

# Public health systems under attack in Canada: Evidence on public health system performance challenges arbitrary reform

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## ABSTRACT

Public health is currently being weakened in several Canadian jurisdictions. Unprecedented and arbitrary cuts to the public health budget in Quebec in 2015 were a striking example of this. In order to support public health leaders and citizens in their capacity to advocate for evidence-informed public health reforms, we propose a knowledge synthesis of elements of public health systems that are significantly associated with improved performance. Research consistently and significantly associates four elements of public health systems with improved productivity: 1) increased financial resources, 2) increased staffing per capita, 3) population size between 50,000 and 500,000, and 4) specific evidence-based organizational and administrative features. Furthermore, increased financial resources and increased staffing per capita are significantly associated with improved population health outcomes. We contend that any effort at optimization of public health systems should at least be guided by these four evidence-informed factors. Canada already has existing capacity in carrying out public health systems and services research. Further advancement of our academic and professional expertise on public health systems will allow Canadian public health jurisdictions to be inspired by the best public health models and become stronger advocates for public health's resources, interventions and outcomes when they need to be celebrated or defended.

**KEY WORDS:** Public health; public health administration; evidence-based practice; public health practice; Canada; Quebec

La traduction du résumé se trouve à la fin de l'article.

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Canadian public health systems have recently been under siege, weakened by budget cuts and attempts to limit their scope of action.<sup>1</sup> A particularly alarming illustration of these attacks has been the draconian 33% budget cuts imposed upon Quebec's regional public health units by the provincial government in 2015, with a stated rationale of optimization in the context of budgetary constraints and alleged inefficiencies. As a result of the cuts, it is estimated that positions for more than 100 public health professionals, including nurses, nutritionists and health surveillance experts, abruptly disappeared in 2015 (personal communication, Dr. David-Martin Milot, President of Jeunes Médecins pour la Santé Publique, November 2015). This is particularly troubling given that Quebec was consistently put forward as the Canadian jurisdiction that had the most solid public health infrastructure and capacity to deliver public health functions.<sup>2–4</sup>

From our perspective as practitioners, we consider that Canadian public health leaders and citizens should be supported in their capacity to challenge arbitrary reforms in public health systems with timely and science-based evidence.

We contend here that any effort at optimization of public health systems should be informed by empirical evidence. We first define public health systems and performance. We then discuss structural elements of public health systems that are associated with improved productivity and efficiency. By summarizing these predictors of performance and communicating them to peers, policy-makers, the media and the general population, we hope to put forward useful metrics against which to assess the pertinence and likely impact of public health systems reforms.

## Public health systems and their performance

The literature on public health system performance has been generated primarily as part of public health systems and services research (PHSSR), the field of study that examines the organization, financing and delivery of public health services within communities and their impact on health.<sup>5</sup> Public health systems are composed of public-sector and non-governmental organizations. Although much PHSSR research had historically been based in the US, PHSSR is gaining strength in Canada, notably through the Core Public Health Functions Research Initiative in British Columbia, which has led to the development of a Canadian PHSSR agenda and to several interprovincial research projects.<sup>5,6</sup>

Improving performance should be a key goal of any public health systems reform. Performance is a multifaceted concept: in Table 1, we adapt Handler and colleagues' public health performance framework<sup>7</sup> in order to summarize elements and dimensions of performance often reported in the PHSSR literature, notably productivity, effectiveness, efficiency and equity.<sup>3,5,6,8–16</sup> *Productivity* is the relationship between structures and resulting

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**Table 1.** Summary of elements and dimensions of public health system performance

Context	Structure	Process	Outcome
Historical and political	<i>Infrastructure</i>	<i>Core functions</i>	Determinants of health
Key public health stakeholders	<ul style="list-style-type: none"> <li>• Administrative and organizational (governance, inter-organizational relationships and partnerships, population size, etc.)</li> <li>• Policy and legislation</li> <li>• Information technology</li> <li>• Physical and technical</li> </ul> <i>Resources</i> <ul style="list-style-type: none"> <li>• Financial</li> <li>• Workforce</li> </ul>	<ul style="list-style-type: none"> <li>• Surveillance and population health assessment</li> <li>• Health promotion</li> <li>• Disease and injury prevention</li> <li>• Health protection</li> <li>• Health emergency management</li> </ul> <i>Interventions</i> <ul style="list-style-type: none"> <li>• Direct services</li> <li>• Mobilization, advocacy and strategic influence</li> <li>• Collaboration and partnerships</li> <li>• Support and expertise</li> </ul>	Health disparities Health status
Performance (productivity, effectiveness, efficiency, equity)			
Structure → Process = <i>Productivity</i> Process → Outcome = <i>Effectiveness</i> Structure → Outcome = <i>Efficiency</i> Process → Outcome (reduced health disparities) = <i>Equity</i>			

processes; *effectiveness* is the relationship between processes and resulting outcomes; *efficiency* links structures and resulting outcomes; and *equity* is the responsibility to dispense public health services within a population in such a way as to reduce health disparities.<sup>17</sup>

### Evidence-informed factors associated with public health system performance

In order to identify the best available evidence on public health system performance, we conducted a scoping review of studies evaluating performance in comparable international public health systems.

The relationships between elements of public health systems and improved processes or outcomes have been analyzed in several empirical studies and systematic reviews.<sup>11–13</sup> Infrastructure-related elements under study have included: population size served by a public health jurisdiction; administrative practices; presence of local boards of health; level of decentralization; and the number and scope of public health organizations within a system. Indicators of financial resources such as public health spending

and funding sources, as well as workforce elements such as staffing per capita and leadership qualifications have also been studied.

Currently, there appears to be sufficient evidence to support a relationship between four structural elements and the performance of public health systems. Increased productivity in public health systems has consistently been associated with: 1) increased financial resources;<sup>11–13</sup> 2) increased staffing per capita;<sup>11–13</sup> 3) a population size between 50,000 and 500,000;<sup>11,13</sup> and 4) specific administrative features with respect to workforce development, leadership, organizational climate and culture, inter-organizational relationships and partnerships, and specific financial processes.<sup>11</sup> Furthermore, two of these elements are significantly associated with improved population health outcomes (efficiency): increased financial resources and increased staffing per capita.<sup>12,13,15,16</sup> These factors are summarized in Table 2.

### Validity and relevance of these four factors

The association between the factors listed in Table 2 and the performance of public health systems has been clearly documented

**Table 2.** Evidence-informed public health system elements associated with improved performance

Structural elements	Impact on performance	Highlights
1. Financial resources • Spending	↑Productivity <sup>11,13</sup> ↑Efficiency <sup>12,13,15,16</sup>	<ul style="list-style-type: none"> <li>• Financial investments in public health have the potential to improve community health<sup>12</sup></li> <li>• 10% increase in local public health spending significantly associated with decreased mortality of between 1.1% and 6.9%<sup>12,16</sup></li> <li>• Increases in local health department expenditures significantly associated with decreased infectious disease morbidity<sup>12,15</sup></li> </ul>
2. Workforce • Staffing per capita	↑Productivity <sup>11,13</sup> ↑Efficiency <sup>12,15</sup>	<ul style="list-style-type: none"> <li>• Local health departments with higher staff per population served perform better on delivering essential public health services<sup>13</sup></li> <li>• Increase in local public health staffing – full-time equivalents per capita – significantly associated with decreased cardiovascular mortality<sup>12,15</sup></li> </ul>
3. Population size	↑Productivity <sup>11,13</sup>	<ul style="list-style-type: none"> <li>• The size of the jurisdiction served by a public health agency is the strongest predictor of performance in delivering essential public health services<sup>13</sup></li> <li>• Optimal population size for a public health jurisdiction: between 50,000 and 500,000<sup>13</sup></li> </ul>
4. Organizational structure • Administrative practices	↑Productivity <sup>11</sup>	<ul style="list-style-type: none"> <li>• Administrative evidence-based practices are associated with increased delivery of essential public health services and are identified in five major domains: workforce development, leadership, organizational climate and culture, inter-organizational relationships and partnerships, and financial processes<sup>11</sup></li> </ul>

in two recent peer-reviewed systematic reviews and one review of reviews.<sup>11-13</sup> These reviews are of good methodological quality and the significant association between the four aforementioned factors and public health performance was measured using appropriate statistical and econometric methods. These factors are also consistently documented in leading peer-reviewed longitudinal studies,<sup>15,16</sup> and PHSSR analyses.<sup>5,10,14</sup>

PHSSR is complex and common limitations may affect these findings. First, a majority of PHSSR performance studies to date are cross-sectional, restricting our ability to draw causal relationship. Second, not all studies explicitly address how they control for confounding factors. For example, the underlying economic wealth of a community can constitute an uncontrolled confounder affecting the analyzed variables: public health structure and health outcomes. This bias has been explicitly controlled for by econometric techniques (instrumental variables method) in a longitudinal study,<sup>16</sup> which established a statistically robust relationship between increased public health spending and decreased mortality.<sup>5,12</sup>

Third, PHSSR is a developing field and relatively few studies analyzing public health system performance are available for review. Literature reviews as well as methodological and conceptual articles greatly outnumber empirical studies, and studies are mostly descriptive rather than analytical. Performance analyses focus more on productivity than efficiency, effectiveness or equity. Most of the PHSSR literature on performance originates in the US and the few international comparisons of public health systems are primarily descriptive, with little data on performance.<sup>3,5,8,9</sup> As a result, our analysis rests on US-based studies because they provide, for now, the best empirical evidence on public health system performance.

Fourth, the literature reported in Table 2 mostly relies on the analysis of only two specific US data sets.<sup>10,12,13</sup> The first database comes from the National Public Health Performance Standards program, developed by the Centers for Disease Control and US national public health organizations. This program regularly surveys public health departments, collecting data on the delivery of essential public health services through self-assessment tools. The second database is the National Association of City and County Health Officials Profile studies, which regularly assesses US local health department infrastructure and activities over time. Interestingly, despite being limited to US settings, these data sources have enabled leading-edge research on public health system performance.

Despite these limitations, we consider that this US-based literature is also relevant to the Canadian context. Indeed, major similarities exist between US and Canadian public health processes and population health outcomes. In terms of processes, the 10 essential public health services measured by the National Performance Standards are comparable to the Canadian core public health functions. Furthermore, multiple parallels can be drawn between leading population health outcomes in Canada and in the US. Hence, despite notable differences between the US and Canadian social determinants of health and public health organizational structures, the four factors identified in Table 2 can be a source of guidance for Canadian public health jurisdictions until PHSSR from Canada can provide more insights into specific predictors of Canadian public health system performance.

## CONCLUSION

We identified limited but convincing evidence to guide the development of more productive and efficient public health systems in Canada. The evidence available from high-quality systematic reviews runs counter to the arguments and actions taken recently in the context of severe austerity measures applied to public health in the province of Quebec. In fact, the available evidence suggests that imposing budgetary constraints and dismantling the public health workforce is unfounded and dangerous: investment in public health has significant and quantifiable impacts in improving population health and well-documented returns on investments. Even if Quebec reportedly had, until the recent round of cuts, the best public health infrastructure and capacity in Canada, there was certainly room for further improvement. We would suggest that inefficiencies in the system should be addressed by recourse to evidence-informed organizational practices,<sup>11</sup> not by indiscriminate and massive destruction of public health infrastructure and capacities.

This commentary aims to enrich the discourse around public health in Canada by proposing a timely and useful knowledge synthesis on public health system performance, relevant to the Canadian context and to current reforms. Our goal is to support public health leaders, decision-makers and concerned citizens with valid and useable evidence as they advocate for judicious reforms in public health systems. Canada already has existing capacity and experience in PHSSR but we need to further advance our collective academic and professional expertise on public health systems.<sup>6</sup> Additional PHSSR and ready-to-use knowledge syntheses will allow Canadian public health jurisdictions to: be inspired by the best public health systems within Canada and abroad; negotiate on solid grounds when undergoing major public health reforms; and become stronger advocates for public health resources, interventions and outcomes when they need to be celebrated or defended.

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## RÉSUMÉ

La santé publique est présentement en voie d'être affaiblie dans plusieurs provinces canadiennes. Les coupes arbitraires imposées au budget de la santé publique au Québec en 2015 en sont un exemple frappant. Afin de soutenir les dirigeants et les citoyens dans leur capacité à plaider en faveur de réformes appuyées par des données probantes, nous dressons ici une synthèse des éléments des systèmes de santé publique qui sont associés à une meilleure performance. Quatre de ces éléments sont associés de façon récurrente et significative à une augmentation de la productivité d'un système de santé publique : 1) des ressources financières accrues, 2) un ratio accru de professionnels de santé publique par habitant, 3) une taille de population desservie entre 50 000 et 500 000 personnes, et 4) des mesures organisationnelles et administratives fondées sur des données probantes. Soulignons que des ressources financières accrues et une augmentation du ratio de professionnels de santé publique par habitant sont significativement associées à des améliorations de la santé de la population. Aussi, toute tentative d'amélioration d'un système de santé publique devrait au moins être guidée par ces quatre éléments probants. Le Canada possède déjà un réseau d'expertise sur les systèmes et services de santé publique. Le renforcement de ce réseau et des expertises professionnelles permettrait aux diverses organisations canadiennes de santé publique de : s'inspirer des meilleurs modèles de pratique; mieux argumenter en faveur de ressources accrues; et mieux présenter nos interventions de santé publique et leurs résultats concrets quand vient le temps de célébrer ou de défendre les acquis.

**MOTS CLÉS :** santé publique; administration de la santé publique; pratique fondée sur des données probantes; pratique de la santé publique; Canada; Québec