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Interagency Communication, Collaboration, and Interoperability within Police Services and between Police Services and Other Emergency Services

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INTERAGENCY COMMUNICATION, COLLABORATION, AND INTEROPERABILITY WITHIN POLICE SERVICES AND BETWEEN POLICE SERVICES AND OTHER EMERGENCY SERVICES

Report for Mass Casualty Commission

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I. Introduction: Security Networks, Interoperability, and Crisis Response

In the aftermath of any mass casualty event, it is instructive to consider the factors that either facilitated or hindered interoperability between the police and other agencies that responded to the crisis. This report discusses the concept of interoperability with a specific focus on the factors that contribute to or hinder effective interorganizational communication and decision-making during emergencies. In addition to looking at the ways in which these issues play out in Canada, this report discusses relevant cases in the United Kingdom, United States, and Australia to illustrate the consequences of a lack of collaboration between investigative agencies and formal interoperability initiatives.

Police, fire and rescue services, and ambulance services are responsible for responding to a wide variety of emergency situations, both nature- and human-related (Power & Alison 2017: 243). Major crises can unfold over the course of hours, days, weeks, months, or years. The active shooter incident in Moncton, NB in 2014, which resulted in the deaths of three RCMP officers and injuries to two other officers, lasted over 28 hours. The mass casualty event in Nova Scotia unfolded over a period of 13 hours on April 18–19, 2020 and resulted in the deaths of 22 persons. Incidents can be complex, time sensitive, and unpredictable (Hine & Bragias 2021: 1493). Active shooter incidents can occur without warning and escalate rapidly in terms of the number of persons at risk and the area covered, thus presenting serious challenges to the police and other first responders:

> Police cannot be sure of what or who to expect upon arrival at a scene or the level of assistance they may encounter; there may be innocent bystanders or multiple offenders involved; they are high-stakes events that may result in serious consequences and the police are typically under time pressure to resolve the situation before it escalates. At the same time, officers need to make critical decisions about how to respond. Officers need to decide how to prioritize the multiple duties that are required and consider potential outcomes (Hine & Bragias 2021: 1493–94).

The following discussion considers the various dimensions of interoperability during major crises and the challenges and opportunities that exist in developing effective multi-agency networks. Of particular interest are the relationships between agencies that have a security mandate (Whelan 2011; Whelan 2012). These include what are often referred to as "blue light" organizations: police, fire and rescue, and ambulance services (Charman 2014).

Two key concepts in such discussions are *interoperability* and *security networks*. Interoperability, which will be discussed in further detail below, refers basically to the ability of different systems to connect and exchange information with each other (Gottschalk 2009). The term "security network" refers to those agencies in a jurisdiction that have a mandate to provide frontline, first responder services to protect the safety and health of the community. As Whelan has observed, "The practice of security is multifaceted" (2016: 311). Security networks can therefore be viewed as "deliberately structured platforms whereby agencies are required to work together to achieve their own goals and also a collective goal" (Whelan 2016: 311).

Other terms that are closely related to each other and merit defining here include "crisis" and "critical incident." A "crisis" has been defined as an event or series of events that

> … significantly disrupts normal operations, has caused or is likely to cause severe distress or have severe consequences for individual staff or organisations, and requires out of ordinary measures to restore order and normality, thus demanding immediate action from senior management… A crisis may be precipitated by a critical event (Buth 2010: 4).

A critical incident, on the other hand, is more narrowly defined as "an event or series of events that seriously threatens the welfare of personnel, potentially resulting in death, life-threatening injury or illness" (Buth 2010: 4).

Various critical incidents and major crises "require different skills and approaches of police in controlling and managing the successful outcomes" (Hine & Bragias 2021: 1493). Large-scale crises require police services, fire and rescue, and emergency medical services to

work effectively together, along with municipal, provincial/territorial, and federal agencies. It

has been noted that "Being able to effectively work alongside and communicate decisions with

[a] vast array of personnel with differing goals can become difficult, especially given the

environment in which they need to work" (Hine & Bragias 2021: 1493; Bonkiewicz & Ruback

2012). The environments of major crises are often complex and may involve high levels of

ambiguity and uncertainty, and critical incidents are by nature time-sensitive (House, Power, &

Alison 2014). "The diversity and demands encountered when responding to major incidents may

transcend the capabilities of any one individual; their effective management requires the

collective and coordinated activities of several individuals and groups" (House, Power, & Alison

2014: 329; see also Axelsson & Axelsson 2006; Drucker 2007). Effective responses therefore

require a complex and multifaceted approach. Yet the extent to which police, fire and rescue, and

emergency medical services train on interoperability, practice simulations, and have integrated

policies and operational plans varies across jurisdictions.

While the notion of interoperability as the ability of organizations to work together seems

simple, "the capacity of distinct and unique systems to communicate with one another effectively

has always been a challenge in public safety…" (Piett 2021: np; see also Perez et al 2017). Piett

has observed:

> When systems aren't interoperable, disjointed response efforts and information gaps
> persist, both of which can cost time and, in dire circumstances, lives. Without
> interoperability, key information remains siloed, leaving decision-makers in the dark.
> Response teams have limited visibility into the status of victims or how others are
> reacting to emergency events as they unfold (Piett 2021: np).

There are several dimensions of interoperability, including technical, organizational, and

relational (human and agency) (Pollock & Coles 2015: 8). Many situations or initiatives are

referred to as "multi-agency," but this term is purely descriptive, referring to multiple

organizations working for the same outcome but potentially in parallel with each other. An *inter-*

agency relationship, on the other hand, implies that two or more agencies effectively penetrate each other's working practices (Charman 2014: 105). In other words, inter-agency relationships center around interoperability. Critical incidents in international contexts and in Canada have demonstrated

> … the dilemmas associated with multi-agency working and the extent to which multi-agency working does or does not become inter-agency working, i.e. the extent to which agencies operate in a coordinated and cohesive manner…. Interoperability constitutes in effect inter-agency working at the front end of services that rely on coordinated activities between different agencies and professions. (Charman 2014: 103).

II. Inter-agency Dynamics and Interoperability

The components of security networks in any one jurisdiction may be easily mapped; but it can be difficult to know how the agencies in the network work together and the factors that facilitate or hinder collaboration. A key question that often emerges from the challenges regarding interoperability in blue-light organizations is "Who should assume the leadership of integrating the organisations?" (Wankhade & Patnaik 2019: 130). In addressing this question, there are several structural and relational issues that must be considered:

> Structural properties include such attributes as the design, size and level of goal-consensus between network members… Relational properties refer to the relationships between actors or network members… Analysts usually focus on the "formal" relationships. "Informal" relationships are also important, not only in terms of the ways in which they shape formal relationships but because these "social networks" are often the way work really gets done (Whelan 2016: 312; see also Zaheer, McEvily, & Perrone 1998; Cross & Parker 2004).

The role of interpersonal relationships in interoperability is discussed below.

In addition to the formal and informal relational dynamics of a security network, Whelan (2016: 313) has noted that there are both endogenous and exogenous factors that can affect how a security network performs. In discussing high-risk, high-impact contexts, Alison, et al. have described endogenous uncertainty as:

> … uncertainly about the problems. It may include incident-specific environmental characteristics such as ambiguous information, intensive time pressure and risk, all of which can induce doubt in decision makers, e.g., "What are we dealing with and what are the risks?" (Alison et al 2015b: 1311)

In contrast, exogenous uncertainty stems from:

> … ambiguity about the operating system that is responding to the decision problem and may include issues affiliated to the management of the problem and associated team processes. Exogenous uncertainties can derive from confusion over the expectations of one's own and others' behaviour. This can compromise the effectiveness with which teams plan and ultimately execute decisions and actions (Alison et al 2015b: 1311).

While a well-organized network should be able to manage the exogenous factors, less control may be exercised over endogenous factors. Research has found that in critical incident settings, exogenous uncertainty may be significantly greater than endogenous uncertainty (Alison et al 2015b). The stressors of endogenous and exogenous factors in responding to a critical event are discussed later in this report.

A. The "3 Cs": Cooperation, Coordination, Collaboration

Pollock and Coles have noted, "Effective management of major incidents requires responder organizations to operate beyond their 'normal' scope of duty and instead act as a collaborative network" (2015: 4). But as Whelan (2016) has pointed out, collaboration cannot be achieved merely by forming a network. Many factors affect the interoperability of a security network, including the presence or lack of trust between parts of the network and practiced routines of information exchange and partnership. In short, having an action plan or strategic plan is in itself not sufficient to produce collaboration.

Whelan (2016) has argued that "strong, high-performing networks will be based more on collaboration than cooperation or coordination" (325) but has also noted that the concepts of cooperation, coordination, and collaboration are often used interchangeably, without being clearly defined (313). It can be instructive to think of cooperation, coordination, and

collaboration as a spectrum, with cooperation at one end and collaboration at the other. With this understanding of "the 3 Cs," the performance of a security network increases as the network's attributes move from cooperation to collaboration (Whelan 2016: 310). At one end of the spectrum, cooperation involves sporadic interaction between agencies (e.g., a discrete joint investigation), while coordination involves two or more agencies adapting and aligning their policies to improve the overall effectiveness of the security network. Collaboration, at the other end of the spectrum, entails a more in-depth, strategic approach to a shared policy framework and, in its most robust form, involves integration (Keast, Brown, & Mandell 2007).

The collaboration continuum has been expanded to include additional components, as depicted in **Figure 1**. This continuum spans from agencies being isolated from one another to being fully integrated. As a security network moves up the continuum, there is a greater chance of achieving common goals, including ensuring the safety and security of the community in critical incident cases.

Figure 1: The Collaboration Continuum
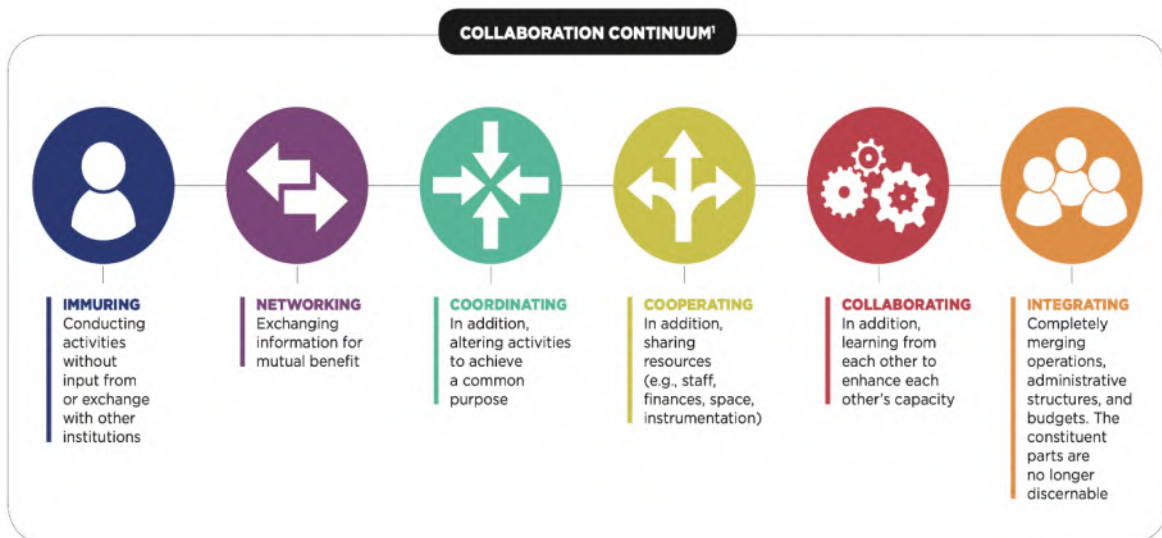
Source: D Mashek. 2015. "Capacities and Institutional Support Needed along the Collaboration Continuum," presentation at Claremont Colleges (June 2015), citing AT Himmelman. 2002. "Collaboration for Change: Definitions, Decision-Making Models, Roles, and Collaboration Process Guide." Himmelman Consulting (January 2002).

The degree of interoperability between police services and between the police and other emergency services will be affected by the location of a particular jurisdiction on the continuum. However, the extent to which cooperation/coordination/collaboration is required will vary depending upon specific contexts. As Whelan has noted, "It is not necessarily the case that one approach works best all of the time. There may be times where cooperation is all that is required" (Whelan 2016: 314). The nature and extent of collaboration that is desirable and feasible are variable across jurisdictions, due to several factors, including funding issues and inconsistent messaging from government departments: "Amongst the complexities identified for services in achieving effective collaboration is the multifaceted line of responsibility locally and nationally" (Kane 2018: 81). This is reflected in the development of national frameworks, including the Canadian Interoperability Communications Action Plan, led by the federal government with the participation of the provincial/territorial governments (Public Safety Canada 2011; Public Safety Canada 2013).

Observers have noted that there is often a disconnect between discussions of collaboration at the strategic level of organizations on the one hand and its implementation at the operational level (Berlin & Carlstrom 2011; Pollock & Coles 2015). As mentioned above, a key question for any security network in this regard is: which organization is to assume the leadership role? Whelan has suggested that "rather than view a lead organization as *controlling* the network, we can view leadership in terms of coordinating the activities of others in a way that maximises efficiencies and is supported by network members" (2016: 319). Similarly, Pollock and Coles have stated:

> Collaborative networks are ideally characterized by reciprocity, representation, equality, participatory decision making, and collaborative leadership… The success of such networks depends on the ability of their leaders to organize structures, resources, and interactions when bringing together participants with different authority, motivations,

interests, skills, and access to information (2015: 4; see also de Leon & Varda 2009; Moynihan 2005).

B. Interoperability in Canada

The Communications Interoperability Strategy for Canada includes a framework for understanding the key components of communications interoperability (**Figure 2**). Note that this schematic was based on the one developed by SAFECOM and the US Cybersecurity and Infrastructure Security Agency (2021: 2).

Figure 2: Canadian Communications Interoperability Continuum
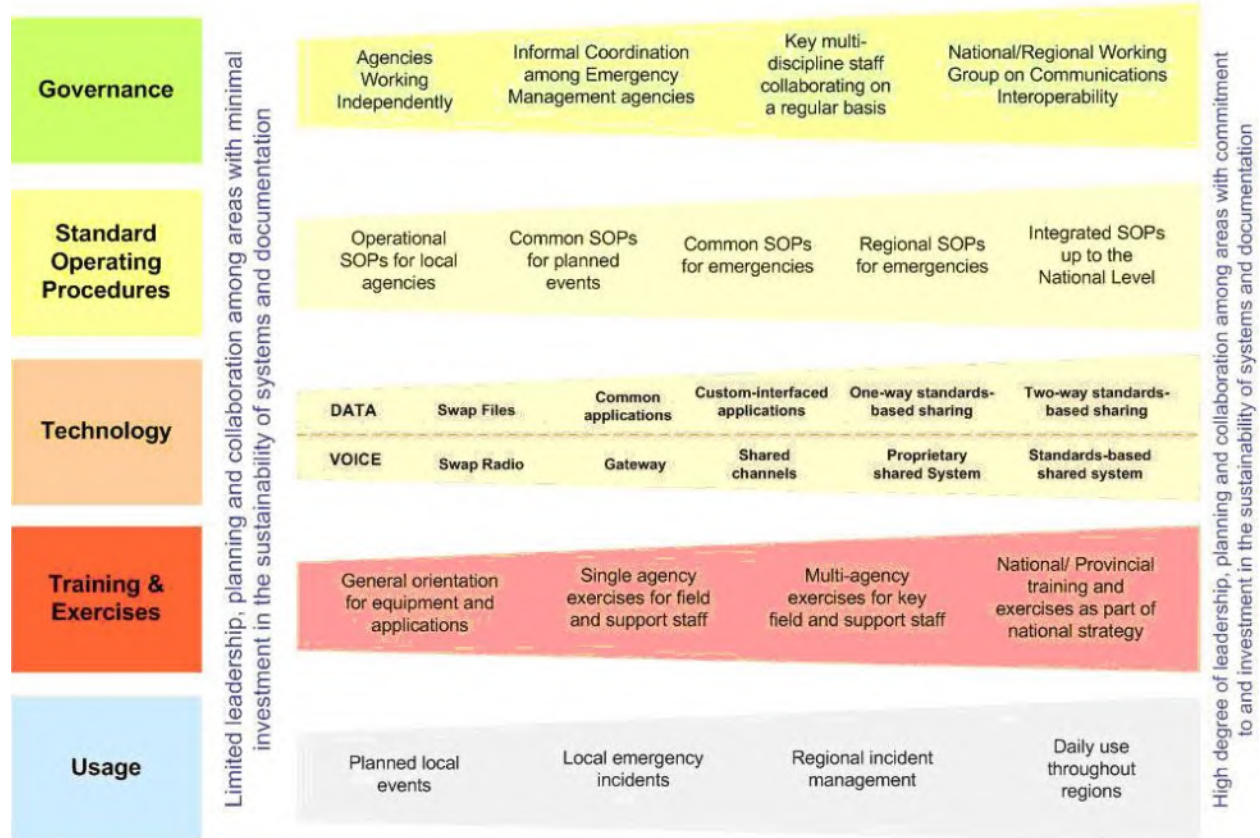
Source: Public Safety Canada, "Communications Interoperability Strategy for Canada" (2011) 12.

In 2018, the federal/provincial/territorial (FPT) Ministers Responsible for Emergency Management acknowledged the importance of a "reliable, modern, nationwide and interoperable public safety broadband network (PBSN) … [that could] be used by emergency responders and

public safety personnel to communicate with each other, share and access information during day-to-day operations, weather-related incidents and natural disasters, emergencies and major events" (Public Safety Canada 2022: i). A Temporary National Coordination Office (TNCO) was established. Partners in this endeavour include the federal, provincial, and territorial governments, as well as the non-government sector (e.g., the Canadian Association of Chiefs of Police, the Canadian Association of Fire Chiefs, the Federation of Canadian Municipalities, and the Paramedic Chiefs of Canada). Consultations with stakeholders were conducted across the country, and research was conducted to inform the preparation of a national plan. The principles for the PSBN, which were presented by the TNCO to FPT governments in early 2022, include: 1) interoperability; 2) equitable service; 3) affordability; 4) sustainability; 5) coverage; 6) delivery of mission critical services; 7) network service always; 8) security; 9) resiliency and robustness; and 10) use of spectrum (Public Safety Canada 2022: ii–iii).

Nova Scotia has been a participant in the interoperability initiatives organized by Public Safety Canada and was one of the first provinces to have a province-wide trunked mobile radio (TMR) system in place for all public safety organizations using the 700mhz bandwidth. This was in place as of 2015 and is known as TMR2 (according to personal communication with NS law enforcement official; see also Rock Networks 2015). Since that time, there have been eight provincial mutual aid channels available to all radio users (police, fire, emergency health services (EHS), Valley Communications, which dispatches for nearly all of the volunteer fire services in the province, as well as servicing as a 911 Public Safety Answering Point (PSAP), search-and-rescue (SAR) volunteers, the military, border services, hospitals, etc.) to facilitate collaboration and coordinated responses to significant events. These channels are in addition to some shared encrypted channels restricted to use by law enforcement in the province. This work

on coordinated radio systems has progressed to include Prince Edward Island (which uses the

Nova Scotia system) and New Brunswick, which has now implemented TMR2. There are now at

least two common channels available throughout the entire geographic area of the three maritime

provinces. In effect, the trunked system allows a Halifax Regional Police portable to work in

Charlottetown and vice versa. There are five dispatch points in Nova Scotia capable of

controlling and assigning the various radio channels for use: the provincial Integrated Emergency

Services (IES), the RCMP Operational Communications Centre (OCC), Emergency Health

Services (EHS), Cape Breton Centre, and Shubie Station for the provincial government

Emergency Management Office (EMO). There is information-sharing between these centres

through the provincial 911 system, which includes overflow protocols.

C. The Important Role of Communication During Major Crises

A central issue for agencies in emergencies is communications, which has been described as "a

process through which an organization sends a message across a channel to another part of the

organization (intraorganizational) or to another organization in the network (interorganizational

communication)" (Kapucu 2006: 209). As Kapucu has noted, however:

> Creating an effective communication network for emergencies is a challenge because it
> may conflict with the organizational structure developed during routine times. When the
> information is simple, a bureaucratic system functions better. Most of the time,
> information in emergencies is complex (Kapucu 2006: 211–12).

Buth has observed, "Time is of the essence in crisis response… Robust communications

protocols…are key to ensuring that the occurrence of an incident is communicated to relevant

managers without delay. The quality of information shared is as significant as the speed of

information flows" (2010: 7). As well, "To act effectively in disaster situations requires sharing

and using information effectively: collecting, collating, analyzing and then deploying it promptly

and in a useful form" (Kapucu 2006: 208). This information-sharing must be across

organizational boundaries and must often occur quickly. This is particularly the case in a

dynamic environment in which a crisis is unfolding rapidly, where there may be a high degree of

uncertainty about the plan and objectives of perpetrators, and/or victims are being randomly

targeted. Inadequate sharing of information may result in resources being inefficiently used

and/or work being unnecessarily duplicated (Kapucu 2006: 211). The extent to which the flow of

information is effective thus plays a major role in the ability of agencies to respond to a crisis: "If

responders are not in contact with each other and if information does not flow properly, it is hard

to envision successful crisis and disaster management" (Kapucu 2006: 209; see also Hine and

Bragias 2021).

Additional challenges exist when personnel from multiple agencies who are responding

to a crisis are in dispersed locations. Strategies must be employed to overcome traditional

communication constraints (Rice 1990: 99).

> Environments characterized by uncertainty and rapid change present different constraints
> and opportunities on organizations than do stagnant and stable environments. An extreme
> event or a disaster challenges the capabilities of routine communication systems whose
> natural constraints may be acceptable in "normal" times (Kapucu, 2006:210).

For these reasons, it is important that interoperative communications arrangements are

"established as part of standard operating procedures so when critical events occur, the protocols

and processes for an effective response are [already] in place" (Kane 2018: 84). The US

Cybersecurity and Infrastructure Security Agency (2019) has produced a best practice guide to

improving emergency alerts, warnings, and notifications (see also Hawkins 2013).

While communications within a security network is a critical issue, communications with

the public is also an important component of emergency management. Lamberti has noted, "The

elements of crisis communications during an incident include controlling messages related to the

police response, meeting the physical and psychological needs of the community, and having the ability to send messages with minimal oversight" (2016: 68). However, traditional command hierarchies and departmental rules about access to sensitive material or mission-related details can sometimes impede the quick dissemination of information: "Messages routinely go through layers of hierarchy for approval before being released to the public. That lengthy approvals process could make crisis communications irrelevant… Timeliness in crisis communications is critical" (Lamberti 2016: 63). Social media can therefore play an important role during a crisis, especially for quick holding messages, such as "we're aware of the incident," "please stand by and be patient with us," and "we provide more information as soon as possible" (Lamberti 2016: 58).

Studies of the effectiveness of communications within and between emergency service agencies in major crises have found that there is better information flow in decentralized decision-making models: "in crisis situations, it is typically the frontline response personnel who are closest to the incident, that have the most up-to-date and accurate understanding … of the situation" (Hine and Bragias 2021: 1504). A boundary spanner is a person in an organization whose role is to link the organization with the external environment and thereby facilitate interagency relationships, using information gathered from first responders (Williams 2002). Boundary spanners, especially those with frontline experience, can be an effective means for improving communication among multiple personnel and agencies.

For a best practices guide to communications and interoperability, see the report of the US National Public Safety Telecommunications Council (2018).

D. Organizational and Occupational Cultures and Interoperability

> What you want to achieve is a "network culture." That is to say, all players have to understand why they are in the network, where they fit in the network, what their contribution is, and how important their contribution is… in order to give meaning to their activities (former senior official from a security intelligence agency, quoted in Whelan 2016: 320).

Discussions of interoperability tend to focus primarily on communication systems, and little attention has been given to strategies for creating and sustaining professional and cultural interoperability (Wankhade & Patnaik 2019: 133). But features of an organization's culture can either facilitate or hinder collaboration (Yang & Maxwell 2011), and cultural interoperability among agencies can therefore be as important as technical and information-based interoperability (Charman 2014: 103). As Kane has put it, "Emergency interoperability … is as much a social process as a technological one" (2018: 82).

The culture of an organization generally refers to "a system of shared assumptions, knowledge, attitudes, values, and norms that explains the way organizational members collectively think and behave" (Cohen 2018: 888). Thus, Charman has noted, "It is in a better understanding of the social dynamics of an organization, how its employees think, operate, learn, and feel which can reveal far more about the inner workings and the potential failings of an organization" (2014: 104). Research has found that personnel who work in agencies where the organizational culture promotes values of mutual interests, fairness and common purpose are more likely to develop and maintain long-term collaborative relationships (Kim & Lee 2006). Studies that examine first responder organizations in particular have found that transformations in organizational culture can enhance interoperability (Jacobs & Keegan 2018; Granter et al 2019; Ward & Winstanley 2006). The culture commonalities among agencies have been described as the "glue" that binds agency networks (Sabatier 1993: 27).

However, as Stephenson has pointed out, traditional blue-light agencies have historically had separate identities and cultures: fire and rescue services are very regimented and have strong norms of command and control; police services work in small teams that may be siloed from one another; and ambulance personnel work either solo or with one other partner (Stephenson 2015: 108). These long-established working cultures may have emerged to facilitate the achievement of specific organizational goals but may hinder the development of collaborative inter-agency partnerships. For example, even though technological innovations should improve the technical side of communications systems, the differing cultural attributes of the police, fire and rescue, and emergency medical services may limit their effectiveness in multi-agency contexts.

Cultural barriers between individual police services, as well as between police services and other emergency services, have been found to hinder collaboration, interoperability, and the effective response to threats to community safety and security (LePard 2010; Oppal 2012). Moreover, cultural fragmentation may encompass not just variations across agencies but also segmentation in ranks within an agency and divergent leadership styles, all of which may hinder collaboration among public safety agencies (Cohen 2018: 886). As Whelan has noted,

> The strength of any particular group's culture will depend upon many factors such as the length of its history, the stability of its membership and the types of experiences its members have shared. Culture is likely to have a profound impact on the extent to which collaboration takes place in networks. This is particularly true of security networks (2016: 315).

Sanders (2014) conducted an ethnographical study of how members of the police, fire, and EMS in one rural and one urban jurisdiction interacted with their technologies and the ways in which "their respective organizational contexts, cultures and practices shape technological functioning and collaborative action … during multi-agency incidents" (464). Among the findings was a disconnect between how technologies were designed to function and their application:

> The varying social work ideologies within emergency response … have influenced access to emergency technologies and their stored information and in turn, have created an ideological disconnect between how these technologies were designed to function and their in-situation application (Sanders 2014: 472).

Sander's conclusions supported the findings of Vaughan (1999) that organizational contexts shape emergency responders' actions, which have an "irreducible and emergent effect on the way complex information is transmitted, communicated, processed and stored" (916).

Appropriate technology can play a significant role in facilitating interoperability, but over-reliance on technology alone to the detriment of other organizational factors can hinder information-sharing (Whelan 2016: 322). Both the potential and the limits of technology must be considered by individual first responder agencies and by security networks, as noted by Voss and Andersoon (2019): "Developing the technical, economic, and governance structures that are needed to revolutionize data-sharing technology use for public safety likely cannot be accomplished by individual agencies working in isolation" (2019: i). Among the questions that should be asked are: What are some of the specific challenges regarding technology and interoperability? What are some examples of these challenges in real-life crisis response? Are there strategies for maximizing technology? Are there any official or recommended guidelines that specifically address technology?

Studies have examined the degree to which variations in the type of agency, the segmentation in ranks within agencies, and leadership styles may hinder collaboration among public safety agencies (Cohen 2018: 886). A case study of operative emergency management in two Norwegian counties identified several major organization, leadership, and individual barriers that limited or hindered effective communication within and between the emergency response organizations (Gilja 2013). Organizational barriers included a lack of training, lack of knowledge about other organizations' capabilities and requirements, and inadequate notification procedures;

leadership barriers included inadequate incident command and underestimating escalation potential; and at the individual responder level, stress and the lack of requisite skills were barriers (Filja 2013: 68). Moreover, the perception of differences in internal culture may lead individuals to feel that they are driven by different purposes and different organizational goals, as seen in this statement by a member of the Australian Federal Police:

> There are a number of cultures inside networks…. [I]f you are looking in a policing context, the [Australian Federal Police] and the Victoria Police are basically policing organisations … but our cultures are different; if you are inside the AFP and the VicPol, you can see there are cultural differences between the organisations (quoted in Whelan 2016: 320).

Strategies to mitigate the hesitancy of first responder agencies to share information, including intelligence, must aim to break agencies out of their respective occupational/cultural silos. It has been noted that, "The three main blue-light services have separate identities and cultures": fire and rescue services are very regimented and have strong command and control; police services work in small teams that may be siloed from one another; and ambulance personnel work either solo or with one other partner (Stephenson 2015: 108).

The organizational culture of police agencies has been extensively documented, showing that the occupational culture of policing is widely shared among police agencies (Griffiths 2020). Ingram, Terrill, and Paoline (2018: 782) have noted that there are collective effects of police culture that may affect the behaviour of individual officers: "Culture is an emergent phenomenon that originates in officer attitudes, becomes shared, and then manifests at a higher level." As Charman (2014) has also noted, "Individual occupational cultures have strong impacts on their members" (116).

Less attention has been paid to fragmentation among police agencies due to their respective organizational cultures (Cohen 2018). There may be factors that contribute to

disconnects between police agencies and these can interfere with collaboration and interoperability.

Given the strong and unique cultural practices of the RCMP, municipal police agencies of various sizes, fire and rescue services, and emergency medical services, moving from a multi-agency mindset to a genuine inter-agency approach is a challenging enterprise. Research studies have found that communication between personnel in the three agencies is a key to developing an inter-agency approach (Charman 2014: 114). There are instances in which, under time pressure and the seriousness of the incident, communication between agencies may decrease and the focus is on intra-agency information sharing (Alison et al 2015a).

E. Interpersonal Relationships, Trust, and Interoperability

> It is impossible to create a truly collaborative network without there being interpersonal or inter-organisational relationships based on a high degree of reciprocity and trust (Whelan 2016: 323).

> Networks are all founded on human beings who have a whole range of strengths and weaknesses… I could have the best structure, I could have the best model, I could have everything in the system be the best, but if I am not plugging in compatible people who have different types of strengths and weaknesses and can actually deliver as a collective, I am still not going to get the right outcome (Australian Federal Police officer, quoted in Whelan 2016: 324).

In a discussion of the importance of informal relationships to achieving the goals of a network, Whelan (2016: 323) has stated: "It is well established that a crucial amount of work gets done through informal networks based on interpersonal relationships. Reciprocity and trust may be as or more important than technology in facilitating and sustaining security networks and interoperability. Whelan's conclusions are based on twenty in-depth interviews with "senior members of security, law enforcement and intelligence agencies" in Australia (2016: 316). The topics explored in the interviews included the interviewee's perceptions on the important factors in network operations and "what makes them operate effectively" (317). This was followed by

more specific questions on "the structural, cultural, policy, technological and relations levels of analysis to better understand these network dynamics" (317).

House, Power, and Alison (2014) have noted that, "In order to execute plans, agencies in an interoperable environment must trust one another in order to be willing to take risks and follow commands from one another" (325). Similarly, Palttala et al (2012) have noted that effective communication requires uniform decision-making and good structures of collaboration. Trust among and between blue light services is a prerequisite for an effective response to major crises (Kapucu 2005).

The process of building trust among blue light services is best done prior to a collective response to a crisis (Kapucu 2006: 210), "because knowledge, routines, and communication practices cannot change overnight" (Laufs & Waseem 2020: 11). As Dynes and Tierney (1994: 150) have noted, "The best predictor of [organizational] behaviour in emergencies is behaviour prior to the emergency."

Analysis of the responses of agencies to natural disasters, air crashes, terrorist acts, and other major crises have found that communication errors are often due to social rather than technological factors (Dynes & Quarantelli 1976; Charman 2014; Granot 1999). Two case studies from the United Kingdom illustrate this point:

> The inquest into the deaths of 12 people at the hands of gunman Derrick Bird in Cumbria in the north of England in 2010 brought into focus once more the difficulties that the emergency services face in providing medical and protective services during major incidents (Chesterman, 2011). Despite 13 ambulances, 3 helicopters and 4 rapid response cars being available, some were not permitted to go further into the danger area for fear that the gunman was still present. One victim remained untreated for almost nine hours. The police were unaware of ambulances standing nearby to the scene. This lack of awareness and communication between different emergency services was not unique to Cumbria (Charman 2014: 101).
>
> A coroner's inquest into the deaths of 52 people who died in terrorist attacks in London on 7 July 2005 again revealed the problems of communication, lack of awareness of the roles of other members of the emergency services, and indeed outright hostility. Reports of angry clashes between ambulance staff and firefighters at Aldgate tube station on the

morning of 7 July have been well documented (Charman 2014: 101–2); see also Wainwright, 2011).

These problems most often arise due to issues of trust and conflicting agency goals (Garnett & Kouzmin 2007). In such cases, agencies tend to focus on their own mandate, resulting in inefficient interoperability (House, Power, & Alison 2014).

As previously mentioned, boundary spanners – organization members whose role is to link their organization with external environments – can facilitate interagency relationships (Williams 2002) by using information gathered from other first responders to build bridges and make more effective decisions. These horizontal connections can supplement formal relationships that are based on positions. Whelan (2016:316) has noted that there are informal personal relationships between organizations based on interpersonal trust, and organizational networks that are based on formal relationships between agencies. Both are necessary.

F. Access to Information

"Effective decision-making requires access to timely and relevant data" (Voss & Anderson 2019: 1). The importance of access to information, information-sharing, and integrated data systems among responder agencies was noted by an Australian Customs and Border Protection Service Officer:

> When there are risks out there everyone needs to be able to have access to information because they might be the member of the group or the member of the network that has the answer that others are looking for… No one agency in that network has the ability to understand the capabilities of the whole system" (quoted in Whelan 2016: 318).

However, "[T]he collection and analysis of any type of threat information can only be successful when it reaches the public safety officials who need it most, and local agencies should insure that information sharing for intelligence purposes is truly a two-way street" (McLellan & Johnson 2018: 3). Voss and Anderson (2019) have therefore noted, "To make the firehose of data

potentially available to first responders timely, relevant, and usable, public safety agencies and technology developers need to collectively address the technical, economic, and governance challenges…" (1).

While there are often indications that agencies generally agree on the importance of information-sharing, studies have found that agencies are often primarily "concerned with obtaining information rather than providing information" and tend to focus on their own areas of interest rather than that of the collective, which results in inefficiencies in the response to major crises (Hine & Bragias 2021: 1503). Like trust-building, effective information-sharing is not something that can be relied upon to occur spontaneously when it is most needed. Instead, it needs careful planning and practice: "Agencies need to make careful decisions about the who, what, where, when, why, and how of data sharing *before* a multi-agency incident occurs" (Voss & Anderson 2019: ii). Barriers include competing organizational requirements, concerns regarding resources, and professional identity (Kane 2018).

G. Memoranda of Understanding

To assist in planning for and fostering a collaborative security network that accounts for differing organizational cultures, effective interpersonal relationships, and reliable access to information, partner agencies often enter into agreements with one another. For example, memoranda of understandings (MOUs) are "non-legally binding arrangements used to describe the terms under which the RCMP cooperates with its partners" (RCMP 2019: 3). These partners may include other police services and levels of government and provide a framework for sharing information, cooperation and collaboration on projects, and sharing equipment, personnel, or agency property (RCMP 2019). MOUs are a method for facilitating and continuing intersectoral collaboration (Damari, Rostamigooran, & Farshad 2019).

Researchers have found that there are often issues in the drafting and implementation of MOUs (Damari, Rostamigooran, & Farshad 2019). In constructing MOUs, "Special attention should be given to liability, responsibility, accountability, and the role that agencies will play when the agreement is activated" (McLellan & Johnson 2018: 2). However, there are very few standard templates for drafting MOUs, and some MOUs are designed without consulting all stakeholders, which can result in very little actual take-up. The challenges of implementing MOUs include a lack of experience in joint planning, bureaucratic obstacles in the participating agencies, a lack of support from senior leadership, inadequate budgets for implementation of MOU provisions, and a lack of understanding of MOU objectives (Damari, Rostamigooran, & Farshad 2019: 172). Damari, Rostamigooran, and Farshad have therefore cautioned, "MOUs can facilitate communication with the right persons in other organizations and strengthen the interaction between organizations … [but] implementation requires strong determination; and generally serious issues cannot be solved by signing an MOU" (2019: 173).

RCMP MOUs are not legally compulsory and do not involve the exchange of money. The challenges surrounding RCMP MOUs were highlighted in an internal audit conducted by the RCMP in 2019 to examine "whether the use of MOUs is consistent with applicable policy requirements within the RCMP" (RCMP 2019). The audit findings included:

- A majority of MOUs were missing key mandatory clauses required by [RCMP] Policy and contained limited financial information.
- Reviews of MOUs were not conducted systematically, and approvals were not always performed at the required level.
- There was no central oversight function in place to ensure that MOUs were respective of core elements of Policy and were aligned with RCMP priorities; and
- There was a general lack of knowledge surrounding contractual arrangements and the approved authorities that applied to them, which increased the risk of exceeding the authorities (RCMP 2019: 3).

Overall, the audit concluded:

> The MOU process should be strengthened to address gaps; that employees drafting MOUs have the proper tools and guidance they need; that reviewers follow a standardized process and document their review; and that the MOU Coordination Unit is involved in monitoring and oversight to ensure compliance with policies (RCMP 2019: 3).

An example of the uncertainties that surround MOUs is a memorandum directed to the Chair of the Halifax Regional Municipality Board of Police Commissioners from a solicitor with the municipality's Legal Services. The memorandum was a response to a request for "clarification around the enforceability of the Memorandum of Understanding signed by HRM, RCMP, and the Board in 2001" (Salsman 2020: 1). The Chair of the Board of Commissioners had raised the question after learning that the Department of Justice was not aware of the MOU. The Solicitor's position set out in the Memorandum was that since the Department of Justice was not a signatory, the MOU was only a statement of intention of the three parties and not an enforceable legal document.

H. Decision-making in Dynamic Environments

There is an emerging body of research literature on the thought processes of personnel involved in making decisions in dynamic settings (Hine & Bragias 2021: 1494). The Naturalist Decision Making (NDM) framework facilitates the study of decision-making in real-world environments, which are often more complex than lab-based scenarios and simulations (Klein, et al., 1993). The NDM model posits several key differences between traditional crises on the one hand and dynamic events that unfold rapidly on the other hand: the latter are complex, unpredictable, often have time pressures and involve multitudes of persons and multiple agencies. These characteristics place these events outside normal police practice.

Research has found that police officers may make decisions differently in situations involving significant time pressures (Orasanu & Connolly 1993). Specifically,

during high-pressure situations, people tend to make intuitive decisions based on previous experience, rather than following a slower analytical process… It has been suggested that because officers rely on the unconscious intuitive decision-making processes, they may be unable to effectively communicate their decisions with others (Hine & Bragias 2021: 1494; see also Cohen-Hatton & Honey 2015).

In addition to time pressure, major crises often require police officers and emergency responders to communicate and collaborate with personnel from other services, including fire and rescue and emergency medical services, with whom they may never previously have worked: "This interaction entails officers working with different personalities, cultures, goals, expertise, and jargon, which all add to the complexity of the situation" (Hine & Bragias 2021: 1495; see also Haferkamp et al 2011). The focus on interoperability frameworks, policies, and plans may obscure the human element of communications:

> When we talk about communication failures, we may be thinking mode failures, but we may be discussing human failures… Unless we agree on a definition for communications, then we can't agree or analyze how communications failed… Most failures are human failures, and no matter how much money you spend on radios, you will still have communication failures when someone forgets to turn on their radio (Cox 2017b: 2–3; see also Cox 2017a).

III. Barriers to Interoperability

Research has identified several barriers to interoperability in emergency situations. These include 1) organizational problems (e.g., poorly defined command structure); 2) poor information management; 3) inefficient communications; 4) inadequate situational awareness; 5) insufficient equipment; and 6) limited inter-agency training (Power & Alison 2017: 243).

Simulation exercises may have limited utility in preparing for an actual critical event, researchers noting, "Even when simulations are incredibly immersive, responders are aware that the exercise is fictitious and so the personal impact of such events, especially with regard to the salience of potential aversive long-term consequences (e.g. job loss), will be reduced" (Power & Alison 2017: 244).

A. Centralized versus Decentralized Command Systems

Discussions of interoperability often centre on the centralization and integration of first responder agencies (e.g., Boin 2004; Quantrelli 1988). Some observers, however, have argued against the concept of interoperability as entailing common operational pictures, a clear hierarchical organizational structure, collective accountability, and trust and effective communication (Kapucu & Garayev 2011). For example, House, Power, and Alison have contended that this framework is "unrealistic in practice due to the inherent stressors of the major incident environment" (2014: 331). Specifically, there are concerns that centralized, hierarchical incident management structures may hinder rapid multi-agency decision-making and response in dynamic environments (House, Power, & Alison 2014). Kapucu, for example, has found that "Hierarchies generally perform badly in emergencies, because if any of the hierarchy's top nodes fail, they isolate large networks from each other" (2006: 208; see also Liu, Guo, & Nault 2017). Likewise, Power and Alison have argued that a centralized command system "adds complexity to the emergency because it can blur professional boundaries and increase confusion about roles and responsibilities within the networked team" (Power & Alison 2017: 243; see also Brown, Crawford, & Darongkamas 2000; Curnin et al 2015).

To combat this potential problem, some scholars advocate for a non-hierarchical, decentralized yet interoperable major incident management network: "[T]he concept of interoperability needs to embrace the decentralised nature of major incident command systems, rather than enforcing a desire for an unrealistic and unobtainable goal of centralised interoperability" (House, Power, & Alison 2014: 331). In this vein, Alexander has found that decentralized approaches provide more opportunity for local efforts that may be hampered or overridden by a centralized approach (Alexander 2010). Hine and Bragias have similarly noted:

> During high-pressure situations, time-sensitive crises create conditions of increased decision-making for personnel at the lower levels of organizational structure, and less time for consultation amongst the team. This resulting autonomy amongst lower-level members created a "horizontal" style of functioning in teams, questioning the practicality of normative communication systems that tend to follow a rigid hierarchy (2021: 1502).

Moreover, researchers have highlighted the important role that middle managers, who are responsible for supervising personnel involved in service delivery:

> Middle managers as effective leaders are critical to the success of any interoperability or collaboration program, because of their ability to liaise between upper management and the operational member… Effective middle managers have the unique ability to communicate internally and externally; essentially to play both sides of the field. As a result, they should be the driving force of interoperability and any management or executive attempt to re-align significant strategic goals must always include them in the process. (Coakeley 2016b: 2)

In first responder agencies, middle managers occupy the realm between frontline workers and senior management. In police agencies, for example, it is often non-commissioned officers (NCOs) who fulfill this function. There is additional research to be conducted on the centralized vs decentralized crisis management approaches and the role that middle managers play in both models.

B. Changing Policy versus Changing Behaviour

Trust, reciprocity, and relationships, which may be as important as technological aspects of a plan. As Whelan (2016: 316) has stated, "A change in policy … is not enough, as promoting the sharing of information requires a 'need-to-share' information culture. Policy, then, can clearly both support and undermine inter-agency collaboration." There may be slippage between how a network is designed and how it is used/implemented by the involved agencies.

C. Organizational Factors: The Bureaucratization of Interoperability

It has been noted, "Response organisations must be reactive and agile, achieving self-synchronisation between and amongst … organisations. Major incident response requires a mix

of skills and capabilities dependent upon a network configuration rather than a singular organisation" (House, Power, & Alison 2014: 329). Researchers who have studied live disaster training exercises have found that participants frequently either revert to gathering information rather than progressing to action, or they take action without deliberately considering options (Waring, Moran, & Page 2020).

It has been stated that, "The best time to talk about how to respond to an incident is before they happen" (Calderwood 2017). In post-event analyses and inquiries, "Simply saying 'communication failure' says nothing about what failed, when it failed, where it failed, or how it failed. It is the exact equivalent of simply stating 'something went wrong'" (Morgan 2022: 2). Rather, it is important to examine the context in which decisions were made: "Without the context, planners will not know what needs to be addressed or fixed." (Morgan 2022: 2).

The lack of experience among agency decision-makers may also hinder an effective response. Major crises are quite rare, and police leaders and frontline officers may have little or no prior experience responding to such events (Rojeck & Smith 2007; Hine & Bragias 2021: 1493): "Major incidents are inherently ambiguous and complex; it is the associated experience of uncertainty that makes decision making difficult" (Power & Alison 2017: 244). In these circumstances, the police and other first responders are often required to go beyond their normal duties, training, and expertise.

Police services and fire/rescue services have traditionally had rigid command-and-control structures, but strict hierarchies and boundaries within and between organizations may inhibit effective decision-making (Eyre et al 2008), especially during critical incident responses. For example, the Incident Command System (ICS), which is used by many fire service agencies in Canada (see Dubowski, 2011), does not emphasize collaboration with other agencies and

services (Hanifen 2017). On the other hand, if there is effective multi-agency interdependence –

that is, if participating agencies rely on one another "for their efforts, information and resources"

– then the execution of the plans for responding to critical events is enhanced (House, Power, &

Alison 2014: 324).

D. Endogenous and Exogenous Stressors in the Major Incident Environment

> It is inevitable that decision-making when operating in an interoperable environment will
> be bounded. Major incidents are peppered with both endogenous and exogenous stressors
> causing uncertainty, derived from poor or miscommunication of complex situational
> factors along unstable and large hierarchical team networks (House, Power, & Alison
> 2014: 326, 331).

Research studies have found that endogenous and exogenous stressors often hinder

interoperability and therefore hinder the timely and effective response to major incidents

(Comfort 2007; House, Power, & Alison 2014). Endogenous challenges include lack of

information, resource issues, e.g. personnel and equipment, time issues, and issues related to

managing personnel (Power & Alison 2017: 247). In major crises, endogenous stressors include

"complexity, time urgency, ambiguity and high risk."

Whether a critical event unfolds over a relatively long period of time or is a dynamic,

rapidly developing incident (such as occurred in Nova Scotia in 2020), there are stressors that

challenge even the best interoperability mode. It has been noted that, "In practice, the stressors of

the major incident environment distract commanders from coordinated multi-team functioning,

reducing the tendency to make collaborative decisions and implement actions" (House, Power, &

Alison 2014: 322).

The current literature on interoperability defines an interoperable response as being

characterized by "a shared inter-agency understanding of the situation" (House, Power, & Alison

2014: 323). This involves the development of a "common operating picture", which may be

more challenging to achieve in a rapidly unfolding critical event (House, Power, & Alison 2014: 323). The absence of a common operating picture can adversely affect a coordinated response to a critical incident, leading to a tendency of the participating agencies to "revert back to intra-agency hierarchies as a means of maintaining control" (House, Power, & Alison 2014: 323; Contestabile 2011).

F. The Absence of Best Practices

Researchers have noted, "The literature on multi-agency disaster response and collaboration is rich in in-depth case studies, but there is little cross-over learning and only rarely a more general evaluation of best practices" (Laufs & Waseem 2020: 11). The absence of best practices is due in part to the challenges in measuring the performance and effectiveness of security networks (Whelan 2016: 313). What is considered "effective" will vary among the individual agencies involved in the network, as well as among networks in different regions and those serving different populations (Provan, Fish, & Sydow 2007: 505).

The development of best practices is facilitated by conducting after-incident reviews that identify how a critical incident was responded to. However, only in exceptional circumstances are independent inquiries called to examine every facet of a response. Rather, reviews are usually called only after a major crisis in which there were serious operational failures. There is not a substantive body of literature on incidents in which the strategies used were successful. This focus on "bad" practices may not produce "best" practices. Moreover, it is generally left to individual agencies to conduct reviews, the results of which may not be published. Police, fire and rescue and emergency medical services need to have the capacity for conducting after-incident reviews and to compile the findings into lessons learned and best practice policies. It is important that planning processes identify vulnerabilities that may impact the ability of blue-light

agencies to respond to critical incidents (McLellan & Johnson 2018: 2). It is also important that

the findings of reviews and the lessons learned be shared with the general public. This

transparency will increase public trust and confidence in first responder agencies. An excellent

example of an organizational "autopsy" is the report produced by then-Deputy Chief Constable

Doug LePard, who examined all facets of the Vancouver Police Department's investigative

response in the case of Robert Pickton (LePard 2010). The 400+ page report is perhaps the most

thorough and thoughtful study of an organization's response to a crisis.

H. Agencies Operating in Silos

> The current and past policies of municipal, provincial, and federal governments,
> combined with the independent practices and procurement processes of public safety and
> security organizations have created a collection of siloed communications networks
> incapable of efficient interoperability (General Dynamics Canada 2013: 8).

A challenge to developing security networks based on interoperability is that many organizations

are hampered by their continued operation in silos and their misunderstanding of one another's

standard operating procedures (SOPs) (Coakeley 2016b; Seoane 2019a; Seoane, 2019b). Noting

that multi-agency SOPs can work at cross-purposes, Coakeley has stated:

> We can no longer afford to believe that our individual mandates supersede those of the
> other agencies with whom we are responding… The time wasted as a result of ignorance
> or misunderstanding of one another's SOPs can have catastrophic effects… (2016a: 1
> and 3).

In examining how agencies perform in crises, Laufs and Waseem (2020: 12) have found

that most personnel make decisions and tailor their responses based on their specific field of

expertise, and there are institutional boundaries that limit collaboration with other agencies. This

in turn limits the effectiveness of responses. To ensure interoperability, participating agencies

must understand and accept the hierarchy and the capacities and resources that each partner

brings to the effort: "Collaborative multi-agency environments depend to a large extent on the

willingness of agencies to share information and coordinate their response with others"

(Olejarski & Garrett 2010; Laufs & Waseem 2020: 12). However, such sharing of information

and coordination cannot be only ad hoc:

> Success of collaborations amongst blue light organisations … is not simply about why
> and under what institutional conditions they are formed; rather, it is about how each of
> these collaborations is managed over time in terms of the processes developed to build,
> nurture and support those networks (Wankhade & Parnaik 2019: 135).

The role of boundary spanners is thus not just to be an inter-agency link during major crises but

to break down institutional boundaries on an ongoing basis. Frequent joint exercises are another

strategy for interoperability, which can help to build trust between agencies (Laufs & Waseem

2020: 12). The RCMP transfer policy wherein senior leadership, non-commissioned officers and

frontline officers are moved on a regular basis may prevent the development and sustainability of

relationships of trust between the RCMP and municipal police services (LePard, 2010).

IV. Elements of an Effective Multi-agency Response

Research on interoperability has produced materials that can be used to inform the development

of a framework for effective multi-agency response to major crises. Auf der Heide, for example,

has identified the conditions that must be achieved for an effective multi-agency response in a

crisis as the following (see also House, Power, & Alison 2014: 330):

- Articulation of commonly understood meanings or understanding of the threat between a system and its members;
- Sufficient trust among leaders, organizations, and citizens to overcome uncertainty and enable members to accept directions;
- Sufficient resonance or support of the community between the emerging system and its environment to gain support for action;
- Sufficient resources to sustain collective action under varying conditions; and
- Integration of the activities of responding agencies with their respective roles, incorporated in a planned and systematic manner.

Importantly, these conditions, which facilitate interoperability and collaboration between

response agencies, raise several questions that should be considered when a jurisdiction is

planning for interoperability in the context of crisis response:

- How can collaboration and interoperability best be established and sustained?
- What elements facilitate interoperability and what are the barriers to interoperability?
- What is the role of technology, organizational culture and protocols, and personal relationships in interoperability?
- Which indicators should be used to monitor collaboration activity in the future?
- What evidence is there of wider sharing of the lessons and of them being learned?
(Kane 2018: 79)

The next section examines initiatives taken in the United Kingdom to improve interoperability

among blue-light agencies, and those examples may be especially instructive for thinking about

actions that Canadian jurisdictions can take to improve the effectiveness and efficiency of multi-

agency response. The countries share the same system of government and the origins, and

evolution of policing in Canada was heavily influenced by UK developments, e.g., Peel's

principles of policing (Griffiths 2020).

V. Interoperability in the United Kingdom: Experiences, Initiatives, Outcomes

> Collaboration is a highly skilled change-management process. Building and maintaining collaborations call for the building of relationships, financial management, negotiation skills, creativity and the ability to learn. In too many places, the skills of the people leading and managing collaborations are not enough to meet the problems they face (HM Inspectorate of Constabulary and Fire & Rescue 2020: 19).

As part of an effort "supporting collaborative and innovative blue light working" (HM

Government 2016: 4), the UK government has conducted major community consultations about

collaboration among emergency services (HM Government 2016; HM Inspectorate 2020). The

premise of these consultations was that "Closer working can enable the emergency services to

deliver more effective and efficient services for the public" (HM Government 2016: 6). Two

strategic planning documents, "Police Vision 2025" and the "National Digital, Data and

Technology Strategy (2020–2030)," provide a framework for increasing interoperability among police services. "Police Vision 2025" was designed to "shape decisions around transformation and how we use our resources to help keep people safe and provide an effective, accessible value for money service that can be trusted" (Association of Police and Crime Commissioners (APCC) & National Police Chiefs' Council (NPCC) 2016: 2). The document states that local police services will be aligned, and among the strategies used to sustain this alignment is "improving data-sharing and integration to establish joint technological solutions and enabling the transfer of learning between agencies and forces so we can work more effectively together to embed evidence-based practice…" (APCC & NPCC 2016: 7).

The National Digital, Data and Technology Strategy, which was launched at the Police Digital Summit 2020, "sets out a new digital ambition for our service through a set of tangible digital priorities for policing and it outlines the key data and technology building blocks required to deliver them" (APCC 2020: 2). The strategy document sets out a pathway for developing and integrating technology and data systems, noting that "The improvement must be focused on capability rather than structure; in how we distribute digital transformation capabilities across policing to serve the needs of the whole network, and of localities."

In addition to these most recent initiatives, Stephenson (2015) conducted a review of 37 public inquiry reports in the UK produced from 1986 to 2010 that investigated failures of interoperability. Among those studied were inquiries into the Derrick Bird shootings in 2010 (BBC 2011; Chesterman 2011); the 2005 London bombings (London Assembly 2006), the 1988 Lockerbie Bombing (Wells, 2009; Marquise, 2008); and other critical events, including floods, explosions, air and rail crashes, and disease outbreaks. Stephenson concluded that the most common failures identified were 1) poor working practices and organizational training; 2)

inadequate training; 3) ineffective communication; 4) lack of leadership; and 5) failure to learn lessons (2015, 109). In the case of the Derrick Bird shootings in Cumbria, there had been a lack of awareness and communication between different emergency services (Wainwright 2011). During the 2005 terrorist attacks in London, there had been "problems in communication, a lack of awareness of the roles of other members of the emergency services, and indeed outright hostility" (Charman 2014: 102; see also HM Government 2012).

This review prompted the UK government in 2012 to create the Joint Emergency Services Interoperability Programme (JESIP) in order "to achieve better cooperation and coordination between the three emergency services at the scene of a major incident" and to facilitate better working relationships between the services on an ongoing basis (Stephenson 2015: 109; see also Flanagan 2014; Pollock 2017).[1] A Joint Decision Model (JDM) (see **Figure 2**) was subsequently developed to be used by commanders in the police, fire and rescue, and emergency medical services to improve collaboration and effective decision-making. The JDM is designed to address the challenges in inter-agency communication, collaboration, and interoperability discussed earlier in this report. It provides a template that can be used in any jurisdiction to develop a framework to improve the effectiveness and efficiency of the response to major crises.

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[1] See the website of Joint Emergency Services Interoperability Programme, https://www.jesip.org.uk/home. See also JESIP. 2016. "JESIP Fact Sheet 1." Version 7 (March 2016), https://www.jesip.org.uk/uploads/media/pdf/JESIP_ Fact_Sheet_1_V7_March_2016.pdf (accessed 5 April 2022).

Figure 2: The JESIP (UK) Joint Decision Model (JDM)

Source: JESIP. (no date). https://www.jesip.org.uk/joint-decision-model (accessed 5 April 2022)

The JDM is centered on three primary considerations, set out in **Table 1**.

Table 1: The Joint Decision Model (JDM)

Situation	Direction	Action
What is happening?	What do you want/need to achieve in the first hour (desired outcomes)?	What do you need to do to resolve the situation and achieve your desired outcomes?
What are the impacts?	What are the main aims and objectives of the emergency response?	
What might happen and what is being done about it?	What overarching values and priorities will inform and guide this?	
What are the risks?	What overarching values and priorities will inform and guide this?	
What might happen and what is being done about it?		

Source : https://www.jesip.org.uk/joint-decision-model

A related UK initiative was the development of a "single message to be used by each service for the declaration of a major incident and communicating relevant information to the

service-specific control room that would then be understood when shared with other services"

(Stephenson 2015: 114), known as "M/ETHANE."[2] The M/ETHANE acronym stands for:

M major incident declared?
E exact location
T type of incident
H hazards present or suspected
A access (routes that are safe to use)
N number, type, severity of casualties
E emergency services present and those required

Source: JESIP webpage "M/ETHANE," https://www.jesip.org.uk/methane

JESIP has produced a corresponding M/ETHANE checklist for those working in control rooms

in order to help them collect the relevant information. Research cited by Stephenson (2015) has

shown that the JDM and the M/ETHANE message have been effective in producing changes in

blue-light agency practices and thereby enhance interoperability (116). For a more in-depth

description of M/ETHANE and its use, see the JESIP Resource Manual (2018: 13–14, 88–89,

130–32).

As part of efforts in recent years to prioritize interoperability, over 10,000 operational

and tactical commanders in the United Kingdom have been trained in "the new way of working,

and this is being achieved by each commander attending a day's training, which is delivered by a

multiagency team from each of the blue light communities" (Stephenson 2015: 113). According

to Stephenson, this training "has not only significantly increased the understanding of the issues

and pressures being experienced by the different services but also forged some of the

relationships that over time had started to diminish due to different organizational pressures that

had removed the capacity for commanders to participate in exercises" (113). However, there has

so far been no published evaluation of the impact of this training and relationship-building on the

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[2] See the JESIP webpage "M/ETHANE," https://www.jesip.org.uk/methane (accessed 6 May 2022).

response to major crises. However, case studies of collaboration within emergency services projects in the United Kingdom have identified several lessons that can inform Canadian discussions of interoperability. Some of these are listed here (adapted from Kane 2018: 85):

- Where emergency services collaboration is successful, it is grounded in a clear, shared vision between partners.

- Local political (non-partisan) endorsement is critical in providing support.

- It is often key individuals who drive collaboration, and this requires that appropriate communications and transfer of responsibilities are in place when those personnel move on.

- Appropriate, universally agreed governance structures are essential in the management and development of collaboration.

- In collaboration between services (inter), it is important that due consideration is given to collaboration within the same service (intra).

- In aligning services through collaboration, retaining "brand" identity is both a common aspiration and a key challenge.

- There is positive public backing for collaboration but a lack of public awareness about what currently happens.

- Sustainability of collaboration is linked to local decisions around future direction (e.g., underpinning what exists or expanding reach).

- Collaboration would be given further momentum if linked to key performance indicators. These could cover things such as response times, public confidence, capital expenditure, crime and detections rates, cost savings, etc.

- Future funding is key to sustainability and expansion – a range of options exist, for example, more funding from governments.

- Data is patchy, inconsistent, and not linked to targets.

- The limited evidence of successful financial outcomes hinders conclusive economic analysis.

The government of the United Kingdom has itself also recently explored the performance of police-to-police collaborative arrangements in all 43 England and Wales police forces and six case studies of collaborative initiatives to determine the factors that affect their success or failure (HM Inspectorate 2020). The findings reveal that good practice in police collaboration has several requirements:

1. Collaboration must demonstrate a benefit to the public by having clear objectives, a clear identity, and the purpose of the collaboration must be clearly set out to the public (HM Inspectorate 2020: 5).

2. The costs–benefits of collaboration are important, which not only includes fiscal costs but also the benefits of having the capacity to effectively respond to critical incidents and events (HM Inspectorate 2020: 6).

3. Trust is a key element of leadership and governance for collaborative relationships, including delineating "how decisions will be made and who will make sure that tasks are allocated and completed" (HM Inspectorate 2020: 6).

4. It is important to recognize the "complex and specialist nature of collaboration. It is a highly skilled change-management process that needs good relationship-building, financial management, political skills and creativity" (HM Inspectorate 2020: 7).

5. "Putting the right people with the right skills in place leads to success and improves the efficiency and effectiveness of the programme" (HM Inspectorate 2020: 7).

6. Too often, decision-making is complex and bureaucratic, due in part to police services not adapting their structure "to fully achieve the benefits of the collaboration" (HM Inspectorate 2020: 17).

7. It is necessary to conduct evaluations of collaborative initiatives to identify the factors that facilitate and hinder positive outcomes and to determine how collaboration can be enhanced (HM Inspectorate 2020: 20).

VI. Major Crises in Canada: Findings and Recommendations

Reports and inquiries that are produced after major crises can provide important insights into the factors that facilitate or hinder interoperability. A review of the government of Alberta's response to the historic floods in the southern part of the province in 2013 found that this disaster "tested Alberta's emergency management system to a degree never before encountered and rarely seen globally" (MNP 2015: 1). The review found that there were "extensive emergency management skills, capability and capacity throughout the Government of Alberta and the province," and there was a framework for emergency management in place that involved a variety of stakeholders, including NGOs, the federal government, and industry (MNP 2015: 6). However, the report noted, "In order to successfully implement and execute the framework,

structures and plans the required emergency management must be in place" (MNP 2015: 6).

While the response to and recovery from the floods were aligned with best practices, the review

nonetheless found that there were gaps and opportunities for improvement:

> The lack of a formalised and comprehensive emergency social services framework was one of the most significant gaps in overall response and recovery. […] The absence of a provincial framework resulted in coordination and communication issues, lack of clarity regarding roles and responsibilities and challenges with delivery. Although challenges were eventually overcome through the outstanding efforts of the individuals and groups involved, there is an urgent requirement to develop and implement a provincial emergency social services framework (MNP 2015: 9).

> Where frameworks, plans and procedures were in place, and people were trained in their use, communication and information passage was quite effective. In situations where these underpinning elements were not in place there were communication challenges. Therefore, the path to improved communication is to provide the appropriate frameworks, plans and procedures, and then ensure that all involved are aware of them and practiced in their use. (MNP 2015: 62).

A. Systemic Failures of Interoperability Within and Between Police Services

> Virtually every interjurisdictional serial killer case including Sutcliffe (the Yorkshire Ripper), and Black (the cross-border child killer) in England, Ted Bundy and the Green River Killer in the United States and Clifford Olsen in Canada, demonstrate the same problems and raise the same questions. And always the answer turns out to be the same— systemic failure. Always the problems turn out to be the same, the mistakes the same, and the systemic failures the same (Campbell 1996 ("Bernardo Review"): 4).

Cases involving serious criminal behaviour can unfold rapidly or occur over a lengthy period. In

either situation, the interoperability within and between police organizations plays a significant

role in the ability of the police and other emergency services to respond effectively. The mass

casualty event in Nova Scotia was a dynamic, rapidly unfolding event, unlike the cases of Paul

Bernardo, Robert Pickton, and others where the criminal acts were perpetuated over a longer

period of time. While there are unique features of rapidly evolving critical events, the issues of

interoperability are similar.

In 2014, three members of the RCMP Codiac detachment in Moncton, New Brunswick

were killed and two others wounded in confrontations with a 24-year-old who was armed with a

high-powered rifle. The subsequent findings of an inquiry into the incident provide insights into the nature of police responses to rapidly unfolding events in which suspects are armed. The review of the Moncton event found that "On June 4, 2014, supervisors in Codiac were confronted with a situation that in many ways exceeded what supervisors are trained to deal with. They were faced with a crisis situation that evolved quickly, was operationally challenging and highly emotional" (MacNeil 2014). The final report set out a number of recommendations in five areas: 1) supervision, 2) training, 3) technology, 4) equipment, and 5) communications and aftercare. Specifically, the recommendations included ensuring that officers are equipped with cellphones and police radios while on duty and the development of a radio and data system to facilitate communication between RCMP members in all maritime divisions (MacNeil 2014). The RCMP (2015) issued a response to the report, accepting the recommendations and setting out a timeline for taking initiatives to address the areas of concern that were identified. In 2017, the RCMP issued an update on actions taken on the recommendations of the MacNeil report (RCMP 2017). These included providing additional training to frontline supervisors to manage critical incidents, improving effective communication among officers and to the public when responding to critical incidents, and improving equipment and technology. There have been no published updates since 2017 and no independent evaluation of the initiatives and their effectiveness in improving the response to critical incidents.

B. Decision-Making and Interoperability in Major Case Investigations

The investigation into the missing and murdered women in the Robert Pickton case stretched over many years, as did the crimes committed by Paul Bernardo. The inquiries that were conducted into these cases following the arrests of Pickton and Bernardo revealed key issues surrounding the interoperability of police services.

Between May of 1987 and December of 1992, Paul Bernardo raped or sexually assaulted at least eighteen women in Scarborough, Peel, and St. Catharines, Ontario and killed three women in St. Catharines and Burlington. Following Bernardo's arrest in February 1993, a review was conducted of the investigative activities of municipal police services, the Ontario Provincial Police, and forensic agencies (Campbell 1996). One of the major findings of the review was that:

> There were times during the separate investigations […] that the different police forces might as well have been operating in different countries… Because of systemic weaknesses and the inability of different law enforcement agencies to pool their information and co-operate effectively, Bernardo fell through the cracks… (Campbell 1996: 5).

In commenting on the future ability of Ontario law enforcement agencies to effectively respond to similar circumstances, Justice Campbell stated:

> Ontario has, in its existing law enforcement agencies, the essential capacity to respond effectively to another case like this, but only if certain components of those agencies are strengthened and only if systems are in place to co-ordinate and manage the work of different agencies (Campbell 1996: 5).

The extent to which the Bernardo Review resulted in lessons learned for Canadian law enforcement agencies was called into question by the investigation and eventual arrest in 2002 of Robert Pickton, who would be convicted of murdering sixteen women in British Columbia between the late 1980s and the early 2000s. Following his conviction in 2007 for the second-degree murder of six women (while facing additional first-degree murder charges in the death of twenty other women), two major inquiries were convened to consider why Pickton had been able to commit so many homicides over a span of three decades (LePard 2010; Oppal 2012). The interoperability, or lack thereof, between the Vancouver Police Department (VPD) and the RCMP during these years was a focus of both inquiries.

In 2010, the VPD tasked then-Deputy Chief Constable Doug LePard with conducting an in-depth management review of how the department's investigation into missing women had been conducted. The findings from this review included:

1. The VPD should have recognized earlier that there was a serial killer at work and responded appropriately, but the investigation was plagued by *a failure at the VPD's management level to recognize what it was faced with* (emphasis added).

2. When the VPD did respond with an investigative unit targeted at investigating the Missing Women as potential serial murders, the investigative team suffered from a lack of resources, poor continuity of staffing, *multi-jurisdictional challenges*, a lack of training, and a lack of leadership, among other challenges (emphasis added).

3. There was compelling information received and developed by the VPD and the RCMP from August 1998 to late 1999… suggesting that Pickton was the likely killer, and it was sufficient to justify a sustained and intensive investigation. The VPD received the first information about Pickton in July and August 1998, and also received extraordinary information from an unrelated informant in 1999…. The information suggested that Downtown Eastside sex trade workers were willingly visiting the Pickton property in Coquitlam and some were being murdered there

4. The VPD passed on ALL information about Pickton to the RCMP when it received it, because the RCMP had jurisdiction over the investigation of information pertaining to crimes occurring in Coquitlam.

5. The RCMP accepted responsibility for investigating the Pickton information and led an investigation in Coquitlam. This investigation was intensely pursued until mid-1999 but was thereafter essentially abandoned by the RCMP, although the RCMP continued to explicitly assert authority over the investigation. *RCMP management appears to have not understood the significance of the evidence they had in 1999 pointing to Pickton, … and did not ensure it was collated in such a way as to allow a proper analysis* (emphasis added).

6. Notwithstanding the many deficiencies in the VPD investigation, they did not cause the failure of the investigation into Pickton because *the RCMP had responsibility for that investigation while the VPD focused on other investigative avenues*. If the VPD investigation had been better managed, however, the VPD could have brought more pressure to bear on the RCMP to pursue the Pickton investigation more vigorously (emphasis added).

7. There have been significant improvements in the VPD due to the lessons learned from the Missing Women investigation, including better training, analysis, resources, and leadership. *There have also been significant improvements in the response to multi-jurisdictional crimes by the VPD, the RCMP, and other police agencies in BC, but other improvements are needed* (emphasis added).

8. Had there been a regional police force in the Lower Mainland at the time of the Pickton investigation, the problems created by the multiple policing jurisdictions would have been significantly reduced and a better outcome likely would have resulted—*there would have only been one set of organizational priorities* (LePard 2010: 18–19, emphasis added).

Several of these findings relate directly to the significant challenges of interoperability that existed between the VPD and the RCMP and that hindered the investigation into the missing women and delayed the identification and arrest of the perpetrator. Key themes in the findings included a lack of communication within the VPD and between the VPD and the RCMP, leadership and management issues, and the fracturing of the case investigation process due to the absence of a regional police service.

In addition to the VPD review of the Pickton case, the provincial government appointed Justice Wally T. Oppal as commissioner of an inquiry into the response of police agencies to missing women, many of whom were the victims of Robert Pickton. The inquiry heard from a variety of stakeholders, including the victim's families, police services, and officers involved in the investigations. From the evidence gathered during the inquiry, Justice Oppal posited several possible explanations for the failures of the police services investigating the missing women in the Greater Vancouver region: 1) discrimination in the form of systemic institutional bias and political/public indifference; 2) a lack of leadership in the supervision and management of the investigations; 3) limited and outdated policing systems, approaches, and standards; 4) the fragmentation of police services in the Lower Mainland of British Columbia; 5) inadequate resources; 6) police culture and people problems; and 7) an alleged conspiracy (Oppal 2012: 93).

Justice Oppal concluded that, although there was no evidence of overt individual bias that contributed to the failings of the police investigations, there was systemic bias in the policing response to the missing women (96):

> Policing systems failed because unintentional, but unchecked, systemic bias led to faulty risk assessments, an inadequate emphasis on proactive prevention strategies, an inadequate allocation of resources, and significant oversights in pursuing investigative strategies (Oppal 2012: 109).

There was also an absence of leadership: "No senior manager at the VPD, RCMP 'E' Division

Major Crime Section, Coquitlam RCMP, or Provincial Unsolved Homicide Unit (PUHU) took

on this leadership role and asserted ongoing responsibility for the case" (Oppal 2012: 96). This

resulted in "investigations without sufficient direction, staffing or resources... [T]he pattern of

disengaged leadership was due to a combination of lack of interest and understanding" (Oppal

2012: 97). The police investigations were also hindered by a "parochial and silo-based approach

to policing" and the "poor or non-existent integration of community-based principles" into the

investigative process (Oppal 2012: 98 and 99).

The Inquiry also found serious communication issues amongst the municipal and RCMP

police services in the Lower Mainland, due to the fragmented policing arrangements and the

absence of a regional police service: "The failure to take all necessary measures required by

cross-jurisdictional crime resulted in serious communication failures, linkage blindness,

uncoordinated parallel investigations, and lack of sharing of key evidence" (Oppal 2012: 100).

These are all attributes of a lack of interoperability, as discussed above.

The Inquiry also revealed that police culture and "people problems" hindered the

investigations (Oppal 2012: 103). Regarding the issue of police culture, the Report states,

"Organizational culture influences all aspects of an institutional life, particularly decision-

making, and *shapes the interactions of members and between members and outsiders*" (Oppal

2012: 103, emphasis added). In elaborating on "people problems," which the Report describes as

"interpersonal issues, lack of fit of an officer for a position, and other personnel level issues," the

Report states, "Several personality conflicts and personnel issues affected the dynamics of the

investigation" (Oppal 2012: 104). The findings of the Oppal Inquiry thus laid bare many of the

issues surrounding the interoperability of police services that have been documented in other

jurisdictions and in research findings. Words of warning were thus offered by Mr. Justice Oppal:

"I conclude that serial killers will continue to win the day as long as we continue to ignore past

lessons" (Oppal 2012: 93).

VII. Final Thoughts: Best Practices in Interoperability

A review of the research on interoperability in crisis situations in Canada, the United Kingdom,

and elsewhere reveals best practices that can inform the development of effective and efficient

multi-agency responses to crises. These best practices include:

1. Strong, high-performing networks are based more on collaboration than cooperation (see section II-A above). The ideal is integration.

2. Technology, integrated data systems, and information-sharing are important but must have an integrative framework to be of maximum utility.

3. Informal interpersonal relationships based on trust are as important as formal inter-agency relationships.

4. The cultures of participating agencies may dampen interoperability. Jurisdictions should therefore promote a positive network culture that will mitigate the barriers imposed by individual agency cultures.

5. Jurisdictions should reduce cultural fragmentation between individual police services and between police services and other first responders.

6. Joint training sessions, the development of formal and informal relationships based on trust, reciprocity, and aligned mutual interests should be features of strategies designed to improve interoperability.

7. Addressing current gaps in interoperability should include strategies for building relationships among key decision-makers.

8. Planning in advance of crises increases the effectiveness of agency and multi-agency responses.

9. Emergency preparation training should be provided to officers at all ranks, not just to senior leadership. There should also be regular training with other emergency response agencies.

10. To accommodate multiple agencies with their own cultures and operating procedures, efforts should be made to delineate clearly defined roles for agencies and individual units and have a command structure that is "as decentralised as necessary and as centralized as possible" (Steinberger 2016; Hine & Bragias 2021: 1504).

11. "There should be a continuous sharing of resource information between partners, collaborative decision-making about invoking schemes for inter-agency decision-making, and an ongoing review of the needs of civilians" (Laufs & Waseem 2020: 12; see also Guddemi 2021).

12. There should be a development of protocols to ensure the sustainability and continuity of formal and informal relationships within and among blue light agencies.

The development and implementation of effective interoperability within and among blue light agencies depend upon training, expertise, planning and implementation, leadership, and personal relationships (Steigenberger 2016; Severson 2019). The goal is to create a "collaborative culture and to develop formal and informal institutional procedures that improve the ability of emergency response agencies to collaborate in a disaster" (Laufs & Waseem 2020: 12; see also Kristiansen, Haland, & Carlstrom 2019). Agreements and protocols should be established to ensuring the continuity and sustainability of these components. It is important that participating agencies speak a "common language," which may require stepping outside individual agency cultures and traditional practices (Kristiansen, Haland, & Carlstrom 2019). Essential requirements include improving management control; formalizing organizational structure, responsibility, and authority; improving performance measurement and evaluation; and improving oversight of interoperability-related committees (New Hampshire Department of Safety 2019). It is also important to have strategies for achieving stakeholder support for organizational change (Kane 2018).

There is an emerging literature of best practices from the United Kingdom and from research literature more broadly that can guide the creation of structures and processes of interoperability and thereby facilitate true inter-agency collaboration between blue-light agencies, allowing for effective responses to major crises.

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