A scoping literature review of collaboration between primary care and public health

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Aim: The purpose of this scoping literature review was to determine what is known about: 1) structures and processes required to build successful collaborations between primary care (PC) and public health (PH); 2) outcomes of such collaborations; and 3) markers of their success. Background: Collaboration between PC and PH is believed to enable more effective individual and population services than what might be achieved by either alone. Methods: The study followed established methods for a scoping literature review and was guided by a framework that identifies systemic, organizational and interactional determinants for collaboration. The review was restricted to articles published between 1988 and 2008. Published quantitative and qualitative primary studies, evaluation research, systematic and other types of reviews, as well as descriptive accounts without an explicit research design, were included if they addressed either the structures or processes to build collaboration or the outcomes or markers of such collaboration, and were published in English. Findings: The combined search strategy yielded 6125 articles of which 114 were included. Systemic-level factors influencing collaboration included: government involvement, policy and fit with local needs; funding and resource factors, power and control issues; and education and training. Lack of a common agenda; knowledge and resource limitations; leadership, management and accountability issues; geographic proximity of partners; and shared protocols, tools and information sharing were influential at the organizational level. Interpersonal factors included having a shared purpose; philosophy and beliefs; clear roles and positive relationships; and effective communication and decision-making strategies. Reported benefits of collaboration included: improved chronic disease management; communicable disease control; and maternal child health. More research is needed to explore the conditions and contexts in which collaboration between PC and PH makes most sense and potential gains outweigh the associated risks and costs.
Background

Worldwide, health systems are revisiting the concept of primary health care (PHC) and trying to understand why the promise of ‘health for all’ has fallen short of the expectations it once inspired. The multiple, sometimes conflicted, meanings attached to PHC have been confusing, divisive and eroded its potential to improve health. Not only is PHC poorly integrated with the rest of the health system, there are challenges with integration between interventions offered by sectors within the field of PHC (Frenk, 2009). In this article, we focus on how collaboration between two sectors, primary care (PC) and public health (PH), might improve PHC.

We use the definition of PHC articulated in the Alma Ata Declaration; PHC is ‘essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self reliance and self-determination’ (World Health Organization [WHO], 1978: 1). We make a distinction between PHC and PC, not to resurrect old debates, but to make clear, as others have done (Muldoon et al., 2006; Russell et al., 2007) that PHC is a broad term conceptualizing an approach to health policy and services for individuals and populations that includes PC, PH and other services and sectors. As the first point of entry to a healthcare system, PC provides person-focused, integrated, coordinated care over time for all but the most uncommon conditions (Starfield, 1998). We define PH to be ‘an organized activity of society to promote, protect and improve, and when necessary, restore the health of individuals, specified groups, or the entire population. It is a combination of sciences, skills, and values that function through collective societal activities and involve programs, services, and institutions aimed at protecting and improving the health of all people’ (Public Health Agency of Canada, 2007: 13).

Collaboration between PC and PH is believed to enable the delivery of more effective clinical services, community screening and public education campaigns than what might be achieved by either of these sectors alone (Lasker, 2002; Weiss et al., 2002). According to Lasker, when the practice-based services for individuals offered by PC are combined with the population-based strategies offered by PH, health services can become more accessible and tailored to community needs, and better equipped to manage the origins of health problems. Lasker and The Committee on Medicine and Public Health’s (1997) framework for PC and PH collaboration includes: a shared goal; the full range of health and disease determinants; the people and organizations that can make an impact on these determinants; the diverse resources and skills of partners; and the types of interventions that can be mounted. The focus of the interventions in a PC and PH collaboration can be to increase service coordination, increase accessibility for the uninsured, enhance the quality and cost-effectiveness of care, identify and address community problems, strengthen health promotion and health protection and shape the health system through policy, training and research (Lasker and The Committee on Medicine and Public Health, 1997). We used the Public Health Agency of Canada (1997: 9) definition of collaboration, ‘a recognized relationship among different sectors or groups, which have been formed to take action on an issue in a way that is more effective or sustainable than might be achieved by the public health sector acting alone’.

Shifting patient population and health service trends, together with an increased focus on population health and health determinants, are some of the drivers propelling the exploration of collaboration between PC and PH. In the United States, the fiscal pressures associated with providing care for a growing uninsured patient population have influenced the leverage attributed to collaboration (Lasker and The Committee on Medicine and Public Health, 1997). In the United Kingdom, efforts to integrate PC and PH began in the 1990s

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with the establishment of Primary Care Groups, and later Primary Care Trusts, which have a requirement to engage in strategic planning, needs assessment and service evaluation (Gillam et al., 1998; The Change Foundation, 2009). In Canada, after decades of little progress (Hutchison et al., 2001), PHC renewal efforts have ramped up with an unprecedented momentum (Hutchison, 2008) with growing recognition that stronger collaboration between PC and PH is needed (Dault et al., 2004; Ontario Ministry of Health and Long Term Care, 2006; Rachlis, 2006; The Change Foundation, 2009). Concurrently, in the wake of disasters such as SARS, the tainted blood scandal (transfusions of blood contaminated with hepatitis C) and water contamination, calls to renew PH have led to improvements in human resource planning and management (Canadian Institutes of Health Research [CIHR], 2003; Naylor et al., 2003; Joint Task Group on Public Health Human Resources, 2005).

In this article, we report on a scoping review of the literature that examines collaboration between PC and PH. The purpose of the review was to determine what was known from published quantitative and qualitative studies, evaluation research, systematic and other types of literature reviews as well as descriptive accounts without an explicit research design about structures and processes required to build successful collaborations between PH and PC, outcomes of these collaborations and markers of their success.

### Methods

The study followed established scoping literature review methods (Arksey and O’Malley, 2005; Anderson et al., 2008; Rumrill et al., 2010) and was guided by a framework that identifies three determinants for collaboration (San Martin-Rodriguez et al., 2005). Systemic determinants reside in the environment outside of the organization where the collaboration takes place. Organizational determinants are conditions within the organization, and interactional determinants refer to the interpersonal interactions between team members. This framework guided data extraction and coding of articles included in the review. A detailed description of our methods is published in another paper in this issue (Valaitis et al., in press); therefore, here, we report only key points.

Nine databases (MEDLINE, CINAHL, Cochrane, DARE, Dissertations International, EPOC, EMBASE, PsycINFO and Sociological Abstracts) were searched from 1988 (10 years following Alma Ata) to May 2008 using Mesh Headings and free text key words that were applicable to PH, PC and collaboration – in combinations using the Boolean operators ‘AND’ and ‘OR’ (Table 1). Two librarians developed a search strategy independently and, after comparing results, agreed on a single strategy. To update our review, the same databases were searched for systematic and other types of review articles in July 2011 yielding four relevant articles that we consider in our discussion of the review results. Additional strategies included a search of relevant websites, hand searching of relevant journals and the references in two review articles (Ciliska et al., 2005; Stevenson Rowan et al., 2007) and contact with content experts (Valaitis et al., in press). To enable some comparability of healthcare systems, the review was restricted to articles about collaboration between PC and PH in Canada, United States, Western Europe, Australia and New Zealand. We included primary studies of all types, theses, literature reviews of all types, including systematic reviews, and descriptive accounts of collaboration without an explicit research design if they addressed either structures or processes to build collaboration between PC and PH, outcomes of collaboration or markers of success, and were published in English.

The title and abstract of each article was independently evaluated by two researchers, as were articles assessed as relevant. Disagreements were resolved by consensus by the co-principal investigators (R.M.M. and R.V.). Data were extracted using a specifically designed and pilot-tested form derived from detailed research questions. Consistent with a narrative approach (Arksey and O’Malley, 2005), extractors recorded details of structures and processes of programs or interventions to contextualize results. Data extracted included the purpose of the collaboration, participants in the collaboration, research methods used, if any, the site or context of where the collaboration occurred, theoretical framework applied, if any, what precipitated and or motivated the collaboration, activities of professionals and disciplines, barriers and facilitators to and results or outcomes of collaboration and indicators of a successful collaboration. A compendium

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containing the complete extraction forms, most of which are one page in length, for all 114 articles can be obtained by contacting the corresponding author. Each extraction form was imported separately as a ‘source’ into NVivo 8 (QSR International Pty Ltd, 2008). Guided by the research questions and the San Martin-Rodriguez et al. (2005) determinants of collaboration framework described previously, the first two authors developed the coding structure for analysis in consultation with the research team. Extractions were analyzed using content analysis with first-level coding followed by categorization into larger themes.

Results

The combined search strategy yielded 6125 articles. Of these, 114 articles met the inclusion criteria. In the interests of brevity, Table 2 lists the first author of these articles alphabetically. The majority of articles originated from the United Kingdom (38%) and the United States (34%; Valaitis et al., in press). Most articles described local collaborations in urban and rural settings often involving physicians and nurses and were reported at organizational and interactional levels. The results presented here are a high-level overview. Details about the aims of the interventions and collaborations and the activities of professionals and organizations involved in collaborations are identified in the compendium of extraction forms for each article available from the first author.

Types of collaboration

We used Lasker and The Committee on Medicine and Public Health’s (1997) synergies of medicine and PH collaboration to guide categorization of the types of collaboration found in our review. These include collaborations aimed at: improving health care by coordinating services for individuals; improving access to care by establishing frameworks to provide care for uninsured; improving the quality and cost-effectiveness of care by applying a population perspective to medical practice; using clinical practice to identify and address community health problems; strengthening health promotion and health protection by mobilizing community campaigns; and shaping the future direction of the health system by collaborating around policy, training and research (Lasker and The Committee on Medicine and Public Health, 1997: 51). The most commonly reported types of collaboration were those aimed at improving the quality and cost-effectiveness of care by applying a population perspective to PC (22%), and those that used clinical practice to identify and address community health problems (17%). Other types, representing collaborations that focused on integration and/or quality improvement, primarily included numerous papers from the United Kingdom that reported on collaboration in efforts to achieve a model of an integrated health system (Wood et al., 1994; Gerrish, 1999; Headland et al., 2000; Banks-Smith et al., 2001; Bindman et al., 2001; Hurst et al., 2002; Edmonstone et al., 2003; Roff, 2003; Heller and Goldwater, 2004; Meyrick, 2004; Hopayian et al., 2005; Marks and Hunter, 2005; Shaw et al., 2006; Brown et al., 2007). Collaborations aiming to
improve access to care by establishing frameworks to provide care for the uninsured were only reported in articles originating from the United States (Machala and Miner, 1994; Lasker and The Committee on Medicine and Public Health, 1997; Wilson et al., 2000; Oros et al., 2001; McElmurry et al., 2009). Another commonly reported type of collaboration was academic partnerships initiated to concurrently improve service delivery and broaden students’ educational experiences (Bennett et al., 1994; Lundeen et al., 1997; Williams et al., 1999; Wilson et al., 2000; Oros et al., 2001; Desai et al., 2003; Morgan and Kelly, 2004; Ferrari and Rideout, 2005; Michener et al., 2005; Rothman et al., 2005; Harrison et al., 2006).

### Activities carried out in collaborations

Collaborations between PC and PH served a variety of client populations, and, as Figure 1 shows, involved a full range of activities. Community activities included community engagement and participation (Bennett et al., 1994; Alexy and Elnitsky, 1996; Ayres et al., 1998; Banks-Smith et al., 2001; Baptistie and Drennan, 1999; Bennett et al., 1994; Billingham and Perkins, 1997; Bindman et al., 2001; Bourdages et al., 2003; Brauer et al., 2006; Brown and van Zwanenberg, 1989; Brown, 2006; Butler-Jones, 2004; Carlisle et al., 2004; Chambers et al., 2005; CIHR, 2003; Ciliska et al., 1992; Ciliska et al., 2005; Cook et al., 2001; Cook, 2006; Cornell, 1999; Crep-Smyal, 1999; Danila et al., 1997; de Guzman, 2007; Desai et al., 2003; Dion, 2004; Edmonstone et al., 2003; Elster et al., 2002; Ewles, 1999; Fatchett, 1990; Ferguson et al., 1992; Ferrari and Rideout, 2005; Fraser, 2005; Gerrish, 1999; Gillam et al., 1998; Gillam and Schamroth, 2002; Harris et al., 2007; Harper et al., 2000; Harris et al., 2003; Hogg et al., 2006a; Hogg et al., 2006b; Hogg and Hanley, 2008; Hopayian et al., 2005; Hripcsak et al., 1999; Hurst et al., 2002; Huston et al., 2006; Illiffe et al., 2002; Illiffe and Lenihan, 2003; Jackson and Marley, 2007; Jenkins and Sullivan-Marx, 1994; Jewell and Griffiths, 2001; Jordan et al., 1998; Kaufman et al., 2006; Kearney et al., 2005; Kilduff et al., 2001; Kilduff et al., 2004; Kilduff, 2006; Koponen and Kalkas, 1997; Lambrew et al., 1993; Larson et al., 2006; Lasker and The Committee on Medicine and Public Health, 1997; Lea et al., 2005; Leeds et al., 2000; Lemelin et al., 2001; Lundeen et al., 1997; Mack et al., 2007; Malcolm and Barnett, 1995; Margolis et al., 2001; Marks and Hunter, 2005; Mayo et al., 1996; McDonald et al., 1997; McElmurry et al., 2009; Meyrick, 2004; Miles et al., 2005; Morgan and Kelly, 2004; Olney and Clarkson, 2002; O’Neil and Clarkson, 2002; Oros et al., 2001; Pierce et al., 2007; Porter et al., 2007; Poulton, 2000; Public Health Research Education and Development (PHRED) (2006); Record et al., 2000; Renfrew et al., 2001; Cook, 2000; Koponen and Kalkas, 1997; The Network (2008); Sheldon, 1999; Roe, 2003; Rogers et al., 1999; Rothman et al., 2005; Russell et al., 2003; Sanders et al., 2008; Scott, 1999; Shandro, 2003; Shaw et al., 2006; Shirin and Absher, 2006; Stephenson Rowan, 2007; Taylor et al., 2007; Thackway et al., 2000; The Network (2008); Thomas et al., 1995; Voelker (1994); Welton et al., 1997; Welton et al., 2000; Wilson et al., 2000; Williams et al., 1999; Wood et al., 1994; Xyrichis and Lowton, 2008; Yam, 1999; Yiannakis and Matthews, 2001).
Lundeen et al., 1997; McDonald et al., 1997; Ewles, 1999; Harper et al., 2000; Margolis et al., 2001; Oros et al., 2001; Heller et al., 2003; Carlisle et al., 2004; Andrews, 2002; Fraser, 2005; Michener et al., 2005; Rothman et al., 2005; Asaid and Riley, 2007), community development (Billingham and Perkins, 1997; Heller and Goldwater, 2004; Brown et al., 2007) and multi-sectoral involvement (Billingham and Perkins, 1997; Arora et al., 2000; Wilson et al., 2000). Various types of jointly offered health promotion (Fatchett, 1990; Wiles and Robison, 1994; Wood et al., 1994; Lasker and The Committee on Medicine and Public Health, 1997; Cook, 2000; Bindman et al., 2001; Oros et al., 2001; Heller et al., 2003; Riley et al., 2003; Dion, 2004; Kearney et al., 2005; Rothman et al., 2005; Brown, 2006; Sanders et al., 2008), health education (Lambrew et al., 1993; Bennett et al., 1994; Alexy and Elnitsky, 1996; Harper et al., 2000; Record et al., 2000; Thackway et al., 2000; Bourdages et al., 2003; Harris et al., 2003; Heller and Goldwater, 2004; Ferrari and Rideout, 2005; Kearney et al., 2005; Mack et al., 2007; McElmurry et al., 2009; Sanders et al., 2008) and illness/injury prevention initiatives (Lasker and The Committee on Medicine and Public Health, 1997; Lundeen et al., 1997; Crump et al., 1999; Rogers et al., 1999; Lemelin et al., 2001; O’Neil and Clarkson, 2002; Heller et al., 2003; Heller and Goldwater, 2004; Meyrick, 2004; Chambers et al., 2005; Kearney et al., 2005; Brown, 2006; Harrison et al., 2006; PHRED, 2006; Stevenson Rowan et al., 2007) were reported. The most commonly offered health services were general PC services (Alexy and Elnitsky, 1996; Lasker et al., 1997; Poulton, 2000; Record et al., 2000; Andrews, 2002; Heller and Goldwater, 2004; Ferrari and Rideout, 2005; Brown, 2006; Kaufman et al., 2006; Shirin and Absher, 2006; de Guzman, 2007; Jackson and Marley,

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chronic disease management including screening (Alexy and Elnitsky, 1996; Rogers et al., 1999; Record et al., 2000; CIHR, 2003; Chambers et al., 2005; Ferrari and Rideout, 2005; Brown, 2006; PHRED, 2006; Mack et al., 2007; Wedel et al., 2007) and immunization and communicable disease control (Lambrew et al., 1993; Bennett et al., 1994; Wood et al., 1994; Alexy and Elnitsky, 1996; Danila et al., 1997; Crump et al., 1999; Harper et al., 2000; Russell et al., 2003; Heller and Goldwater, 2004; Ferrari and Rideout, 2005; Harris et al., 2007). Several collaborations involved information systems activities such as developing or managing information systems (Voelker, 1994; Hripcsak et al., 1999; Renfrew et al., 2001; Shandro, 2003; Heller and Goldwater, 2004; Meyrick, 2004; Mack et al., 2007) and sharing information (Shandro, 2003; Harris et al., 2007). Development or implementation of best practice guidelines using a variety of strategies was reported (Lambrew et al., 1993; Wood et al., 1994; McDonald et al., 1997; Crump et al., 1999; Cook, 2000; Wilson et al., 2000; Shandro, 2003; Michener et al., 2005; Huston et al., 2006; Larson et al., 2006) as well as a leadership role for PH in promoting such guidelines (Lasker and The Committee on Medicine and Public Health, 1997; Welton et al., 1997; Cornell, 1999; Hurst et al., 2002; Hopayian et al., 2005). Activities carried out by PH in collaborations with PC included conducting needs assessments (Billingham and Perkins, 1997; Lasker and The Committee on Medicine and Public Health, 1997; Kilduff et al., 1998; Poulton, 2000; Wilson et al., 2000; Bindman et al., 2001; Gillam and Shamroth, 2002; Heller et al., 2003; Roff, 2003; Dion, 2004; Meyrick, 2004; Brauer et al., 2006; Brown, 2006; de Guzman, 2007; Stevenson Rowan et al., 2007; Taylor et al., 2007; Wedel et al., 2007), planning programs (Cornell, 1999; Cook, 2000; Oros et al., 2001; Desai et al., 2003; Wedel et al., 2007) and carrying out quality assurance and evaluation (Bindman et al., 2001; Hurst et al., 2002; Bourdages et al., 2003; Hogg et al., 2006a; Brown et al., 2007; de Guzman, 2007; Harris et al., 2007). Teamwork and management activities tended to focus on supporting teams and measures to address client and service concerns or practice governance (Ciliska et al., 1992; Wood et al., 1994; Malcolm and Barnett, 1995; Gillam et al., 1998; Cook, 2000; Headland et al., 2000; Banks-Smith et al., 2001; Bindman et al., 2001; Hurst et al., 2002; Bourdages et al., 2003; Edmonstone et al., 2003; Riley et al., 2003; Asaid and Riley, 2007). Professional education initiatives included academic programming (Mayo et al., 1996; Harris et al., 2003; Heller and Goldwater, 2004; Morgan and Kelly, 2004; Lea et al., 2005; Kaufman et al., 2006) and informal training initiatives (Wood et al., 1994; Thomas et al., 1995; Welton et al., 1997; Gillam et al., 1998; Cornell, 1999; Scott, 1999; Bindman et al., 2001; Gillam and Shamroth, 2002; Harris et al., 2003; Huston et al., 2006; Harris et al., 2007; Hogg and Hanley, 2008; McElmurry et al., 2009). Advisory board and committee participation (Alexy and Elnitsky, 1996; Kilduff et al., 1998; Margolis et al., 2001; Iliffe et al., 2002; Desai et al., 2003; Dion, 2004; Rothman et al., 2005) and social marketing and communication campaigns about health issues (Danila et al., 1997; Lasker and The Committee on Medicine and Public Health, 1997; Hripcsak et al., 1999; O’Neil and Clarkson, 2002; Kearney et al., 2005; Sanders et al., 2008) were also reported.

The characteristics of successful collaboration between PC and PH as well as structural and process factors influencing collaboration are briefly discussed in the following section and summarized in Figure 2. Results are presented according to the three determinants for collaboration (systemic, organizational and interactional) as proposed in the framework by San Martin-Rodriguez et al. (2005).

Systemic factors influencing collaboration

Government involvement, policy and fit with local needs

Health reform and government mandates for development of teams and partnerships were important systemic factors enabling collaboration reported in UK articles (Wiles and Robison, 1994; Wood et al., 1994; Gillam et al., 1998; Arora et al., 2000; Poulton, 2000; Banks-Smith et al., 2001; Cook et al., 2001; Jewell and Griffiths, 2001; Hurst et al., 2002; Iliffe and Lenihan, 2003; Riley et al., 2003; Meyrick, 2004; Shaw et al., 2006; Brown et al., 2007), and to a lesser extent, in articles from Canada (Shandro, 2003; Butler-Jones, 2004; Brauer et al., 2006; Sanders et al., 2008) and the United States (Jenkins and Sullivan-Marx, 1994; Lasker and The Committee on Medicine and Public Health, 1997). Collaboration between PC and PH occurred more commonly where initiatives had common goals such as reducing health disparities.
and meeting the healthcare needs of disadvantaged populations (Lasker and The Committee on Medicine and Public Health, 1997; Wilson et al., 2000; Elster et al., 2002; Harrison et al., 2006; PHRED, 2006; Wedel et al., 2007; McElmurry et al., 2009), improving quality of care (Ferguson et al., 1992; Alexy and Elnitsky, 1996; Lundeen et al., 1997; Harris et al., 2003; Heller and Goldwater, 2004), containing costs (Lambrew et al., 1993; Voelker, 1994; Lasker and The Committee on Medicine and Public Health, 1997; Welton et al., 1997; Hripcsak et al., 1999; Williams et al., 1999), enhancing evidence-informed practice (Cornell, 1999; Jordan et al., 1998; Gillam and Schamroth, 2002; Hopayian et al., 2005; Larson et al., 2006) and improving emergency planning and response (Hogg et al., 2006b; Harris et al., 2007; Mack et al., 2007; Pierce et al., 2007; Taylor et al., 2007). Collaboration was, however, also negatively impacted by the rapid and constant change created by healthcare reform (Welton et al., 1997; Hopayian et al., 2005). Newly created structures and governance processes could lead to uncertainty about the processes of PC and PH collaborations (Ciliska et al., 2005). Healthcare reform became a barrier to collaboration when national priorities took precedence over community-level priorities (Ewles, 1999).

Government involvement, including the ‘fit’ of collaboration with a government’s agenda and endorsement of the value of collaboration by government officials (Lambrew et al., 1993; Shandro, 2003) were important facilitators (Harrison and Keen, 2002; Riley et al., 2003; Sanders et al., 2008). The importance of collaboration between levels of government, for example, in an emergency (Taylor et al., 2007), and coordination and priority setting to enhance collaboration were stressed (Ciliska et al., 2005). Relevant policy development was especially emphasized, one example being the reorganization of fiscal and structural resources to create Primary Care Groups in the United Kingdom (Bindman et al., 2001).

**Funding and resource factors**

Collaborations were successful, for the most part, if they were adequately funded (Lambrew et al., 1993; Poulton, 2000; Kaufman et al., 2006; Olney and Yoon, 2007; Wedel et al., 2007). Interestingly, not all successful collaborations required additional investments (Lasker and The Committee on Medicine and Public Health, 1997); some pooled and shared resources (CIHR, 2003) and capitalized on volunteer and in-kind contributions (Lundeen et al., 1997; PHRED, 2006; Shaw et al., 2006).

Collaboration between PC and PH was impeded where a lack of resources for evaluation, health promotion activities and information infrastructure for reporting, sharing and comparing data, human resources and time occurred (Ciliska et al., 1992; Billingham and Perkins, 1997; McDonald et al., 1997; Cornell, 1999; Gerrish, 1999; Rogers et al., 1999; Bindman et al., 2001; Lemelin et al., 2001; Edmonstone et al., 2003; Iliffe and Lenihan, 2003; Hopayian et al., 2005; Kearney et al., 2005; de Guzman, 2007; Stevenson Rowan et al., 2007; Xyrichis and Lowton, 2008). Fee-for-service remuneration of physicians impeded collaboration

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<td>Leadership, Management and Accountability Issues</td>
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**Figure 2** Factors Influencing Collaboration between Primary Care and Public Health
while alternatives such as capitation, salary or blended funding models enabled them to delegate tasks, allowing more opportunity to provide community-based care (Wedel et al., 2007; The Network Towards Unity for Health, 2008). The intermittent or short-lived nature of some pilot or demonstration projects was another impediment (Arora et al., 2000; Hogg and Hanley, 2008).

At a broader level, other challenges related to distribution of funds across health sectors and dominance of an illness rather than a health paradigm (Lemelin et al., 2001). Financial performance incentives were criticised for preferentially encouraging some health promotion activities in PC at the expense of those not incentivized (Hogg and Hanley, 2008). The small size of PH departments and their capacity to respond to the imperative for more collaboration with PC was a concern (Cornell, 1999; CIHR, 2003), and there was apprehension that population expertise and programs could be diluted if absorbed into PC (CIHR, 2003).

Power and control issues

Many successful collaborations between PC and PH were driven by values and beliefs, most commonly a belief in the value of collaboration between sectors (Fatchett, 1990; Ayres et al., 1996; Hripcsak et al., 1999; Williams et al., 1999; Elster et al., 2002; Butler-Jones, 2004; Dion, 2004; Chambers et al., 2005; Fraser, 2005; Shaw et al., 2006; Harris et al., 2007; Stevenson Rowan et al., 2007), the value of prevention, health promotion and population health (Fatchett, 1990; Jenkins and Sullivan-Marx, 1994; Lasker and The Committee on Medicine and Public Health, 1997; Jordan et al., 1998; Elster et al., 2002; Desai et al., 2003; Brauer et al., 2006; Olney and Yoon, 2007) and the importance of teamwork for enabling effective coordinated care (Cook et al., 2001; Xyrichis and Lowton, 2008). Less-successful collaborations were characterized by separate and siloed bureaucracies of PC and PH (The Network Towards Unity for Health, 2008). Territorial ownership conflicts about programs and mandates were common concerns at the systems and organizational levels (Jenkins and Sullivan-Marx, 1994; Wiles and Robison, 1994; Malcolm and Barnett, 1995; Lasker and The Committee on Medicine and Public Health, 1997; Bindman et al., 2001; Hopayian et al., 2005; Mack et al., 2007; Wedel et al., 2007).

Education and training

Interdisciplinary education (Ciliska et al., 2005) emphasizing system-wide collaborative work practices (Welton et al., 1997; The Network Towards Unity for Health, 2008) and training in PH (Carlisle et al., 2004) are needed. There were calls for education programs to bridge knowledge gaps and prepare graduates for practice in integrated systems (Carlisle et al., 2004; Brown, 2006) and training to expand managerial abilities in facilitating large diverse teams (Banks-Smith et al., 2001; Harrison and Keen, 2002; Iliffe and Lenihan, 2003; Hogg and Hanley, 2008). Furthermore, evaluation skill development is needed in applying PH concepts in PC (Jordan et al., 1998; Gillam and Schamroth, 2002; Iliffe and Lenihan, 2003).

Organizational factors

Lack of a common agenda

Successful collaboration was most likely to occur with organizational support and resources. Lack of organizational support, which restricted collaboration, took many forms including lack of a common agenda (Kilduff et al., 1998; Dion, 2004; Brauer et al., 2006; Brown, 2006; Hogg and Hanley, 2008) or vision (Arora et al., 2000; Shandro, 2003; Shaw et al., 2006; Wedel et al., 2007), as well as dominating (Harrison and Keen, 2002) and competing agendas (Welton et al., 1997; Heller et al., 2003; Ciliska et al., 2005; Hopayian et al., 2005; Hogg and Hanley, 2008). Differences in organizational culture, such as PC’s focus on individuals and short-term results, and PH’s focus on populations and long-term view of health, limited their collaboration (Welton et al., 1997; Arora et al., 2000; Edmonstone et al., 2003). Added to this, PC was reported to devalue aspects of PH activities such as prevention, population needs assessments, and community development (Ayres et al., 1996; Billingham and Perkins, 1997; Jordan et al., 1998; Kilduff et al., 1998; Hurst et al., 2002; Bourdages et al., 2003; Ciliska et al., 2005; Shaw et al., 2006; Hogg and Hanley, 2008). Physician workload issues, lack of joint planning and challenges associated with multiple-stakeholder engagement deterred buy-in to collaboration by the PC sector (Arora et al., 2000; Banks-Smith et al., 2001; Gillam and Schamroth, 2002; Russell et al., 2003; Meyrick, Primary Health Care Research & Development 2012; 13: 327–346
Finally, PH role confusion at the organizational level restricted collaboration, particularly with respect to the general lack of role clarity and variation in PH roles between sites (Meyrick, 2004; Hopayian et al., 2005). Concerns about human resources pertained to the availability and performance capacity of personnel to manage collaborative teams (Harrison and Keen, 2002; Iliffe and Lenihan, 2003; Hogg and Hanley, 2008), knowledge of PH concepts in PC (Arora et al., 2000; Heller et al., 2003; Hogg et al., 2006b) and skills required of PH to perform needs assessments (Jordan et al., 1998). The time needed for collaboration, community mobilization and evaluation was another barrier (Gillam et al., 1998; Harper et al., 2000; Harrison and Keen, 2002; Bourdages et al., 2003; Shandro, 2003). That said, many authors reported that health professionals facilitated collaboration (Jenkins and Sullivan-Marx, 1994; Ayres et al., 1996; Mayo et al., 1996; Jordan et al., 1998; Margolis et al., 2001; Harrison and Keen, 2002; Ferrari and Rideout, 2005; Hogg and Hanley, 2008) and partners brought resources to the table (Leeds et al., 2000; Wilson et al., 2000; Michener et al., 2005).

Leadership, management and accountability issues

Developing community-based committees with diverse membership mandated with an advisory or steering function was a key leadership approach to facilitate collaboration. Community engagement and representation on these committees were essential for collaborations to be responsive to community needs and facilitate joint planning (Machala and Miner, 1994; Alexy and Elnitsky, 1996; Billingham and Perkins, 1997; Crump et al., 1999; Ewles, 1999; Harper et al., 2000; Wilson et al., 2000; Bindman et al., 2001; Oros et al., 2001; Andrews, 2002; Michener et al., 2005; Rothman et al., 2005; Kaufman et al., 2006; Asaid and Riley, 2007; Sanders et al., 2008). Involvement of multiple professionals was also important to develop buy-in (Lambrew et al., 1993; Alexy and Elnitsky, 1996; Margolis et al., 2001; Iliffe et al., 2002; Shandro, 2003; Ciliska et al., 2005). Specific strategies to enable collaboration included: contractual agreements between jurisdictions and organizations (Wood et al., 1994; Lasker and The Committee on Medicine and Public Health, 1997; Cornell, 1999; Wilson et al., 2000; Porter et al., 2007; Wedel et al., 2007); organizational structures such as personnel designated to enhance cooperation between PC and PH (Lambrew et al., 1993; Gerrish, 1999; Williams et al., 1999; Headland et al., 2000); mentorship programs for new employees (Scott, 1999); involvement of someone able to bridge the sectors (Lasker and The Committee on Medicine and Public Health, 1997); physician and non-physician champions (Harper et al., 2000); and job descriptions requiring collaboration (Russell et al., 2003).

An important management process was to prepare the organization for changes associated with collaboration (The Network Towards Unity for Health, 2008) and ensure organizational structures and processes enabled healthcare providers to function optimally (Shandro, 2003; Ciliska et al., 2005; de Guzman, 2007). Small, stable, diverse teams with a high proportion of full-time staff enabled better team participation with more impact on patient care (Shaw et al., 2006; Xyrichis and Lowton, 2008). Obtaining adequate administrative support for managers (Lasker and The Committee on Medicine and Public Health, 1997; Kilduff et al., 1998) and assisting them to develop knowledge and skills needed to support the work of collaborative teams (Banks-Smith et al., 2001; Margolis et al., 2001) were stressed.

Geographic proximity of partners

Co-location of PH and PC organizations and team members was an important facilitator of collaboration. Geographic proximity of team members facilitated communication, information exchange, a sense of common purpose and high levels of trust between healthcare providers (Williams et al., 1999; Cook et al., 2001; Kaufman et al., 2006; Wedel et al., 2007; Xyrichis and Lowton, 2008). However, geographic separation of team members left some providers, especially in rural settings, feeling professionally isolated (Oros et al., 2001; Ciliska et al., 2005; Brown, 2006). Network formation is a strategy that created

critical mass among geographically dispersed team members (Jewell and Griffiths, 2001).

**Shared protocols, tools and information sharing**

The use of a standardized shared system for collecting data and disseminating information enhanced access to quality medical information and supported effective interdisciplinary care (Voelker, 1994; Welton et al., 1997; Banks-Smith et al., 2001; Kaufman et al., 2006; Pierce et al., 2007; Stevenson Rowan et al., 2007; Wedel et al., 2007; The Network Towards Unity for Health, 2008). Shared protocols were useful for facilitating multi-disciplinary, evidence-based practice and quality assurance and for collecting data and disseminating information (Welton et al., 1997; Margolis et al., 2001; Hurst et al., 2002). Other facilitators of collaboration were evidence-based toolkits and decision-support tools (Rogers et al., 1999; Huston et al., 2006; Larson et al., 2006; Wedel et al., 2007), as well as clear referral processes between partners (Crump et al., 1999), and linked records (Shandro, 2003).

**Interactional factors**

**Shared purpose, philosophy and beliefs**

Early successes in the collaboration between PC and PH maintained enthusiasm (Cornell, 1999; Arora et al., 2000) and collaborations were enhanced if partners shared similar philosophies of care (Wiles and Robison, 1994; de Guzman, 2007); believed in the value of the collaboration’s impact on community health (Cornell, 1999); and acknowledged the importance of health improvement and health inequalities (Arora et al., 2000). When there was not a similar philosophy of care or a common goal to reach, attitudes and beliefs of team members became barriers to collaboration. Attitudes included negative stereotypical views of PC and PH roles and a lack of belief in the value of collaboration or activities such as prevention (Voelker, 1994; Rogers et al., 1999; Russell et al., 2005; Porter et al., 2007; The Network Towards Unity for Health, 2008). Other attitudinal issues included resistance to change (Kilduff et al., 1998; Gerrish, 1999; Leeds et al., 2000; Banks-Smith et al., 2001; The Network Towards Unity for Health, 2008) and lack of interest in participating in planned activities (Bourdages et al., 2003; Chambers et al., 2005). A lack of understanding of PH (Billingham and Perkins, 1997; Dion, 2004; Ciliska et al., 2005; Brauer et al., 2006; Xyrichis and Lowton, 2008) and various community nursing roles (Wiles and Robison, 1994; Baptiste and Drennan, 1999) created interpersonal barriers to collaboration, as did philosophical differences in approaches to care (Wiles and Robison, 1994; Hurst et al., 2002) and competing priorities and agendas (Harrison and Keen, 2002; Iliffe and Lenihan, 2003; Brauer et al., 2006).

**Clear roles and positive relationships**

The quality of professional relationships (Riley et al., 2003; PHRED, 2006; Harris et al., 2007; Jackson and Marley, 2007) was a vital facilitator for collaboration. Numerous authors reported on the importance of all partners having clear roles and responsibilities to enable effective teamwork (Wiles and Robison, 1994; Wood et al., 1994; Mayo et al., 1996; Billingham and Perkins, 1997; Lasker and The Committee on Medicine and Public Health, 1997; Welton et al., 1997; Gillam et al., 1998; Cook, 2000; Cook et al., 2001; Shandro, 2003; Dion, 2004; Ciliska et al., 2005; Brauer et al., 2006; Brown, 2006; Stevenson Rowan et al., 2007; Xyrichis and Lowton, 2008). Having better knowledge of one another’s roles, skills and organizations enhanced the speed and nature of decision-making among teams.

Moreover, understanding of and capacity for interdisciplinary teamwork (Poulton, 2000; Heller et al., 2003; Dion, 2004; Xyrichis and Lowton, 2008) having had previous positive relationships and developing new linkages among PC and PH personnel (Wood et al., 1994; Ayres et al., 1996; Baptiste and Drennan, 1999; Margolis et al., 2001; Brown, 2006; Shaw et al., 2006; Porter et al., 2007) enabled collaborations. In contrast, various types of communication issues (Baptiste and Drennan, 1999; Hripcsak et al., 1999; Hurst et al., 2002; Ciliska et al., 2005) and poor rapport impeded collaboration (Wiles and Robison, 1994; Alexy and Elnitsky, 1996; Poulton, 2000; Harris et al., 2007; Hopayian et al., 2005). Specific strategies to develop team relations included the following: providing partners with feedback; acquiring input often; having patience to nurture relationships; taking the time needed to build linkages (Ferguson et al., 1992; Billingham and Perkins, 1997; McDonald et al., 1997; Mack et al., 2007); and education (Bennett et al., 1994; Scott, 1999; Ciliska et al., 2005).

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Effective communication and decision-making strategies

Many authors discussed the importance of direct and open communication and decision-making to promote understanding, trust and respect between PH, PC and the community (Lasker and The Committee on Medicine and Public Health, 1997; Welton et al., 1997; Kilduff et al., 1998; Cornell, 1999; Gerrish, 1999; Scott, 1999; Riley et al., 2003; Shirin and Absher, 2006; Asaid and Riley, 2007; Harris et al., 2007; Mack et al., 2007; Wedel et al., 2007). Brief, unscheduled visits were thought by some to overcome the frequently cited barriers of time and scheduling (Larson et al., 2006). Others identified the value of regular monthly meetings for promoting collaboration, enhancing communication and developing trust and mutual understanding (Margolis et al., 2001; Brown, 2006; Mack et al., 2007). Facilitators included attention to process, open, upfront communication about competition and control issues and appreciation of collaborating partners’ various complementary resources, skills and expertise (Lasker and The Committee on Medicine and Public Health, 1997; Cornell, 1999; Michener et al., 2005). Involvement of the whole team was important to develop buy-in and a sense of ownership (Ferguson et al., 1992; Lasker and The Committee on Medicine and Public Health, 1997; Cornell, 1999; Leeds et al., 2000), while consensus building (Cook et al., 2001; Huston et al., 2006; Wedel et al., 2007) and joint planning (Oros et al., 2001) enabled teams to address various health-related activities. Specific strategies to improve communication and decision-making included: giving and receiving feedback (Billingham and Perkins, 1997; Asaid and Riley, 2007; Jackson and Marley, 2007); responding to community-identified needs (Rothman et al., 2005); being mindful of the PC context (Billingham and Perkins, 1997; Cornell, 1999); empowering all team members (Scott, 1999); and letting go of rigid professional boundaries to better meet community needs (Lasker and The Committee on Medicine and Public Health, 1997; Riley et al., 2003; Ciliska et al., 2005).

Markers of successful collaboration

Overall, there was sparse evidence about what marks successful collaboration between PC and PH. Although authors did not specifically discuss indicators, some were surmised from the extractions. Successful collaboration was thought to have occurred when there was: a feeling of being part of the team (Wiles and Robison, 1994); full co-location of the team (Wedel et al., 2007); improvement in health-related outcomes (Porter et al., 2007); reduction in health disparities (Porter et al., 2007); improvement in access to health services (Porter et al., 2007); improvement in health-related knowledge, attitudes and or behaviors (Porter et al., 2007); increased capacity and expertise (Desai et al., 2003); implementation of new collaborative initiatives (Desai et al., 2003); sustained programs (Riley et al., 2003; Wedel et al., 2007); increased understanding of PC (Gillam and Schamroth, 2002); increased community assessment and data collection and analysis skills (Gillam and Schamroth, 2002); increased linkages with other agencies (Gillam and Schamroth, 2002); and improved support for multidisciplinary collaboration and teamwork (Gillam and Schamroth, 2002).

Positive outcomes of collaboration

Our review found that successful collaboration between PC and PH could have different benefits for each partner (Lasker and The Committee on Medicine and Public Health, 1997) and resulted in outcomes for individuals and populations, health professionals and healthcare systems.

Individuals and populations

Health outcomes for individuals and populations can be grouped into three main areas beginning with improvements in chronic disease management (Crump et al., 1999; Record et al., 2000; Desai et al., 2003; Jackson and Marley, 2007; McElmurry et al., 2009), including screening (Gillam et al., 1998; Rothman et al., 2005; Larson et al., 2006) and self-care (McElmurry et al., 2009). Second, there were improvements in communicable disease control (Mayo et al., 1996; Danila et al., 1997; Hripcsak et al., 1999; Hogg et al., 2006a) and immunization rates (Bennett et al., 1994; Crump et al., 1999; Rothman et al., 2005; Larson et al., 2006). Third, improvements were seen in maternal and child health including better birth outcomes (Machala and Miner, 1994), reduced teen pregnancies (Rothman et al., 2005), increased uptake of prenatal care (Rothman et al., 2005), healthier maternal and child lifestyles (Margolis et al., 2001) and reduced child emotional and behavioral problems (Sanders et al., 2008).
Health professionals

Outcomes for health professionals included enhanced educational experiences for students (Mayo et al., 1996; Wilson et al., 2000; Oros et al., 2001) and development of new academic programs (Williams et al., 1999; Roff, 2003). At the practice level, there were improvements in the understanding of PC and PH concepts, areas of responsibility and roles (Cornell, 1999; Headland et al., 2000; Leeds et al., 2000; Cook et al., 2001; Heller et al., 2003; Morgan and Kelly, 2004), team functioning (Gerrish, 1999; Leeds et al., 2000; Andrews, 2002; Riley et al., 2003) and information sharing (Wood et al., 1994; Banks-Smith et al., 2001; Kaufman et al., 2006).

Health service delivery

At the health service delivery level, the most frequent outcome was improved access to care (Ferguson et al., 1992; Lasker and The Committee on Medicine and Public Health, 1997; Lundeen et al., 1997; Leeds et al., 2000; Banks-Smith et al., 2001; Oros et al., 2001; Rothman et al., 2005; Harrison et al., 2006; Kaufman et al., 2006; PHRED, 2006; Shirin and Absher, 2006; McElmurry et al., 2009) and quality of care (Jenkins and Sullivan-Marx, 1994; Wood et al., 1994; Malcolm and Barnett, 1995; Lasker and The Committee on Medicine and Public Health, 1997; Headland et al., 2000; Banks-Smith et al., 2001; Kaufman et al., 2006; Wedel et al., 2007). Other outcomes were improved efficiencies through timelier case reporting and less duplication of care (Malcolm and Barnett, 1995; Hripcsak et al., 1999; Headland et al., 2000; Cook et al., 2001; Margolis et al., 2001; Dion, 2004), enhanced individual patient and community satisfaction (Wood et al., 1994; Leeds et al., 2000; Kearney et al., 2005; Lea et al., 2005; Wedel et al., 2007) and improved continuity and coordination of care (Shandro, 2003; PHRED, 2006; Shirin and Absher, 2006). Care delivery processes were strengthened by an increased focus on health promotion and illness prevention (Lasker and The Committee on Medicine and Public Health, 1997; Banks-Smith et al., 2001; Lemelin et al., 2001; Iliffe and Lenihan, 2003; Riley et al., 2003; Morgan and Kelly, 2004; Kearney et al., 2005) and population health needs (Renfrew et al., 2001; Dion, 2004; Morgan and Kelly, 2004), use of needs assessments in PC (Danila et al., 1997; Lasker and The Committee on Medicine and Public Health, 1997; Jordan et al., 1998; Cornell, 1999; Banks-Smith et al., 2001; Cook et al., 2001; Hurst et al., 2002) and support for quality improvement (Danila et al., 1997; Lasker and The Committee on Medicine and Public Health, 1997; Harrison and Keen, 2002; Hurst et al., 2002; Desai et al., 2003). Cost outcomes included increased funding support and enhanced sustainability as a result of collaboration among formerly competing organizations (Oros et al., 2001; Kaufman et al., 2006; de Guzman, 2007) and efficiencies through resource sharing (Ferguson et al., 1992; Banks-Smith et al., 2001; Cook et al., 2001).

Negative outcomes of collaboration

There were also some negative outcomes and risks associated with collaboration between PC and PH including reservations about the gains to be made given the modest evidence base (Hurst et al., 2002; Stevenson Rowan et al., 2007) and cost (Andrews, 2002). Benefits to individuals and populations were not always realized (Wood et al., 1994; Gillam and Schamroth, 2002) and the extent to which team members felt part of the team varied (Wiles and Robison, 1994; McDonald et al., 1997; Baptiste and Drennan, 1999; Cook et al., 2001). Questions remain about how to provide PH leadership in PC (Brown et al., 2007) and concerns that PH skills might be spread too thinly (Marks and Hunter, 2005). Financial incentives to achieve health promotion targets can conflict with professional philosophies and be demoralizing when they shape practice in a way that shifts care away from local priorities and ignores inequities (Marks and Hunter, 2005).

For PC, the values underpinning collaboration with PH and a community-oriented approach can be at odds especially with traditional medical training (Gillam and Schamroth, 2002; Stevenson Rowan et al., 2007). There is risk too that the time PC providers have for patient care will be diminished as a result of the time needed to collaborate with other professionals (McDonald et al., 1997). For PH, dispersal of PH staff into PC settings can lead to a lack of critical mass, risking erosion of PH expertise (CIHR, 2003). Added to this, there is uncertainty whether collaboration with PC has the potential to address a broad PH agenda and questions about the current capacity of PH organizations to apply PH skills in PC (Heller et al., 2003).
Discussion

The purpose of this scoping literature review was to determine the structures and processes required to build successful collaborations between PH and PC and the outcomes and markers of these collaborations to inform a program of research focused on strengthening PHC through collaboration between these sectors. The review revealed that successful collaboration was thought to have occurred when there were positive systems, organizational or interactional changes. At the system level, collaboration was successful with improvement in health-related outcomes, reduction in health disparities and improvement in access to health services (Porter et al., 2007). At the organizational level, collaboration was successful with a feeling of being part of the team (Wiles and Robison, 1994), full co-location of the team (Wedel et al., 2007), implementation of new collaborative initiatives (Desai et al., 2003) and sustained programs (Riley et al., 2003; Wedel et al., 2007). At the interactional level, collaboration was successful with improvement in health-related knowledge, attitudes and or behaviors (Porter et al., 2007) and increased capacity and expertise (Desai et al., 2003). As such, there is evidence to support collaboration between PC and PH as a strategy to address principles of equity and access in health care and enhance the potential for achieving the goal of ‘health for all’ (WHO, 2008). Attention to the structural and process factors that impede and facilitate collaboration between these sectors is likely to be worthwhile and requires the efforts of policymakers, managers and healthcare providers.

At a systems level, strong leadership from policymakers is needed to create policies that support collaboration, reduce the silos between PC and PH and enable enhanced communication and cooperation within and between levels of government. The use of alternative funding mechanisms to remunerate PC physicians and provide incentive to collaborate with PH was advocated by some authors of articles in our review. However, a recent article reviewing the use of financial incentives to promote PH activities in PC in the United Kingdom found that incentivizing activities may lead to negative health outcomes and further health inequities (Peckham and Hann, 2008). This calls into question whether alternative funding mechanisms necessarily are an enabler of collaboration that will result in improved health for populations. Another major systems level barrier to collaboration between PC and PH is the lack of sustainable funding available to support service providers to participate in collaboration as well as the lack of funding for information systems and evaluation. This is consistent with findings from a narrative review of Comprehensive Primary Health Care in Australia which concluded that for the model to be realized ‘resources will need to be directed beyond individual treatment to population health issues, cross-sector collaboration and consumer participation’ (Hurley et al., 2010: 147).

At an organizational level, managers and senior administrators have a significant role to play in fostering PC and PH collaboration by striving to achieve a unified vision and goals and a shared understanding and valuing of the unique cultures and contributions of both sectors. Leadership is also required at this level particularly with respect to facilitating joint planning between PC and PH and the community. Community participation in health is a principle of PHC that has been difficult to achieve. A recent review of community-oriented PC, an approach developed more than 50 years ago for PC physicians to address community health found that full implementation of the model with community engagement and participation in PC practices was rare (Gavagan, 2008). At the interactional level, our review suggests that service providers within an organization have a key role to play to enable collaboration between PC and PH. Working together to achieve open consistent communication and strong interprofessional relationships with a clear understanding of the roles of PC and PH team members is particularly important. Writing about the Australian experience, McDonald et al. (2009) identify that coordinated and integrated primary and community care is enhanced by interorganizational and interprofessional partnerships.

This scoping review aimed to capture context-free, context-sensitive and colloquial evidence (Culyer and Lomas, 2006) about the structures, processes and outcomes of this collaboration. By casting such a wide net, the results of our initial search strategy yielded many more articles than we had anticipated, a phenomenon we believe occurred because of the overlap in our focus of interest with closely related areas such as community

intervention research, health promotion and community participation. Moreover, it was difficult to discern between collaboration and other similar processes such as cooperation, coordination and integration. This made the review process challenging and resource intensive (Valaitis et al., in press). Many articles described collaborations initiated by universities responding to unmet health needs in a locality through service learning opportunities for students. Our review did not include educational literature and further research should be carried out to understand the training required to enable PC and PH collaboration.

The review provides a broad overview of the characteristics of collaboration between PC and PH. It provides the foundations of a framework from which our ongoing research can develop a more complex understanding of when, where and under what contextual conditions collaboration is effective and when it warrants time and financial resources. Clearly, there are considerable structural and process-based factors impacting collaboration at systemic, organizational and interactional levels. What is less clear is how these factors interrelate and influence one another. Moreover, questions remain as to which factors are necessary but not sufficient for collaboration and which compilation of factors is sufficient to create a successful collaboration. Our review indicates that PC and PH collaborations involve various health professionals practicing in diverse models of care and geographic and social contexts. All of these factors influence PC and PH collaboration. For example, some PC models are likely more enabling of collaboration than others (Lamarche et al., 2003) and in rural settings collaboration may be necessitated by a smaller resource base. Future research should explore these relationships and interactions.

Across countries, most collaboration between PC and PH was initiated and implemented at a local level, reflecting the grass roots nature of innovation and change. Unmet health needs and gaps in health services would undoubtedly be more visible at a local level generating a response by concerned stakeholders. The leadership and risk-taking inherent in local efforts provides a starting point and potential lever for broader change. However, this review shows that it is important for countries and organizations to have policy supports and resources in place to facilitate the development, evaluation and sustainability of collaboration if the impact of collaboration is intended to extend beyond a local level and a reliance on the good will of those involved.

This scoping review includes a large proportion of articles that are descriptive accounts of collaboration. Furthermore, of the 34 articles reporting results from research studies, 75% used qualitative, cross-sectional survey or mixed methods designs. Although these designs limit what can be concluded about the outcomes of collaboration, the benefits of collaboration between PC and PH, particularly in chronic disease management, communicable disease control and maternal child health, cannot be discounted. Just as importantly, potential risks and costs of collaboration for both PC and PH require careful consideration. The conditions and contexts in which potential gains from successful collaborative synergies outweigh associated risks and costs need further exploration.

More primary research and development of theoretical constructs and frameworks are needed to develop the science and inform the practice of successful collaboration between PC and PH. Our ongoing program of research will build on the results of this scoping review by investigating collaboration between PC and PH in the Canadian context, developing a framework and drafting indicators of successful collaboration. It is the first study in a four-year program of research (http://strengthenPHC.mcmaster.ca) that aims to understand how PHC can be strengthened through collaboration between PC and PH, what types of collaboration are best suited for particular contexts, the indicators of collaboration and when collaboration makes the most sense.

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