

POLICY BRIEF 34

# How to enhance the integration of primary care and public health?

## Approaches, facilitating factors and policy options

Bernd Rechel

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This policy brief is one of a new series to meet the needs of policy-makers and health system managers. The aim is to develop key messages to support evidence-informed policy-making and the editors will continue to strengthen the series by working with authors to improve the consideration given to policy options and implementation.

### **What is a Policy Brief?**

A policy brief is a short publication specifically designed to provide policy makers with evidence on a policy question or priority. Policy briefs

- Bring together existing evidence and present it in an accessible format
- Use systematic methods and make these transparent so that users can have confidence in the material
- Tailor the way evidence is identified and synthesised to reflect the nature of the policy question and the evidence available
- Are underpinned by a formal and rigorous open peer review process to ensure the independence of the evidence presented.

Each brief has a one page key messages section; a two page executive summary giving a succinct overview of the findings; and a 20 page review setting out the evidence. The idea is to provide instant access to key information and additional detail for those involved in drafting, informing or advising on the policy issue.

Policy briefs provide evidence for policy-makers not policy advice. They do not seek to explain or advocate a policy position but to set out clearly what is known about it. They may outline the evidence on different prospective policy options and on implementation issues, but they do not promote a particular option or act as a manual for implementation.

How to enhance the integration of primary care and public health?  
Approaches, facilitating factors and policy options

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## Acronyms

<b>CCG</b>	clinical commissioning group
<b>CPCSSN</b>	Canadian Primary Care Sentinel Surveillance Network
<b>PRISMA</b>	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
<b>WHO</b>	World Health Organization

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### How do Policy Briefs bring the evidence together?

There is no one single way of collecting evidence to inform policy-making. Different approaches are appropriate for different policy issues, so the Observatory briefs draw on a mix of methodologies (see Figure A) and explain transparently the different methods used and how these have been combined. This allows users to understand the nature and limits of the evidence.

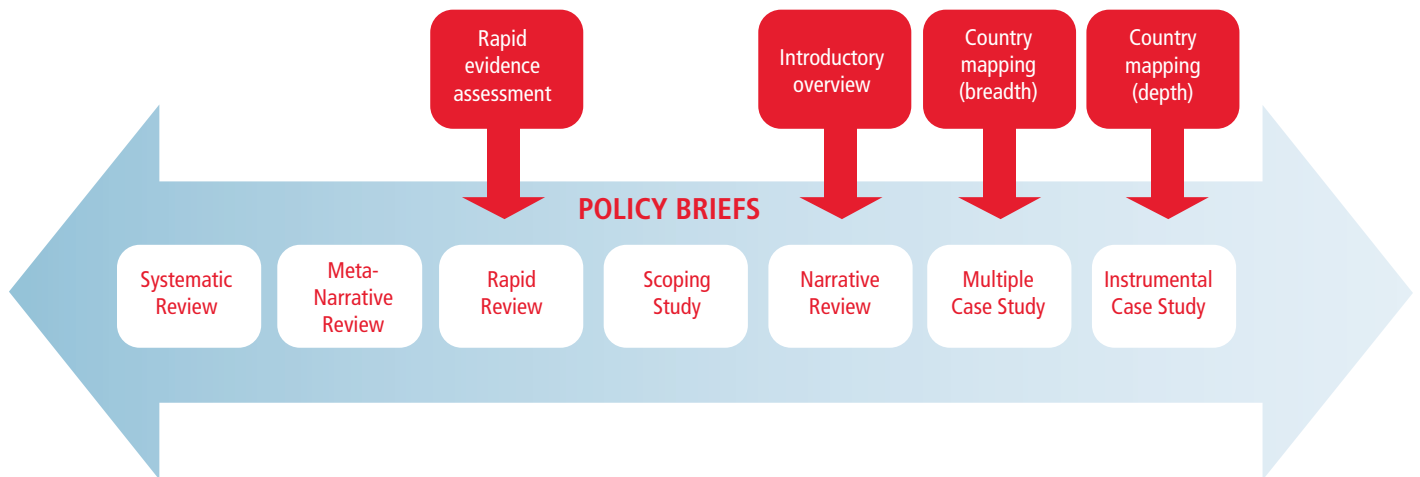
There are two main 'categories' of briefs that can be distinguished by method and further 'sub-sets' of briefs that can be mapped along a spectrum:

- **A rapid evidence assessment:** This is a targeted review of the available literature and requires authors to define key terms, set out explicit search strategies and be clear about what is excluded.

- **Comparative country mapping:** These use a case study approach and combine document reviews and consultation with appropriate technical and country experts. These fall into two groups depending on whether they prioritize depth or breadth.
- **Introductory overview:** These briefs have a different objective to the rapid evidence assessments but use a similar methodological approach. Literature is targeted and reviewed with the aim of explaining a subject to 'beginners'.

Most briefs, however, will draw upon a mix of methods and it is for this reason that a 'methods' box is included in the introduction to each brief, signalling transparently that methods are explicit, robust and replicable and showing how they are appropriate to the policy question.

Figure A: The policy brief spectrum



Source: Erica Richardson

## Key messages

- There are **universal calls for improved integration** between public health and primary care, but it is less clear how this can be achieved – and, in practice, integration is often hampered by the ways in which both sectors and services are organized and financed, as well as through other obstacles.
- Interaction between public health and primary care is complex. **Some functions are more clearly situated in one of the two domains, while others belong to both of them.** For example, primary care often performs some public health functions (e.g. screening, immunization and interventions to support healthy lifestyles), while public health helps to make the provision of primary care more effective (e.g. through surveillance, planning and evaluation).
- Enhanced integration between these two domains can bring health and other **benefits** (although these are not clearly documented in the literature), but can also bring **risks**, of which policy-makers should be mindful, such as placing an additional burden on already limited (financial, human and other) resources.
- Much of the recent academic literature on the integration of public health and primary care is from the United States, but there are also **many examples from Europe.** We cluster the examples into five categories, but these are not mutually exclusive, and many interventions (such as increased adoption of electronic patients records) could fall under more than one category:
  - (1) **Coordinating health care services for individuals**, e.g. by bringing clinical and public health professionals together at one site.
  - (2) **Applying a population perspective to clinical practice**, e.g. by using population-based information to enhance clinical decision-making.
  - (3) **Identifying and addressing community health problems**, e.g. by using clinical opportunities to identify and address underlying causes of health problems.
  - (4) **Strengthening health promotion and disease prevention**, e.g. through education, advocacy for health-related laws or regulations.
  - (5) **Collaborating around policy, training and research**, e.g. by engaging in cross-sectoral education and training, or conducting cross-sectoral research.
- There are **organizational models of primary care** that are conducive to integration with public health, as well as **systemic, organizational and interpersonal factors** that can facilitate integration and provide a useful checklist for integration attempts at either the national or regional level. Which model comes into consideration and which factors play a key role will depend very much on the specific country context and the organizational set-up of primary care and public health.
- Yet, a systematic approach to improved integration can be broadly guided by the following principles, which have been identified as essential to success: a **shared goal** of population health improvement; **community engagement**; aligned **leadership**; **sustainability**; and **sharing and collaborative use of data and analysis.**

## Executive summary

There are many calls for improved integration between public health and primary care, but it is less clear how this can be achieved. This policy brief describes the types of initiatives that have been undertaken; provides examples of such initiatives in Europe and beyond; and summarizes the factors that can help to enhance or hinder the integration of primary care and public health.

The relationship between primary care and public health is complex. In most European countries **primary care performs some public health functions, while public health can help to make the provision of primary care more effective**. Screening and immunization, for example, as well as interventions to support healthy lifestyles, are public health functions that are nowadays commonly provided in primary care, although with wide variations between countries. Importantly, there is a large overlap of activities between public health and primary care, and various settings come into consideration depending on the national context.

**Much of the recent academic literature on the integration of public health and primary care has originated from the United States**, where an influential Institute of Medicine report in 2012 called for improved integration between the two domains, but there are also many examples from **Europe**. Following approaches adopted in earlier reviews, we cluster them into five categories: (1) **Coordinating health care services for individuals**; (2) **Applying a population perspective to clinical practice**; (3) **Identifying and addressing community health problems**; (4) **Strengthening health promotion and disease prevention**; and (5) **Collaborating around policy, training and research**.

These categories are not mutually exclusive and many interventions could fall under more than one category. For example, information from electronic health records could be used to coordinate clinical and community services for individuals and to guide public health interventions at the population level.

Research has identified **organizational models of primary care** that are conducive to integration with public health and **systemic, organizational and interactional factors that can facilitate integration** between the two domains. Systemic factors relate to the environment outside of the organization where the collaboration takes place and include, for example, governmental involvement, funding models and structures, and education and training. Organizational factors relate to conditions within the organization, such as having a common agenda or geographic proximity, while interactional factors relate to interactions between team members and include roles and relationships and effective communication and decision-making strategies. It is clear from this multitude of factors that policy levers for improved integration are numerous. They will need to be tailored to the specific health system and provider context that aims to take the integration of public health and primary care forward. Yet, a systematic approach to improved integration can be guided by the following principles, which have been identified as essential to success: a **shared goal** of population health improvement; **community engagement**; aligned **leadership**; **sustainability**; and **sharing and collaborative use of data and analysis**.

Finally, improved integration of public health and primary care promises to bring major benefits to population health (e.g. improved chronic disease management, communicable disease control, and improved maternal and child health), but these **benefits are rarely documented in the literature so far**. Furthermore, integration may also bring certain **risks**, such as competition over scarce resources. Policy interventions to improve integration will need to be mindful of the potential risks and should aim to demonstrate benefits, which will help to increase buy-in.





## Policy brief

### Introduction

Improved integration of public health and primary care is believed to yield substantial benefits to patients and wider populations, and various approaches have been pursued in Europe and elsewhere with the aim of achieving this. Reported benefits of collaborations between primary care and public health include improved chronic disease management, communicable disease control, and improved maternal and child health (Martin-Misener et al., 2012). Among the various approaches to integrating primary care and public health, community-focused initiatives have been recommended for assisting underserved populations (Pinto et al., 2012). Enhanced integration of primary care and public health has also been pointed out as a key response to population ageing and the rising burden of non-communicable diseases (WHO, 2018b).

Indeed, a number of political declarations have called for greater integration of public health and primary care. The 1978 *Alma-Ata Declaration on Primary Health Care* drew attention to the need for comprehensive care, disease prevention and health promotion, intersectoral action, and community and individual involvement (WHO, 1978). The 1986 *Ottawa Charter for Health Promotion* called explicitly for reorienting health services towards health promotion (WHO, 1986). The 2008 *World Health Report: Primary health care – Now more than ever* also called for “integrating public health action with primary care” (WHO, 2008). In 2012, *Health 2020*, the European health strategy of the WHO Regional Office for Europe, recognized primary care as “a key vehicle for delivering health promotion and disease prevention services” (WHO, 2012b) and the 2012 *European Action Plan for Strengthening Public Health Capacities and Services* recommended “strengthen[ing] public health in all health and social care services, in particular primary health care” (WHO, 2012a). Finally, a follow-on report to Alma-Ata identified the coordination of personal and public health interventions as one feature of innovative primary health care models (WHO, 2018a), and another WHO report called in 2018 for “closing the gap between public health and primary care through integration” (WHO, 2018b).

Despite these political declarations of intent, in practice there are often many obstacles in the way of improved integration of primary care and public health, such as differences in the ways the two sectors are organized and financed, as well as differences in education, culture and approach. Furthermore, there are few systematic overviews of what initiatives have been undertaken; which factors influence the integration of primary care and public health; what outcomes have been achieved; and what can be undertaken to increase the chances of achieving enhanced integration. These are the questions this policy brief addresses. Drawing on recent studies from Europe and the United States (Box 1), it explores examples of successful strategies to enhance integration; factors that support or hinder integration; and wider policy lessons.

### Box 1: Methods

This policy brief is based on a systematic review of the academic literature on the integration of public health and primary care, carried out in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Shamseer et al., 2015). The databases searched were Medline and Embase, with a search of articles published since 2010, to cover the most recent academic literature. The search was conducted in March 2019 using the free text search terms “public health” AND (“primary care” OR “primary health care”), recognizing that the latter two terms are often used synonymously. The search was confined to titles, as the search of abstracts would have yielded an unmanageably large number of articles. A total of 270 records were retrieved from the literature search, with 155 articles remaining after deletion of duplicates. After title and abstract screening, 67 records remained and were included in full-text screening. After this step, 46 articles were retained and included in the review (see Appendix).

We complemented our review with examples of interventions identified by Shahzad et al. (Shahzad et al., 2019), who conducted a scoping review of studies on collaboration and integration between primary care and public health published in English between 1990 and 2017. We categorized the identified interventions according to an adapted version of Lasker’s models of Medicine and Public Health Collaborations (Lasker, Committee on Medicine and Public Health et al. 1997), which was also followed by Shahzad and colleagues.

### Defining key concepts

The terms “primary care” and “primary health care” are often used interchangeably (Félix-Bortolotti, 2009). However, they derive from different assumptions and premises and carry different connotations. The term “**primary care**” originated in the United Kingdom, where in 1920 it was used to imply the regionalization of health services; it was later used to denote first-point medical care (Félix-Bortolotti, 2009). Today, primary care can be defined as “the first level of professional care in Europe, where people present their health problems and where the majority of the population’s curative and preventive health needs are satisfied” (Boerma & Kringos, 2015).

In contrast, the term “**primary health care**” originated from the 1978 *Alma-Ata Declaration* and describes not only a level of care, but a more comprehensive approach (Félix-Bortolotti, 2009), emphasizing universal coverage, accessibility, comprehensive care, disease prevention and health promotion, intersectoral action, and community and individual involvement (WHO, 1978). The 1978 Declaration set out that primary health care should address “the main health problems in the community, providing promotive, preventive, curative and rehabilitative services”, including “education concerning prevailing health problems and the methods of preventing and controlling them; promotion of food supply and proper nutrition; an adequate supply of safe water and basic sanitation; maternal and child health care, including family planning; immunization against the major infectious diseases; prevention and control of locally endemic diseases; appropriate treatment of common diseases and injuries; and provision of essential drugs”, as well as multisectoral action. In this vein, the World Health Organization (WHO) defines primary health care as being made up of three main areas: “empowered people and

communities; multisectoral policy and action; and primary care and essential public health functions as the core of integrated health services” (WHO, 2019). It further clarifies that this includes “a spectrum of services from prevention (i.e. vaccinations and family planning) to management of chronic health conditions and palliative care” (WHO, 2019).

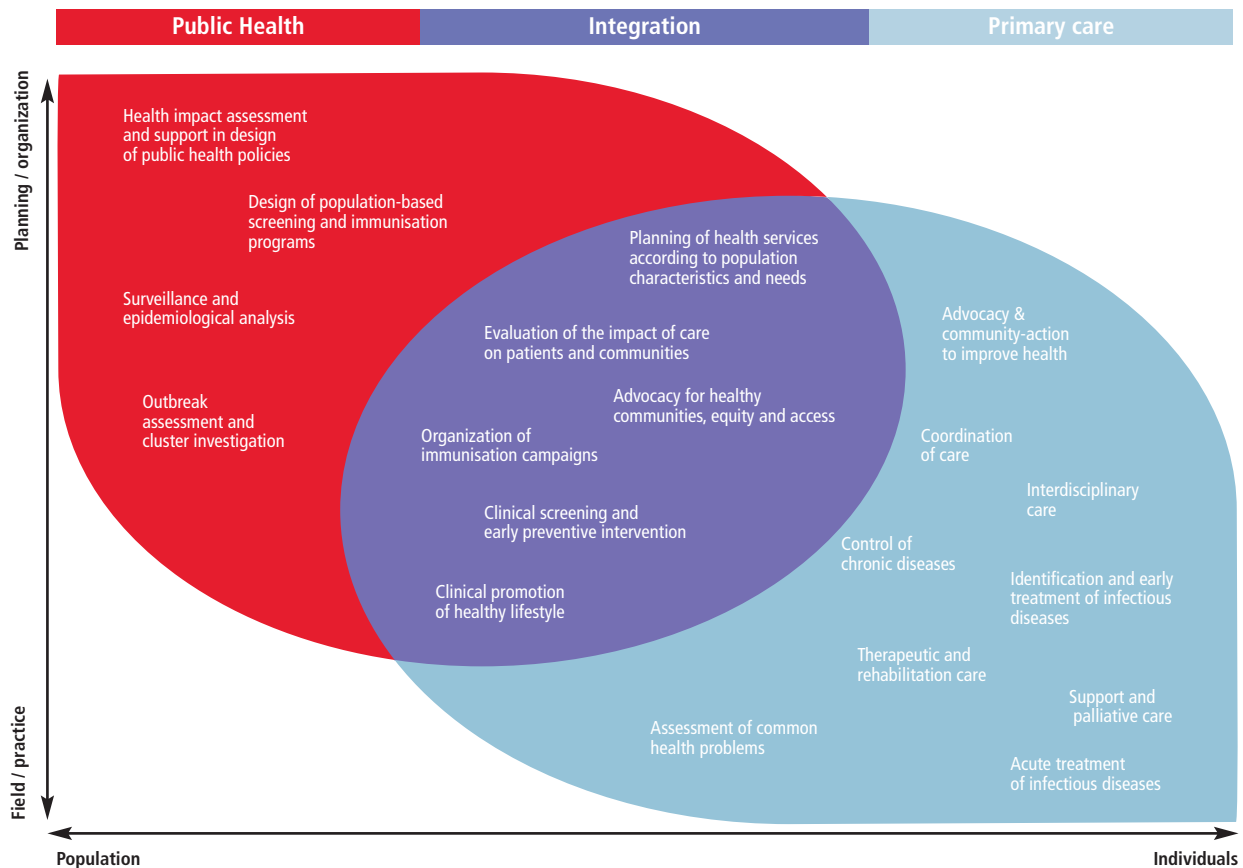
**Public health** can be defined as “the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society” (Acheson, 1988). It aims to improve the health of populations by keeping people healthy, improving their health or preventing the deterioration of disease. A distinction between public health and primary care that is often made is that primary care is primarily concerned with individuals, while public health tends to take a population perspective (Bjorn Jensen, Lukic & Gulis, 2018). This, however, is only helpful to a certain degree, since populations are made up of individuals and public health interventions can also be directed at individuals (Booth et al., 2016). While many public health activities are targeted at populations, such as in health campaigns, there are also public health services provided to individuals, such as screening and vaccination. Typical public health activities include surveillance of population health, the response to health hazards and emergencies, health protection (e.g. through addressing environmental or occupational risk factors), health promotion (including action to address social determinants and health inequities) and disease prevention (including through early detection).

While the emerging discipline of public health in the 18<sup>th</sup> and 19<sup>th</sup> centuries was mainly concerned with environmental causes of ill health, such as poor housing conditions or lack of clean water, in the second half of the 19<sup>th</sup> century the focus began shifting towards the development of personal preventive services. Maternal and child health services began to be established and mass vaccination was introduced (Hill, Griffiths & Gillam, 2007). As early as 1926 Winslow argued in his address to the American Public Health Association’s annual meeting that, going forward, public health must deal with chronic disease, with an increasing emphasis on individuals. He further argued that distinctions between treatment and prevention were exceedingly difficult and that prevention and treatment should become indistinguishable.

While in some countries these two domains of the health system are still organized, funded and provided separately, in other countries they are more integrated (Rechel et al., 2018). Which setting is more appropriate depends very much on the national context (Bjorn Jensen, Lukic & Gulis, 2018). However, in most countries, primary care performs some public health functions, while public health can help to make the provision of primary care more effective.

The complex interaction between public health and primary care is illustrated in Figure 1. The figure highlights that some functions are more clearly situated in one of the two domains, while others belong to both of them. Screening

Figure 1: Interaction between public health and primary care



Source: Levesque et al., 2013.

and immunization, for example, as well as interventions to support healthy lifestyles, are public health functions that are nowadays commonly provided in primary care, while surveillance, planning and evaluation are public health activities that improve primary care (Levesque et al., 2013; Tyszko et al. 2016). There is a need for both types of approaches and the closer they are interlinked, the more integrated services will be.

The level of integration between primary care and public health can be seen as a continuum, moving from isolation to mutual awareness, cooperation, collaboration, partnership and, finally, merger (Institute of Medicine, 2012). However, it is important to stress that there is no generally accepted understanding of these terms and they are used very differently in the literature, with potential differences between the North American and European contexts.

### How to improve the integration of primary care and public health?

The integration of primary care and public health can cover a wide range of activities, including community engagement and participation, health promotion, health education, prevention activities, chronic disease management, screening, immunization and communicable disease control, information systems activities, development of best practice guidelines, conducting needs assessments, quality assurance and evaluation, and professional education (Martin-Misener et al., 2012). We have clustered examples of interventions promoting enhanced integration identified in our literature search into five broad categories that follow Lasker's models of Medicine and Public Health Collaborations (Lasker et al., 1997)<sup>1</sup> and the adaptation of these models by Shahzad et al. (2019). It is important to note from the outset that these categories are not mutually exclusive and the same example can incorporate interventions from more than one category.

#### (1) Coordinating health care services for individuals

Coordination of health care services for individuals is a core strategy for promoting cross-sectoral collaboration between clinical care and public health (Shahzad et al., 2019). Interventions can include: (1) coordination of clinical services with community services, whereby clinical services such as prevention, diagnosis and treatment or rehabilitation are combined with services such as counselling, outreach and social programmes; (2) bringing personnel to existing practice sites to provide individual-level support services to patients; and (3) establishment of 'one-stop' shop centres, where clinical and community-based professionals are brought together at one site (co-location), organized around the needs of local populations.

Examples of coordinating clinical services with community services can be found in England. Since early 2013, the clinical commissioning groups (CCGs) in England have been responsible for commissioning planned and emergency

hospital care, rehabilitation, most community services, mental health and learning disability services. Locally, directors of public health advise local CCGs on public health issues. Integrating the public health function both in the CCG and local authority (where some public health services have been moved), as has been done in **NHS Hounslow**, can help to better understand health inequalities, coordinate health improvement campaigns, integrate health and social care commissioning, and improve horizontal integration (Saeed, 2012). Another example from England is the "Three Tier" model of shared care for diabetes in **Ealing**. This is based on clusters of general practices (which have been developing since 2015) into geographic localities of about 50,000 population to coordinate care and lead collaborative improvements. These areas are termed Health Networks when considering medical care and Local Health Communities when considering broader aspects of health. A multidisciplinary team leads the work in each of 7 Health Networks and all are integrated through a supportive Facilitation Team, a strategic Oversight Team and a Leadership Course (Banarsee et al., 2018). A further example comes from **the Netherlands**, where a stepwise approach based on two central tools (district health profile and policy dialogue) was used to develop integrated district plans and promote collaboration between primary care and public health in seven neighbourhoods. The stepwise approach involved: (1) Getting to know the neighbourhood; (2) Assembling the working group; (3) Analysing the neighbourhood; (4) Developing a district health profile; (5) Preparing policy dialogues; (6) Holding local dialogues; (7) Embedding integrated district plans and collaboration. The combination of the two tools facilitated the process of bringing public health and primary care closer together and collaboration was perceived as a positive starting point (Storm et al., 2015).

In the state of **Minnesota**, the Minnesota Department of Health and local public health departments are working with primary care practices to determine how best to streamline referrals to community services, how to use health information technology to facilitate follow-up, and how to integrate non-traditional providers such as community health workers or community paramedics into a more coordinated system of care, to address the growing burden of chronic disease (Korn, 2014).

Another type of intervention to coordinate health care services for individuals is to bring personnel to existing practice sites to provide individual-level support services to patients. Based on the review by Shahzad et al. (2019), such interventions include the following features: (1) primary care sites can lease certain services from public health departments, and vice versa; (2) organizations can hire or contract professionals with expertise or experience in providing a desired service; (3) primary care or public health sites bring in outside personnel to provide individual-level support services for patients. For example, one health centre in the **United States** hired community health workers to provide care coordination for people with chronic

<sup>1</sup> The report by Lasker and the Committee on Medicine and Public Health also identified a sixth category, improving access to care for the uninsured, with interventions including establishment of free clinics and referral networks, increasing clinical staffing at public health facilities, and transferring uninsured patients to mainstream medical settings (Shahzad et al., 2019).

conditions, such as through education, assistance in navigating the health system, and addressing the social determinants of health (Lebrun et al., 2012). A similar scheme has been established in **Slovenia** (Box 2).

### Box 2: Health promotion in Slovenia's primary health care centres

Health promotion centres in all 58 primary health care centres across Slovenia have since 2002 taken on a major role in providing lifestyle interventions against key risk factors. Between 2013 and 2016 new approaches in primary prevention were developed and piloted. Activities in pilot projects were focused on three major goals: 1. development of a community approach, 2. assuring equity-focused health care, 3. development of an integrated health promotion centre. Health promotion centres integrated previously dispersed activities and introduced multidisciplinary teams. This resulted in increased competencies of staff, higher quality of services and higher visibility of health promotion activities in local communities.

Source: Petrič et al. 2018

A further strategy to coordinate health care services for individuals is to establish 'one-stop' shop centres, where clinical and community-based professionals are brought together at one site (co-location), organized around the needs of local populations (Shahzad et al., 2019). For example, in a pilot programme in **Hungary**, GP clusters were established in the two most disadvantaged regions of the country, composed of six GPs in close vicinity to each other. The GP clusters form a network of collaborating practices, which, in addition to curative care, offers preventive services and health promotion interventions and employs health professionals other than physicians and nurses (public health professionals, community nurses, physiotherapists, dietitians, health psychologists). A public health coordinator coordinates the work of these additional health professionals and supervises the work of Roma health mediators. The aim is to improve the health status of the entire target population (Adany et al., 2013; Jakab, 2013).

A previous literature review on collaboration between primary care and public health identified different types of primary care models that aim to integrate primary care and public health (Levesque et al., 2013). They illustrate that the organization of primary care can help greatly in advancing integration of public health and primary care. The review identified the following three broad models, spanning across all five categories of interventions described in this section (Box 3).

### Box 3: Primary care models for improved integration

#### • Integrating primary care and public health in the provision of community-based care for individuals

In this approach, primary care provision integrates a public health perspective to meet the needs of communities or specific population groups. Examples include:

- Community Health Centres in the United States and Canada (providing health promotion activities that aim to address health determinants or providing health services to those without health insurance)

- Community-oriented Primary Care in the United Kingdom, South Africa or the United States (incorporating epidemiology, public health and financial management to maximize health for a given community) (Scutchfield, Michener & Thacker, 2012)
- Family Health Strategy in Brazil (establishing health units composed of a GP, nurse, nurse auxiliary and 4–6 lay community health workers) (Harris, 2012; Pinto et al., 2012).

#### • Integrating primary care into overall service provision as part of the broader health system

In this approach, the integration of public health and primary care is embedded in the provision of services that go beyond primary care. Examples include:

- Health and Social Services Centres in Québec, Canada (ensuring health services to the population of the province)
- Accountable Care Organizations in the United States (providing the full range of health services to a defined population, with effective primary care being a key element)
- Medicare Local in Australia (based on an overarching regional governance framework for primary health care).

#### • Integrating public health into medical practice through collaborative team work

In this approach, primary care staff and public health practitioners collaborate as teams to improve, for example, health promotion and health care management, linking with other services where appropriate. Examples include:

- Family Health Teams, Canada
- Multidisciplinary Health Clinics, France
- Patient-Centred Medical Home, United States
- General Practitioners with a Special Interest, United Kingdom
- Primary Health Networks, Australia (Booth et al., 2016)
- GP clusters in Hungary.

Source: Levesque et al., 2013.

## (2) Applying a population perspective to clinical practice

The second model of enhanced integration between primary care and public health involves applying a public health lens to primary care (Shahzad et al., 2019). This can involve the following types of interventions: (1) using and sharing population-based information (e.g. about prevalent health problems, health risks within the community, and preventive services for particular patient groups) to enhance clinical decision-making; (2) using population-based strategies, such as community-wide screening, case finding and outreach programmes, to direct patients to medical care; and (3) using population-based analytic tools, such as clinical epidemiology, risk assessment, cost-effectiveness analysis, to enhance practice management, for example, by informing decisions about practice site locations, service provision at each site, practice staffing patterns, the need for patient education programmes, etc. In an example from the **United Kingdom**, GP practices in Liverpool are organized into 18 neighbourhoods, and public health professionals have worked with primary care to develop a health profile for each neighbourhood to inform primary care practice (Gosling, Davies & Hussey, 2016).

### (3) Identifying and addressing community health problems

The third model of enhanced integration between primary care and public health involves using data obtained in primary care in support of public health (Shahzad et al., 2019). The key categories of interventions here include: (1) conducting community health assessments – this can, for example, facilitate planning and development of health programmes (both in primary care and public health) and services, and ensure that health programmes (again, both in primary care and public health) and services are responsive to local community needs; (2) using clinical encounters and shared data, such as electronic health records (Box 4), to build community-wide databases; and (3) using clinical opportunities to identify underlying causes of health problems (e.g. social and behavioural risk factors such as domestic violence and tobacco smoking) and addressing these issues, for example, through targeted counselling and educational materials, or referrals to appropriate community programmes. **Liverpool**, for example, has introduced welfare advice within GP practices through a scheme called 'Advice on Prescription', which enables GPs to refer patients

to the Citizens Advice Bureau for welfare, benefits, debt and housing advice (Gosling, Davies & Hussey, 2016).

### (4) Strengthening health promotion and disease prevention

The fourth model of enhanced integration between primary care and public health comprises interventions that adopt a population-based approach and strengthen health promotion and disease prevention through: (1) education (e.g. on risky behaviours or environmental issues); (2) advocacy (e.g. for health related laws or regulations, or for disadvantaged groups); (3) initiatives targeted at improving community health (Shahzad et al., 2019).

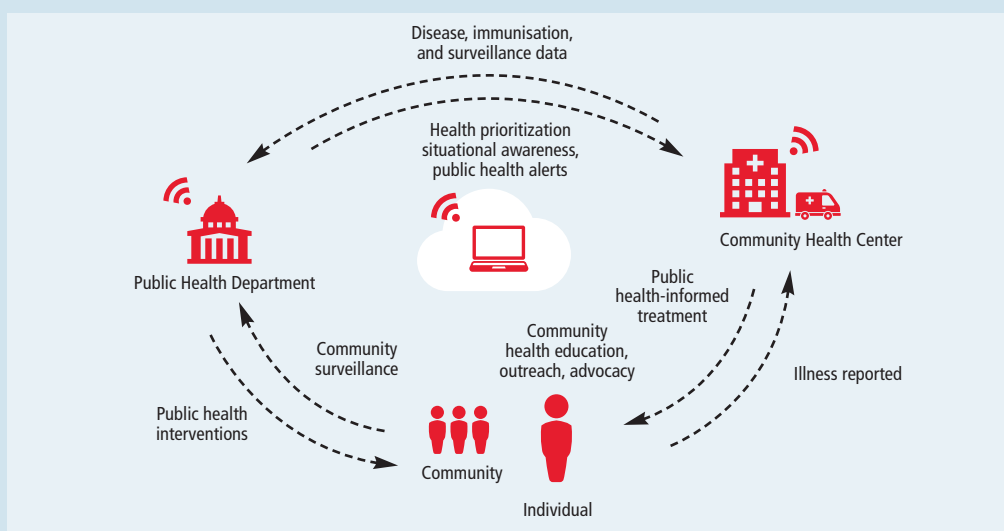
A number of examples relate to education of patients. In the **Netherlands**, for example, guidelines for obesity and undernutrition from the Dutch College of General Practitioners have been published to guide the daily practice of primary care workers. These guidelines recognize that primary care is involved in the treatment of many related chronic diseases, making it an ideal starting point for interventions (Truswell et al., 2012; van Avendonk et al., 2012).

#### Box 4: IT as a facilitator of enhanced integration between primary care and public health

The review undertaken by Shahzad et al. (2019) has shown that, in many instances, increased adoption of health information technologies, such as electronic health records, has led to enhanced integration between primary care and public health. This has been of relevance for interventions spanning across all the categories described in this section. A few examples of initiatives identified in our review of literature are provided below.

The **New York City** Department of Health and Mental Hygiene, one of the world's largest public health agencies, makes public health-enabled electronic health records available to 2500 primary care providers. In a data exchange initiative with 26 health centre sites, syndromic surveillance data were automatically reported to public health departments, while primary care physicians were guided in real time in their diagnosis and treatment (Figure 2). In another initiative from the New York City Department, information exchange was expanded to chronic disease management and prevention (Calman et al., 2012).

Figure 2: Exchange of health data between public health, primary care, individuals and communities



Source: Calman et al., 2012.

Similarly, in Canada, the **Canadian Primary Care Sentinel Surveillance Network (CPCSSN)** Data Presentation Tool is a customized web-based software application designed to present processed data in an easy-to-use format for primary care clinics. The Data Presentation Tool also facilitates public health action in participating clinics by allowing easy and direct access to their CPCSSN-processed electronic medical record data. The Data Presentation Tool enables users to quickly understand disease prevalence and associated risk factors within their practice populations (Queenan, Birtwhistle & Drummond, 2016).

In another example from Canada, a reporting mechanism for influenza-like illness has been established in **Ontario** that enables primary care practices to provide surveillance information to public health while simultaneously addressing the needs of primary care practices (Price, Chan & Greaves, 2014).

Another initiative in the Netherlands saw the development of a prevention programme involving screening for cardiovascular diseases in primary care. The initiative was supported by national professional organizations of GPs and occupational physicians, plus three large health foundations. It entailed development of an evidence-based guideline, according to which high-risk patients were advised to attend two consultations at the general practice to complete a risk assessment and obtain tailored advice. Three pilot studies showed that the programme was feasible and that sufficient participants were recruited (Assendelft et al., 2012).

Implementation of **pre-exposure prophylaxis in the United States** is another example of health promotion and disease prevention, in which public health agencies play a role in identifying eligible individuals, improving adherence and reinforcing risk-reduction and prevention messages, while primary care providers are predominantly responsible for administering pre-exposure prophylaxis, but with roles in the other phases of the prevention and care continuum (Norton, Larson & Dearing, 2013).

Similarly, a pilot project in **Missouri**, United States, aimed to establish linkages between community-based organizations, health care providers and public health systems, to ensure identification, referral and follow-up for people with uncontrolled high blood pressure or pre-hypertension. The project involved the provision of education sessions in community organizations and follow-up counselling (Yun et al., 2015).

In **New York City**, the Department of Health and Mental Hygiene has developed the **Public Health Detailing Programme**, working with primary care providers since 2003 to improve patient care by addressing the leading causes of illness, disability and death. The programme operates through one-to-one visits, or ‘detailing’, a strategy usually associated with the pharmaceutical industry. Trained Health Department representatives promote evidence-based, clinical preventive services and chronic disease management

by delivering brief, targeted messages to the entire clinical care team. The programme has led to changes in practice behaviour, including screening for intimate partner violence, prescribing longer-lasting supplies of medicine, and improved patient self-management (Dresser et al., 2012).

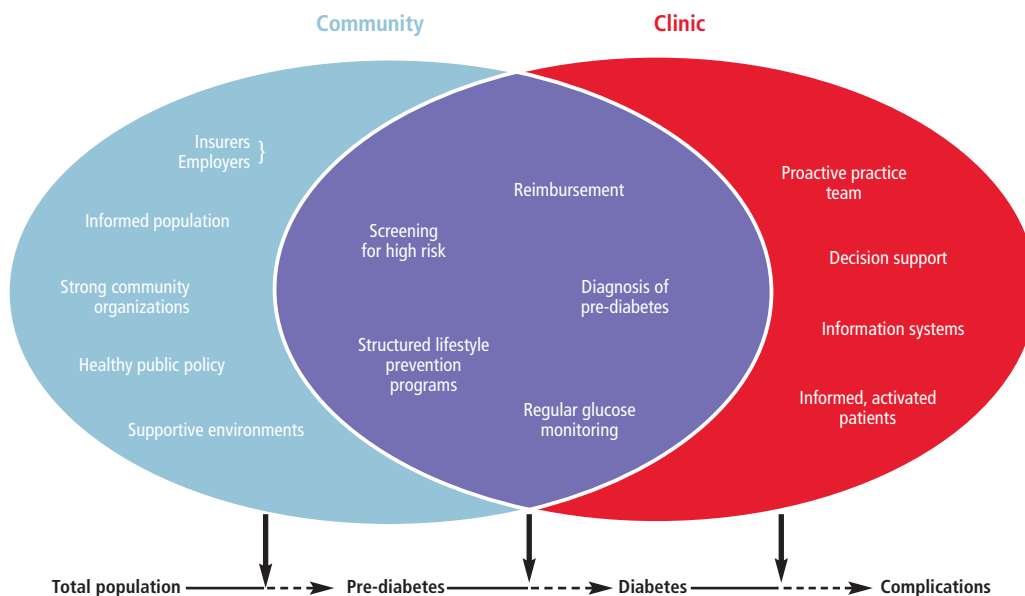
A systematic review of primary care **physician-mediated childhood obesity interventions** identified nine relevant studies, covering behavioural, educational and technological interventions. Roles of primary care physicians involved screening and diagnosis, making referrals for intervention, providing nutrition counselling and promoting physical activity. Health care teams often included dietitians and nurses. Most interventions led to positive changes in body mass index, healthier lifestyles and increased patient satisfaction (Bhuyan et al., 2015).

In a study in **Colorado**, United States, practices working collaboratively with a public health department on influenza vaccination increased their vaccination rates compared to practices that delivered vaccinations at the practice site only (Kempe et al., 2014). These collaborations comprised joint community clinics, as well as nurses from the public health department aiding with delivery at the practices.

Initiatives targeted at improving community health include providing **access to physical activity for patients of a community health centre** in New England, United States, in collaboration with a local YMCA. This initiative recognized that physicians are a major source of advice and can play a crucial role in helping patients to initiate changes in diet, exercise and smoking, but that they are unlikely to assist in setting goals for physical activity or arranging access to fitness centres. To address this, the intervention enabled subsidized access to swimming and exercise facilities at the local YMCA (Silva et al., 2012).

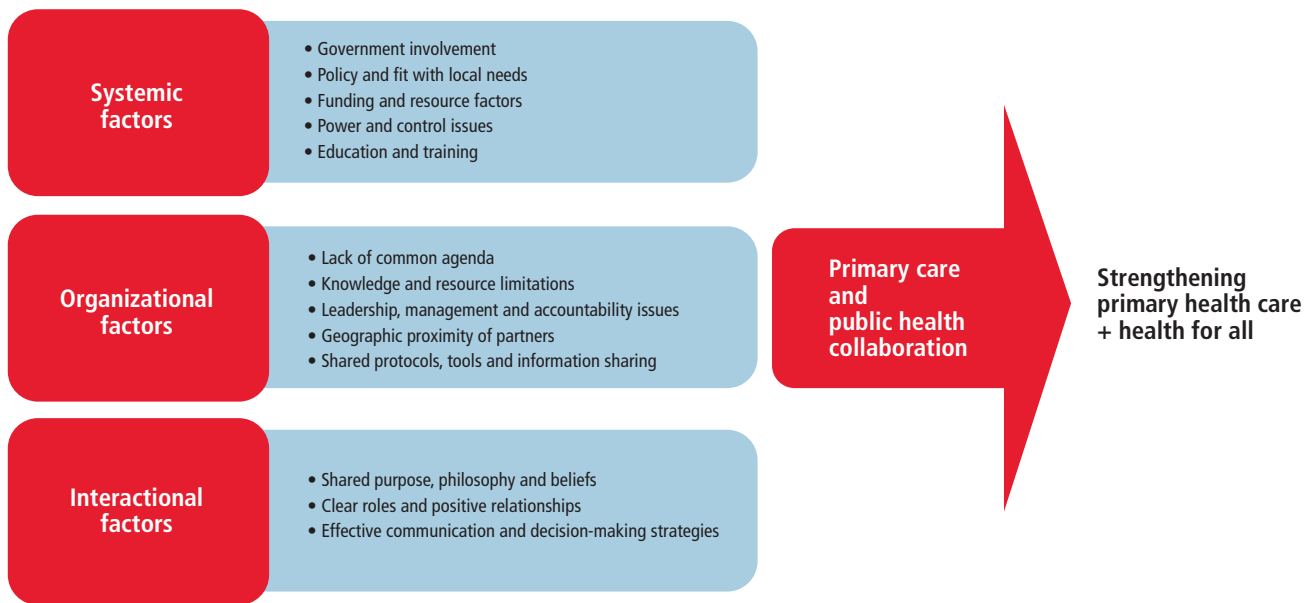
Another example is health care providers encouraging **older primary care patients with pre-diabetes and type 2 diabetes to attend community-based centres for older**

Figure 3: Community–clinic partnership model for the prevention of type 2 diabetes



Source: Green et al., 2012.

Figure 4: Factors influencing collaboration between public health and primary care



Source: Martin-Misener et al., 2012.

**people** in San Antonio, Texas, United States. These centres are a community resource to support self-management and lifestyle changes (Noel et al., 2016).

**Primary prevention of type 2 diabetes** was pointed out in the United States as being another area where more integrated community organization, medical practice and policy are needed. The areas of action that overlap between providers of public health and primary care indicate where partnerships between these providers are most needed (Figure 3).

Another example from the United States involves **nurse-assisted community kitchens and physical activity in schools to address obesity among children**. In both these areas, it is possible to integrate public health and primary care through nursing actions, such as sharing a concern for population health, participating in community engagement, leadership alignment and data-sharing across systems, and advocacy for infrastructural sustainability. For example, nurses assisted community members in obtaining space and funding for a community kitchen (Evans-Agnew, Mayer & Miller, 2018).

##### (5) Collaborating around policy, training and research

This category comprises interventions such as influencing health system policy; engaging in cross-sectoral education and training, as well as conducting cross-sectoral research (Shahzad et al., 2019). In **Catalonia, Spain**, for example, the **sentinel surveillance network** for daily reporting of acute respiratory infections consists of 56 primary care physicians, a virological reference laboratory and a

coordinating team at the Public Health Agency of Catalonia. The network allowed collaborative public health research on the effectiveness of pharmaceutical and non-pharmaceutical measures to prevent hospitalization in a pandemic situation in the context of a case-control study. This illustrated that primary care professionals who are already engaged in collaborative actions with public health are prone to engage in public health research projects, acting as a translational framework for research (Torner et al., 2013).

##### Factors facilitating the collaboration between public health and primary care

Many hallmarks of successful collaboration between primary care and public health will be the same as successful collaboration more broadly (Booth et al., 2016). A scoping literature review of collaboration between primary care and public health published in 2012 and covering 114 studies (Martin-Misener et al., 2012) distinguished between systemic factors, organizational factors and interactional factors that support collaboration (Figure 4). These factors are broadly in line with the principles of successful integration of primary care and public health identified in the influential report published in 2012 by the Institute of Medicine (Box 5).

Systemic factors relate to the environment outside of the organization where the collaboration takes place. Organizational factors relate to conditions within the organization, while interactional factors relate to interactions between team members (Martin-Misener et al., 2012). Subsequent studies identified in the review provide further examples of factors in each of these categories.

### Box 5: Institute of Medicine's principles of successful integration of primary care and public health

In 2010, the Institute of Medicine in the United States formed a Committee on Integrating Primary Care and Public Health. In their influential report published in the same year (Institute of Medicine, 2012), they identified five principles as being essential to successful integration of primary care and public health (Institute of Medicine, 2012):

- a shared goal of population health improvement;
- community engagement in defining and addressing population health needs;
- aligned leadership that:
  - bridges disciplines, programmes and jurisdictions to reduce fragmentation and foster continuity;
  - clarifies roles and ensures accountability;
  - develops and supports appropriate incentives; and
  - has the capacity to manage change;
- sustainability, key to which is the establishment of a shared infrastructure and building for enduring value and impact; and
- the sharing and collaborative use of data and analysis.

The Institute of Medicine concluded about the composition and focus of recent efforts to integrate primary care and public health (Institute of Medicine, 2012):

- In many of the examples, integration was driven by a specific health issue that was identified as a community area of concern, such as chronic disease, prevention or the health needs of a specific population.
- Participants in integration initiatives varied widely, including an array of primary care and public health entities and other contributors, such as community organizations, academic institutions, businesses and hospitals.
- Key opportunities for integration included the sharing and use of data and the development of a workforce capable of functioning in an integrated environment.

Resources have been developed to support partnerships between primary care and public health, such as *The Practical Playbook*, which outlines key strategies for building partnerships (Michener et al., 2016). *The Practical Playbook* is an edited volume, also published as an online platform (<https://www.practicalplaybook.org>), which aims to facilitate partnerships in the United States through a directory of existing efforts, expert guidance, templates and other resources.

Importantly, the Institute of Medicine pointed out that there is no universal template for the integration of primary care and public health, due to the varied settings in which primary care is delivered and the unique population health needs across varied settings (Institute of Medicine, 2012). This is even more the case when going beyond the context of the United States and considering integration in diversely organized European health systems.

## Systemic factors

Systemic factors influencing collaboration between public health and primary care include governmental involvement, policy and fit with local needs, funding and resource factors, power and control issues, and education and training (Martin-Misener et al., 2012). Which of these factors is most important depends on the local context. Some barriers to collaboration require systems change or additional resources, whereas others can be addressed through educational approaches (Pratt et al., 2018).

With regard to **governmental involvement, policy and fit with local needs**, health reform and governmental mandates for collaborative teams and partnerships were identified as important systemic factors enabling collaboration. Collaboration also occurred more commonly where initiatives had common goals, such as reducing health disparities, meeting the health needs of disadvantaged populations, or improving quality of care. Governmental involvement, a fitting government agenda and the endorsement of collaboration by government officials are all facilitators of collaboration. In contrast, frequent health reforms can undermine collaboration (Martin-Misener et al., 2012). Processes that enhance shared priorities (such as policies that encourage aligned planning processes, allowing shared priorities to be explored and addressing barriers to collaboration), have also been identified as important (Pratt et al., 2018).

**Funding and resource issues** are also key. Adequate funding increases the chance of collaborations being successful, although not all successful collaborations required additional investments, with some pooling and sharing resources, and others using volunteer and in-kind contributions. Payment models for services can support or hinder collaboration (Martin-Misener et al., 2012). In the United States, it has been observed that models of community-oriented primary care have proved impractical in the absence of payment models that support these activities (Landon, Grumbach & Wallace, 2012).

**Power and control issues** are another set of factors at the systemic level. Successful collaborations have been found to be driven by shared values and beliefs, such as belief in the value of collaboration, or the value of prevention, health promotion and population health. In contrast, less successful collaborations were characterized by separate and siloed bureaucracies and territorial ownership conflicts (Martin-Misener et al., 2012). A harmonized information and communication infrastructure has also been found to be important (Lebrun et al., 2012; Wong et al., 2017; Pratt et al., 2018), as are trust-building among partners, staff retention and buy-in (Lebrun et al., 2012). The different size and coverage of public health and primary care areas, on the other hand, can pose practical obstacles to improved collaboration (Pratt et al., 2018).

Finally, **education and training** that bridge public health and primary care, and emphasize system-wide collaborative work practices can underpin collaborations (Martin-Misener et al., 2012).

## Organizational factors

Organizational factors influencing collaboration between public health and primary care include lack of a common agenda, knowledge and resource limitations, leadership, management and accountability issues, geographic proximity of partners, and shared protocols, tools and information (Martin-Misener et al., 2012).

Apart from the **lack of a common agenda**, lack of organizational support also manifests itself in dominating or competing agendas. There can be differences in



organizational cultures between public health and primary care, with public health focusing on populations and a long-term view of health, and primary care focusing on individuals and short-term results (Martin-Misener et al., 2012). The need for clear mandates, vision and goals was confirmed in subsequent studies (Wong et al., 2017; Valaitis et al., 2018b; Wakida et al., 2018). For example, a study of public health and primary care collaboration in health jurisdictions in Colorado, Minnesota, Washington and Wisconsin (United States) concluded that identifying shared priorities and achieving tangible benefits from working together was critical to realizing long-term sustainable working relationships (Gyllstrom et al., 2019).

**Knowledge and resource limitations** present common organizational barriers to collaboration and include shortage of human and financial resources, space and capacity for team-building and change management. With regard to human resources, challenges can arise around the capacity to manage collaborative teams, knowledge of public health concepts in primary care, and skills in public health required to perform needs assessments (Martin-Misener et al., 2012).

**Leadership, management and accountability issues** include the development of community-based committees mandated with an advisory or steering function, allowing for community engagement and representation, and responsiveness to local needs. Strategies to enable collaboration included contractual agreements between jurisdictions and organizations, organizational structures such as designated personnel, mentorship programmes for new employees, and job descriptions requiring collaborations (Martin-Misener et al., 2012). A study in Canada emphasized the need for strategic coordination and communication mechanisms between partners, the identification of formal organizational leaders as champions of collaboration, the establishment of a collaborative organizational culture, and collaborative approaches to programme and service delivery (Wong et al., 2017; Valaitis et al., 2018b).

**Geographic proximity of partners** is another organizational factor that can help collaboration. Geographic proximity can facilitate communication, information exchange, a sense of common purpose and high levels of trust (Martin-Misener et al., 2012).

**Shared protocols, tools and information** can enhance access to medical information and support effective interdisciplinary care. They also help in quality assurance and the collection and dissemination of data (Martin-Misener et al., 2012).

## Interpersonal factors

Interpersonal (or “interactional”) factors influencing interaction between public health and primary care include having a shared purpose, philosophy and beliefs, clear roles and positive relationships, and effective communication and decision-making strategies (Martin-Misener et al., 2012).

**A shared purpose, philosophy and beliefs** can greatly facilitate collaboration. Early successes in the collaboration can help to maintain enthusiasm and collaboration is enhanced by similar beliefs, a belief in the value of the collaboration’s impact on community health, and a belief in the importance of health improvement and overcoming health inequalities (Martin-Misener et al., 2012).

**Clear roles and positive relationships** are other important interpersonal factors that enable effective teamwork. Having a good knowledge of one another’s roles, skills and organizations enhanced the speed and nature of decision-making among teams (Martin-Misener et al., 2012).

Finally, **effective communication and decision-making strategies** can promote understanding, trust and respect between public health, primary care and the community. This can include regular monthly meetings, attention to process, open communication about competition and control issues, and appreciation of complementary resources, skills and expertise (Martin-Misener et al., 2012). This was confirmed by several qualitative studies in Canada. One of these studies, based on in-depth interviews with 74 key informants from three provinces, also identified relevant intrapersonal factors: personal qualities, skills and knowledge; and personal values, beliefs and attitudes (Wong et al., 2017; Valaitis et al., 2018a).

An earlier qualitative study of participants who attended a national meeting in Canada in 2010 to discuss primary care and public health collaboration found widely differing viewpoints, ranging from “system-driven collaborators” to “cautious collaborators” and “competent isolationists”. “System-driven collaborators” believed that system-level factors, such as policies and payment systems, can strongly influence collaborations. “Cautious collaborators” were cautious about moving forward, with concerns that public health might be swallowed up by the primary care sector. “Competent isolationists” emphasized the differences in roles between primary care and public health (Akhtar-Danesh et al., 2013).

## Discussion and conclusions

This review on the integration of public health and primary care has identified a number of relevant studies from the time period 2010 to March 2019. Much of the literature is focused on the experience of the United States, with a spike of articles after the publication of the influential 2012 Institute of Medicine report calling for the integration of public health and primary care. A major limitation of this review is that it was based on a search of free-text key words in the titles of records, potentially excluding a large number of relevant articles. Furthermore, it was confined to English-language publications. The review provides a useful snapshot of the state of the recent academic literature but cannot in any way claim to be comprehensive.

The five principles pointed out by the Institute of Medicine as being essential for successful integration of primary care and public health (Institute of Medicine, 2012) remain relevant: a shared goal of population health improvement; community engagement; aligned leadership; sustainability; and the sharing and collaborative use of data and analysis. While the identification of relevant factors at the systemic, organizational and interpersonal levels is very useful, their relative importance and interactions remain poorly understood. This means that it remains difficult to point to the essential factors needed for collaboration to work in practice.

Since the publication of the Institute of Medicine report, many examples of successful integration initiatives have been described in the literature, including in the areas of community engagement and participation, health promotion, health education, prevention activities, chronic disease management, screening, immunization and communicable disease control, information systems activities, development of best practice guidelines, conducting needs assessments, quality assurance and evaluation, and professional education. Rather than aiming to achieve integration of public health and primary care around a whole range of services, it might be more feasible to begin with some of these single issues where improvements can be more immediately visible.

Our research has identified a number of interventions that promote integration between primary care and public health. We classify these into five types of strategy, but these categories are not mutually exclusive and the same example can incorporate interventions from more than one category. For example, increased adoption of health information technologies, such as electronic health records, supports enhanced integration between primary care and public health across all types of strategy. The five types of strategy are: (1) Coordinating health care services for individuals; (2) Applying a population perspective to clinical practice; (3) Identifying and addressing community health problems; (4) Strengthening health promotion and disease prevention; (5) Collaborating around policy, training and research.

The examples of interventions under each of these strategies identified in the literature provide useful guidance and illustration, but they are not easily generalizable or transferable to other settings. As the Institute of Medicine pointed out for the United States in 2012, there is no universal template for the integration of primary care and public health, due to the varied settings in which primary care is delivered and the unique population health needs across different settings (Institute of Medicine, 2012). This might be even more the case when going beyond the context of the United States and considering integration in European health systems.

A systematic review of organizational models of primary care that promote interaction between public health and primary care concluded that they provide important experiences, but also cautioned that their generalizability is limited by the context in which they were implemented, although this context is often neglected in the reporting on them. This context includes the health system (organization, financing) and the wider political and socioeconomic context (Levesque et al., 2013). As the example of the United States illustrates, a major impetus for attempts to improve integration between public health and primary care was achieved by national-level government initiatives, changes in the financing of providers, the encouragement of new care models and the publication of high-profile institutional reports. It can be assumed that similar governance efforts will be needed in other health systems to improve the integration of public health and primary care. The guiding principles and relevant factors identified in this review can provide a useful checklist for what issues should be considered by policy-makers when aiming to enhance the integration of public health and primary care at the country or regional level.

Which organizational models come into consideration for a given country depends very much on the way that country's primary care and public health are organized, governed and financed, and on the appetite and scope for change. Systemic factors that can facilitate integration include health service structures, funding models and financial incentives, governmental and regulatory policies and mandates, power relations, harmonized information and communication infrastructure, targeted professional education, and presence of system leaders as champions of collaboration. Organizational factors include a common agenda, sufficient knowledge and resources, leadership, management and accountability, geographic proximity, and shared protocols, tools and information. Interactional factors include trusting and inclusive relationships; shared values, beliefs and attitudes; role clarity; and effective communication and decision processes.

It is clear from this multitude of factors that policy levers and options for improved integration and collaboration are numerous. They can provide a useful checklist for the issues that should be considered but will need to be tailored to the specific health system and provider context that aims to take the integration of public health and primary care forward. A starting point is the organizational set-up of primary care

and public health in the country in question. There are several ways in which this set-up can be modified to enhance integration. One way is to integrate primary care and public health in the provision of care for individuals. Examples for this are community health centres in various countries. Another, perhaps less organizationally demanding, option is to integrate an increasing number of public health activities into primary care. Examples from Europe are multidisciplinary health clinics in France, or GPs with a Special Interest in Public Health in the United Kingdom.

In all cases, policy interventions to improve collaboration will need to be mindful of potential risks and should aim to demonstrate benefits, which will help to increase buy-in from primary care and public health professionals, as well as amongst the public. Improved integration of public health and primary care promises to bring major benefits, including to population health, but these benefits have rarely been

documented in the literature so far. Furthermore, collaboration may also bring certain risks, such as competition over scarce resources (Martin-Misener et al., 2012). Both primary care and public health tend to view themselves as “underappreciated and underresourced” (Landon, Grumbach & Wallace, 2012). They tend to have limited resources in terms of funding and time, which can make integration an additional burden rather than an opportunity (Koo et al., 2012). Lumping expenditure for public health together with other health expenditure could therefore undermine an already low resource base (Brown, Upshur & Sullivan, 2013). Another objection is that, by going to the level of primary care practices, public health skill sets would be underutilized, as they are best deployed at a population level, which is also where key determinants of health would be best addressed (Brown, Upshur & Sullivan, 2013).

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## APPENDIX

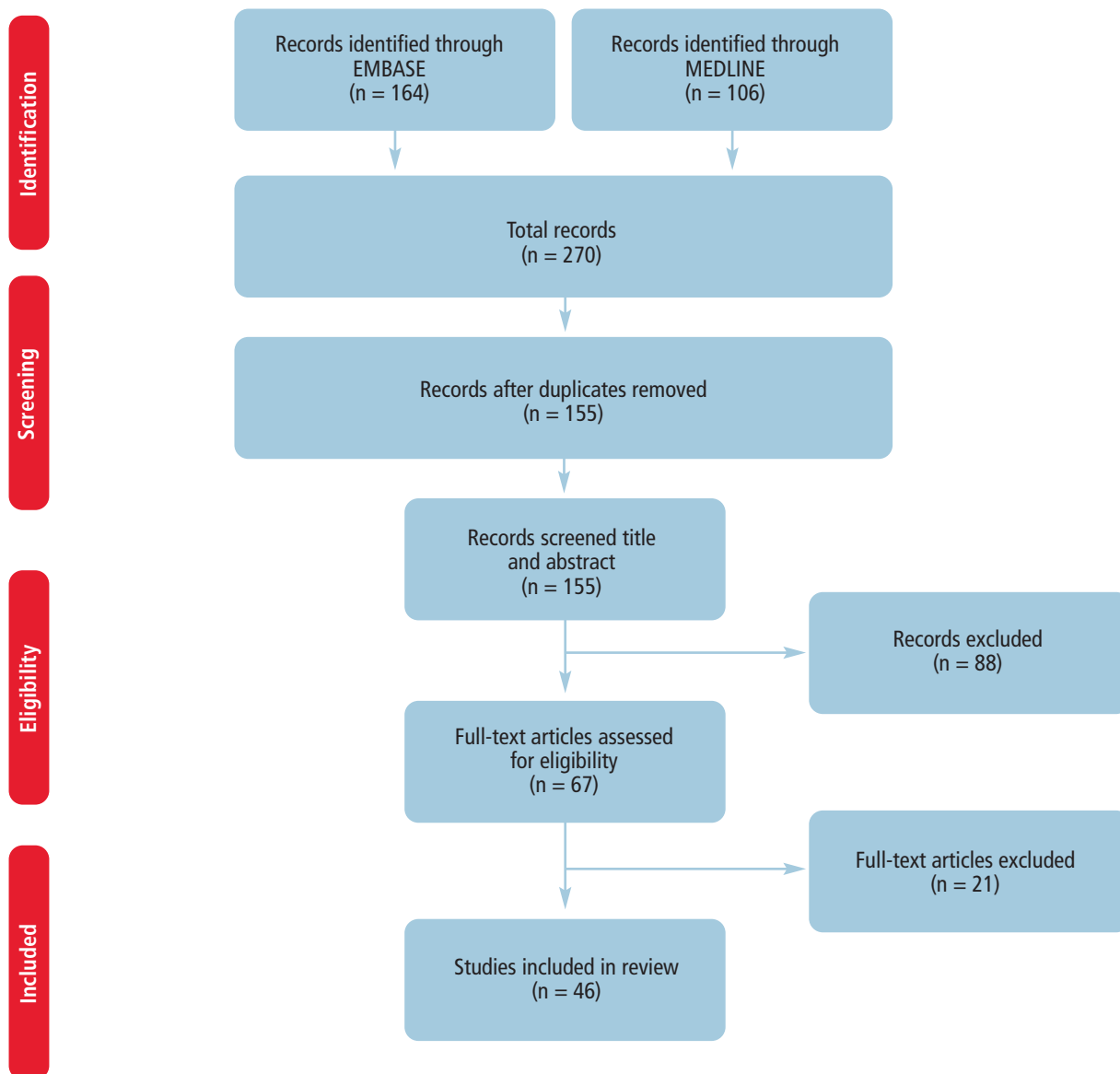
### Search strategy and results

All retrieved references were imported into Endnote, after which duplicates were deleted. The records were then screened for relevance, with a first screening of titles and abstracts, followed by the full text of articles. Inclusion criteria were relevance to collaboration, cooperation or integration of public health and primary care. Both individual studies and reviews were included. Exclusion criteria were

being published before 2010 and not exploring the collaboration, cooperation or integration of public health and primary care. Articles not published in English or only as conference abstracts were also excluded.

A total of 270 records were retrieved from the literature search, with 155 articles remaining after deletion of duplicates. After title and abstract screening, 67 records remained and were included in full-text screening. After this step, 46 articles were retained and included in the review (Figure A1).

Figure A1: PRISMA flow diagram of the search process for academic articles



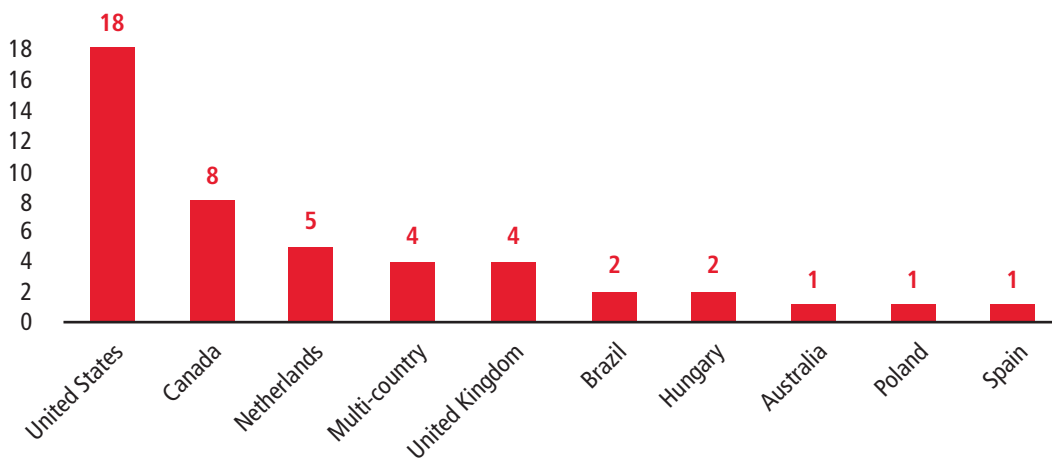
Source: Author's compilation.

Figure A2 illustrates that the academic articles published on the integration of primary care and public health are strongly biased towards the United States and Canada. From the European countries, the Netherlands and the United Kingdom are most strongly represented. There is also a very uneven timeline in publication, with a spike in articles published in 2012 (Figure A3).

The likely reason for the uneven geographical coverage and the timeline of publications is an influential report published by the Institute of Medicine in 2012 (Institute of Medicine, 2012), which led to a number of follow-up articles and

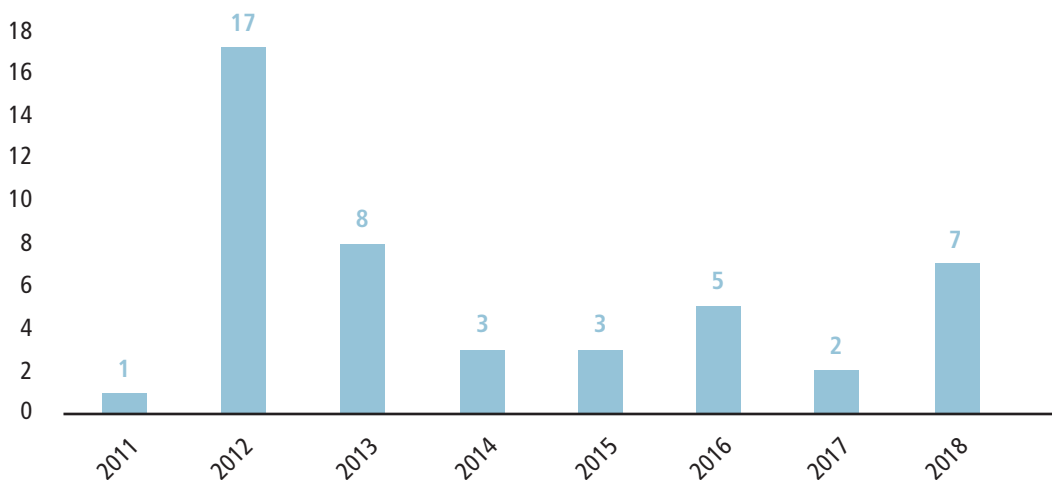
studies. Several developments in the United States gave rise to a new emphasis on integration, including the adoption in 2010 of the Patient Protection and Affordable Care Act, the development of new care models such as accountable care organizations, and the spread of patient-centred medical homes, leading to the recognition that the health of individual patients is linked to the larger community (Koo et al., 2012; Landon, Grumbach & Wallace, 2012; Linde-Feucht & Coulouris, 2012; AAFP, 2015). Until then, the two areas of primary care and public health had functioned largely independently (Landon, Grumbach & Wallace, 2012; AAFP, 2015).

**Figure A2: Countries covered in included articles**



Source: Author's compilation.

**Figure A3: Year of publication of included articles**





**Table A1: Academic articles included in the review**

Authors	Title	Year of publication	Country
Adany R et al.	General practitioners' cluster: a model to reorient primary health care to public health services	2013	Hungary
Akhtar-Danesh N et al.	Viewpoints about collaboration between primary care and public health in Canada	2013	Canada
Assendelft WJJ et al.	Bridging the gap between public health and primary care in prevention of cardiometabolic diseases: background of and experiences with the Prevention Consultation in the Netherlands	2012	Netherlands
Banarsee R et al.	Towards a strategic alignment of public health and primary care practices at local levels – the case of severe and enduring mental illness	2018	United Kingdom
Bhuyan SS et al.	Integration of public health and primary care: a systematic review of the current literature in primary care physician mediated childhood obesity interventions	2015	United States
Birtwhistle RV	Canadian Primary Care Sentinel Surveillance Network: a developing resource for family medicine and public health	2011	Canada
Booth M et al.	The new Australian Primary Health Networks: how will they integrate public health and primary care?	2016	Australia
Brown AD, Upshur R, Sullivan TJ	Public health and primary care: competition or collaboration?	2013	United States
Calman N et al.	Strengthening public health and primary care collaboration through electronic health records	2012	United States
Dresser MG et al.	Public health detailing of primary care providers: New York City's experience, 2003–2010	2012	United States
Evans-Agnew RA, Mayer KA, Miller LLL	Opportunities in the integration of primary care and public health nursing: two case exemplars on physical activity and nutrition	2018	United States
Gosling R, Davies SM, Hussey JA	How integrating primary care and public health could improve population health outcomes: a view from Liverpool, UK	2016	United Kingdom
Green LW et al.	Primary prevention of type 2 diabetes: integrative public health and primary care opportunities, challenges and strategies	2012	United States
Harris M	Integrating primary care and public health: learning from the Brazilian way	2012	Brazil
Jakab Z	Public health, primary care and the 'cluster' model	2013	Hungary

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Authors	Title	Year of publication	Country
Jakab Z	Public health, primary care and the 'cluster' model	2013	Hungary
Kempe A et al.	Effectiveness of primary care–public health collaborations in the delivery of influenza vaccine: a cluster-randomized pragmatic trial	2014	United States
Koo D et al.	A call for action on primary care and public health integration	2012	United States
Korn J	Linking primary care and public health in Minnesota	2014	United States
Landon BE, Grumbach K, Wallace PJ	Integrating public health and primary care systems: potential strategies from an IOM report	2012	United States
Lebrun LA et al.	Primary care and public health activities in select US health centers: documenting successes, barriers, and lessons learned	2012	United States
Levesque JF et al.	The interaction of public health and primary care: functional roles and organizational models that bridge individual and population perspectives	2013	Multi-country
Linde-Feucht S, Coulouris N	Integrating primary care and public health: a strategic priority	2012	United States
Martin-Misener R et al.	A scoping literature review of collaboration between primary care and public health	2012	Multi-country
Noel PH et al.	Primary care–public health linkages: older primary care patients with prediabetes & type 2 diabetes encouraged to attend community-based senior centers	2016	United States
Norton WE, Larson RS, Dearing JW	Primary care and public health partnerships for implementing pre-exposure prophylaxis	2013	United States
Pinto RM et al.	Primary care and public health services integration in Brazil's unified health system	2012	Brazil
Plochg T et al.	Integrating primary care and public health	2012	Netherlands
Pratt R et al.	Primary Care and Public Health Perspectives on Integration at the Local Level: A Multi-State Study	2017	United States
Pratt R et al.	Identifying barriers to collaboration between primary care and public health: experiences at the local level	2018	United States

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Authors	Title	Year of publication	Country
Price D, Chan D, Greaves N	Physician surveillance of influenza: collaboration between primary care and public health	2014	Canada
Queenan JA, Birtwhistle R, Drummond N	Supporting primary care public health functions	2016	Canada
Rawaf S	A proactive general practice: integrating public health into primary care	2018	United Kingdom
Saeed M	Improving the public health/primary care partnership: a perspective from NHS Hounslow	2012	United Kingdom
Silva M et al.	Improving population health through integration of primary care and public health: providing access to physical activity for community health center patients	2012	United States
Specchia ML et al.	Building successful collaborations between Public Health and Primary Health Care	2013	Multi-country
Storm I et al.	How can collaboration be strengthened between public health and primary care? A Dutch multiple case study in seven neighbourhoods	2015	Netherlands
Torner N et al.	Influenza sentinel surveillance network: a public health–primary care collaborative action to assess influenza A(H1N1)pmd09 in Catalonia, Spain	2013	Spain
Truswell AS et al.	Practice-based evidence for weight management: alliance between primary care and public health	2012	Netherlands
Tyszko PZ et al.	Primary health care tasks in implementing the main operations of public health	2016	Poland
Valaitis R et al.	Organizational factors influencing successful primary care and public health collaboration	2018	Canada
Valaitis R et al.	Strengthening primary health care through primary care and public health collaboration: the influence of intrapersonal and interpersonal factors	2018	Canada
van Avendonk MJ et al	Primary care and public health a natural alliance? The introduction of the guidelines for obesity and undernutrition of the Dutch College of General Practitioners	2012	Netherlands
Wakida EK et al.	Barriers and facilitators to the integration of mental health services into primary health care: a systematic review	2018	Multi-country

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Authors	Title	Year of publication	Country
Wong ST et al.	What systemic factors contribute to collaboration between primary care and public health sectors? An interpretive descriptive study	2017	Canada
Wynn A, Moore KM	Integration of primary health care and public health during a public health emergency	2012	Canada
Yun S et al.	Missouri Community, Public Health, and Primary Care Linkage: 2011–2012 Pilot Project Results & Evaluation	2015	United States

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