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.

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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

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 heathcare 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

Table 1 Keywords for electronic database search

Primary care	Population health	Collaboration
Primary health care	Community health	Partnership
Primary healthcare	Public health	Alliance
Comprehensive primary health care	Nurse practitioner	Teamwork
Primary medical care	Advanced practice nurse/ nursing	Affiliation
Community-oriented primary care	Advanced nursing practice	Integration
Medicine	Clinical nurse specialist	Cooperation
Family medicine	Public health nurse/nursing	Communication
Family physician	Community health nurse/ nursing	Coalition
General practitioner		Connection
		Linkage
		Network(s)
Evidence	Best practice	Evaluation
Effectiveness		

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 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

Table 2 Articles included in scoping review listed by first author

Alexy and Elnitsky (1996)	Harris *et al*. (2003)	O'Neil and Clarkson (2002)
Andrews (2002)	Harrison *et al*. (2006)	Olney and Yoon (2007)
Arora *et al*. (2000)	Harrison and Keen (2002)	Oros *et al*. (2001)
Asaid and Riley (2007)	Headland *et al*. (2000)	Pierce *et al*. (2007)
Ayres *et al*. (1996)	Heller and Goldwater (2004)	Porter *et al*. (2007)
Banks-Smith *et al*. (2001)	Heller *et al*. (2003)	Poulton (2000)
Baptiste and Drennan (1999)	Hogg *et al*. (2006a)	Public Health Research Education and Development (PHRED) (2006)
Bennett *et al*. (1994)	Hogg *et al*. (2006b)	Record *et al*. (2000)
Billingham and Perkins (1997)	Hogg and Hanley (2008)	Renfrew *et al*. (2001)
Bindman *et al*. (2001)	Hopayian *et al*. (2005)	Riley *et al*. (2003)
Bourdages *et al*. (2003)	Hripcsak *et al*. (1999)	Roff (2003)
Brauer *et al*. (2006)	Hurst *et al*. (2002)	Rogers *et al*. (1999)
Brown and van Zwanenberg (1989)	Huston *et al*. (2006)	Rothman *et al*. (2005)
Brown (2006)	Iliffe *et al*. (2005)	Russell *et al*. (2003)
Brown *et al*. (2007)	Iliffe and Lenihan (2003)	Sanders *et al*. (2008)
Butler-Jones (2004)	Jackson and Marley (2007)	Scott (1999)
Carlisle *et al*. (2004)	Jenkins and Sullivan-Marx (1994)	Shandro (2003)
Chambers *et al*. (2005)	Jewell and Griffiths (2001)	Shaw *et al*. (2006)
CIHR (2003)	Jordan *et al*. (1998)	Shirin and Absher (2006)
Ciliska *et al*. (1992)	Kaufman *et al*. (2006)	Stephenson Rowan (2007)
Ciliska *et al*. (2005)	Kearney *et al*. (2005)	Taylor *et al*. (2007)
Cook *et al*. (2001)	Kilduff *et al*. (1998)	Thackway *et al*. (2000)
Cook (2000)	Koponen and Kalkas (1997)	The Network (2008)
Cornell (1999)	Lambrew *et al*. (1993)	Thomas *et al*. (1995)
Crump *et al*. (1999)	Larson *et al*. (2006)	Voelker (1994)
Danila *et al*. (1997)	Lasker and The Committee on Medicine and Public Health (1997)	Wedel *et al*. (2007)
de Guzman (2007)		Welton *et al*. (1997)
Desai *et al*. (2003)	Lea *et al*. (2005)	Wiles and Robison (1994)
Dion (2004)	Leeds *et al*. (2000)	Williams *et al*. (1999)
Edmonstone *et al*. (2003)	Lemelin *et al*. (2001)	Wilson *et al*. (2000)
Elster *et al*. (2002)	Lundeen *et al*. (1997)	Wood *et al*. (1994)
Ewles (1999)	Machala and Miner (1994)	Xyrichis and Lowton (2008)
Fatchett (1990)	Mack *et al*. (2007)	
Ferguson *et al*. (1992)	Malcolm and Barnett (1995)	
Ferrari and Rideout (2005)	Margolis *et al*. (2001)	
Fraser (2005)	Marks and Hunter (2005)	
Gerrish (1999)	Mayo *et al*. (1996)	
Gillam *et al*. (1998)	McDonald *et al*. (1997)	
Gillam and Schamroth (2002)	McElmurry *et al*. (2009)	
Harris *et al*. (2007)	Meyrick (2004)	
Harper *et al*. (2000)	Michener *et al*. (2005)	
	Morgan and Kelly (2004)	

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; Billingham and Perkins, 1997;

Figure 1 Activities in Primary Care and Public Health Collaborations

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; Lundeen *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,

2007; Taylor *et al.*, 2007), 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 Schamroth, 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 Schamroth, 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

Figure 2 Factors Influencing Collaboration between Primary Care and Public Health

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

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 heath (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,

2004; Chambers *et al.*, 2005; Rothman *et al.*, 2005). 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).

Knowledge and resource limitations

Resource limitations were the most commonly identified organizational barrier to collaboration and included deficits in human and financial resources, space, team building and change management capacity (Carlisle *et al.*, 2004; Chambers *et al.*, 2005; Brauer *et al.*, 2006; de Guzman, 2007). 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.*, 2003; 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).

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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