Pandemic Protection in Canada:

A Review of Ontario, Québec, and the Federal Government's Framework for Collaboration in Public Health Critical Infrastructure Protection

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Abstract

The subject of this research paper is critical infrastructure protection in Canada in the organizational field of public health (or prevention and protection against pandemics and health crises). This is a topic that has been pervasive throughout history with the many flus, viruses, outbreaks, and pandemics. Today, it remains extremely prevalent, especially with the current fear and spreading of Ebola. This research seeks to analyse the policy coherence of the framework of collaboration used in Canada through a neo-institutional lens looking at the organisational field of public health. Given the clear existence of interdependencies at all levels (communities, cities, institutions, governments, countries); the different sources of vulnerabilities, threats, and expertise; and the historical, political, and institutional context of Canada, this research paper follows the premise that critical infrastructure protection in public health requires a multi-faceted and collaborative approach between the different levels of government. Using this perspective, this research paper takes a methodological and rigorous look at Canada's framework for collaboration in protecting against pandemics. This is accomplished through a comprehensive literature review followed by a review of government documents and grey literature surrounding Canada, Ontario and Québec's approaches. The conclusion of this paper is that there is a clear intent from the governments in Canada to collaborate in order to protect society and critical infrastructure in the event of a pandemic, but that work remains to be done to improve the policy coherency and collaboration. This is evident in the need to arrive at a consistent definition of key concepts, as well as the need to improve collaboration by arriving at clear definitions of roles and responsibilities, establishing communication, and building trust.

1. Introduction

In a broad sense, critical infrastructure protection is a subject that is extremely pertinent to every society and it is a topic that highlights the importance of collaboration among actors. It is not a myth that our cities are increasingly vulnerable to attacks, disasters, and deterioration. Whether it be a long-term problem such as climate change, or something as unforeseeable as pandemics, natural disasters, terrorisme or other manmade catastrophes, societies need to be able to prevent, protect against, recover from, and restore their critical infrastructure promptly in order to remain operational. Tremblay defines critical infrastructure as the resources that are important for the functioning of a country's society and economy (Tremblay, 2011). This research paper will specifically focus on how governments develop strategies and collaborate to protect critical infrastructure against pandemics in the context of Canadian federalism. Public health is listed as one of the ten sectors involved in critical infrastructure in Canada in the National Strategy for Critical Infrastructure (Public Safety, 2014). As such, the public health system will be analysed as an organisational field in the larger domain of critical infrastructure protection. The main research question for this paper is the following: to what extent do the federal government and the provincial governments of Ontario and Québec achieve policy coherence in their framework for collaboration to protect against pandemics? To answer this question, we have formulated two sub-questions: are Ontario, Québec and the federal government consistent in their definitions of the key concepts in critical infrastructure protection? How do Ontario, Québec and the federal government collaborate?

This paper will be organised in three main parts. The first contribution will be a literature review that explores the main concepts and debates that are recurrent in the authors' analyses and conclusions. The second part will provide an overview of the design, including the methodology, conceptual framework, and analytical structure. The third section will be a research/analysis of the framework for collaboration for the protection against pandemics in Canada (between the federal government, Ontario and Québec). This research portion will follow the structure of the literature review and will be designed to address the specific points developed by the authors in the literature review (i.e. do the governments have similar conceptions of what is involved in critical infrastructure protection? How do they collaborate?) In particular, the section will seek to develop an understanding of the extent of policy coherence in the frameworks for collaboration in critical infrastructure protection (specifically against pandemics) that exist between the federal Government of Canada and the provinces of Ontario and Québec.

Part I: Literature Review

2. Literature Review

The following section is a review of the recent literature surrounding critical infrastructure protection, with a focus on public health and Canadian examples. The purpose of this literature review is to bring to light the key questions and areas of analysis that the authors in the field discuss in order to provide a background and orientation for the analytical part of this research paper.

'Disaster' or 'risk management' are terms that are generally easily understood. It is clear that societies are constantly affected by large unforeseeable disasters, whether they are natural or manmade. Large and catastrophic events, especially when they are unforeseeable, are difficult to plan for, learn from, prepare for, and protect against (Cox, 2012:1919). These events are clearly explained and often used as case studies in research studying critical infrastructure. Examples of this are the SARS outbreak (Johnson *et al*, 2005); Hurricane Katrina (Leavitt and Kiefer, 2006; Comfort and Haase, 2006); and the influenza outbreak (French and Raymond, 2009:824). This literature review will describe and contextualize the concepts and challenges of critical infrastructure protection. This will be done by first looking at how the key concepts in critical infrastructure protection are defined and second by looking at how the authors discuss collaboration.

2.1 Critical Infrastructure Protection Concepts and Terms

After an extensive review of the literature, we have identified five concepts that are central to the study of critical infrastructure (critical infrastructure, critical infrastructure protection, resilience, vulnerabilities, and interdependency). These concepts are used countless times by both the authors and the critical infrastructure actors and stakeholders. However, what emerges is that often these terms have different meanings for the various actors involved in critical infrastructure protection, a phenomenon that has an effect on the ability of the actors to align their efforts with each other.

The authors frequently mention the fact that the different actors and stakeholders in critical infrastructure protection use the key concepts (critical infrastructure, critical infrastructure protection, resilience, vulnerability, and interdependency) to frame their actions, but without clearly defining what these terms encompass. What results is a situation where different actors use similar words, but have a different conception of what the terms mean, and therefore act differently. To counter this situation, the authors advocate arriving at similitude or consensus on these terms: they state that in order to create a successful framework for collaboration, it is important to clarify common definitions. Bossong states, for example, that when there is ambiguity, there cannot be any effective action (Bossong, 2013:216).

To provide an example of a situation where lack of consensus around key concepts hinders action, Caruson and MacManus describe the situation in which institutions face pressure when they must act efficiently and effectively in everyday operations whilst simultaneously being able to respond adequately in the event of a disaster (Caruson and MacManus, 2011:347). One way to offset this pressure would be to produce more research and analysis. Vulnerability analyses and assessments, in particular, would help to alleviate this task (Caruson and MacManus, 2011:347; Wall and Marzall, 2006:377). However, the authors discuss that it is hard to produce these analyses without a clear definition and consensus on what vulnerabilities are. This remains a challenge for the actors collaborating in critical infrastructure protection. The lesson here is that it is important for actors to clarify this term first before proceeding to use it and act on it (Caruson and MacManus, 2011:347-348).

The brief example of the need for vulnerability analyses (prefaced by the need for a clear definition of what 'vulnerability' means) shows that in order for governments to take action and to work together, they must first clearly define and reach consensus on what the key concepts encompass. Essentially, necessary co-operations between systems and actors cannot be established without a clear definition of *what* has to be done, by *whom*, and *how*. Many of the authors agree here that the various concepts and vocabularies involved in emergency management/critical infrastructure protection are very fluid: the definitions vary based on the institution/region. This section will be helpful to understanding the debates and consensus around what each term encompasses.

2.2.1 Critical Infrastructure

The notion of critical infrastructure (CI) has varying definitions and meanings (Leavitt and Kiefer, 2006:308). Generally, it is described as an asset, system, or a part thereof that is essential in order to maintain vital societal functions (health, safety, security, and well-being). It can cross political boundaries and may be manmade or natural (Leavitt and Kiefer, 2006:308; Bossong, 2013:215). The destruction/disruption of CI would therefore have a significant impact on the society (Bossong, 2013:215). However, it is clear that CI is a term that is often used without a clear definition (Gallard, 2010:7). This is in part due to the fact that CI was imposed as a new term in order to formulate many questions that are addressed to industrialized countries (Gallard, 2010:12). Because of the broadness and ambiguity of the term, various countries and entities have created their own definitions of CI depending on spatial and temporal factors (Gallard, 2010:9). The Department of Homeland Security, for instance, has divided critical infrastructure into specific sectors (i.e. Information Technology, Energy, etc.) (Hardenbrook, 2005:3). Public Safety and Emergency Preparedness Canada has also identified specific sectors, which are different from the sectors identified by the United States, (transportation,

manufacturing, safety, water, food, government, energy and utilities, communications and IT, and health care). The Canadian critical infrastructure sectors are structured in a National Cross-Sector Forum that includes governmental and private sector members (Quigley, 2013:146).

2.2.2 Critical Infrastructure Protection

Contemporary critical infrastructure protection (CIP) began in the 1990s with the new thinking on globalisation and terrorism (Bossong, 2013:211). This relatively new field of study is marked by many questions. One question, for instance, is over ethical concerns: to what extent should the state intervene and enact protective measures, and how much should liberties and freedoms be compromised in this aim? (French and Raymond, 2009:825). In general, CIP is marked by unproductive investments into 'partnerships' (interdependencies) that have varying levels of success. These investments are aimed at implementing policy frameworks that focus on robustness and safety (Bossong, 2013:211). However, these investments cannot be successful without a clear definition of what CIP means.

To contrast with the term critical infrastructure protection, Hardenbrook prefers to write about "critical infrastructure security," as for him, the term 'protection' limits the concept of a more comprehensive strategy (2005:2). As well, Hardenbrook refers to the fact that security must go beyond physical protection and must include planning, policy development, and understanding of the threats that can occur (2005:10).

2.2.3 Resilience

Resilience is a concept that has multiple definitions. Godschalk, for instance, states that resilient systems are redundant (so the system does not fail), diverse, efficient, autonomous, strong, interdependent, adaptable, and collaborative (2003:139). But what does *resilience* actually mean and how can it be achieved? Davoudi provides a particularly elucidating view of three possible rationalisations of resilience. First, she explains her fear that resilience is becoming another *buzzword* that replaces sustainability. In the case of resilience, it is clear that there is a lack of consensus over what it means (Davoudi, 2012:299). Resilience can be operationalized as a concept in three key ways. Davoudi explains that *engineering resilience* involves thinking of resilience as a return back to equilibrium after disturbance. *Ecological resilience* means assessing the magnitude of the event that the system can absorb before it changes. *Evolutionary resilience* provides a study of the flexibility of a system to not only react to the event, but also positively change and adapt after the event (Davoudi, 2012:300-302). This concept of evolutionary resilience is interesting methodologically as it involves a scientific paradigm shift (thinking that the world is chaotic, complex, unpredictable, and constantly changing vs. thinking that the world is predictable). As well, evolutionary resilience challenges the equilibrium and implies that the very nature of the system may change over time regardless of the existence (or not) of an event. This means that resilience is

no longer a reactive goal of returning back to normality, but rather, resilience is the ability and capacity of systems to transform and adapt in response (Davoudi, 2012:202).

This view also implies a dramatic change in the structure of systems and a departure from typical hierarchical, predictable models. Instead, this flexible view implies that when systems mature, resilience actually reduces (based on the rigid structures), but that when systems collapse due to a shock, a window of opportunity opens for a new, supple system to be created to replace the old one (Davoudi, 2012:303).

Most authors do not take into account Davoudi's various approaches to resilience. Instead, they employ a simple, versatile definition of resilience that changes depending on the situation (Fünfgeld and McEvoy, 2012:326). Generally, authors agree that resilience is the capacity of the system to withstand shocks without failure (Boyle, 2012:351). When thinking about the ability of a system to respond to/react to risks and crises, it is necessary to first clarify whether this involves simply surviving or whether it means being flexible enough to continue functioning well. Furthermore, it is necessary to *define* the various risks and types of events that could endanger a society (Boyle, 2012:351). These two questions necessarily have to be answered when thinking about precautionary planning/contingency and response planning (Boyle, 2012:352).

The lack of clarity in defining resilience implies that there are limitations in our ability to understand and forecast behaviours of systems during catastrophic events (Fünfgeld and McEvoy, 2012:328). In reaction, Shaw advocates a reframing of resilience in order to identify the various values and political choices that shape how we approach resilience (2012:308). This involves a reassessment of resilience and a new methodology and framework for analysing how social-ecological systems approach managing resilience (Haider *et al.* 2012:313). Vastveit, Eriksson, and Nja help us to begin thinking about risk analysis and its functions by identifying three rationalities: instrumental, communicative, and power rationalities (2014:444-445).

2.2.4 Vulnerabilities

A recurring theory among authors is that societies become more vulnerable when they are more advanced (Bossong, 2013:211). In particular, metropolitan areas – given their density, fragmented and diverse population, and economic disparities – are sites of increased vulnerability (Caruson and MacManus, 2011:350). However, it is hard to find consensus over the definitions of threats and vulnerabilities. This is particularly evident when even officials from the same jurisdiction cannot arrive at a clear consensus over what constitutes vulnerability (Caruson and MacManus, 2011:366).

In response, some authors describe vulnerability mapping, which is the conceptualising or visualization of cities/societies as sites of vulnerabilities (Boyle, 2012:356). Again, this necessitates a clarification: does the

exercise involve identifying specific risks and their effects or simple identifying *vulnerable* segments of a society? It is hard to identify and think about vulnerabilities without first breaking them down into specific points of vulnerability (Godschalk, 2003:137). LaPorte, in particular, is one of the only authors to go so far as to identify the increasingly destructive capacities of various local and regional levels within a global distribution system, and the rise and maturity of widespread adversaries that harbour deep resentment against Western culture, economics, and political institutions as sources of threats (2007:61).

2.2.5 Interdependency

Finally, interdependency is another fundamental concept associated with critical infrastructure, as it not only is a key characteristic of modern societies, but it brings a need for societies and governments to collaborate with each other. The authors discuss the various types/sources of interdependency, which are often cross-regional in nature (Bossong, 2013:211). LaPorte describes that technical, economic, and social infrastructure networks and communities are all very dense, interdependent, and geographically dispersed. The networks involved in this interdependence become very fragile because they rely upon each other in any event or crisis (LaPorte 2007:61; Boyle, 2010:353). A pointed example would be the effects of pandemics that are not stopped or limited to a region demarcated by borders (Johnson *et al.* 2005:412).

2.2.5.1 Types/levels of interdependencies

There are various types and levels of interdependencies between actors. Disasters and catastrophic events (with the exception of cyber-events) most often affect *places.* Places are complex, interconnected socio-spatial systems (Davoudi, 2012:304). Cities are a key example of '*places,'* as they are complex, interdependent systems (Godschalk, 2003:136). Within cities, there are also various communities with their own challenges and complexity within their interactions (Murphy, 2007:301). Furthermore, there is interdependency between different levels of government or institutions; between governments and the private sector; and even between countries (Hardenbrook, 2005:7; 9; Rudner, 2009:776; Quigley, 2013:145). These interdependencies can have economical or physical origins (Hardenbrook, 2005:7; 9).

2.2.5.2 Critical infrastructure interdependencies

Importantly, there are also several types of critical infrastructure interdependencies. Some of these types are physical (products/services produced by one region and then used by another), cyber (electronic connections), and geographic (common areas between regions) (Hardenbrook, 2005:3). Interdependence in infrastructure systems is a key element of modern society (Barker and Little, 2006:1). An important feature of critical infrastructure is that it is often privately owned (Quigley, 2013:143; Rudner, 2009:784). Private sector ownership of critical infrastructure then becomes an important area of study in critical infrastructure protection,

as there are often challenges within public-private collaboration (Quigley, 2013:143). This collaboration will be described in a later section of this literature review.

2.2.5.3 The challenge of interdependency

Finally, interdependence can be mobilised through collaboration as a *tool* for protecting societies (Santella *et al,* 2009:410; Baker and Little, 2006:1). However, more often than not, the complex, humanistic nature of organisations leads to viewing interdependency as a *problem* rather than a *solution.* Because systems are connected and rely upon each other, there is often confusion surrounding the jurisdictional division of roles and responsibilities. This confusion can sometimes be attributed to interagency animosity, which must be addressed in order to attempt effective coordination (Boyle, 2012:360). Quigley makes an important point that often policymaking refers to 'partnerships', but that those 'partnerships' are in fact nothing more than interdependencies (2013:149). Nevertheless, it is clear that an interdisciplinary and coordinated approach is crucial to addressing the problems of critical infrastructure protection (Baker and Little, 2006:9).

2.3 Collaboration and Interdependency

The concept and existence of interdependency brings about the necessity for collaboration between the various actors and stakeholders in critical infrastructure protection. As was mentioned earlier, without first clearly describing and finding consensus surrounding the concepts mentioned above, it is hard to envision a concrete method of collaboration. This is exacerbated by the fact that there is a plurality of actors and systems that are key to any framework of collaboration. It is clear that the different actors need to devise capacities to act upon what can be imagined and must create institutional capacities for catastrophic surprises (LaPorte, 2007:62). Resilience, as fluid as the term is, emphasizes the need for coordination. The lack of coordination between agencies is often viewed as the factor that worsens the impact of disruptive events (Boyle, 2012:360). The authors have differing views on who the different actors are, what their roles should be, and how the collaboration should take place.

2.3.1 How to collaborate?

As a method for achieving collaboration, Boyle speaks about setting out a common task-based organizational structure that defines the roles and responsibilities of each actor in order to facilitate coordination (2012:361). Caruson and MacManus describe that it is important to successfully establish a clear definition of the roles and responsibilities involved in CIP (2011:349). After establishing a definition of the roles and responsibilities, it is important to create frameworks of action with specific policy tools and instruments in order to achieve the goals of CIP (Champagne, 2013:45). These frameworks should be aimed towards adaptive

capacity at different scales in order to mobilise resources in the most effective way possible (Wall and Marzall, 2006:378-379). Furthermore, drawing on Davoudi's notion of evolutionary resilience, it is necessary to build flexible and adaptable definitions of boundaries in order to be able to enact flexible management and for systems to be able to cope with external pressures. Interactions between spatial and ecological scales and complex structures need to be flexible in order to deal with the complexity (Haider *et al.* 2013, 316-317; Hardenbrook, 2005:8). Cooperative thinking should be interdisciplinary and focus on communication, team building, and problem-solving (Barker and Little, 2006:2). Hardenbrook advocates creating intermediary agencies, and planning on a regional level to address the problem of coordination (2005:11, 15).

Finally, in contrast to all of the other authors, LaPorte argues that institutional leaders have two important tasks in facilitating effective CIP: spreading fear and preparing communities to accept collective suffering (LaPorte, 2007:63).

2.3.2 Inter-governmental and intra-governmental collaboration

Regardless of *how* collaboration is achieved, it is important to determine the important actors. One view is that emergency management/CIP requires inter-governmental as well as intra-governmental collaboration (French and Raymond, 2009:824; Caruson and MacManus, 2011:366; Leavitt and Kiefer, 2006:312). Despite Davoudi's discussion about the departure from typical bureaucratic hierarchical models and structures, Bossong argues that there needs to be a Weberian model of rules, coordination, and regulation between the public sector and the private sector in order to achieve efficient and effective protection (2013:212-213).

Bossong speaks about 'meta-governing', which involves steering actors multiple sectors or political divides (2013:210). Meta-governing is very similar to the term "multilevel governance" used to describe the interactions and relationships between the various levels of government (Champagne, 2013:45). The Government of Canada, in particular, has three types of frameworks for sharing the responsibility of CIP: tax sharing/reduction programs; financing between all three levels of government; or public-private partnerships (PPPs) (Champagne, 2013, 53-56).

There are key challenges in inter- and intra-governmental collaboration. For instance, political changes and power structures can greatly affect the life and success of cooperative programs (Champagne, 2013:44). The lack of trust between organisations is also a problem. Although there is a key necessity for collaboration between governments, states are reluctant to allow for a cross-sector authoritative role to a supra-governmental entity like the European Union. This is indicative of a lack of trust and a perception of legitimacy (Bossong, 2013:220). As well, it is difficult to create/implement infrastructure across organisations and across

jurisdictions because of technical or organisational constraints (Comfort and Haase, 2006:330). It is also a challenge to coordinate between organisations when there is so much overlap in jurisdictions (Hardenbrook, 2005:11). Fundamentally, there is a lack of agreement on the division of roles and responsibilities of different levels of government. It is not clear *who pays* and *who provides* (Leuprecht and Hataley, 2013:178).

Finally, it is clear that there is a gap between the resilience advocated in literature and the resilience articulated in political discourse (Haider *et al.* 2013:318). The application of a coherent resilience framework is not without problems. As with all other organisations and power structures, there is a danger of these frameworks being used by self-reliant individuals that wish to increase their own resilience over others (Shaw, 2013:310).

2.3.3 Collaboration with local governments and communities

Many governmental agencies work directly together with organisations and community networks (Bradford and Chouinard, 2010:52). After September 11, 2001, many mandates were given to municipalities to deal with security issues, but without clear provision of financing or resources (Leuprecht and Hataley, 2013:178). In Canada, the security systems are flexible but centralised, so they are well equipped to work with community organisations. However, constitutionally, municipalities do not have a clearly defined field of action (Leuprecht and Hataley, 2013:177). If governments are to work together with communities, they need to clearly define the roles and responsibilities and the resources used towards the collaboration. Working together with communities achieves a dual purpose: reaching out to marginalized residents and creating a contextual knowledge base by mobilising the networks that have local and contextual knowledge. In theory, this sounds ideal. However, in practice, the top-down nature of federal and provincial governments does not align well with the bottom-up nature of community organisations (Bradford and Chouinard, 2010:54; Bradshaw, 20013:139). Trying to create a framework for action between the federal and provincial governments and communities would involve a complete realignment or restructuration (Bradford and Chouinard, 2010:71).

As well, there is a debate surrounding the credibility and capacity of communities as important actors in CIP (Bradshaw, 2003:138). Some authors argue that communities within municipalities have key information and social capital that can be mobilised in CIP (Murphy, 2007:298). However, communities within a municipality are numerous, interdependent, and complex (Murphy, 2007:298). Although information can be dispersed very quickly through community lines, there is not necessarily any cohesion between groups that often prioritize working by themselves and withholding information from others (Murphy, 2007: 301-303).

Furthermore, the priorities of a community or municipality can depend on many factors. For instance, Bradshaw analyses the disastrous decisions of the Swan Hills community in Alberta. The residents of Swan Hills made decisions that negatively affected the environment, but that benefitted them financially. However, most of the residents (besides the Aboriginal population) were only transiently living in the community in the first place (before moving away after benefitting economically) (Bradshaw, 2003:141). As well, there are various power influences and relations within communities, and these can be especially evident within the decisions that the municipalities make (Bradshaw, 2003:141). There are many assumptions about the 'tight knit' nature of communities and their contextual capacity. However, do the communities actually have the capacities for enacting appropriate CIP? Do they really have any legitimacy? There are practical challenges that as managers, community members might not be able to face, and the disparity in wealth and resources of different communities might also be a key variable in the provision of their public services (Bradshaw, 2003:144). Governments cannot simply download the responsibilities on the communities and leave them to 'fend for themselves' (Shaw, 2013:311). First, they must make sure that the communities have the credibility and capacity to enact decision-making and action (Bradshaw, 2003:148).

2.3.4 Collaboration with the private sector

The role of the private sector in CIP is clear because of private ownership (Galland, 2010:7; Hardenbrook, 2005:3; Quigley, 2013:143), but there are many contentions over the outcomes of public-private-partnerships (PPPs). It is hard to envision collaboration with the private sector and this is clear in the current lack of any well-defined strategy (Hardenbrook, 2005:6). The main question is *how to enact* partnerships, especially given the divergent natures of the public and private sectors (Quigley, 2013:16). The authors agree on the fact that the private sector necessarily must be involved in CIP, as many infrastructures are the property of the private sector (Bossong, 2013:211). However, the authors warn of the latent effects of private-public partnerships and agreements, especially in the fact that fundamentally, the public sector aims to fulfill private interests over the public good (Warner, 2010:145). Furthermore, a trust-related challenge on the side of the private sector is evident when it comes to governments' willingness to disclose sensitive information about their vulnerabilities (Hardenbrook, 2005:10).

2.3.5 Essential Elements for Collaboration

Finally, the authors make reference to four essential elements for collaboration in critical infrastructure protection. These "essential elements" (as we will refer to them in this research paper) have been derived from our understanding of the recurring recommendations and findings found in the literature on critical infrastructure protection. Given the fact that these elements were outlined multiple times by the authors, we

consider that these elements are essential in order for a framework of collaboration in critical infrastructure protection to be successful. This section provides an explanation of these elements, along with references to the authors that have mentioned these points. These essential elements will create a bridge between the literature review section and the research on the framework of collaboration in public health in Canada. We will discuss how these essential elements emerge in Ontario, Québec and the federal government in the last analytical section of this paper.

2.3.5.1 Reactive vs. proactive thinking

Many of the studies and current perceptions of CIP involve reactive thinking rather than proactive thinking (i.e. *survival thinking* vs. *thinking for life*) (Shaw, 2012:309; Hardenbrook, 2005:1; Massie, 2009:508; Rudner, 2009:795). It has been mentioned before that although proactive CIP might lead to a negotiation of civil liberties, reacting after the event only limits the effectiveness of the response. Godschalk explains that perhaps we should be thinking and creating flexible systems and that are not just reactive systems (Godschalk, 2003:137). This proactive thinking needs to be a focus of future studies and literature, because pre-emptive action with the absence of evidence of a threat can be destructive in and of itself, and can lead to less legitimacy and trust. Similarly, aggressive prevention is not desirable, because of the limitations of knowledge as a capacity to act. Instead, there should be a focus on contingency planning to manage uncertainty (Boyle, 2012:352-354). Staging exercises are important: they facilitate critical thinking and envision possibilities in order to be able to effectively deal with an uncertain future. This does not involve predictions, but rather, producing knowledge about unknown events (Boyle, 2012:358). As such, there needs to be a balance between preparing for the unknown and preparing for the known (Boyle, 2012:359; Leavitt and Kiefer, 2006:313). Proactive thinking enhances readiness to handle future crises through analysis and research that increase situational awareness (Boyle, 2012:364). However, as Davoudi explains, forming creative and flexible structures that can think proactively implies a dismantling of traditional systems and structures (Davoudi, 2012:304).

2.3.5.2 Increasing capacities

In order to promote better CIP, it is important to increase the currently limited institutional capacities when it comes to planning and acting (LaPorte, 2007:61). There is a clear lack of technical competence and a lack of understanding of critical infrastructures and the interdependencies that are inherent across boundaries (Leavitt and Kiefer, 2006:311). In particular, it is important to think about the role and to build the capacity of local governments (Warner, 2010:146). Thinking about local capacities includes focusing on community leadership and defining responsibilities, capabilities and resources (French and Raymond, 2009:827).

Evaluations can be an important tool in increasing capacity building and strategic learning (Bradford and Chouinard, 2010:56).

2.3.5.3 The importance of communication

Feedback and communication are key features of successful CIP (LaPorte, 2007:61). Communication reinforces institutional structures and promotes a culture of collaboration and trust interpersonally and between agencies (Boyle, 2012:360-361). For instance, common knowledge is a tool that is important to good collaboration, but effective communication of common knowledge relies on building trust (Comfort and Haase, 2006:330). There is currently asymmetry in the communications processes between the organisations that work together in emergency response. This asymmetry and disruption limits organisations' capacities to anticipate events and needs. Therefore, it is important to establish an infrastructure of communication between the entities before the event occurs in order to strengthen the capacity for organisation and collaboration before, during, and after the fact (Comfort and Haase, 2006:339).

2.3.5.4 Building trust

It was clear in many of the texts that trust is a great barrier to the systems of collaboration and action. In order to effectively cooperate, it is important to establish trust. Trust building in collaboration is currently under developed (Quigley, 2013:144). Any lack of trust poses direct problems to CIP, as was evident in the lack of coordination during the events that took place during the SARS breakout (Leuprecht and Hataley, 2013:177). Trust is especially important in the collaborations between the public and private sector (Hardenbrook, 2005:6). There is a lack of coherence between the governmental institutions that want information about vulnerabilities and the private sector that is reluctant to disclose confidential information, and this poses a direct threat to any sort of collaboration (Quigley, 2013:147). Furthermore, it is evident that the population has less and less trust in the government generally (Quigley, 2013:150). In order to advance and create appropriate and effective systems, decision makers need to think about the importance of building trust between organisations.

2.4 Conclusion

To conclude, this literature review revealed many important aspects and limitations of the current elaboration of CIP. It is clear that critical infrastructure protection – especially in the organisational field of public health – is an important field of study. It is also clear, however, that there are many challenges and inconsistencies in the current thinking and policymaking. First, the literature reveals that although *security* and *protection* and words that are often used and that are very relatable, there is little clarity in the actual definition and operationalization of CIP concepts between actors/institutions (these include critical infrastructure, critical

infrastructure protection, resilience, vulnerability, and interdependence). As well, although collaboration is incredibly important given the trans-boundary nature of disasters, their effects, and the actors involved, there is little to no clear consensus on the scope or methods involved in collaboration. There are similarly many debates over the role of the private sector and the role of local level government and communities. Finally, the literature about CIP provides us with essential elements that are necessary for any successful framework of collaboration in critical infrastructure protection. These elements include espousing *proactive* rather than *reactive* thinking, acting on the need for increasing capacities, and understanding the importance of communication and trust. Much work remains to be done – both academically and in policymaking – to refine and reach consensus on the important concepts and to improve collaboration by acting on the essential elements for collaboration.

This research paper will analyse if the federal government and the provinces of Ontario and Québec define these elements similarly, and whether there are established methods of collaboration put in place in order to achieve policy coherency. As such, the first objective of this research paper is to discover how the federal government and the provincial governments of Ontario and Québec articulate their conceptions of critical infrastructure, critical infrastructure protection, resilience, vulnerabilities, and interdependence where it concerns pandemics. After an exploratory look at the cognitive coherency between the federal government's and provincial governments' definitions of these concepts, this research paper will explore how the governments work together by first examining the division of roles and responsibilities, then by looking at the collaborative instruments in place, and finally by discussing how the governments meet the four essential elements for collaboration that were explored above (s. 2.3.5 Essential Elements for Collaboration).

Part II: Research Design

3. Theoretical and conceptual framework

The literature review section of this paper illuminated certain necessities and challenges in critical infrastructure protection. This research paper will use the theory of neo-institutionalism as a theoretical basis and multi-level governance and policy coherence as a key concepts in order to analyse the level of collaboration and coherence (to what extent the policies/activities of the governments are harmonized or absent of contradictions) achieved by the federal government and the provincial governments of Ontario and Québec in prevention and protection against pandemics. The main research question for this paper will explore to what extent the framework for collaboration between the federal government and the provincial governments of Ontario and Québec achieves policy coherence in public health.

3.1 Theoretical premise

In this research paper, the term "framework for collaboration" refers to the methods and tools used to facilitate a collaborative approach between multitudes of actors vertically and horizontally within public organisations. The literature review section of this research paper demonstrated the complexity and necessity for interdependence. In particular, interdependence is important in this study because of the cross-boundary nature of pandemics. Therefore, an effective strategy at protecting and reacting to these outbreaks involves the federal level, the provincial level, cities, communities, non-profit organizations and the public sector. When analyzing policy coherency of the framework for collaboration used in Canada (specifically in the federal government, Ontario, and Québec), we find it important to first see if the governments arrive at similar definitions of the key concepts, and second to examine their methods of collaboration.

3.1.2 Neo-institutionalism and organisational fields

The theory of neo-institutionalism is particularly useful in analyzing the methods of collaboration and policy development to deal with pandemics. It would allow for an analysis that takes into account the weight and bearing of the historical division of powers at Constitution and a consideration of the rules, structures, constraints, and resources of the institutions that shape how decisions are made and how collaboration can be facilitated or disabled, especially with a view to taking into account different interests and political legacies (Howlett et al., 2009:43-44). Andre Lecours also speaks to the fact that neo-institutionalism (or new institutionalism) takes into account the fact that institutions are bearers of ideas and interests. These ideas and interests are especially manifest in policy making and decision making that flows out of a certain institutions (Lecours, 2005:34-37). Neo-institutionalism will be used as a background in this paper to lend credence to the fact that institutions are not mere constructions. They are interest-bound organisations, with actions and

interactions that are imbued with their own particular interests, purposes, and meanings, shaped by deeply rooted rules, norms, and ideologies. As such, it is highly important to look at how these institutions codify meaning in order to understand their outputs and policies as bearers of meaning within their interactions with each other. Because of the historical, constitutional, and political differences between the relationships of the province of Québec to the federal government and the province of Ontario to the federal government, the theory of neo-institutionalism will provide an interesting and comparative light on how these public institutions define and act upon their interpretations of public health in relation to each other. In this paper, the argument is for a streamlined and collaborative approach in line with multi-level governance, since the nature of pandemics is cross-boundary.

Additionally, the research section on collaboration will list the policy instruments used to facilitate collaboration between the governments. A study of policy instruments can be useful to enhancing our understanding of institutions as bearers of meanings. Policy instruments are the techniques, methods and tools chosen and used by governments in order to operationalise their policies (Lascoumes et Le Galès, 2007:3). Hood and Lascoumes and le Galès describe that policy instruments are not neutral: they are imbued with the meaning-making capacities of institutions and are useful indicators of political relationships and institutional ideologies (Hood, 2007:137; Lascoumes et le Galès, 2004:21).

Furthermore, this paper looks specifically at critical infrastructure protection at the public health level (protecting against pandemics). Paul DiMaggio and Walter Powell's concept of organisational fields is useful to use in this paper, since the focus is on one specific sector of Canadian critical infrastructure. An organisational field is an aggregate of key suppliers, resources, consumers, regulatory agencies, and other important actors and stakeholders involved in producing a similar service or product. Therefore, it is not simply an ensemble of competing firms or a network of organisations that interact, but rather the totality of relevant actors within a certain area or domain of institutional life. The structure of an organisational field must be defined based on empirical investigation, and fields only exist to the extent that they have been institutionally defined or "structured." Defining or structuring an institutional field is made of four parts: an increase in the extent of interaction between the organisations and actors; defined inter-organisational structures of domination and patterns of coalition; an increase in the information load that the actors in the field must navigate and use; and a mutual awareness among the participants in the organisational field that they are involved in a common enterprise (DiMaggio and Powell, 1983:148; Huault, 2009:3). The concept of organisational fields allows for the role of the actors to be considered in tandem with the importance of the context (historical, political, economic, etc.) in order to study the organisational behaviour and provide a more mesoscopic analysis by creating a bridge

between the roles of the individuals/organisations and the context (Huault, 2009:3). The construction of organisational fields can be viewed as a cultural phenomenon involving pre-existing social practices; roles within an established dynamic of power relations between groups; and cognitive structures that form a cultural frame. These three elements operate within a certain context. As such, within an organisational field, not only are the systems of power important, but also all of the positions occupied by the various actors within the cultural frames, since the organisational field is a critical unit that bridges the organisational and societal levels in the study of a certain field (Machado-da-Silva; Filho & Rossoni, 2006:33-37). Both the actors and the context are important units of analysis, making the concept of organisational fields key to the theoretical framework.

Public Safety Canada, the Ontario Ministry of Community Safety and Correctional Services, and Sécurité publique Québec all list public health as one component of critical infrastructure (Ontario Ministry of Community Safety & Correctional Services, 2012; Public Safety Canada, 2014; Sécurité publique Québec, 2010). Public Safety Canada states that Canada's critical infrastructure is interconnected and that partnerships are required between government and critical infrastructure stakeholders. Public Safety Canada also states the need to work with these partners to manage risks, reduce vulnerabilities, and strengthen the resilience of critical infrastructure: all concepts that will be analysed in this research paper (2014). This paper will consider *public health* as an organisational field within which a plethora of actors, stakeholders, and service providers must act cooperatively, given their interests, resources and constraints, within the institutional and social Canadian context. Public health is a shared responsibility in Canada that requires coordination between all of the levels of government. Partnerships are extremely important to allow Canada to increase its capacity and prepare adequately (Public Health Agency of Canada, 2012; Emergency Management Policy Directorate, 2011). For the federal government of Canada, critical infrastructure refers to "the processes, systems, facilities, technologies, networks, assets and services essential to the health, safety, security or economic well-being of Canadians and the effective functioning of government" (Public Safety, 2014). The organisational field of public health incorporates all of the social and physical systems needed to protect against a sudden outbreak that can threaten the functioning of Canadian societies.

3.1.4 Policy Coherence

Furthermore, the concept of policy coherence is important in the context of this research. Ultimately, this paper seeks to understand whether, given the necessity of collaboration between all of the critical infrastructure stakeholders, the concept definitions, policies and methods of collaboration developed by the federal government and the provincial governments of Québec and Ontario are coherent. Jean-François Savard describes policy coherence as the harmonization, or at least the absence of contradictions, between the diverse

objectives of a policy and the activities designed to achieve those objectives. Furthermore, he describes that in order to achieve policy coherence, the policies adopted by an institution should not be hampered by other activities by the same institution or by other governments or institutions (Savard, 2010:313). This paper will examine whether the actions of the federal government and the provincial governments of Ontario and Québec achieve policy coherence in their actions and methods of collaboration in what concerns protection against pandemics.

3.1.5 Multi-level Governance

Finally, multi-level governance is a key term that is instrumental to explaining the methods of collaboration between the different governmental organizations and their non-governmental partner organizations and entities. The relatively new concept of multi-level governance is important to our study. It helps to explain that in the context of complex relationships, divisions of power, and financing between the federal government and the provinces of Ontario and Québec, policy development and implementation requires collaboration between the federal, provincial, municipal governments as well as collaboration with non-governmental organizations and entities (Champagne, 2013:45). This paper follows the premise that multi-level governance is necessary because of the institutional context in Canada and the diversity of actors and stakeholders involved in critical infrastructure protection. Given the necessity of collaboration and multi-level governance, as demonstrated by the types of interdependencies, how do these organizations manage to collaborate with each other given the constraints and opportunities provided by the structures and historical arrangements that shape decision-making? How is the concept of multi-level governance articulated in the framework of collaboration between the various actors in Canada? To what extent is multilevel governance achieved as an objective of the policies and methods of collaboration defined by these three governments? Generally, the concept of multi-level governance includes all of the stakeholders and actors (including at the local level and within the private sector and community sector). However, for the scope of this paper, the analysis will be limited to the provinces of Ontario and Québec, along with the federal government. The idea that collaboration is key (the fundamental tenet of multi-level governance) will be used as the premise of this paper.

This paper will use the theory and concepts outlined in this section to explore and analyse the framework for collaboration in critical infrastructure protection against pandemics in Canada in the organisational field of public health. The theory of neo-institutionalism will be used to provide a theoretical background to the analysis of the roles and actions of the actors in protection against pandemics along with an

analysis of the institutional context. The public health system will be seen as an organisational field composed of a variety of actors, stakeholders, and service providers acting within a pre-defined and structural cultural and institutional context, according to the concept of organisational fields described above. Furthermore, this paper will look at the policy coherence of the framework for collaboration in Canada (federal government, Ontario and Québec) in public health to see whether all of the actions and methods of collaboration of these three governments are aligned and do not contradict each other, especially in aiming to achieve multilevel governance. The concept of multilevel governance will be used as a dependent variable. This paper considers that multilevel governance and collaboration are necessary and are an objective in protecting against pandemics.

3.2 Research Question

The central research question for this study is the following: to what extent do the federal government and the provincial governments of Ontario and Québec achieve policy coherence in their framework for collaboration to protect against pandemics? To answer this question, we have formulated two sub-questions: are Ontario, Québec and the federal government consistent in their definitions of the key concepts in critical infrastructure protection? How do Ontario, Québec and the federal government collaborate or not on these issues?

4. Methodology

The literature review portion brought together all of the debates, findings, similar arguments, and conclusions of the authors in order to develop a primary source of information on the key points and main challenges involved in modern critical infrastructure protection. The research portion of this paper seeks to mobilize the knowledge created by the authors in order to analyze Canada's framework for collaboration based on the main findings of the researchers. As well, this paper is rooted in theories and concepts that allow for a structured analysis of the findings. Essentially, this paper seeks to apply a rigorous methodology and the knowledge gained from peer-reviewed journal articles in order to contribute a meaningful and useful empirical analysis of policy documents the policy coherence of Canada's framework for collaboration.

4.1 Research Design and Structure

The paper will follow a similar structure to the literature review above. It will first provide an analysis of how the three governments define the key concepts and whether they are in accord with each other (a necessity for achieving policy coherence). The second part of the analysis will looks at the methods for collaboration and

will focus on the roles and responsibilities of the governments, the instruments in place to facilitate collaboration, and the extent to which the collaboration meets the essential elements described in section 2.3.5 Essential Elements for Collaboration (in the literature review).

The analytical portion of this research paper uses primarily government documents and seeks to explore and analyse the policy coherence within the framework for collaboration in public health between the federal government of Canada and the provincial governments of Ontario and Québec. This section of the research has been built using a developed theoretical and conceptual framework, and follows a similar structure to the literature review. As was discussed in the theoretical and conceptual framework, this research will use the theory of neo-institutionalism and particularly the branch of organizational fields developed by DiMaggio and Powell. As well, the objective of the research is to assess the policy coherence and to what extent the framework for collaboration is built around the fundamental concept of multilevel governance rooted in collaboration.

In order to address the main research question and its two sub-questions, the analysis will be divided into two analytical subsections. The first will explore how the federal government and the provincial governments of Ontario and Québec each define the concepts and terms involved in critical infrastructure protection (interdependencies; critical infrastructure; critical infrastructure protection; resilience; and vulnerabilities). The purpose of this first subsection is to assess, keeping in mind the role of the individual governments and the institutional and social context, whether or not there is consensus on the definition of the concepts and terms. A framework of collaboration where the terms are not agreed upon mutually would indicate a lower level of policy coherency. This subsection will describe *what* is involved in critical infrastructure protection against pandemics in Canada.

The second subsection will provide a descriptive look at the methods of collaboration within the framework for collaboration. First, the roles and responsibilities of the governments and their partners will be explored. This is crucial to the analysis that is grounded in the neo-institutional theory and particularly in the concept of organizational fields. It is important to identify the pertinent actors and their roles within the structured organizational field of public health. Second, the policy instruments will be explored to see how the actors formulate their strategies for preventing and protecting against pandemics and whether or not these strategies are coherent with each other. Finally, we will provide a discussion on how well the governments meet the essential elements for collaboration outlined in the literature review (section 2.3.5). This section on collaboration will describe *who* is involved in critical infrastructure protection against pandemics in Canada and *how* the actors perform this.

4.2 Presentation of Case Studies

This paper follows the format of comparative case studies between the federal government, the government of Québec, and the government of Ontario using documents provided by the governments in Canada pertaining to public health and recent health crises. The federal government, Québec and Ontario each have their own influenza pandemic plans, which will be used for comparison to see if the initiatives and strategies between the three are aligned. As well, both the federal government and Ontario produced studies on the impacts and lessons learned from the case of SARS, which heavily affected Toronto. These will also be used for the analysis. As well, a reading of the studies on SARS, the federal government and Ontario's influenza plans, and a critical book chapter by Jeffrey Shantz showed that the "essential elements for collaboration" for studying frameworks for collaboration discussed in the last section of the literature review (defining concepts; proactive thinking; increasing capacities; communication; and trust) are all important indicators of an effective framework for collaboration (Ministry of Health and Long-Term Care in conjunction with the SARS Outbreak Analysis Committee, 2006; Public Health Agency of Canada, 2012; Public Health Agency of Canada, 2003; Ontario Ministry of Health and Long-Term Care, 2013; Public Health Agency of Canada, 2009; Shantz, 2010).

Finally, the National Strategy for Critical Infrastructure and the Action Plan for Critical Infrastructure, both developed by Public Safety Canada, were chosen as they provide the basis and the objectives for the framework for collaboration developed by the federal government (Public Safety Canada, 2014). Other documentation and information by the federal government, Québec or Ontario pertaining to public health, critical infrastructure, resilience, and pandemics will also be used. The following table (Table 1: Primary sources for analysis) reflects the main governmental policy documents that were used in the analysis. These references can also be found in greater detail in the bibliography.

Table 1: Primary sources for analysis (policy documents)

Source	Title
Emergency Management Ontario	Pandemic
Gouvernement du Québec	The Québec Infrastructure Plan 2014-2024
Ministère de la santé et services sociaux	Québec Influenza Plan – Health Mission
Ministry of Health and Long-Term Care in conjunction with the SARS Outbreak Analysis Committee	Descriptive Epidemiology of the Severe Acute Respiratory Syndrome (SARS) Outbreak Ontario, Canada, 2003
Ontario Ministry of Community Safety & Correctional Services	About Ontario's Incident Management System
Ontario Ministry of Community Safety & Correctional Services	Critical Infrastructure
Ontario Ministry of Health and Long-Term Care	Ontario Health Plan for an Influenza Pandemic 2013

Public Health Agency of Canada	Learning from SARS: Renewal of Public Health in Canada
Public Health Agency of Canada	Responding to an Infectious Disease Outbreak: Progress between SARS and Pandemic Influenza H1N1
Public Safety Canada	An Emergency Management Framework for Canada.
Public Safety Canada	Action Plan for Critical Infrastructure (2014-2017)
Public Safety Canada	Critical Infrastructure Partners
Public Safety Canada	Critical Infrastructure
Public Safety Canada	Enhancing Critical Infrastructure Resiliency
Public Safety Canada	National Strategy for Critical Infrastructure
Sécurité publique Québec	Sûreté des infrastructures stratégiques

Part III: Analysis

In Canada, the question of preventing and protecting the population against epidemics is complex. First, because of the different forms of viruses, and second, because of the fluid boundaries and constant exchanges mentioned above, and finally, because of the institutional context. In terms of the institutional context, we must take into account the division of powers during Confederation in 1867 (Cliche, 2011:54-56). Furthermore, we must take into account the fact that services, goods, and needs have diversified since 1867, and many issues – especially ones that cross boundaries and necessitate interdependence – require a collaborative approach from more than just one government. The division of responsibilities in 1867 occurred during a time where public health was focused on communicable diseases (smallpox and cholera, for instance) as well as on non-infectious nutritional, occupational, and environmental diseases. Today, there has been a great shift from communicable diseases to chronic non-communicable diseases with the occasional unpredictable outbreak, such as SARS (PHAC, 2004:44-45). Nevertheless, the scope and measures taken within public health have differed, leaving the legislative framework for the federal powers in public health vague and uncertain. For instance, while the federal government has the responsibility to collect information and provide surveillance about pandemics, there is no clear legal and constitutional mandate requiring the provinces/territories to disclose information. The provinces/territories have the most input in public health, but a great part of the funding comes from the federal government. As well, the local/regional agencies all have their own governance, but their activities are constrained by provincial/territorial laws, regulations, policies, directives and conditional funding (PHAC, 2004). According to the Constitution, public health is a shared responsibility in Canada that requires coordination between all of the levels of government that must play different roles. Therefore, partnerships are extremely important to allow Canada to increase its capacity and prepare adequately (PHAC, 2012; Public Safety, 2011). However, there is no standardized definition of public health and it is difficult to understand what is funded and how in the current framework (PHAC, 2004).

Globalization has made our world ‘smaller’: people and good can move freely and frequently beyond borders. Interconnectedness is present and increases the risk for spreading diseases (PHAC, 2004). Therefore, systems-based thinking and coordinating activities are both essential to an effective public health strategy (PHAC, 2004). Public health operates in a complex space in Canada where the federal/provincial mandates intersect and where the local/regional levels/institutions must play a key part as front-line defenders (Shantz, 2010:6). This complicated blend of actors also becomes more complex when we consider historical and political tendencies and tensions that have arisen from federalism, as well as the legacy of past instruments and policies that are the foundational stones to any politico-administrative action in Canada. Champagne, for instance, demonstrates the changing nature of infrastructure programs based on the political powers throughout several

eras of the Canadian political past (Champagne, 2013). It is clear that a coherent approach is needed within an effective and efficient framework for collaboration that is built upon the legacy of Canadian federalism. The first step to assessing policy coherency is to determine whether the province of Ontario and the federal government have similar visions of what critical infrastructure, infrastructure protection, vulnerabilities, resilience, and interdependencies consist of.

5.1 Critical Infrastructure Concept and Terms: Definition and Consensus among Ontario, Québec, and the Federal Government

This first section of analysis will look at how Ontario, Québec and the federal government define the key concepts identified in the literature review. The purpose of this section is to analyse whether there is policy coherence in the framework for collaboration by assessing whether the definitions are similar and free of contradictions.

5.1.1 Critical Infrastructure

Using the pandemic plans for each level of government as primary sources, we have developed a comparative analysis of Ontario, Québec, and the federal government's definitions of critical infrastructure. This will guide our understanding of the extent to which the governments see public health as a critical infrastructure sector (i.e. a critical element/system to maintain the functioning of society). A synthesis table is provided at the end of this section in Table 2: Critical Infrastructure Comparison for a summary of the analysis.

In general, mentions and definitions of 'critical infrastructure' are much more prevalent in the federal documentation than in what can be found for the province of Ontario and Québec. However, despite the rarity of critical infrastructure definition in the provincial policy documents, a few key points come to light.

To begin with, the federal government describes critical infrastructure as the processes, systems, facilities, technologies, networks, assets, and services that are necessary for the health, security, safety, and/or economic well-being of Canadians and for a functioning government. Disrupting critical infrastructure could have catastrophic effects, such as the loss of life or adverse economic effects and harm to public confidence (Public Safety, 2009; 2014). Within this definition, public health is listed as one of the ten key sectors of critical infrastructure (Public Safety, 2014).

In 2004, the PHAC (Public Health Agency of Canada) stated in its report on SARS that public health, although being one of the ten sectors of critical infrastructure, is a key term that lacks definition. According to the PHAC, most people associate public health with curative medicine, but it goes beyond that: public health

seeks to promote good health and protect/prevent against health crises. Historically, the health care that we have access to now was left in the hands of individuals to arrange, but today, with new definitions and broadened mandate, 'public health' is public, broader, and in need of clarification and redefinition (PHAC, 2004). For the PHAC, public health is the science and art of promoting health, prolonging life, preventing disease, and improving quality of life using science, skills and beliefs to maintain public health via collective action. Two things that are emphasized by the public health organisational field are the prevention of disease and the health needs of the general population. In that sense, public health integrates a key and fundamental regulatory function that all of the levels of government should be involved in promoting (PHAC, 2004).

For the federal government, ten sectors are listed as being part of critical infrastructure, including the health sector (Public Safety, 2014). In contrast, Ontario's Ministry of Health and Long Term Care (MOHLTC) defines the same ten sectors, but states that the government is responsible for public safety and security and continuity of government and that the other eight sectors (including health) are mainly the responsibility of the private sector (Ontario Ministry of Community Safety & Correctional Services, 2012).

Furthermore, despite the fact that the federal government tends to advocate a more regulatory function by the government in public health, Ontario defines public health as a sector of critical infrastructure as non-pharmaceutical interventions that help to slow the spread of contagious diseases in a community. For Ontario, a large part of public health (one of the ten key sectors of critical infrastructure) intervention occurs in non-public settings (i.e. workplaces, homes, community spaces) (MOHLTC, 2013). In that sense, public health is a much narrower concept for Ontario than for the federal government. Additionally, Ontario focuses on maintaining a status quo of good health especially via the promotion of good standards and methods for health sector employees and for the general population in their homes and work (i.e. Ontario has issued many handbooks for workplace health standards and guides on washing hands) (MOHLTC, 2013). One clear example is the MOHLTC's Pandemic Planning Checklist for Employers, which teaches employers to establish a crisis management team in the event of a disease/outbreak (MOHLTC, 2006).

When looking at the province of Québec, the Québec Infrastructure Plan 2014-2024 lists health and social housing as part of the activity sectors that make up safe, modern infrastructure to support economic development. The health and social services makes up the largest portion of the contribution of the Québec Government for 2014-2024 after road networks (health and social services totalling $16,998.9M/18.8% and road networks totalling $20,423.6M/22.6%) (Gouvernement de Québec, 2014:22). However, this portion of the budget refers specifically to ongoing projects, which are either undergoing construction or are in the planning phase, without making mentioned of emergency public health procedures (Gouvernement de Québec,

2014:23). Therefore, the definition of emergency public health procedures remains elusive in the Québec Infrastructure Plan, showing that public health relates more to daily procedures rather than to emergency planning.

In contrast to the Québec Infrastructure Plan, the Québec Pandemic Influenza Plan provides a more in-depth definition of the importance of public health as part of critical infrastructure. Although it doesn't specifically employ the term 'critical infrastructure,' the Ministère de la Santé et Services Sociaux (MSSS) Québec Plan states that:

> "An influenza pandemic has a strong potential to cause individual and psychosocial disruptions affecting people, spouses, families, work and education environments, cultural and recreational gatherings – in short, all of society's activities would be affected to an unpredictable degree, as would the population's physical and psychosocial health" (MSSS, 2006:15).

The reference to the disruption of society's activities relates back to Tremblay's definition of critical infrastructure, stating that critical infrastructure encompasses the resources that are important for the functioning of a country's society and economy (Tremblay, 2011). Therefore, although Québec doesn't specifically use the term 'critical infrastructure', we have made the assumption that it is implied.

Table 2: Critical Infrastructure Comparison

Government	Definition: Critical Infrastructure
Federal	Critical Infrastructure: the processes, systems, facilities, technologies, networks, assets, and services that are necessary for the health, security, safety, and/or economic well-being of Canadians and a functioning government • Disrupted critical infrastructure could have catastrophic effects (i.e. loss of life; adverse economic effects; harm to public confidence) Public health: Promoting good health and protecting/preventing against health crises • The science and art of promoting health, prolonging life, preventing disease, and improving quality of life using science, skills and beliefs to maintain public health via collective action • The federal government has a regulatory role in critical infrastructure protection
Ontario	Public health critical infrastructure is mainly the responsibility of the private sector, but the government of Ontario has a role in ensuring non-pharmaceutical/health promotion systems • Public health is a sector of critical infrastructure made up of mainly non-pharmaceutical interventions that help to slow the spread of contagious diseases in a community • Maintains the status quo of good health via the promotion of good standards and methods for health sector employees and for the general population in their homes and work

	• Ontario government is in charge of the maintenance of public safety and security and continuity of government, but public health infrastructure protection falls mainly under the responsibility of the private sector
Québec	• Health and social housing are part of the activity sectors that make up safe, modern infrastructure to support economic development • No clear definition of emergency public health procedures in the Québec Infrastructure Plan • Québec does not use the term 'critical infrastructure' specifically, but does provide a definition of public health that is in line with Tremblay's definition of critical infrastructure

What emerges in this section is that the federal government uses the term 'critical infrastructure' more clearly, more frequently, and more broadly to encompass public health. In addition, the federal government sees a much more interventionist and regulatory role for itself in critical infrastructure protection in public health. In comparison, Ontario states that responsibility for public health critical infrastructure is mostly held by the private sector. The Ontario government's role then remains mostly to promote good health practices and non-pharmaceutical approaches. Finally, Québec does not necessarily refer to public health as part of critical infrastructure, but its pandemic plan employs a definition of public health protection that is in line with Tremblay's definition of critical infrastructure. What emerges is that the three levels of government share different conceptions of what is and isn't involved in critical infrastructure for protecting against pandemics.

5.1.2 Critical Infrastructure Protection

In this section, the pandemic plans and other pertinent policy documentation (i.e. the National Strategy for Critical Infrastructure) for each level of government were used as key sources to look at how each government defines critical infrastructure protection. This is especially important as it allows us to understand the extent of action that each government foresees as critical to disaster management before/during/following an outbreak. A synthesis table is provided at the end of this section in Table 3: Critical Infrastructure Protection Definitions for a summary of the analysis.

Critical infrastructure protection is an interesting concept, especially because of the ethical considerations and political baggage inherent in any action to protect a population. On a federal level, the National Strategy for Critical Infrastructure identified three objectives for building resilience in critical infrastructure protection: building partnerships; sharing and protecting information; and implementing an all-hazards risk management approach (Public Safety, 2014). However, in some cases, there is an ethical dilemma over what the role of the state is and how much the state can infringe on personal liberties to protect public

health. The Emergency Management Framework of the federal government states that fundamentally, the federal, provincial and territorial governments must work together to preserve the safety and security of citizens. Emergency management decisions are therefore guided by ethics and value human life and dignity over individual liberty in order to save human lives, preserve the environment and protect property and the economy (Public Safety, 2011). For instance, under the Emergency Management Act, the Premier has the power to direct and control local governments and facilities if such measures are needed. In the case of SARS, all of the hospitals in the GTA and Simcoe County were ordered to activate their "Code Orange" emergency plans, a decision that was subsequently heavily criticized (PHAC, 2004).

Shantz, in his article, argues that in the case of SARS, the federal government's restriction of liberty (especially the multitude of people put into quarantine unnecessarily) was not relevant, legitimate or necessary and that less restrictive measures could have been used (2010). Shantz also makes the case that the status of federal-provincial social and health-based cash transfers and provincial spending liberties have been expanded and reduced throughout the Canadian history dependent on the political party in power and that party/domestic politics greatly influenced how critical infrastructure protection is performed (Shantz, 2010). Shantz' article provides an interesting debate for the extent of action that can be legitimately taken to protect collective interests in public health.

Furthermore, despite the three objectives given by the National Strategy for Critical Infrastructure, there is no conclusive list of the functions of public health systems, and it is hard to define what falls under the mandate of critical infrastructure protection and to what extent (PHAC, 2004). When there is a public danger, based on federal definitions, the importance given to individual interests shifts towards more collective interests as public health ethics dominate the conversation. When it comes to choosing the target population for vaccines, the federal government uses a logic of distributive justice, advocating for distributing resources in a fair and equitable manner (PHAC, 2009).

In Ontario, the MOHLTC uses the precautionary principle. During planning periods, health partners are encouraged to constantly review the response activities in order to be prepared in the event of a crisis. Business continuity plans are developed to maintain business functions during a disaster (MOHLTC, 2013). Furthermore, MOHLTC has developed a scale to measure severity in terms of transmissibility and in terms of clinical severity of illness. Based on this scale, different action and responses can be used during a pandemic. MOHLTC also established communication, immunization, public health measures, distribution, and surveillance strategies (MOHLTC, 2013). In Ontario, the emphasis is on evidence-based practices to reduce risk of transmissibility and a communication system in order to share information with other regions in a timely fashion (MOHLTC, 2013).

Finally, the public health measures used by Ontario are grouped into two categories: voluntary public health measures and mandatory public health measures, depending on the level of risk (MOHLTC, 2013). In this case, it is evident that the federal government and Ontario operate along different interventionist logics, which can collide in the event of a crisis. Ontario uses a more evidence-based, catered, preventative approach, whereas the federal government prefers a most invasive approach geared at protecting the collective interests over individual liberties.

The Québec Plan follows a three-pronged approach (preparedness, reaction, recovery) and frames its pandemic plan as a response to a management crisis. It is based on three key principles of response, which demonstrate the Ministry's commitment to an approach that is both highly structured and rooted in the need for communication. The first principle refers to *strategies that match the functions of the network*, which is connected to the principle that the mission of the health and social services network is to save and preserve human life and well-being. This encompasses five key areas of activity: protecting the public health, providing medical care to promote physical health; protecting psychosocial well-being; providing clear and relevant information in communication; and maintaining the continuity of services. The second principle refers to a *top-down decision-making process*, coming from the Ministry (MSSS, 2006). The Ministry takes a leadership role and becomes involved in coordinating responses from the network, thus triggering a top-down model for decision-making. This decision-making power is further rooted in legality and justified by the Public Health Act and the Civil Protection Act, among others (MSSS, 2006:19). The final principle refers to *delivering a highly effective organization*, and is shaped by a ministerial coordination structure that mobilizes all of the Ministry's departments and that encompasses the strategic management unit (overseen by the associate deputy minister) and the Operations Branch (overseen by the director of operations, who is also in contact with the CEOs of health and social services agencies) (MSSS, 2006:20-21). The MSSS also asks agencies and establishments to adopt a coordination structure that is similar to its own to ensure open lines of communication and structural alignment (MSSS, 2006:22).

Furthermore, the Québec Plan puts great emphasis on the need for creating structure and reinforcing communication as key ways in which to mitigate the management issues resulting from absenteeism and a high demand for services (MSSS, 2006:27). Interestingly, the Québec Plan also uses specific managerial terminology, referring to other organisations as 'partners' (MSSS, 2006:37) and to citizens as 'clients'/the 'ultimate client' (MSSS, 2006:29).

Additionally, preventative measures involved in critical infrastructure protection are an important feature of the Québec Plan, and there is frequent reference to the idea of prevention as being a bottom-up

strategy that is enforced and enacted by programs and services (especially at the community level) and by individuals. The Québec Plan refers to case management and empowering individuals to take action by themselves by providing information about home quarantines, self-care, and auto-assessments (MSSS, 2006:54). Basic prevention involves improving and maintaining standards of public health and promoting personal hygiene (i.e. hand-washing) among citizens and within establishments. In this method, key partners (such as doctors, regional councils, and scientists) are highly important in providing research and fostering awareness. Furthermore, promoting and applying the application of prevention and control measures beyond establishments is an important tool: for instance, this is evident in the workplace, in daycare facilities, schools, communities, and community resources, among others. Finally, the Québec Plan speaks to basic practices that must always be applied along with additional precautions in the event an emerging outbreak (MSSS, 2006:37). Along with prevention, the Ministry also advocates self-care and seeks to bolster home support services and the capacities of informal care givers (MSSS, 2006:59). The approach then, is to increase individual autonomy and solidarity in communities. Empowering and enabling communities and individuals further allows Québec to create a tailored approach that exists alongside a strengthened base of individuals and communities (MSSS, 2006:76).

This emphasis on action at the community or individual level is in line with Québec's general goal to manage the crisis by responding to the challenges and strains placed on the critical infrastructure systems, resulting from overload on medical services and increased absenteeism (an element that is also evident in the Ontario Plan). However, beyond individual strategies, the Québec Plan also provides strategies for its network of stakeholders and partners, including coordinating the delivery of healthcare, deploying non-traditional healthcare services, ensuring access to information resources (such as Info-santé and Info-social), and setting up prehospital emergency services, among others (MSSS, 2006:57). The Québec Plan also provides a section about human resource management, providing training and addressing human resource needs, and recruiting alternate human resources and volunteers (MSSS, 2006:107; 110). These strategies are elaborated in the form of required prevention plans and provisions, specific healthcare guidelines, accelerated administrative procedures (i.e. pronouncement of death) and pre-established mechanisms developed by the Ministry (MSSS, 2006:66; 72).

The Canadian Influenza Pandemic Plan similarly makes mention of the need to provide health services emergency planning to offset the risk of reduced human resources, but only briefly describes the problem and does not offer any remedy, besides stating that the responsibility lays with the facilities to ensure that they are fully staffed (PHAC, 2009:14, 17). However, in contrast with the Canadian Influenza Pandemic Plan, the Québec

Plan states that special measures are only to be used as a last resort in the event of total failure after the usage of preventative strategies, individual and community empowerment, and top-down decision-making and strategy implementation (MSSS, 2006:105).

Table 3: Critical Infrastructure Protection Definitions

Government	Definition: Critical Infrastructure Protection
Federal	- Building partnerships - Sharing and protecting information - Implementing an all-hazards risk management approach - Interventionist approach where emergency management decisions are guided by ethics that value (collective) human life and dignity over individual liberty in order to save human lives, preserve the environment and protect property and the economy
Ontario	- Guided by the precautionary principle - Health partners are encouraged to constantly review their response activities in order to be prepared (including having and maintaining business continuity plans) - Actions vary depending on the scale of emergency (i.e. existence of voluntary vs. mandatory health measures) - Strategies: communication, immunization, public health measures, distribution, and surveillance - Research and evidence-based practices to reduce risk of transmissibility and preserve communication systems and information sharing
Québec	- Three-pronged approach: preparedness, reaction, recovery - Strategies to match the functions of the network - Preventative strategies and HR management - Top-down decision-making process - Focus on structuring and reinforcing communication - Reinforced public health practices and bottom up strategy to promote self-care and home support - Research and fostering awareness

It is clear here that the three governments operate along different ideological veins when addressing critical infrastructure protection. The federal government maintains an all-hazards risk management approach and will privilege protecting collective human life over individual liberties in an ethical dilemma. Ontario and Québec are guided by precautionary strategies, focusing on preparing their partners and the public to assist in combatting a pandemic by reinforcing good public health practices; promoting research and evidence-based practices; and prioritizing communication. What emerges is that the provinces and the federal government each espouse a certain ideology (i.e. interventionist ideology vs. precautionary ideology) which is demonstrated in

their pandemic plans. These ideologies are part of the historical and political baggage that each government carries, and is an indicator of the interest and ideology-driven nature of institutions within the theory of neo-institutionalism.

5.1.3 Vulnerabilities

In this section, the pandemic plans for each level of government and other pertinent government documents were used as primary sources to develop a comparative analysis of how each level of government defines vulnerabilities. This will help guide our understanding of who/what each government deems is vulnerable and where the governments will target their primary action in the first outbreak of a pandemic. A synthesis table is provided at the end of this section in Table 4: Vulnerabilities Definitions for a summary of the analysis.

In terms of vulnerabilities, the provinces of Ontario and Québec and the federal government have very different conceptions and definitions. The federal government explains vulnerabilities in terms of services and systems, stating that the disruption of one service would affect various other essential services/systems (Public Safety, 2014). As well, the federal government elaborates that vulnerabilities and risks are associated with urbanization, critical infrastructure dependencies and interdependencies, terrorism, climate chance, environmental change, diseases, and the rapid movement of people and goods around the world (Public Safety, 2011).

As well, in terms of the population, the PHAC has a more macroscopic perspective and states that diseases can be distributed evenly along a population, so that it is more effective to target a wide population than certain key, vulnerable populations. Furthermore, the PHAC explains that the health of populations and individuals is shaped by factors in their social, economic, natural, built and political environments, and especially that the risk of contagious diseases grows in areas of low population densities because of their socio-economic conditions (PHAC, 2004). The assumptions made by the PHAC are that the next pandemic will occur outside of Canada and likely in Asia. As well, a great risk identified by the PHAC is the possibility of two simultaneous viruses in circulation (PHAC, 2009).

The MOHLTC takes a more microscopic approach. First, in its influenza plan, Ontario puts a great emphasis on protecting the needs of vulnerable populations (people more likely to be exposed, suffer from the impact, or less likely to benefit from response and recovery measures) (MOHLTC, 2013). Ontario's assumptions are that a pandemic can occur anywhere in the world, including in Ontario, and at any time of the year. Ontario puts an emphasis on continuously recognizing hazards and risks in order to protect and prevent outbreaks and

be prepared in the event that it does happen. The MOHLTC also states the need to identify key population groups to receive the vaccine first, which is in direct contradiction of the logic used by the federal government (MOHLTC, 2013). It is clear that the federal government and Ontario are not aligned in terms of the identified risks and vulnerabilities to public health.

Throughout the entirety of the document, the Québec Plan refers to societal vulnerabilities and vulnerable populations. The first mention of vulnerabilities has to do with one of the four conditions of an influenza pandemic: human vulnerability. Regarding human vulnerability, the Québec Plan refers to the fact that viruses are threats to those who have not been exposed to the virus or were exposed to it in the distant past (MSSS, 2006:14). The Québec Plan also mentions the fact that once an outbreak occurs, it can take 3-4 months or longer to produce a vaccine, during which time, the world would be exposed and those affected would be susceptible to the effects of the first wave of the pandemic (MSSS, 2006:15).

The Québec Plan also elaborates on its vision of the most vulnerable people, listing young people with difficulties (i.e. from pervasive developmental disorders); the elderly; dependent people; people with disabilities; and people with mental health problems or addictions. The Québec Plan also talks about the three dimensions of vulnerability: *weakness* (those with existing sensitivities, which makes them more susceptible to stress, for instance); *disadvantage* (those who are at a disadvantage financially or otherwise); and *exposure* (those that are more exposed to psychosocial impacts) (MSSS, 2006:76),

In relation to the pandemic itself, the Québec Plan refers to three key pandemic periods, each of which involves its own challenges and vulnerabilities. The pandemic alert period is the period of time leading from the first/early detection of conditions that indicate an imminent outbreak. The pandemic period is the period of time during which the outbreak is occurring: during this time, surveillance is highly necessary to guide and adjust responses to the pandemic and to assess their impact. The final period is called the recovery period, during which the impact of the pandemic must be assessed, along with the measures that are needed to move away from vulnerability and to recover to a stable state (MSSS, 2006:32).

Furthermore, the Québec Plan makes reference to the fact that antiviral medication can be used to reduce morbidity and absenteeism in the short term, but that there is limited availability. In a response to the challenge posed by limited supplies, the Québec Plan states that it would target the priority groups (established groups of vulnerable people and key human resources to maintain a functioning society, such as nurses or doctors) as the first recipients of anti-viral drugs. The priority groups and identified vulnerable people would also be the first to receive successful vaccinations once they have been produced (MSSS, 2006:45). These priority

groups are established by PHAC and are also based on information from provincial, national, and international expert bodies (MSSS, 2006:40).

Table 4: Vulnerabilities Definitions

Government	Definition: Vulnerabilities
Federal	- Services and systems - Vulnerabilities and risks are associated with urbanization, critical infrastructure dependencies and interdependencies, terrorism, climate chance, environmental change, diseases, and the rapid movement of people and goods around the world - Health of populations is shaped by social, economic, built, and political environments (i.e. populations in lower density areas are more vulnerable for contagion) - Targets the wide population for vaccination
Ontario	- Prioritizes vulnerable populations for vaccination - Vulnerable population: those more likely to be exposed, to suffer from the impact, or less likely to benefit from response and recovery measures - Assumption that outbreaks can occur anywhere in the world, at any time - Emphasis on continuously scanning for risks and hazards to be prepared
Québec	- Societal vulnerabilities/human vulnerabilities - Vulnerable population: those that have not been exposed to the virus/have only been exposed in the distant past; young people with difficulties; elderly people; dependent people; people with disabilities; people with mental health problems or addictions - Three dimensions of vulnerability: weakness, disadvantage, exposure - Prioritizes vulnerable populations and priority populations (i.e. health care staff) for vaccination/anti-viral drugs distribution - Different levels of vulnerability depending on the pandemic stage: pandemic alert period/pandemic period/recovery period

Reviewing the way in which the governments define risks and identify certain populations and areas as 'vulnerable' is also telling of the specific institutional ideologies by pointing to the designated areas of risk and priority. For instance, the federal government focuses more on macroscopic vulnerabilities within systems and services (critical infrastructure). The federal government also advocates widespread vaccinations as opposed to targeting vulnerable groups first. In contrast, Ontario and Québec each focus on societal vulnerabilities (although their identification of societal vulnerabilities differ slightly), especially found in those that are exposed or have less access to recovery measures. The provinces also advocate prioritizing specific vulnerable groups for vaccination. Focusing on the vulnerabilities in this section was important in order to show us the key areas that the governments' focus on when preparing for and protecting the population during an outbreak. This analysis

further shows us that, although there is similarity between the pandemic plans of the provinces, there is a certain absence of policy coherence in the framework for collaboration.

5.1.4 Resilience

In this section, we have used pandemic plans and other pertinent government documents to develop a comparative analysis of each level of government's conception of resilience; a term that is a useful indicator to understand the *goal* of each government's actions (whether it be to maintain an equilibrium or to positively adapt with change, for instance). A synthesis table is provided at the end of this section in Table 5: Resilience Definitions for a summary of the analysis.

In terms of resilience, the federal government, Ontario and Québec envision different approaches. The federal government advocates using a combination of security measures to address incidents and focuses on specific activities such as assessing and prioritizing risks, taking protective measures, and conducting exercises to assess measures (Public Safety, 2009; 2013). For the National Strategy on Critical Infrastructure, resilience is the capacity of a system or society to adapt, through resistance and change, in order to reach and maintain a certain level of functioning (Public Safety, 2009). This view is in keeping with Davoudi's concept of evolutionary resilience (where a system is flexible enough to react, adapt and positively change with an event) (Davoudi, 2012). The Canadian Pandemic Influenza Plan and the Emergency Management Framework both outline a strategy based on prevention, preparedness, response, and recovery (PHAC, 2009:4; Public Safety, 2011:4). Prevention includes planning activities to ensure that risks are minimized and unavoidable risks are contained; preparedness refers to preparing planning, training, and simulation exercises; response relates to controlling and repressing the outcomes of the pandemic; and recovery refers to restoring and returning to normal 'interpandemic' levels of activities (PHAC, 2009:4).

Furthermore, Public Safety states that "Resilience is the capacity of a system, community or society exposed to hazards to adapt to disturbances resulting from hazards by persevering, recuperating or changing to reach and maintain an acceptable level of functioning. Resilient capacity is built through a process of empowering citizens, responders, organizations, communities, governments, systems and society to share the responsibility to keep hazards from becoming disasters" (Public Safety, 2011:16). In addition, the current Emergency Management Framework acknowledges that the federal, provincial and territorial governments must work together to deal with specific risks, hazards, and vulnerabilities via prevention, mitigation, and recovery. As such, resilience would involve robustness, redundancy, self-organization and efficiency, which go beyond simply preparing and responding (Public Safety, 2011). These definitions are aligned with Godschalk's

definition of resilient systems in the literature review above (Godschalk describes that resilient systems are redundant, diverse, efficient, autonomous, strong, interdependent, adaptable, and collaborative) (2003:139).

In contrast, Ontario has a more incremental approach to building resilience. It focuses on creating an effective influenza plan for seasonal influenza responses, which can be escalated quickly in the event of a crisis. This means that its strategy would simply be improved and bolstered during a crisis, which could be beneficial as the infrastructure would already be in place (MOHLTC, 2013). The other emphasis is on health workers and employees to constantly be prepared and ready for an event. As well, Ontario focuses on using scientific and technical evidence to inform decision-making when events arise, rather than implementing a large-scale safety-measures response. In sum, Ontario's strategy is more microscopic and focuses on building front-line resilience and evidence-based adapted strategies (MOHLTC, 2013). Its preventative approach has two objectives in the event of a crisis: minimizing serious illness/overall deaths and minimizing societal disruption in Ontario (MOHLTC, 2013). Therefore, Ontario's view fits into Davoudi's definition of engineering resilience (thinking of resilience as a return back to equilibrium after disturbance). It is clear from this section as well that there is a lack of congruence between how Ontario and the federal government perceive and envision a response to a public health crisis.

Québec's approach is similar to the Canadian Pandemic Plan, involving three out of four of the stages listed in the Canadian Pandemic Influenza Plan. For Québec, resilience is based on a three pronged approach, which relates to the various stages of pandemics. Preparedness refers to the period before a pandemic has occurred/been declared and involves all of the preventative procedures and mechanisms, including consistent and good operations for health systems, personal hygiene, and maintenance of health support to all members of the population. Response refers to the response activities that occur within the various sectors needed to manage a crisis. This involves protecting the health of the population, mobilizing important and relevant information, and ensuring people's physical and psychosocial well-being, while providing medical treatment and keeping the network operational during the time of crisis. Recovery refers to the activities involved in helping people, families, communities, and organisations to return to *normal* after a pandemic (MSSS, 2006:17). In this sense, similarly to Ontario, Québec's view of resilience also refers to Davoudi's concept to engineering resilience (Davoudi, 2012:300).

To bolster resilience, the Québec Plan cites vaccinations as the most effective means for mitigating the effects of an outbreak. Vaccinations are not used in the prevention stages and cannot be prepared or predicted beforehand; therefore, they must be quickly researched and created at the outset of a crisis. When the vaccine production begins, the first recipients are those that are vulnerable and the priority groups established by PHAC

and expert bodies, as mentioned earlier in the section on vulnerabilities (MSSS, 2006:42-43). Beyond vaccination, the Québec Plan states that the feasibility of enacting an effective response to bolster resilience depends on the availability of human/material resources. As such, a strategy for resilience seems hinged, for Québec, on maintaining the very systems of critical infrastructure that are attacked by the pandemic.

Finally, the Québec Plan acknowledges the importance of improving public health, especially in terms of building proactive and sustained public health responses and fostering education and prevention measures. However, Québec also acknowledges certain difficulties: for instance, it is difficult to put adequate controls and pressure on the health network's resources, especially at the community level. As well, thus far, the effectiveness of public health measures to deal with the effects of pandemics have not been measured (MSSS, 2006:50). Again, this section shows the discrepancies that arise in the three governments' definitions of the key concept of resilience.

Table 5: Resilience Definitions

Government	Definition: Resilience
Federal	- Uses a combination of security measures to address incidents - Focuses on specific activities such as assessing and prioritizing risks, taking protective measures, and conducting exercises to assess measures - Evolutionary resilience: resilience is the capacity of a system or society to adapt, through resistance and change, in order to reach and maintain a certain level of functioning - Strategy based on prevention, preparedness, response, and recovery - Robustness, redundancy, self-organization and efficiency
Ontario	- Incremental approach: focuses on creating an effective influenza plan for seasonal influenza responses, which can be escalated quickly in the event of a crisis - Critical infrastructure is already in place - Focuses on preparing health workers and employees - Uses scientific and technical evidence-based decision-making for a targeted response, as opposed to a large-scale safety-measures response - Engineering resilience: minimizing serious illness/overall deaths and minimizing societal disruption
Québec	- Three-pronged approach: preparedness, response, recovery - Uses vaccinations for the most effective tool in its response - Protects the availability of human/material resources - Places importance on maintaining and improving public health via sustained public health responses, fostering education, and promoting preventative measures - Engineering resilience: returning to what is *normal* after an event

The definitions of resilience that each government espouses are pertinent to our study of the policy coherence of the framework for collaboration. What this section shows us is that while all three governments agree on a course of action that builds resilience based on preparedness, responses, and recovery, the actions that they take to build resilience are different. The federal government uses a view of resilience that falls in line with Davoudi's definition of evolutionary resilience – meaning that the goal is not only to recover, but also to positively adapt with every change/crisis. The federal government uses vocabulary that is reflective of a desire to create robust, efficient systems. The provinces of Ontario and Québec, on the other hand, aim for what Davoudi describes as engineering resilience, which means minimizing damage incurred by the society/system. In particular, Ontario focuses on building on existing seasonal influenza plans and using preparation and existing critical infrastructure to enforce a targeted and adapted response. Québec focuses on using vaccinations are the primary line of defense and prioritizes the human aspect of its critical infrastructure (i.e. human resources). A look at how the governments define resilience shows us the different ideologies and envisioned responses of each government.

5.1.5 Interdependencies

The pandemic plans for each level of government, as well as additional supporting policy documents (i.e. the National Strategy for Critical Infrastructure and the Action Plan for Critical Infrastructure) were used to provide a comparative analysis of Ontario, Québec, and the federal government's definitions of interdependency. This will help us understand what each level of government identifies as an interdependent actor/region/system, so that we can understand how they envision action and collaboration. A synthesis table is provided at the end of this section in Table 6: Interdependency Definitions for a summary of the analysis.

First, when looking at interdependencies, it is clear that the federal government and the provinces of Ontario and Québec acknowledge the need for interdependent and collaborative approaches. However, there is a clear discrepancy between what they set out to do and what they accomplish/who they collaborate with. The National Strategy for Critical Infrastructure (NSCI), Public Safety Canada (PS), and the Action Plan for Critical Infrastructure (APCI) by Public Safety all state that responsibility for building and strengthening resilience is shared between the federal, provincial, and territorial governments along with local authorities and critical infrastructure owners and operators. They also agree that since disasters usually occur locally, the first response is usually by owners and operators, by the local government, or by the province or territory (Public Safety, 2009; 2014). Public Safety's statement on enhancing critical infrastructure resilience states that there are regional offices used to build and support relations with critical infrastructure partners locally and across regions and

borders (Public Safety, 2014). Public Safety also states that partnerships are required between critical infrastructure stakeholders, which includes owners and operators, law enforcement, governments, and the research and development community. The goal is for Public Safety to work with partners to manage risks, reduce vulnerabilities and strengthen resilience (Public Safety, 2014). The report on the aftermath of SARS by the Public Health Agency of Canada (PHAC) also states that public health is a broad field that also relies on inter-sectoral partnerships including the voluntary sector and non-governmental agencies, local associations, community development groups, business groups, government structures, etc. (PHAC, 2004).

However, when looking at Public Safety's list of critical infrastructure partners, only security partners, provinces and territories, and international partners are listed (Public Safety, 2014). The federal government fulfills 'national leadership responsibilities' and is only responsible for providing assistance to the provinces and territories if the assistance has been requested (Public Safety, 2009). As well, although Public Safety's APCI and the NSCI agree that collaboration should include local authorities and critical infrastructure owners and operators, the Emergency Management Framework for Canada (EMFC) states that a collaborative approach is necessary between the federal and provincial/territorial governments and does not mention the other partners (Public Safety, 2009). The EMFC, however, does state that most emergencies are local in nature and should be managed locally (Public Safety, 2011). Furthermore, when looking at the APCI, there is constant mention of 'collaborate' in the table on the roles and responsibilities, but there is no clear indication of what 'collaborate' actually entails (Public Safety, 2014).

When looking at Ontario, the Ministry of Health and Long Term Care's (MOHLTC) Ontario Health Plan for an Influenza Pandemic (OHPIP) has been regularly updated to include a plethora of knowledge from various actors, including the OHPIP Steering Committee made of representatives from various health associations, unions, regulatory bodies, governmental organizations, and different workgroups. In this way, Ontario incorporates a more representative participation from multiple actors involved in public health beyond simply the federal and provincial levels (MOHLTC, 2013). The OHPIP states that all health systems partners have a role to play during a response to a crisis (MOHLTC, 2013). This differs from the federal government's view that the local owners/operators should be the main first responders and responsible parties. Finally, the OHPIP makes a point of listing all of the parties involved in the organisational field of health care, listing such actors like the health sector, the organizations, employers, services, and the private sector in the health system (MOHLTC, 2013).

A further discrepancy occurs relating to the cross-boundary nature of pandemic influenza. In terms of the definition of interdependency, the federal government lists that pandemics are cross-border issues,

especially given the increase in globalisation and the rapid crossing of borders by people, goods, food, and information (for instance, PHAC gives the example of West Nile virus and SARS expanding past their geographic ranges) (PHAC, 2004). However, Emergency Management Ontario states that epidemics, although as serious as pandemics, are usually contained within a region or a country (Emergency Management Ontario, 2012). However, this is not true, given the experience of SARS (PHAC, 2004). The Québec Pandemic Influenza Plan – Health Mission (2006) states that an influenza pandemic is essentially an influenza epidemic that is limited in time, but not in space (13). This demonstrates that there are discrepancies in each government's definition of *what* an influenza pandemic entails between 1) what interdependence is and the extent of it when it comes to diseases and 2) who should be involved in a collaborative approach.

In the case of Québec, it is clear from the outset of the Québec Pandemic Influenza Plan – Health Mission (2006) that interdependencies are highly important. In the background section of the preface, the Ministère de la Santé et Services Sociaux (MSSS) discusses the cross boundary nature of natural disasters and health crises, specifically mentioning the experience with SARS. As well, throughout the document, the Québec Plan lists the need for collaboration and outlines the roles and participation of the 'network' made of stakeholders (citizens, informal caregivers, workers, and decision makers) and partners (communities, employees and members of the private, non-profit, and public sector) (MSSS, 2006:13). The Québec Plan provides an integrated approach that relies heavily on participation from the stakeholders and partners and provides direction for the creation of guidelines, pandemic provisions in business plans, and Regional Pandemic Influenza Plans (RPIPs), all of which must be aligned with the Québec Plan. The creation of these plans complement health and social services emergency measures plans provincially, regionally, and locally, and are to be coordinated with the broader emergency plans outlined in the Québec National Civil Protection Plan (QNCPP) (MSSS, 2006:13).

The Québec Plan also states that the MSSS works together with a large number of organizations and enterprises regularly and that a pandemic simply calls for an accrued need for collaboration with these partners. It is therefore committed to ensuring a concerted effort in protecting against pandemics, where all actors contribute and are united by an integrated approach (MSSS, 2006:25). To promote this collaborative strategy, the Ministry puts emphasis on creating a uniform vision across organisations vis-à-vis a pandemic response, built on constant communication within an established communication infrastructure, information sharing via information relayers and credible channels of information, and developing trust within the network (MSSS, 2006:83; 84; 87; 101). The Ministry also states its three rules for governance, including *protection* (stakeholders must protect themselves and encourage others to do the same); *solidarity* (stakeholders must assist others and

ask for help); and *responsibility and sound management* (stakeholders continue in their activity or try to find suitable replacements, seek current and constant information, and follow instructions) (MSSS, 2006:30).

However, interestingly enough, Québec mostly refers to the MSSS as the uppermost organisation and seldom refers to collaboration or top-down decision-making coming from the federal government, except in a few situations: i.e. PHAC determining the priority groups for receiving anti-viral medication and/or vaccinations and PHAC as the responsible body for updating special measures for travellers coming into and out of the country (MSSS, 2006:51). This shows that in Québec's view, interdependencies are contained mostly regionally, especially since its plans make little mention of other provinces and/or the federal government.

Table 6: Interdependency Definitions

Government	Definition: Interdependency
Federal	- Acknowledges the need for interdependent and collaborative approaches - The responsibility for building and strengthening resilience is shared between the federal, provincial, and territorial governments along with local authorities and critical infrastructure owners and operators - First response: owners and operators/local government/province/territory - Partnerships are required between all critical infrastructure stakeholders - Public Safety's role: work with all partners to manage risks, reduce vulnerabilities, strengthen resilience - However, only provinces, territories, and international actors are listed on Public Safety's list of critical infrastructure partners - The Emergency Management Framework for Canada states that collaboration is necessary between the federal and provincial/territorial governments (only) - Little description of what 'collaboration' entails
Ontario	- Acknowledges the need for interdependent and collaborative approaches - Knowledge is created, used, and shared by various actors (health associations, unions, governmental bodies, etc.) - All health systems partners have a role to play during a crisis
Québec	- Acknowledges the need for interdependent and collaborative approaches - Discusses the cross-boundary nature of health crises - States the need for collaboration and description of the roles and participation from the 'network' of stakeholders (including citizens, caregivers, etc.) and partners (communities, organisations, etc.) - Integrated approach relying on participation from stakeholders and partners, but where Québec sets the guidelines and vision - Provides rules for governance (protection, solidarity, responsibility and sound management)

	- Regional view of interdependency: refers to the MSSS as the uppermost organization and rarely refers to top-down decision-making coming from the federal government

This section shows that the three levels of government tend to interpret the depth and complexity of interdependencies differently. To elaborate, each government states the essential need for collaboration and acknowledges the existence of interdependent systems and interdependent relationships. The federal government refers to a collaborative approach with all partners, but in its supporting documents, it primarily refers to international bodies, the federal government, and provinces/territories as partners. Additionally, the federal government states that most action starts from the bottom up, but provides little description as to what this bottom-up action involves or what is meant by 'collaboration.' In this regards, the federal documentation remains somewhat vague as to what is actually meant by collaboration and who that entails. Ontario acknowledges that all health systems partners have a role to play during a crisis and relies heavily on information and knowledge flowing from all of the actors and stakeholders in public health protection. Finally, Québec refers to its network of stakeholders and partners, including them in the conversation, but also ensuring that their approaches are aligned with Québec guidelines and rules for governance. Interestingly, Québec makes little mention of the federal government as a key partner and refers to the MSSS as the uppermost organisation in the hierarchy in its more regional-centric view of interdependency. These differences show that although on the surface, each government acknowledges and accepts the existence and need for interdependency, in practice, their visions of *who* is at the table and in *what* role differ significantly.

5.2 Collaboration and Interdependency among Ontario, Québec, and the Federal Government

In Canada, the division of powers and the tensions resulting from federalism have created certain jurisdictional ambiguities, which have an effect on coordination and collaboration in certain areas. This has been evident in Canada's response to public health issues in the past, most notably, the recent SARS outbreak (2003). The Public Health Agency, created subsequently to the SARS outbreak, states in its mission its goal "to promote and protect the health of Canadians through leadership, partnership, innovation and action in public health" (PHAC, 2015), thereby acting as a major player in efforts to foster collaboration between the federal and provincial governments. This next section will explore the methods of collaboration in Canada by first looking at how the roles and responsibilities are divided among the governments, then by describing the instruments in place to facilitate collaboration, and finally by discussing how the governments meet the essential elements for collaboration outlined in section 2.3.5 Essential Elements for Collaboration in the literature review. Additionally, as the PHAC was created with the goal to protect health through leadership, partnership, innovation and action, a great part of this analysis will focus on the PHAC's role as a participant/facilitator in the collaboration.

5.2.1 Roles and Responsibilities

The PHAC's "Learning from SARS" (2004) demonstrated that federal powers relating to public health – prior to the creation of the PHAC – were uncertain; a fact that was underlined by the state of disease surveillance (48). In addition, the text states that public health was not a priority for the federal government, and that even the threat of HIV was insufficient to lead to new investments in and reorganization of the public health infrastructure, although reports and recommendations for more attention to public health expenditures were emerging from various groups as well as from the provinces (PHAC, 2004:53; 55). In general, the historical legacy of public health in Canada was rife with jurisdictional ambiguities: the federal government and the provinces/territories had legislation bearing on environmental health issues and could operate water purification facilities and test water; local governments could pass by-laws, provide environmental services, and be involved in enforcement. In addition, testing could be done by public health laboratories as well as by federal, provincial, university, or contract laboratories. The report points to lack of coordination and complications, many of which were brought to light by the events surrounding the SARS outbreak in 2003 (PHAC, 2004:47-49). SARS helped to put public health on the public agenda and was answered by various institutional shifts, including the creation of the Public Health Agency of Canada, as well as the consolidation of federal programs related to security and emergency into one ministry (Public Safety Canada) (PHAC, 2009:3).

The main question to be asked is whether collaborative efforts have improved since the SARS outbreak and since the creation of the Public Health Agency of Canada. To begin with, Public Safety Canada describes the fact that protection against pandemics is a responsibility shared among federal, provincial and territorial governments, along with local authorities and critical infrastructure owners (2014:1). The roles of the different actors seem to be fleshed out more clearly, and certainly, more importance is given to public health in the Canadian Pandemic Influenza Plan (2009), especially in comparison to the description in "Learning from SARS" (2004). According to the Canadian Pandemic Influenza Plan, the federal government (Health Canada, PHAC, and Public Safety Canada) is responsible for the nationwide coordination of the response to pandemic outbreaks and must ensure surveillance, international liaison, and coordination of vaccinations. The federal, provincial, and territorial Ministers of Health ensure distribution of plans to all of the organisations. They also must liaise with stakeholders, develop cost estimates, produce options for decision makers, and plan simulation exercises during the interpandemic period. The provinces and territories are the ones that are responsible for mobilizing contingency plans and resources, ensuring that local governments proceed correctly. Indeed, the Plan states that the health emergency response starts from the local level and moves up to the provinces/territories, and finally to the federal level. The local governments, then, are responsible for planning local responses – following direction from the provinces/territories and the federal government – by liaising with critical infrastructure owners and local stakeholders (emergency responders, hospitals, mortuary services) to facilitate a coordinated response should a pandemic strike a community (PHAC, 2009:5-6). One important thing to note is that the Canadian Plan also often refers to the federal role to liaise with the international bodies, actors, agencies, and governments in the case of an outbreak extending beyond Canadian borders, but very little mention is given to outbreaks that may surpass provincial/territorial frontiers and the importance of a *nationally* coordinated response. The roles outlined in the Canadian Influenza Pandemic Plan refer more to a system where the federal/provinces/territories provide guidelines (albeit not aligned guidelines) and the local governments (of varying capacity, reach, and resources) are to be the front-line defenders.

A more recent report, "Responding to an Infectious Disease Outbreak: Progress Between SARS and Pandemic Influenza H1N1" (PHAC, 2012) reflects the improvements that PHAC has made in its methods of collaboration, particularly in the number of instruments created to assist in building a more streamlined response. The report states that all of the levels of government in the public health system work together to collect and share information to track disease trends. The initial and constant responsibility for investigating possible threats and outbreaks stays at the local/municipal level (the front-line public health responders), with the federal/provinces/territories assisting and providing resources where necessary or requested. The local

authorities work with health care providers to monitor, detect, investigate, and provide testing services, as well as to engage in isolation, treatment, and follow-ups with sick populations (PHAC, 2012:1-2). The provinces and territories can also detect outbreaks, and will assume leadership in coordinating emergency management and response, including by establishing standards and guidelines, as well as by assisting local authorities (*idem*:3). The PHAC has the responsibility to detect, monitor, and analyse national/international trends and disease threats. The PHAC also sets the standards for detecting and reporting and ensures that, where applicable, domestic reporting and control measures are aligned with international standards. The federal government has an advisory role, where it communicates with the provinces and territories and offers a leadership role to coordinate the response between the provinces and territories (PHAC, 2012:3).

However, when looking at the different roles outlined by periods/phases (interpandemic period; pandemic alert period; pandemic period; and post-pandemic period) in the Canadian Pandemic Influenza Plan, it is evident that the divisions in responsibility are not as evident or intuitive. The Canadian Pandemic Influenza Plan contains tables with key response actions by pandemic phases, including response level and a section for outlining the actors responsible for the responses (for surveillance; vaccine programs; antivirals; health services; public health measures; communications; and emergency management and coordination). In general, the responsibilities for all of the categories are shared among all of the actors (federal; provinces/territories; and local governments), with the exception of emergency management and coordination. Based on PHAC's tables, Emergency Management and Coordination is to be lead primarily by PHAC, with the exception of the post-pandemic period, where all of the actors share the responsibility (PHAC, 2009:7-28). This does not reflect the delineated responsibilities and roles in the 2012 report.

Here we see that although the roles are defined more succinctly in some policy documents, it remains relatively ambiguous in other sources. Additionally, the main issue remains: where pandemics cross provincial/territorial boundaries, there is no clear requirement for the provinces and territories to align their responses. Although there is mention of a 'leadership' role to coordinate the responses between the provinces/territories, this responsibility remains vaguely described and offers no concrete definition of *how* this would occur or *who* would ensure it.

5.2.2 Instruments

"Responding to an Infectious Disease Outbreak: Progress between SARS and Pandemic Influenza H1N1" also provides a summary review of the different instruments created and used for ensuring collaboration. These instruments include the Canadian Public Health Service (qualified public health officers and laboratory liaison

officers placed strategically at different levels to assist with response to public health needs); Skills Online (a program to help public health practitioners increase their skills, knowledge and ability in public health); various electronic information systems to support the investigation, monitoring and reporting of public health threats (i.e. Canadian Network for Public Health Intelligence); the Strategic Risk Communications Framework (to guide work in developing effective communication to the general public); the Pan-Canadian Public Health Network (co-chaired by federal and provincial/territorial experts and used to provide advice and best practice protocols to Deputy Ministers); the Health Portfolio Emergency Operations Center (a central command and coordination platform for emergency response, used to support PHAC, Health Canada, and other federal/provincial/territorial partners with event management capabilities, a telecommunications network, equipment, and software to coordination information sharing and response), and the Health Emergency Communications Network (mobilized in response to SARS outbreak), among others (PHAC, 2012:4-10; PHAC, 2009:20).

Other guiding/informational instruments exist outside of the PHAC, such as the Emergency Management Framework and the National Strategy for Critical Infrastructure and Action Plan (reviewed in this paper), as well as the National Emergency Response System (Public Safety, 2014).

There are also several opportunities and fora where the different actors involved in protecting public health to interact developed by Public Safety Canada. The National Cross-Sector Forum is made up the different levels of government and the private sector and organised in different critical infrastructure sectors – each with their key actors – including public health. Its function is to promote timely information sharing; identification of issues that are of national/regional/sectorial concern; use of subject-matter expertise; and the development of tools and best practices to increase resilience. The National Cross-Sector Forum, which applies to all critical infrastructure sectors, has three specific objectives: building partnerships, sharing and protecting information, and implementing an all-hazards risk management approach (Public Safety, 2013:6-7). The federal, provincial, and territorial governments also work together via the FPT Emergency Management Governance Structure, which allows them to coordinate and collaborate and to discuss strategies via their working groups (i.e. the Prevention/Mitigation Working Group; the Preparedness Working Group; the Response Working Group; and the Recovery Working Group) (Public Safety, 2014).

In the previous subsection, it was mentioned that the PHAC's documents do not outline a need or mandate for the provinces/territories to align their efforts. PHAC's policy documents place the federal government in an advisory/leadership role, with the provinces/territories concentrating on aligning efforts and providing resources to their own local governments. Indeed, Public Safety's *National Cross-Sector Forum* and its *FPT emergency management governance structure* seems to be the only instrument where building partnerships

and advancing a collaborative federal, provincial, and territorial approach –aligned with the objectives of the National Strategy for Critical Infrastructure – appear to be prioritized.

5.2.3 Further Analysis Using the Essential Elements for Collaboration

In the literature review, four essential elements for collaboration were identified: engaging in proactive thinking, increasing capacities, prioritizing communication and building trust. These were discovered in the initial literature review and can inform us of whether or not Canada achieves policy coherency in order to return to our central research question: to what extent do the federal government and the provincial governments of Ontario and Québec achieve policy coherence in their framework for collaboration to protect against pandemics? This section will provide a discussion of Canada's collaboration based on a look at how Canada meets the essential elements for collaboration.

5.2.3.1 Reactive vs. proactive thinking

First, in terms of proactive vs. reactive thinking, the policy documents reviewed for this paper suggest that often, disaster management and institutional changes are reactive and occur only to help societies recover. In contrast, the authors advocate planning that focuses on prevention and building credible infrastructure that can be flexible enough to absorb and positively react to unforeseen emergencies. All of the pandemic plans reviewed in this research paper, as well as the various documents from the Public Health Agency and other government departments/agencies refer to a three- or four-staged strategy, starting with the 'inter-pandemic' or prevention period, following through to the pandemic alert period (in some cases), the pandemic period/action period, and the post-pandemic period/recovery period. This indicates that in general, Canada espouses Davoudi's concept of evolutionary resilience, whereby the system not only reacts: it is flexible enough to be prepared, react to the event, and also positively change and adapt after the event. This common perception of the need for proactive and reactive action throughout the Canadian literature both meets this indicator for an existing framework for collaboration and demonstrates some level of policy coherence.

5.2.3.2 Increasing capacities

Another essential element mentioned by the authors is the need to increase capacities at all levels in the system. The Public Health Agency's policy documents point towards the fact that local governments are the front-line defense in cases of pandemic influenza, and thus, must have the tools and resources necessary. PHAC has been working to bolster Canada's overall capacity to respond to emergencies by preparing local authorities to respond to emergencies, while maintaining that the federal/provinces/territories will step in when the problems surpass the local governments' capacities (PHAC, 2012:3).

The documentation refers to a variety of instruments used to increase capacity at the various levels of government. PHAC employs a variety of instruments and strategies to help increase local-level capacity. For instance, field epidemiologists (outbreak investigators) are trained by the PHAC via an apprenticeship program and can be deployed at the local governments' request to try to control the outbreak. In addition, the Microbiological Emergency Response Team (MERT) can supply a mobile laboratory, and the Health Emergency Response Team (HERT) includes a pilot team that is meant to augment provincial and territorial capacity during health emergencies (PHAC, 2012:10-11). The National Emergency Stockpile System (NESS) provides provinces and territories with emergency medical supplies, and the National Cross Sector Forum is also meant to create a forum for increasing and sharing expertise (PHAC, 2012:11; Public Safety, 2014:6-7). In addition, the provincial pandemic plans also refer to strategies to mitigate loss of human resources and business continuity plans.

These instruments and strategies make it clear that there is an initiative on the part of Canada to increase capacities, especially at the local level, in order to effectively respond to a public health emergency. In this regard, this criterion for arriving at a good framework for collaboration seems to be addressed at least by the federal government.

5.2.3.3 The importance of communication

Communication is essential during all stages of a pandemic, including before the pandemic – to ensure proper communication of trends and possible threats. The literature reviewed and the governmental documents all make mention of the essential nature of open and clearly established lines of communication. In the case of Canada, the emphasis is on maintaining open lines of communication from the local level upwards to the provinces, territories, and the federal government, in addition to maintaining systems to keep the Canadian public informed at all times, especially to build and bolster confidence among the Canadian public in its governmental institutions (PHAC, 2009:6. 19; Public Safety, 2011:6). The Emergency Management Framework states that all Canadians are involved in emergency management, which relies on effective partnerships, built on collaboration, coordination and communication – the key components of the FPT emergency management systems (Public Safety, 2011:6).

However, whereas the first steps to opening lines of communication are in place, especially with regards to informing the public and receiving/sharing information to and from local governments, the policy documents (i.e. the pandemic plans) do not concretely demonstrate an effort to build strong communication mechanisms between the provinces and the federal government. In the first analytical section of this paper, it was demonstrated that policy coherence cannot exist without clear, consensual, and aligned definitions of priorities

and concepts. Similarly, it cannot exist without established systems of communication based on the idea that information sharing and common responses are a necessity.

In Canada, communication is an interesting study. First, as we have established, certain institutional legacies and interests that can sometimes cause barriers to collaboration (and by extension, communication). Second, what the pandemic plans show us is that the different governments acknowledge different lines of communication in protection against pandemics. For instance, although the federal government uses discourse surrounding the importance of communication from the local level up (through the provinces to the federal government), in practice, there is a lack of established lines of communication during the provincial governments and the federal government.

5.2.3.4 Building trust

Finally, the idea of trust is pivotal to the existence of a functional framework for collaboration. To support this idea, the National Strategy for Critical Infrastructure states that information sharing and information protection are two complementary elements of a solid basis for collaboration, especially to protect critical infrastructure resilience. In order to accomplish this and achieve effective risk management, timely information sharing across all levels of government and with all stakeholders is paramount. As such, the actors within a collaborative framework need to be as open as possible with each other about their work, especially in emergency management at all stages (i.e. before, during, and after a pandemic) (Public Safety, 2013:9-10).

Despite these well-intended statements, however, it is clear that tensions still arise between the different orders of government, which is telling of the fact that institutions are not static: they are moving, interest and ideology driven entities, consistent with the theory of neo-institutionalism. To illustrate, Bernier presents a perspective on the creation of the PHAC that resonates differently from the documents presented above attesting to the clear benefits of its creation. As was mentioned previously, the SARS outbreak in Toronto led to a federal-level restructuring and to the ultimate creation of the PHAC. The SARS outbreak and the creation of PHAC provided an opportunity for the federal government to enlarge its public health agenda whilst bypassing the provincial responsibility for health (Bernier, 2009:76). Typically, in Canada, the provinces are responsible for decision-making in health and social policy. The creation of PHAC lead to a backlash, where the provinces made the argument that the federal government does not have the tools necessary for addressing public health matters and emergencies. (Bernier, 2009:77). However, the federal government ignored the provinces' claim to their jurisdiction over public health matters and went ahead with the creation of PHAC regardless, in a show of force of executive federalism dominating the provinces (Bernier, 2009:77-80). This isolated case proves significant to a large picture of historical push and pulls between the provinces and the federal government; a

large obstacle that prevents the different orders of government to give up too much trust, for fear of losing its leverage. Of note is also Canada's historical and political baggage of the struggle between executive federalism and the provinces' claim to more decision-making power and broadened jurisdictions.

The evidence of these historical legacies and separate interests allow us to think about the difficulties that can be encountered when different actors, each with their own interests and legacies, try to enter into a collaborative union to attack a problem that does not respect neat socio-geographic boundaries, especially with respect to the fundamental importance of trust. It is hard to definitively state whether or not trust exists between the governments when it comes to protecting against pandemics, especially because a severe pandemic that has required collaboration has not occurred since SARS. What this analysis shows us is that although there is a demonstrated and acknowledged need for collaboration, it is important to take into account the historical tendencies and the interest-driven nature of each level of government when studying the framework for collaboration.

Finally, this section brings us to an important reflection on how Ontario, Québec and the federal government collaborate in protecting against pandemics. Taking a look at collaboration from the angle of the four essential elements provided a few key points about what the governments do in order to facilitate collaboration in critical infrastructure protection and the areas in which they can improve. First, this section proves that the pandemic plans do espouse proactive thinking and generally use an approach that favours working together and individually in the prevention, pandemic, and recovery stages. Second, after the creation of the PHAC, it is clear that increasing capacities – especially at the local level – is a direction that the governments are taking in order to build their strength to protect against pandemics. However, when it comes to communication, this section shows us that certain systems are in place, but that there needs to be increased focus on sharing information and communicating. This is especially true between the federal government and the provinces. Finally, it is hard to establish in the scope of this research paper whether or not there is trust between the governments, but what comes to light is that this is certainly a challenge for Canada given the institutional and historical context. This section leads to the conclusion that Canada is on the right path in terms of building its framework for collaboration in protecting against pandemics, but that there are areas for improvement and for directed action in order to build collaboration that fulfills the criteria that has been mentioned by the authors writing about critical infrastructure protection. In addition to clarifying consistent definitions of the critical infrastructure key concepts (critical infrastructure, critical infrastructure protection, resilience, vulnerability, and interdependency), building a stronger framework for collaboration between the three governments would also entail reaching a consensus on what the roles and responsibilities of each

government (and other critical infrastructure partners and stakeholders) are, developing and growing the instruments to facilitate collaboration, and putting further emphasis on communication and building trust.

6. Conclusion

To conclude, this paper has been positioned around the fact that in a world of rapid exchanges, sharing, and globalization, *boundaries* are no longer solid, impermeable structures. The reality is that boundaries are porous human constructs that divide countries and regions on maps, that are constantly crossed and stretched. As such, protecting a country from a pandemic does not involve simply reinforcing a physical border and preventing people from leaving/entering the region. With constant travel, immigration, imports and exports, every person faces a very concrete risk of contracting an illness or a disease. Vulnerabilities are exacerbated and states need to come up with preventative and reactive methods to mitigate the risks and threats caused by pandemics. This is clear, for instance, in the recent case and spread of the virus Ebola, which posed a very real threat to every country. This has also been evident in former cases, including diseases spread through food and diseases spread through human or airborne contact, such as the SARS virus or H1N1.

In Canada, the question of preventing and protecting the population against pandemics is complex. First, because of the different forms of viruses, second, because of the fluid boundaries and constant exchanges mentioned above, and finally, because of the institutional context. In terms of the institutional context, we must take into account the division of powers during Confederation in 1867, as well as the historico-political legacies of tensions inherent in federalism (Cliche, 2011:54-56). Furthermore, we must take into account the fact that services, goods, and needs have diversified since the signing of the Constitution in 1867, and many issues – especially ones that cross boundaries and necessitate interdependence – require a collaborative approach from more than just one government. As well, it is not only the governments that must form frameworks of collaboration between themselves, but also the private sector, the communities, and non-profit organizations that are also involved in public safety, protection, and service delivery. For instance, in a given situation, the federal government may provide financing, the provincial government may attribute the financing and provide certain services (i.e. immunization), but the communities, municipalities, and private sector need to administer these services (i.e. providing immunization outside of hospitals, private clinics), and non-profit organizations may provide social services and recovery assistance (i.e. social services). This is just one example of how preventing and protection the Canadian public against pandemics requires a multi-faceted approach from a variety of actors with different resources and constraints. It is clear that in order for the Canada to ensure prevention of pandemics and protection of its public in the case of an outbreak, it must develop frameworks for collaboration between the various actors involved.

In conducting this study, we attempted to analyse if the framework for collaboration in protecting against pandemics between Ontario, Québec and the federal government achieves policy coherence or not. This paper explored and analysed the extent to which Ontario, Québec, and the federal government collaborate (the key tenet of multi-level governance) with each other in a framework for collaboration within the organisational field of public health, while bearing in mind the fact that institutions are historically, politically, and ideologically bound active actors. In particular, we looked at whether the three governments share common/similar definitions of key concepts and whether their methods of collaboration were coherent.

The conclusion of this research paper is that although the federal government, Ontario, and Québec all perceive the necessity for collaboration, in reality 1) there are fundamentally different conceptions of the main concepts involved in critical infrastructure protection and 2) the methods of collaboration are not fully coherent. In Canada, it is evident that the historical context plays a large role in how the actors in the organisational field of public health interact and perform their responsibilities. There is a large gap between the socio-economic context of 1867 and the current one, and this is exacerbated by regional and political divides that have grown throughout Canada's history. Furthermore, the original division of powers is not only obsolete, but also unclear. There needs to be a clearer definition of what public health entails, how it should be performed, and what constitutes a general, consensus-based definition of critical infrastructure protection, vulnerabilities, and resilience.

The SARS outbreak demonstrated quite clearly that there is a fundamental gap in the development of a concrete framework for collaboration in public health in Canada (PHAC, 2004). The gap is broadened when it comes to coordination at the federal/provincial collaboration level. The provinces and territories have created frameworks to meet their constitutional responsibilities, but these frameworks are not necessarily aligned or coherent with federal objectives (PHAC, 2004). For instance, in the case of Ontario, an odd paradox occurs where, although it has a larger responsibility in protecting the public health, the Ontarian government espouses a more microscopic, evidence-based, and incremental response. The government of Québec takes a very different approach, building on the fundamental principle of protecting and managing human resources as the essential key to maintaining functional critical infrastructure systems, as well as implementing ministry led top-down strategies to collaborate with its partners, while empowering individuals and the community level to improve general public health and implement preventative strategies. It does not refer to collaboration with other provinces or to the federal government. The federal government, on the other hand, aims for larger security measures to be imposed in the event of a crisis.

What came across in this paper is that although there is a demonstrated will and acquiescence on the part of the governments to protect public health and to collaborate, it is hard to find policy coherence where the governments are not required to and do not actively try to align their priorities with each other. Simply stating the need for interdependent collaboration is insufficient when dealing with active institutional actors that are independent, interest driven, and born of political and historical legacies. Finding the fundamental key to multi-level governance – collaboration – would take an active effort to align definitions, priorities, roles and responsibilities, and instruments among the actors with an understanding that pandemics do not remain within neatly drawn politico-geographic boundaries. Furthermore, the literature review provided us with certain essential elements for collaboration. As was discussed, Canada does meet certain criteria (proactive thinking and increasing capacities), but could improve upon others (communication and building trust in relationships). Additionally, although it was out of the scope of this paper to provide an detailed analysis of *trust* between the governments, evidence points to the fact that trust needs to be fostered and worked upon by the governments with a view to full disclosure of information and mutually reinforcing each other. All of these elements are telling of the fact that public institutions in Canada remain bound by certain ideologies and interests, which necessarily must be taken into account and moulded in order to arrive at a mutual, working framework for collaboration.

The result of this paper concludes that Canada has made great strides since the outbreak of SARS in 2004, but must move forward by specifically focusing on collaboration and an acknowledgment of institutional differences to improve upon its policy coherence within a context of multi-level governance. To do so, the governments could encompass, in their next steps, an effort to arrive at similar and consistent definitions of the critical infrastructure concepts. They could also work together to clarify and establish the roles and responsibilities of all of the critical infrastructure partners and stakeholders (the federal government and the provinces included), continue to grow their collaborative instruments, and further their efforts to increase capacities, engage in proactive thinking, establish communication, and build trust.

Finally, it is evident that the local governments, the private sector, and non-governmental actors are key front-line stakeholders in public health. Although not within the scope of this research paper, a strong approach would acquiesce and involve these stakeholders and redefine the relationships, roles, responsibilities, and collaborative methods between all of the public health actors. A coherent approach would also include streamlined definitions of what is *involved* in public health and crisis protection/prevention. Both the authors in academic literature and the authors in the government literature expressed the needs to create better methods for collaboration (including policy instruments); better definition of roles and responsibilities; and key

elements for a strong framework for collaboration, such as communication, capacity-building, and trust. Moving forward, future additional research to explore the participation of other actors in the framework for collaboration would be useful to refine our analysis of the policy coherence of the framework for collaboration in Canada.

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