boynton PM. Chlamydia testing in community pharmacies: Evaluation of a feasibility pilot in south east London. *Qual Saf Heal Care* [Internet]. 2007 Aug [cited 2020 Nov 12];16(4):303–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/17693680/>
  137. Wright D, Twigg M, Thornley T. Chronic obstructive pulmonary disease case finding by community pharmacists: A potential cost-effective public health intervention. *Int J Pharm Pract* [Internet]. 2015 Feb 1 [cited 2020 Nov 12];23(1):83–5. Available from: <https://pubmed.ncbi.nlm.nih.gov/25371146/>
  138. Burón A, Grau J, Andreu M, Augé JM, Guayta-Escolies R, Barau M, et al. [Colorectal Cancer Early Screening Program of Barcelona, Spain: Indicators of the first round of a program with

- participation of community pharmacies] [Article in Spanish]. *Med Clin (Barc)* [Internet]. 2015 Aug 21 [cited 2020 Nov 12];145(4):141–6. Available from: <https://pubmed.ncbi.nlm.nih.gov/25073826/>
139. Amariles P, Faus M, Jimenez- Martin J, Sabater Hernandez D, Garcia-Jimenez E. [Effect of the Dader Method for pharmaceutical care on the cardiovascular risk of patients with cardiovascular risk factors or cardiovascular disease (EMDADER-CV): methods and general results] [Article in Spanish]. *ARS Pharm* [Internet]. 2008 [cited 2020 Nov 13];49:7–24. Available from: <https://opus.lib.uts.edu.au/handle/10453/29021>
  140. Fornos JA, Andrés NF, Andrés JC, Guerra MM, Egea B. A pharmacotherapy follow-up program in patients with type-2 diabetes in community pharmacies in Spain. *Pharm World Sci* [Internet]. 2006 Apr [cited 2020 Nov 12];28(2):65–72. Available from: <https://pubmed.ncbi.nlm.nih.gov/16791717/>
  141. Mehuys E, Van Bortel L, De Bolle L, Van Tongelen I, Annemans L, Remon JP, et al. Effectiveness of pharmacist intervention for asthma control improvement. *Eur Respir J*. 2008;31(4):790–9.
  142. Holland R, Brooksby I, Lenaghan E, Ashton K, Hay L, Smith R, et al. Effectiveness of visits from community pharmacists for patients with heart failure: HeartMed randomised controlled trial. *Br Med J* [Internet]. 2007 May 26 [cited 2020 Nov 12];334(7603):1098–101. Available from: <https://pubmed.ncbi.nlm.nih.gov/17452390/>
  143. Petkova VB. Evaluation of the impact of a pharmaceutical care program on patients with asthma. *J Fac Pharm*. 2005;34(4):251–62.
  144. Sarkadi A, Rosenqvist U. Experience-based group education in Type 2 diabetes: A randomised controlled trial. *Patient Educ Couns* [Internet]. 2004 Jun [cited 2020 Nov 12];53(3):291–8. Available from: <https://pubmed.ncbi.nlm.nih.gov/15186866/>
  145. Schröder S, Martus P, Odin P, Schaefer M. Impact of community pharmaceutical care on patient health and quality of drug treatment in Parkinson's disease. *Int J Clin Pharm* [Internet]. 2012 Oct [cited 2020 Nov 12];34(5):746–56. Available from: <https://pubmed.ncbi.nlm.nih.gov/22810890/>
  146. Ali M, Schifano F, Robinson P, Phillips G, Doherty L, Melnick P, et al. Impact of community pharmacy diabetes monitoring and education programme on diabetes management: A randomized controlled study. *Diabet Med* [Internet]. 2012 Sep [cited 2020 Nov 12];29(9). Available from: <https://pubmed.ncbi.nlm.nih.gov/22672148/>
  147. Herborg H, Soendergaard B, Froekjaer B, Fonnesbaek L, Jorgensen T, Hepler CD, et al. Improving drug therapy for patients with asthma-part 1: Patient outcomes. *J Am Pharm Assoc (Wash)* [Internet]. 2001 [cited 2020 Nov 12];41(4):539–50. Available from: <https://pubmed.ncbi.nlm.nih.gov/11486980/>
  148. Van Boven JFM, Tommelein E, Boussery K, Mehuys E, Vegter S, Brusselle GGO, et al. Improving inhaler adherence in patients with Chronic Obstructive Pulmonary Disease: A cost-effectiveness analysis. *Respir Res* [Internet]. 2014 Jun 14 [cited 2020 Nov 12];15(1):66. Available from: [/pmc/articles/PMC4067522/?report=abstract](https://pubmed.ncbi.nlm.nih.gov/25073826/)
  149. Giraud V, Allaert FA, Roche N. Inhaler technique and asthma: Feasability and acceptability of training by pharmacists. *Respir Med* [Internet]. 2011 Dec [cited 2020 Nov 12];105(12):1815–22. Available from: <https://pubmed.ncbi.nlm.nih.gov/21802271/>
  150. Varma S, McElnay JC, Hughes CM, Passmore AP, Varma M. Pharmaceutical care of patients with congestive heart failure: Interventions and outcomes. *Pharmacotherapy* [Internet]. 1999

- [cited 2020 Nov 12];19(7):860–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/10417035/>
151. Brook OH, Van Hout H, Stalman W, Nieuwenhuysen H, Bakker B, Heerdink E, et al. A pharmacy-based coaching program to improve adherence to antidepressant treatment among primary care patients. *Psychiatr Serv* [Internet]. 2005 Apr [cited 2020 Nov 12];56(4):487–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/15812103/>
  152. Petkova VB, Petrova GI. Pilot project for education of patients with type 2 diabetes by pharmacists. *Acta Diabetol* [Internet]. 2006 Aug [cited 2020 Nov 12];43(2):37–42. Available from: <https://pubmed.ncbi.nlm.nih.gov/16865327/>
  153. Laforest L, Van Ganse E, Devouassoux G, Chretien S, Bauguil G, Pacheco Y, et al. Quality of asthma care: Results from a community pharmacy based survey. *Allergy Eur J Allergy Clin Immunol* [Internet]. 2005 Dec [cited 2020 Nov 12];60(12):1505–10. Available from: <https://pubmed.ncbi.nlm.nih.gov/16266382/>
  154. Bond C. The MEDMAN study: A randomized controlled trial of community pharmacy-led medicines management for patients with coronary heart disease. *Fam Pract* [Internet]. 2007 Apr [cited 2020 Nov 12];24(2):189–200. Available from: <https://pubmed.ncbi.nlm.nih.gov/17272285/>
  155. Närhi U, Airaksinen M, Tanskanen P, Erlund H. Therapeutic outcomes monitoring by community pharmacists for improving clinical outcomes in asthma. *J Clin Pharm Ther* [Internet]. 2000 [cited 2020 Nov 12];25(3):177–83. Available from: <https://pubmed.ncbi.nlm.nih.gov/10886462/>
  156. Manrai, et al. Understanding the type of queries and interventions made within a community pharmacy for patients with cognitive impairment and the related resource required. *Int J Pharm Pr*. 2015;23:89–90.
  157. Wright D, Twigg M, Barton G, Thornley T, Kerr C. An evaluation of a multi-site community pharmacy-based chronic obstructive pulmonary disease support service. *Int J Pharm Pract* [Internet]. 2015 Feb 1 [cited 2020 Nov 12];23(1):36–43. Available from: <https://pubmed.ncbi.nlm.nih.gov/25409898/>
  158. Cordina M, McElnay JC, Hughes CM. Assessment of a community pharmacy-based program for patients with asthma. *Pharmacotherapy* [Internet]. 2001;21(10):1196–203. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11601666>
  159. Barbanell D, Eldridge S, Griffiths C. Can a self-management programme delivered by a community pharmacist improve asthma control? A randomised trial. *Thorax* [Internet]. 2003 Oct 1 [cited 2020 Nov 12];58(10):851–4. Available from: <https://pubmed.ncbi.nlm.nih.gov/14514935/>
  160. Mangiapane S, Schulz M, Mühlhig S, Ihle P, Schubert I, Waldmann HC. Community pharmacy-based pharmaceutical care for asthma patients. *Ann Pharmacother* [Internet]. 2005 Nov [cited 2020 Nov 12];39(11):1817–22. Available from: <https://pubmed.ncbi.nlm.nih.gov/16219893/>
  161. García-Cárdenas V, Sabater-Hernández D, Kenny P, Martínez-Martínez F, Faus MJ, Benrimoj SI. Effect of a pharmacist intervention on asthma control. A cluster randomised trial. *Respir Med*. 2013;107(9):1346–55.
  162. Amariles P, Sabater-Hernández D, García-Jiménez E, Rodríguez-Chamorro MÁ, Prats-Más R, Marín-Magán F, et al. 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. *J Manag Care Pharm* [Internet]. 2012 [cited 2020 Nov 12];18(4):311–23. Available from: <https://pubmed.ncbi.nlm.nih.gov/22548691/>
163. Tommelein E, Mehuys E, Van Hees T, Adriaens E, Van Bortel L, Christiaens T, et al. Effectiveness of pharmaceutical care for patients with chronic obstructive pulmonary disease (PHARMACOP): A randomized controlled trial. *Br J Clin Pharmacol* [Internet]. 2014 [cited 2020 Nov 12];77(5):756–66. Available from: <https://pubmed.ncbi.nlm.nih.gov/24117908/>
  164. Rubio-Valera M, Bosmans J, Fernández A, Peñarrubia-María M, March M, Travé P, et al. Cost-Effectiveness of a Community Pharmacist Intervention in Patients with Depression: A Randomized Controlled Trial (PRODEFAR Study). *PLoS One* [Internet]. 2013 Aug 12 [cited 2020 Nov 12];8(8). Available from: <https://pubmed.ncbi.nlm.nih.gov/23950967/>
  165. Elliott RA, Tanajewski L, Gkountouras G, Avery AJ, Barber N, Mehta R, et al. Cost Effectiveness of Support for People Starting a New Medication for a Long-Term Condition Through Community Pharmacies: An Economic Evaluation of the New Medicine Service (NMS) Compared with Normal Practice. *Pharmacoeconomics* [Internet]. 2017 Dec 1 [cited 2020 Nov 12];35(12):1237–55. Available from: <https://pubmed.ncbi.nlm.nih.gov/28776320/>
  166. Elliott RA, Barber N, Clifford S, Horne R, Hartley E. The cost effectiveness of a telephone-based pharmacy advisory service to improve adherence to newly prescribed medicines. *Pharm World Sci* [Internet]. 2008 Jan [cited 2020 Nov 12];30(1):17–23. Available from: <https://pubmed.ncbi.nlm.nih.gov/17557211/>
  167. Desborough JA, Sach T, Bhattacharya D, Holland RC, Wright DJ. A cost-consequences analysis of an adherence focused pharmacist-led medication review service. *Int J Pharm Pract* [Internet]. 2012 [cited 2020 Nov 12];20(1):41–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/22236179/>
  168. Brook O, Van Hout H, Nieuwenhuyse H, Heerdink E. Impact of coaching by community pharmacists on drug attitude of depressive primary care patients and acceptability to patients; a randomized controlled trial. *Eur Neuropsychopharmacol* [Internet]. 2003 Jan [cited 2020 Nov 12];13(1):1–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/12480116/>
  169. Herborg H, Soendergaard B, Jorgensen T, Fonnesbaek L, Hepler CD, Holst H, et al. Improving drug therapy for patients with asthma-part 2: Use of antiasthma medications. *J Am Pharm Assoc (Wash)* [Internet]. 2001 [cited 2020 Nov 12];41(4):551–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/11486981/>
  170. van Boven JFM, Stuurman-Bieze AGG, Hiddink EG, Postma MJ, Vegter S. Medication monitoring and optimization: A targeted pharmacist program for effective and cost-effective improvement of chronic therapy adherence. *J Manag Care Pharm* [Internet]. 2014 [cited 2020 Nov 12];20(8):786–92. Available from: <https://pubmed.ncbi.nlm.nih.gov/25062071/>
  171. Eussen SRBM, Van Der Elst ME, Klungel OH, Rompelberg CJM, Garssen J, Oosterveld MH, et al. A pharmaceutical care program to improve adherence to statin therapy: A randomized controlled trial. *Ann Pharmacother* [Internet]. 2010 Dec [cited 2020 Nov 12];44(12):1905–13. Available from: <https://pubmed.ncbi.nlm.nih.gov/21119098/>
  172. Bosmans JE, Brook OH, Van Hout HPJ, De Bruijne MC, Nieuwenhuyse H, Bouter LM, et al. Cost effectiveness of a pharmacy-based coaching programme to improve adherence to antidepressants. *Pharmacoeconomics* [Internet]. 2007 [cited 2020 Nov 12];25(1):25–37. Available from: <https://pubmed.ncbi.nlm.nih.gov/17192116/>
  173. Herborg H, Haugølle LS, Sørensen L, Rossing C, Dam P. Developing a generic, individualised adherence programme for chronic medication users. *Pharm Pract (Granada)* [Internet]. 2008

- [cited 2020 Nov 12];6(7):148–57. Available from: <https://pubmed.ncbi.nlm.nih.gov/25177406/>
174. Kooy MJ, Van Wijk BLG, Heerdink ER, De Boer A, Bouvy ML. Does the use of an electronic reminder device with or without counseling improve adherence to lipid-lowering treatment? The results of a randomized controlled trial. *Front Pharmacol* [Internet]. 2013 [cited 2020 Nov 12];4 MAY. Available from: [/pmc/articles/PMC3665928/?report=abstract](https://pubmed.ncbi.nlm.nih.gov/25177406/)
  175. Bouvy ML, Heerdink ER, Urquhart J, Grobbee DE, Hoe AW, Leufkens HGM. Effect of a Pharmacist-Led Intervention on Diuretic Compliance in Heart Failure Patients: A Randomized Controlled Study. *J Card Fail* [Internet]. 2003 [cited 2020 Nov 12];9(5):404–11. Available from: <https://pubmed.ncbi.nlm.nih.gov/14583903/>
  176. Vrijens B, Belmans A, Matthys K, de Klerk E, Lesaffre E. Effect of intervention through a pharmaceutical care program on patient adherence with prescribed once-daily atorvastatin. *Pharmacoepidemiol Drug Saf* [Internet]. 2006 Feb [cited 2020 Nov 12];15(2):115–21. Available from: <https://pubmed.ncbi.nlm.nih.gov/16342302/>
  177. Brook OH, Van Hout HPJ, Nieuwenhuysen H, De Haan M. Effects of coaching by community pharmacists on psychological symptoms of antidepressant users; a randomised controlled trial. *Eur Neuropsychopharmacol* [Internet]. 2003 [cited 2020 Nov 12];13(5):347–54. Available from: <https://pubmed.ncbi.nlm.nih.gov/12957333/>
  178. Rubio-Valera M, March Pujol M, Fernández A, Peñarrubia-María MT, Travé P, López del Hoyo Y, et al. Evaluation of a pharmacist intervention on patients initiating pharmacological treatment for depression: A randomized controlled superiority trial. *Eur Neuropsychopharmacol* [Internet]. 2013 Sep [cited 2020 Nov 12];23(9):1057–66. Available from: <https://pubmed.ncbi.nlm.nih.gov/23219937/>
  179. Pacini M, Smith RD, Wilson ECF, Holland R. Home-based medication review in older people: Is it cost effective? *Pharmacoeconomics* [Internet]. 2007 [cited 2020 Nov 12];25(2):171–80. Available from: <https://pubmed.ncbi.nlm.nih.gov/17249858/>
  180. Maidment ID, Damery S, Campbell N, Seare N, Fox C, Iliffe S, et al. Medication review plus person-centred care: A feasibility study of a pharmacy-health psychology dual intervention to improve care for people living with dementia 11 Medical and Health Sciences 1117 Public Health and Health Services 11 Medical and Health Sciences 1110 Nursing. *BMC Psychiatry* [Internet]. 2018 Oct 19 [cited 2020 Nov 12];18(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/30340480/>
  181. Tang M, Wollsen M, Aagaard L. Pain monitoring and medication assessment in elderly nursing home residents with dementia. *J Res Pharm Pract* [Internet]. 2016 [cited 2020 Nov 12];5(2):126. Available from: <https://pubmed.ncbi.nlm.nih.gov/27162807/>
  182. Van Der Spek K, Koopmans RTCM, Smalbrugge M, Nelissen-Vrancken MHJMG, Wetzels RB, Smeets CHW, et al. The effect of biannual medication reviews on the appropriateness of psychotropic drug use for neuropsychiatric symptoms in patients with dementia: A randomised controlled trial. *Age Ageing* [Internet]. 2018 May 1 [cited 2020 Nov 12];47(3):430–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/29432518/>
  183. Avery AJ, Rodgers S, Cantrill JA, Armstrong S, Cresswell K, Eden M, et al. A pharmacist-led information technology intervention for medication errors (PINCER): A multicentre, cluster randomised, controlled trial and cost-effectiveness analysis. *Lancet* [Internet]. 2012 [cited 2020 Nov 12];379(9823):1310–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/22357106/>
  184. Elliott RA, Putman KD, Franklin M, Annemans L, Verhaeghe N, Eden M, et al. Cost effectiveness

- of a pharmacist-led information technology intervention for reducing rates of clinically important errors in medicines management in general practices (PINCER). *Pharmacoeconomics* [Internet]. 2014 [cited 2020 Nov 12];32(6):573–90. Available from: <https://pubmed.ncbi.nlm.nih.gov/24639038/>
185. Anonymous (Deloitte report). Primary Care Navigator training programme for dementia Evaluation of its impact - PDF Free Download [Internet]. 2015 [cited 2020 Nov 12]. Available from: <https://docplayer.net/20974862-Primary-care-navigator-training-programme-for-dementia-evaluation-of-its-impact.html>
  186. Hugtenburg JG, Borgsteede SD, Beckeringh JJ. Medication review and patient counselling at discharge from the hospital by community pharmacists. *Pharm World Sci* [Internet]. 2009 Dec [cited 2020 Nov 12];31(6):630–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/19649720/>
  187. Manfrin A, Tinelli M, Thomas T, Krska J. A cluster randomised control trial to evaluate the effectiveness and cost-effectiveness of the Italian medicines use review (I-MUR) for asthma patients. *BMC Health Serv Res*. 2017;17(1):1–13.
  188. Bond CM, Fish A, Porteous TH, Reid JP, Scott A, Antonazzo E. A randomised controlled trial of the effects of note-based medication review by community pharmacists on prescribing of cardiovascular drugs in general practice. *Int J Pharm Pract* [Internet]. 2007 Mar 1 [cited 2020 Nov 12];15(1):39–46. Available from: <http://doi.wiley.com/10.1211/ijpp.15.1.0007>
  189. Vegter S, Oosterhof P, van Boven JFM, Stuurman Bieze AGG, Hiddink EG, Postma MJ. Improving adherence to lipid-lowering therapy in a community pharmacy intervention program: A cost-effectiveness analysis. *J Manag Care Pharm* [Internet]. 2014 [cited 2020 Nov 12];20(7):722–32. Available from: <https://pubmed.ncbi.nlm.nih.gov/24967525/>
  190. Bernstein C, Björkman I, Caramona M, Crealey G, Frøkjær B, Grundberger E, et al. Improving the Well-Being of Elderly Patients via Community Pharmacy-Based Provision of Pharmaceutical Care. *Drugs Aging* [Internet]. 2001 Jan 1 [cited 2020 Nov 12];18(1):63–77. Available from: <http://link.springer.com/10.2165/00002512-200118010-00005>
  191. Geurts MME, Stewart RE, Brouwers JRB, de Graeff PA, de Gier JJ. Patient beliefs about medicines and quality of life after a clinical medication review and follow-up by a pharmaceutical care plan: a study in elderly polypharmacy patients with a cardiovascular disorder. *J Pharm Heal Serv Res* [Internet]. 2015 Dec 1 [cited 2020 Nov 12];6(4):171–6. Available from: <http://doi.wiley.com/10.1111/jphs.12104>
  192. Hoffmann W, Herzog B, Mühlig S, Kayser H, Fabian R, Thomsen M, et al. Pharmaceutical care for migraine and headache patients: A community-based, randomized intervention. *Ann Pharmacother* [Internet]. 2008 Dec [cited 2020 Nov 12];42(12):1804–13. Available from: <https://pubmed.ncbi.nlm.nih.gov/19001531/>
  193. Hohmann C, Klotz JM, Radziwill R, Jacobs AH, Kissel T. Pharmaceutical care for patients with ischemic stroke: Improving the patients quality of life. *Pharm World Sci* [Internet]. 2009 Oct [cited 2020 Nov 12];31(5):550–8. Available from: <https://pubmed.ncbi.nlm.nih.gov/19633917/>
  194. Schulz M, Verheyen F, Mühlig S, Müller JM, Mühlbauer K, Knop-Schneickert E, et al. Pharmaceutical care services for asthma patients: A controlled intervention study. *J Clin Pharmacol* [Internet]. 2001 Jan 1 [cited 2020 Nov 12];41(6):668–76. Available from: <https://pubmed.ncbi.nlm.nih.gov/11402636/>
  195. Neilson AR, Bruhn H, Bond CM, Elliott AM, Smith BH, Hannaford PC, et al. Pharmacist-led management of chronic pain in primary care: Costs and benefits in a pilot randomised



- controlled trial. *BMJ Open* [Internet]. 2015 [cited 2020 Nov 12];5(4). Available from: <https://pubmed.ncbi.nlm.nih.gov/25833666/>
196. Denneboom W, Dautzenberg MGH, Grol R, De Smet PAGM. Treatment reviews of older people on polypharmacy in primary care: Cluster controlled trial comparing two approaches [Internet]. Vol. 57, *British Journal of General Practice*. Royal College of General Practitioners; 2007 [cited 2020 Nov 12]. p. 723–31. Available from: </pmc/articles/PMC2151787/?report=abstract>
  197. Sturgess IK, McElney JC, Hughes CM, Crealey G. Community pharmacy based provision of pharmaceutical care to older patients. *Pharm World Sci* [Internet]. 2003 Oct [cited 2020 Nov 12];25(5):218–26. Available from: <https://pubmed.ncbi.nlm.nih.gov/14584229/>
  198. Bojke C, Philips Z, Sculpher M, Campion P, Chrystyn H, Coulton S, et al. Cost-effectiveness of shared pharmaceutical care for older patients: RESPECT trial findings. *Br J Gen Pract* [Internet]. 2010 Jan [cited 2020 Nov 12];60(570):21–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/20040164/>
  199. Scott A, Tinelli M, Bond C. Costs of a community pharmacist-led medicines management service for patients with coronary heart disease in England: Healthcare system and patient perspectives. *Pharmacoeconomics* [Internet]. 2007 [cited 2020 Nov 12];25(5):397–411. Available from: <https://pubmed.ncbi.nlm.nih.gov/17488138/>
  200. Jódar-Sánchez F, Malet-Larrea A, Martín J, García L, López del AMP, Martínez-Martínez F, et al. Cost-Utility Analysis of A Medication Review With Follow-Up for Older People With Polypharmacy in Community Pharmacies in Spain: Consigue Program. *Value Heal* [Internet]. 2014 Nov [cited 2020 Nov 12];17(7):A511–2. Available from: <https://pubmed.ncbi.nlm.nih.gov/27201576/>
  201. Jódar-Sánchez F, Malet-Larrea A, Martín JJ, García-Mochón L, López del Amo MP, Martínez-Martínez F, et al. Cost-Utility Analysis of a Medication Review with Follow-Up Service for Older Adults with Polypharmacy in Community Pharmacies in Spain: The conSIGUE Program. *Pharmacoeconomics* [Internet]. 2015 Jun 29 [cited 2020 Nov 12];33(6):599–610. Available from: <https://pubmed.ncbi.nlm.nih.gov/25774017/>
  202. Fiss T, Ritter CA, Alte D, Van Den Berg N, Hoffmann W. Detection of drug related problems in an interdisciplinary health care model for rural areas in Germany. *Pharm World Sci* [Internet]. 2010 Oct [cited 2020 Nov 12];32(5):566–74. Available from: <https://pubmed.ncbi.nlm.nih.gov/20593238/>
  203. Mehuys E, Van Bortel L, De Bolle L, Van Tongelen I, Annemans L, Remon JP, et al. Effectiveness of a community pharmacist intervention in diabetes care: A randomized controlled trial. *J Clin Pharm Ther* [Internet]. 2011 Oct [cited 2020 Nov 12];36(5):602–13. Available from: <https://pubmed.ncbi.nlm.nih.gov/21143256/>
  204. Lenaghan E, Holland R, Brooks A. Home-based medication review in a high risk elderly population in primary care - The POLYMED randomised controlled trial [Internet]. Vol. 36, *Age and Ageing*. Age Ageing; 2007 [cited 2020 Nov 12]. p. 292–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/17387123/>
  205. Merks P, Jakubowska M, Drelich E, Świeczkowski D, Bogusz J, Bilmin K, et al. The legal extension of the role of pharmacists in light of the COVID-19 global pandemic [Internet]. *Research in Social and Administrative Pharmacy*. Elsevier Inc.; 2020 [cited 2020 Nov 12]. Available from: </pmc/articles/PMC7289723/?report=abstract>
  206. Hoti K, Jakupi A, Hetemi D, Raka D, Hughes J, Desselle S. Provision of community pharmacy services during COVID-19 pandemic: a cross sectional study of community pharmacists'

- experiences with preventative measures and sources of information. *Int J Clin Pharm* [Internet]. 2020;42(4):1197–206. Available from: <https://doi.org/10.1007/s11096-020-01078-1>
207. Hayden JC, Parkin R. The challenges of COVID-19 for community pharmacists and opportunities for the future. *Ir J Psychol Med*. 2020;37(3):198–203.
  208. Parkhurst C, Singh Purewal G, Donyai P. Community Pharmacy and COVID-19—The Unsung Heroes on Our High Streets. *J Patient Exp*. 2020;7(3):282–4.
  209. Zaidi STR, Hasan SS. Personal protective practices and pharmacy services delivery by community pharmacists during COVID-19 pandemic: Results from a national survey. *Res Soc Adm Pharm* [Internet]. 2020;(July). Available from: <https://doi.org/10.1016/j.sapharm.2020.07.006>
  210. Hussain R, Dawoud DM, Babar ZUD. Drive-thru pharmacy services: A way forward to combat COVID-19 pandemic. *Res Soc Adm Pharm* [Internet]. 2020;(May):10–3. Available from: <https://doi.org/10.1016/j.sapharm.2020.07.015>
  211. Bukhari N, Rasheed H, Nayyer B, Babar ZUD. Pharmacists at the frontline beating the COVID-19 pandemic [Internet]. Vol. 13, *Journal of Pharmaceutical Policy and Practice*. BioMed Central Ltd.; 2020 [cited 2020 Nov 15]. p. 8. Available from: <https://joppp.biomedcentral.com/articles/10.1186/s40545-020-00210-w>
  212. International Pharmaceutical Federation. FIP Covid-19 Information Hub - FIP [Internet]. [cited 2020 Nov 15]. Available from: <https://www.fip.org/coronavirus>
  213. World Pharmacy Council. SectorAnalysis Special Edition: Community Pharmacy & COVID-19 [Internet]. 2020 [cited 2020 Nov 16]. Available from: [https://d3r4tb575cotg3.cloudfront.net/static/2020 Sector Analysis Special Edition - COVID-19 - Final\\_compressed\\_web-v1.pdf](https://d3r4tb575cotg3.cloudfront.net/static/2020 Sector Analysis Special Edition - COVID-19 - Final_compressed_web-v1.pdf)



## APPENDICES

**Appendix 1** – Country Survey Part 1: Pharmacy Services

**Appendix 2** – Glossary of Pharmacy Services

**Appendix 3** – Search strategy

**Appendix 4** – Country Survey Part 2: Pharmacy Interventions on COVID-19

## Appendix 1 – Country Survey Part 1: Pharmacy Services

The Institute for Evidence-Based Health (ISBE) is conducting research for the Pharmaceutical Group of the European Union (PGEU) which aims at synthesizing evidence and trends regarding pharmacy services in Europe. The purpose of this survey is to collect data for this study. The results will be made public in due course. We kindly request you to complete the following survey as accurate as you can.

Country: \_\_\_\_\_

|                                  | PHARMACY SERVICES  | Provided in most pharmacies under contract, agreement, legislation, or regulation (Y/N)<br><i>If Y please indicate National / Regional / Local</i><br><i>If Y and available, please provide name and link to document</i> | Provided in some pharmacies as a pilot (Y/N)<br><i>If Y and available, please provide link to document</i> | Remunerated by Government / Payer (Y/N/In some cases)<br><i>If Y and available, please provide latest fees and currency</i> | Provided individually by some pharmacies (Y/N) | Regulatory limitations (Y/N) | Description of Intervention<br>(Name, frequency, duration, disease or condition, medicines, target population)<br><i>If available, please provide link to document or reference</i> | Other data sources<br><i>Please provide link or reference</i> | OBS |
|----------------------------------|--|---|--|---|--|------------------------------|---|---|-----|
| <b>DISPENSING SERVICES</b>       |  |   |  |   |  |                              |   |   |     |
| 1                                | Night services   |   |  |   |  |                              |   |   |     |
| 2                                | Emergency supply of prescription-only medicines without prescription (e.g. adrenaline, salbutamol) |   |  |   |  |                              |   |   |     |
| 3                                | Urgent supply of prescription-only medicines without prescription (e.g. patient on holiday)        |   |  |   |  |                              |   |   |     |
| 4                                | Repeat dispensing (chronic long-term medications)  |   |  |   |  |                              |   |   |     |
| 5                                | Generic Substitution   |   |  |   |  |                              |   |   |     |
| 6                                | Refusal to dispense due to safety reasons  |   |  |   |  |                              |   |   |     |
| 7                                | Home delivery  |   |  |   |  |                              |   |   |     |
| 8                                | Other _____  |   |  |   |  |                              |   |   |     |
| <b>HEALTH PROMOTION SERVICES</b> |  |   |  |   |  |                              |   |   |     |
| 9                                | Handling and Disposal of Expired or Unwanted Medicines   |   |  |   |  |                              |   |   |     |
| 10                               | Needle/Syringe Exchange  |   |  |   |  |                              |   |   |     |
| 11                               | Pharmacy Travel Health   |   |  |   |  |                              |   |   |     |
| 12                               | Pharmacist-delivered vaccination (e.g. Flu)  |   |  |   |  |                              |   |   |     |
| 13                               | Weight Management  |   |  |   |  |                              |   |   |     |
| 14                               | Smoking Cessation  |   |  |   |  |                              |   |   |     |
| 15                               | Health education   |   |  |   |  |                              |   |   |     |
| 16                               | Other _____  |   |  |   |  |                              |   |   |     |

## Appendix 1 – Country Survey Part 1: Pharmacy Services (cont.)

|  | PHARMACY SERVICES   | Provided in most pharmacies under contract, agreement, legislation, or regulation (Y/N)<br><i>If Y please indicate National / Regional / Local</i><br><i>If Y and available, please provide name and link to document</i> | Provided in some pharmacies as a pilot (Y/N)<br><i>If Y and available, please provide link to document</i> | Remunerated by Government / Payer (Y/N/In some cases)<br><i>If Y and available, please provide latest fees and currency</i> | Provided individually by some pharmacies (Y/N) | Regulatory limitations (Y/N) | Description of Intervention<br>(Name, frequency, duration, disease or condition, medicines, target population)<br><i>If available, please provide link to document or reference</i> | Other data sources<br><i>Please provide link or reference</i> | OBS |
|--|---|---|--|---|--|------------------------------|---|---|-----|
| <b>SCREENING AND REFERRAL SERVICES</b> |   |   |  |   |  |                              |   |   |     |
| 17                                     | Common Ailment Management Schemes (e.g. Strep-A, UTI / Cystitis)  |   |  |   |  |                              |   |   |     |
| 18                                     | Screening individuals at-risk not on medication (e.g. for diabetes, hypertension, lipid disorder, HIV, Hep B, Hep C, colon cancer)                      |   |  |   |  |                              |   |   |     |
| 19                                     | Predictive medicine (e.g. genetic risk)   |   |  |   |  |                              |   |   |     |
| 20                                     | Pharmacovigilance for medicines under additional monitoring (e.g. screening questions for black triangle medicines)                                     |   |  |   |  |                              |   |   |     |
| 21                                     | Scheduling visits / exams, delivery of reports  |   |  |   |  |                              |   |   |     |
| 22                                     | Referral to other healthcare providers (e.g. nurses and nutritionists)  |   |  |   |  |                              |   |   |     |
| 23                                     | Other _____   |   |  |   |  |                              |   |   |     |
| <b>DISEASE MANAGEMENT SERVICES</b>     |   |   |  |   |  |                              |   |   |     |
| 24                                     | Administering injectable medicines (e.g. antibiotics)   |   |  |   |  |                              |   |   |     |
| 25                                     | Directly observed treatment/ Supervised Consumption of Medicines  |   |  |   |  |                              |   |   |     |
| 26                                     | First time dispensing intervention (e.g. New Medicines Service)   |   |  |   |  |                              |   |   |     |
| 27                                     | Instruction on use of therapeutic, self-monitoring device or medical aid (e.g. stoma appliance, inhaler, insulin device, self-monitoring blood glucose) |   |  |   |  |                              |   |   |     |
| 28                                     | Therapeutic adherence support   |   |  |   |  |                              |   |   |     |

## Appendix 1 – Country Survey Part 1: Pharmacy Services (cont.)

|   | PHARMACY SERVICES  | Provided in most pharmacies under contract, agreement, legislation, or regulation (Y/N)<br><i>If Y please indicate National / Regional / Local</i><br><i>If Y and available, please provide name and link to document</i> | Provided in some pharmacies as a pilot (Y/N)<br><i>If Y and available, please provide link to document</i> | Remunerated by Government /Payer (Y/N/In some cases)<br><i>If Y and available, please provide latest fees and currency</i> | Provided individually by some pharmacies (Y/N) | Regulatory limitations (Y/N) | Description of Intervention<br>(Name, frequency, duration, disease or condition, medicines, target population)<br><i>If available, please provide link to document or reference</i> | Other data sources<br><i>Please provide link or reference</i> | OBS |
|---|--|---|--|--|--|------------------------------|---|---|-----|
| 29  | Teleconsultations by pharmacists   |   |  |  |  |                              |   |   |     |
| 30  | Chronic disease management (e.g. hypertension, hyperlipidemia, diabetes, asthma, COPD, NOAC)               |   |  |  |  |                              |   |   |     |
| 31  | Other _____  |   |  |  |  |                              |   |   |     |
| <b>INDIVIDUAL CASE MANAGEMENT SERVICES</b>                  |  |   |  |  |  |                              |   |   |     |
| 32  | Dose Administration Aid  |   |  |  |  |                              |   |   |     |
| 33  | Medication Review  |   |  |  |  |                              |   |   |     |
| 34  | Home or Nursing Home Medication Review   |   |  |  |  |                              |   |   |     |
| 35  | Medication Reconciliation  |   |  |  |  |                              |   |   |     |
| 36  | Therapeutic Substitution   |   |  |  |  |                              |   |   |     |
| 37  | Deprescribing (e.g. benzodiazepines, antidepressants)  |   |  |  |  |                              |   |   |     |
| 38  | Integrated care pathways / protocols or Quality Circles in place with primary care                         |   |  |  |  |                              |   |   |     |
| 39  | High-Cost Therapy Dispensing and Management (e.g. Oncology, HIV, Rheumatoid Arthritis, Multiple Sclerosis) |   |  |  |  |                              |   |   |     |
| 40  | Drug dose titration (e.g. Insulin)   |   |  |  |  |                              |   |   |     |
| 41  | Galenic formulation  |   |  |  |  |                              |   |   |     |
| 42  | Other _____  |   |  |  |  |                              |   |   |     |
| <b>SERVICES BASED ON HEALTH TECHNOLOGY ASSESSMENT (HTA)</b> |  |   |  |  |  |                              |   |   |     |
| 43  | Data collection on the effectiveness of new medicines  |   |  |  |  |                              |   |   |     |
| 44  | Other _____  |   |  |  |  |                              |   |   |     |

UTI: Urinary Tract Infection; Hep: Hepatitis; COPD: Chronic Obstructive Pulmonary Disease; NOAC: New Oral Anticoagulants; OBS: Observations

**THANK YOU**

## Appendix 2 – Glossary of Pharmacy Services

| Pharmacy Service   | Synonyms  | Description  |
|--|---|--|
| <b>DISPENSING SERVICES</b>   |   |  |
| Night services   |   | Night Services are on-call or extended opening services that increase the accessibility to community pharmacies.   |
| Emergency Supply of Prescription-only Medicines without Prescription |   | Supply of a prescription medication in an emergency/lifesaving situation (e.g. adrenaline; salbutamol).  |
| Urgent Supply of Prescription-only Medicines without Prescription    |   | Supply of a prescription medication upon request from a patient previously prescribed it, in an urgent situation, without a prescription, to avoid discontinuation of therapy. E.g. patient on holiday; ran out of medicine and cannot obtain a prescription.  |
| Repeat Dispensing (chronic long-term medications)                    | Continued Dispensing<br>Medication Continuance                | System/service whereby repeat issues of prescriptions (e.g. for medications for chronic diseases) are managed (held) by the pharmacy and dispensed when required/due to the patient without needing to request a prescription from the physician; the pharmacy holds future issues of the prescription in the pharmacy which are pre-authorised by the prescriber for a set duration (e.g. 3, 6 or 12 months). |
| Generic Substitution   |   | The practice of exchanging at pharmacy level one medicine instead of another with the same active substance, strength and pharmaceutical from another manufacturer, without consulting the prescriber.   |
| Refusal to dispense due safety reasons                               | Refusal to fill<br>Non-dispensing (fee)                       | In dispensing a prescription, a pharmacist has to exercise an independent judgement to ensure the medicine is safe and appropriate for the patient; at all times the dispensing of a prescription or any other action taken by the pharmacist, must be consistent with the safety of the patient; pharmacist can refuse to dispense the medicine due to safety reasons.  |
| Home delivery  |   | Delivering medicines and healthcare devices at patients' home  |
| <b>HEALTH PROMOTION SERVICES</b>                                     |   |  |
| Handling and Disposal of Expired or Unwanted Medicines               | Pharmacy waste management                                     | Disposal of Medicines Waste includes safe disposal of expired or un-used medicines in pharmacy.  |
| Needle/Syringe Exchange  |   | Service where intravenous drug users can obtain clean injecting equipment, support and information. It is usually complemented by support for self-care and referral to another health or social care professional if needed.  |
| Pharmacy Travel Health   | Travel Medicine   | Provide pre-travel counselling on individual risk; vaccines administration.  |
| Pharmacist-Delivered Vaccination                                     | Pharmacy-based vaccination<br>Pharmacy-delivered Immunization | Administration of the vaccine by a certified community pharmacist.   |
| Weight Management  | Weight control  | The service delivers a patient-centred, integrated weight management service to improve patients' health and quality of life. The service provides psychological support and makes behavioural interventions, as well as interventions to increase physical activity and improve diet. Where appropriate, pharmacological interventions may also be provided.  |
| Smoking Cessation  |   | Performing counselling and select the most appropriate therapy (e.g. Nicotine Replacement Therapy) to help people give up smoking.   |
| Health education   |   | Providing patient counseling on health promotion, lifestyle modifications and disease prevention   |
| <b>SCREENING AND REFERRAL SERVICES</b>                               |   |  |
| Common Ailment Management  | Minor Ailments Service (MAS)<br>Common Ailments Service       | Providing medicines and advice to patients with common health conditions which can be managed without visiting a physician. It can include the option to prescribe over-the-counter (OTC) and/or prescription-only medicines by the pharmacist, and referral to another health care professional if needed. It may or may not include point-of-care testing (e.g. HIV, HBV, HCV, Strep A test).                |
| Screening Individuals At-Risk  |   | Performing a point-of-care test (e.g. blood glucose, blood pressure, total cholesterol) or a screening validated questionnaire, or both to identify individuals at risk of chronic disease and not on medication, provide counselling  |

## Appendix 2 – Glossary of Pharmacy Services (*cont.*)

|  |  |   |
|--|--|---|
|  |  | and/or referral to a physician or to another health care professional (e.g. nutritionist). E.g. for diabetes, hypertension, cardiovascular disease, asthma, COPD, colon cancer.   |
| Predictive Medicine  |  | Predictive medicine is a branch of medicine that aims to identify patients at genetic risk of developing a disease, thereby enabling either prevention or early treatment of that disease. Either single or more commonly multiple tests are used to identify markers of future predisposition to a disease.  |
| Pharmacovigilance for medicines under additional monitoring  |  | In the European Union (EU), medicines that are being monitored particularly closely by regulatory authorities are labelled with a black inverted triangle (▼) in the product information. These medicines are described as being under 'additional monitoring' and usually require a screening prior to dispensing. Additional monitoring aims to enhance reporting of suspected adverse drug reactions for medicines for which the clinical evidence base is less well developed. The main goals are to screen prior to dispensing and collect information as early as possible to inform the safe and effective use of these medicines and their benefit-risk profile when used in everyday medical practice. |
| Scheduling visits and exams/delivery of reports  |  | Complementary services provided on behalf of patients to schedule visits and exams in pharmacy or primary care and provide patients with health reports.  |
| Referral to other healthcare providers   |  | Referring patient to other healthcare providers such as nurse or nutritionist.  |
| <b>DISEASE MANAGEMENT SERVICES</b>   |  |   |
| Administering Injectable Medicines   | Injection Authority  | Administration of an injectable medicine (e.g. antibiotics, anti-inflammatory drugs, adrenaline) by a certified community pharmacist.   |
| Directly Observed Treatment (DOT)  | Directly observed therapy<br>Supervised Consumption of Medicines       | A method of drug administration in which the pharmacist observes as a person takes each dose of a medication to ensure the person receives and takes all medications as prescribed and to monitor response to treatment. E.g. Methadone, buprenorphine, antibiotics, medicines for the treatment of tuberculosis, HIV etc, others.  |
| First Time Dispensing Intervention   | New Medicines Service  | A structured, private consultation between a pharmacist and a patient starting a new medication focusing on supporting adherence in the first months of treatment. It may or may not include SMS refill / adherence reminders to patients.  |
| Instruction on use of therapeutic or self-monitoring device or medical aid (e.g. stoma appliance, inhaler, insulin device, self-monitoring blood glucose (SMBG)) | Stoma Appliance / Stoma Service<br>Inhaler Technique<br>SMBG education | A structured approach that involves teaching, demonstrating, and assessing the correct use of a device.   |
| Therapeutic adherence support  |  | Structured service/program to identify possible issues related to therapy adherence and provide solutions and motivation. It may or may not include SMS refill / adherence reminders to patients.   |
| Teleconsultations by pharmacists   |  | The possibility for pharmacists to consult and provide patients/public with advice by phone or online.  |
| Chronic disease management (e.g. hypertension, hyperlipidemia, diabetes, asthma, COPD, NOAC)   | Disease management   | A multi-component pharmacy intervention aiming to control symptoms and slow or stop chronic disease progression. This can include the detection of early signs or changing in a patient's condition, medication monitoring, medication review, adherence support and disease self-care support. It may or may not include SMS refill / adherence reminders to patients. It may or may not include point-of-care measurements (e.g. blood glucose, blood pressure, total cholesterol).   |
| <b>INDIVIDUAL CASE MANAGEMENT SERVICES</b>   |  |   |
| Dose Administration Aid (DAA)  | Pill-box<br>Blister pack<br>Preparation of personalized dosage systems | A personalized dosage system or DAA is a device or packaging system for organizing doses of medicines according to the day of the week and time of the day that they need to be taken.  |
| Medication Review  | Medication Therapy Management (MTM)<br>Medication Use Review (MUR)     | A structured evaluation of patient's medicines with the aim of optimizing medicines use and improving health outcomes. This entails detecting drug related problems and recommending interventions. It may or may not include SMS refill / adherence reminders to patients.   |



**INSTITUTE  
FOR EVIDENCE  
BASED HEALTH**  
Advancing Knowledge  
Transforming Healthcare

## Appendix 2 – Glossary of Pharmacy Services (*cont.*)

|  |  |   |
|--|--|---|
|  | Polymedication management<br>Medcheck<br>Medicines/Therapy/Medication optimization |   |
| Home or Nursing Home Medication Review   | Home Medicines Review<br>Residential Medication Management Reviews                 | Medicines review performed at patients' homes or in nursing homes by a community pharmacist.  |
| Medication Reconciliation  |  | The process of comparing the medications a patient is taking (and should be taking) with newly ordered medications to resolve discrepancies or potential problems. E.g. After hospital discharge.   |
| Therapeutic Substitution   |  | The practice of exchanging at pharmacy level one medicine instead of another with a different active substance and with the same therapeutic intent, in consultation with the prescriber and patient or in accordance with national/local protocols.  |
| Deprescribing  |  | Identifying, reducing, and withdrawing medication when the risks of the drug outweigh its clinical benefits (e.g. benzodiazepines, antidepressants, potentially inappropriate medicines in elderly).  |
| Integrated Care Pathways / protocols or Quality Circles in place with primary care |  | Agreed structured pathways of care and interprofessional local meetings between pharmacists, general practitioners (and sometimes primary care nurses) to identify and resolve potential medication and healthcare issues.  |
| High-Cost Therapy Dispensing and Management  | Dispensing specialty medicines   | Dispensing expensive high value medicines (e.g. biological or biosimilar medicines) to patients in the community pharmacy (e.g. Oncology, HIV, Rheumatoid Arthritis, Multiple Sclerosis).   |
| Drug-dose titration  |  | Process of adjusting the dose of a medication by pharmacist, usually with narrow therapeutic index, for the maximum benefit of patient without adverse effects by increasing or decreasing slowly (e.g. insulin, anticoagulants) under agreed protocol or patient directions from physician.  |
| Galenic formulation  |  | Extemporaneous compounding medicines prepared at the pharmacy for an individual patient.  |
| <b>SERVICES BASED ON HEALTH TECHNOLOGY ASSESSMENT (HTA)</b>                        |  |   |
| Data collection on new medicines under conditional reimbursement                   | Real-World monitoring of effectiveness (pharmacy-based)                            | Collecting and recording patient-level effectiveness metrics of new (recently launched) and innovative medicines during dispensing (usually these are medicines under confidential contracts between Payer and Market Authorization Holder which grants temporary reimbursement provided the company is able to demonstrate effectiveness in the real-world population within the first year(s) of launch under Health Technology Assessment procedures). |

## Appendix 3 – Search strategy

All searches performed until 5 August 2020.

### SEARCH #1

#### Systematic reviews of pharmacy services

MEDLINE® (via PubMed®), CDSR, CRD (DARE+NHS EED+HTA), Google Scholar

*Filter applied for systematic reviews and meta-analysis for publication date = last 7 years or since 1 January 2013 until August 2020 (except for Google Scholar which used search since 1 January 2020).*

("Systematic review" OR "meta-analysis") AND (pharmacy OR pharmacist) AND (intervention OR service OR services OR program OR programs OR programme OR programmes OR management) NOT hospital NOT clinic NOT ambulatory NOT inpatient

### SEARCH #2

#### Individual studies of pharmacy interventions on COVID-19

MEDLINE® (via PubMed®), Google Scholar.

*Search date since 1 January 2020 until August 2020.*

(pharmacy OR pharmacist) AND ("COVID-19" OR "coronavirus" OR "SARS-CoV-2") NOT hospital NOT clinic NOT ambulatory NOT inpatient



## Appendix 4 – Country Survey Part 2: Pharmacy Interventions on COVID-19

The Institute for Evidence-Based Health (ISBE) is conducting research for the Pharmaceutical Group of the European Union (PGEU) which aims at synthesizing evidence and trends on pharmacy services in Europe. This research also includes a subset on recent pharmacy interventions on COVID-19 in Europe. The purpose of this section of the survey is to collect data for this subset. The results will be made public in due course. We kindly request you to complete the following survey as accurate as you can.

Country: \_\_\_\_\_

|  | PHARMACY INTERVENTIONS ON COVID-19   | Provided in most (≥80%) pharmacies (Y/N) | Expanded powers granted to pharmacists through amending regulations (Y/N)<br><i>If Y, please provide link or reference</i> | Remunerated by Government / Payer (Y/N)<br><i>If Y and available please provide fees and currency</i> | Extra legislation passed by pharmacy regulators in view of covid-19 (Y/N)<br><i>If Y, please provide link or reference</i> | Other data sources<br><i>Please provide links or references</i> | OBS |
|--|--|--|--|---|--|---|-----|
| <b>PREVENTION: Measures to reduce health risks of COVID-19 pandemic*</b>                           |  |  |  |   |  |   |     |
| 1  | Patient information and education on preventive measures                               |  |  |   |  |   |     |
| 2  | Protocols in place for disinfection of pharmacy surfaces                               |  |  |   |  |   |     |
| 3  | Use of disposable masks by pharmacy staff  |  |  |   |  |   |     |
| 4  | Use of other Personal Protective Equipment by pharmacy staff                           |  |  |   |  |   |     |
| 5  | Queue management in pharmacy   |  |  |   |  |   |     |
| 6  | Floor marking inside pharmacy  |  |  |   |  |   |     |
| 7  | Restriction in pharmacy opening hours  |  |  |   |  |   |     |
| 8  | Barriers at counters in pharmacies   |  |  |   |  |   |     |
| 9  | Temporary suspension of patient care services  |  |  |   |  |   |     |
| <b>PREPAREDNESS: Measures to ensure timely and effective responses from the healthcare system*</b> |  |  |  |   |  |   |     |
| 10   | Business continuity plan - for 1 <sup>st</sup> and 2 <sup>nd</sup> line pharmacy staff |  |  |   |  |   |     |
| 11   | Stock and supply of essential medicines (as defined in your country)                   |  |  |   |  |   |     |
| 12   | Stock and supply of hand sanitizers  |  |  |   |  |   |     |
| 13   | Stock and supply of protective masks   |  |  |   |  |   |     |

## Appendix 4 – Country Survey Part 2: Pharmacy Interventions on COVID-19 (cont.)

|   | PHARMACY INTERVENTIONS ON COVID-19  | Provided in most (≥80%) pharmacies (Y/N) | Expanded powers granted to pharmacists through amending regulations (Y/N)<br><i>If Y, please provide link or reference</i> | Remunerated by Government / Payer (Y/N)<br><i>If Y and available please provide fees and currency</i> | Extra legislation passed by pharmacy regulators in view of covid-19 (Y/N)<br><i>If Y, please provide link or reference</i> | Other data sources<br><i>Please provide links or references</i> | OBS |
|---|---|--|--|---|--|---|-----|
| 14  | Quantity limits for patient for the supply of individual medicines  |  |  |   |  |   |     |
| <b>RESPONSE: Immediate actions in response to COVID-19 pandemic*</b>      |   |  |  |   |  |   |     |
| 15  | Symptom-based referral pathways for suspected cases   |  |  |   |  |   |     |
| 16  | Point-of-care antigen test-based referral pathways for suspected cases  |  |  |   |  |   |     |
| 17  | Increased demand / changes to repeat dispensing (=prescription renewal of chronic medications)                |  |  |   |  |   |     |
| 18  | Emergency supply of medications (without prescription)  |  |  |   |  |   |     |
| 19  | Supply of those medicines, which are usually supplied in the hospital setting (e.g. oncology, antiretroviral) |  |  |   |  |   |     |
| 20  | Increased demand / changes to home delivery of medicines  |  |  |   |  |   |     |
| 21  | Hotline numbers for home delivery of medicines  |  |  |   |  |   |     |
| 22  | Dealing with the supply of medicines shortages  |  |  |   |  |   |     |
| 23  | Preparing alcohol-based hand sanitizer formulations   |  |  |   |  |   |     |
| 24  | Pharmacy telephone support to vulnerable patients during isolation / lockdown                                 |  |  |   |  |   |     |
| 25  | Hotline numbers / protocol for pharmacies for reporting on domestic violence during isolation / lockdown      |  |  |   |  |   |     |
| 26  | Temporary waived prescription copayments for vulnerable patients  |  |  |   |  |   |     |
| 27  | Drive thru pharmacy services (initiated or increased)   |  |  |   |  |   |     |
| <b>RECOVERY: Measures to return to "normal" activities post-pandemic*</b> |   |  |  |   |  |   |     |
| 28  | Reestablishing normal patient care services and stock levels  |  |  |   |  |   |     |
| 29  | Dealing with the new vulnerable patients due to pandemic  |  |  |   |  |   |     |

## Appendix 4 – Country Survey Part 2: Pharmacy Interventions on COVID-19 (cont.)

|    | PHARMACY INTERVENTIONS ON COVID-19   | Provided in most (≥80%) pharmacies (Y/N) | Expanded powers granted to pharmacists through amending regulations (Y/N)<br><i>If Y, please provide link or reference</i> | Remunerated by Government / Payer (Y/N)<br><i>If Y and available please provide fees and currency</i> | Extra legislation passed by pharmacy regulators in view of covid-19 (Y/N)<br><i>If Y, please provide link or reference</i> | Other data sources<br><i>Please provide links or references</i> | OBS |
|----|--|--|--|---|--|---|-----|
| 30 | Referral pathways of exposed patients to antibody testing for immunity assessment against COVID-19 |  |  |   |  |   |     |

31. Were expanded powers granted to pharmacies to perform an already existing pharmacy service? Yes \_\_\_\_ Please explain \_\_\_\_ No \_\_\_\_
32. Were there any new pharmacy services initiated at Government's request or by amending regulation in country? Yes \_\_\_\_ Please explain \_\_\_\_ No \_\_\_\_
33. Were there any emergency temporary closures of pharmacies in country? Yes \_\_\_\_ How many pharmacies? \_\_\_\_ (\_\_\_\_ % on total) No \_\_\_\_
34. Were there deaths of pharmacy staff due to COVID-19 in country? Yes \_\_\_\_ How many deaths? \_\_\_\_ No \_\_\_\_

**THANK YOU**

\* Classification and definition of pharmacy intervention categories on COVID-19 based on Cadogan CA, Hughes CM. On the frontline against COVID-19: Community pharmacists' contribution during a public health crisis. Res Soc Adm Pharm 2020; <https://doi.org/10.1016/j.sapharm.2020.03.015>.

Copyright © 2020, by the Institute for Evidence-Based Health (ISBE) – All rights reserved.