Medical Leadership of Emergency Management Systems in Canada: Key Attributes and Competencies

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Medical Leadership of Emergency Management Systems in Canada:
Key Attributes and Competencies

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Abstract

Background: In this 21st century of diverse regional, national and international threats and emergency events, this study explores the unique authentic transformational leadership challenges unique to emergency medical systems. These complex systems respond to a range of critical emergency events, including mass emergencies, disasters and catastrophes and call for medical leadership competencies.

Methods: A qualitative research study based on grounded theory examines the phenomenology of emergency medical systems by deploying triangulation to isolate the particular theoretical underpinnings of authentic transformational leadership models relevant to this domain. Using a key informant approach and a semi-structured confidential questionnaire, the perspectives of 103 emergency leaders of diverse professional backgrounds on the challenges of emergency management systems are presented. The response rate was 83.5 percent from 81 organizations across Canada.

Results: This study underscores the need for authentic transformational leadership and identifies leadership competencies in the domain of emergency medical systems. This qualitative study of diverse emergency system leaders is original in that it has not hitherto been done across Canada nor internationally.

Conclusions: This study underscores the relevance of leadership principles in the extant literature and highlights those that are critical and unique to leaders of emergency medical systems. In so doing, underscores the need for authentic transformation leadership of an order and caliber yet to be fully potentiated to manage future emergency and crisis events in Canada and internationally.

Key words: Emergency medical systems; Key informant study; Medical leadership; Qualitative research.
Background

Emergency medicine is of growing importance as a specialty internationally [1-6]. Moreover, there is an increasing recognition of the importance of emergency medical leadership in diverse areas, such as the critical emergency infrastructures; emergency informatics; emergency preparedness and collaboration emergency response engagement; logistical systems and medical incident command systems [7-18]. The need for such leadership has been highly stressed and emphasized through the creation of professional competency frameworks and skill sets that define appropriate training and credentials regionally, nationally and internationally [19-24]. Emergency medical systems require authentic transformational leadership of an order not yet fully potentiated in Canada. Such systems encompass medical and care processes inherent in three critical events: mass emergencie s, disasters and catastrophes. Emergencies are small-scale, common and largely predictable events that are managed with regional resources. Disasters are those that overwhelm regional resources and require multi-regional emergency responses and collaboration. Typically, mortality and morbidity exceed 10 and 100 persons respectively. Catastrophes are extreme disasters that paralyze, or destroy, critical community infrastructures and require multi-regional, national and international responses. The extant literature underscores the critical importance of emergency medical leadership in safeguarding the well-being of individuals and the integrity of communities that remain the core mission of emergency medical systems [25-40].

The extant literature in health care systems underscores the importance of transformational leadership in the quest for greater efficiency, effectiveness and performance excellence [41-50]. Moreover, the literature also stresses the complementary importance of authentic leadership in inspiring and fostering mutual respect, open inter-professional communication, collaborative decision-making all of which motivate a commitment to high quality systems of care [51-55]. Authentic transformational leadership is the backbone of high-performing and highly effective health care systems, as evidenced through quality of care, patient satisfaction, workforce satisfaction, organizational effectiveness, performance and social responsibility [56-57]. Authentic transformational leadership engages and motivates professionals to collaborate in integrating their work horizontally and vertically in emergency medical systems. This leadership is also necessary in bringing about transformational changes within integrated health care delivery systems accountable for the overall positive outcomes that include lower mortality and morbidity rates.

No qualitative research studies on emergency medical systems leadership have been carried out in Canada nor internationally. This is qualitative study that explores the phenomenology of emergency medical leadership, using a grounded theory approach and sought to elicit the perspectives of emergency professionals using a key informant methodology [58-67]. Based on the extant literature, there have been no such studies reported on the perceptions of professionals on emergency leadership challenges in Canada nor internationally. Moreover, this study deploys a triangulation approach, whereby several conceptual leadership and open adaptive complex systems constructs are merged to form the theoretical framework for this key informant study [68-69]. Emergency medical systems are complex adaptive systems that self-organize in response to external environmental stimuli, in the form of small scale, disaster or catastrophic events, all requiring medical intervention [70-77]. Emergency medical systems are in turn composed of five system components, each with specific self-organizing processes, as summarized in Table 1.

Table 1 Emergency medical systems components and processes

<table>
<thead>
<tr>
<th>Emergency prevention</th>
<th>Emergency preparedness</th>
<th>Emergency medical care</th>
<th>Emergency recovery and rehabilitation</th>
<th>Emergency review and adaptive learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issues analysis</td>
<td>Business continuity plans</td>
<td>Care interventions</td>
<td>Community reconstruction</td>
<td>After-action reviews</td>
</tr>
<tr>
<td>Primary prevention</td>
<td>Contingency planning</td>
<td>Community responses</td>
<td>Facility care</td>
<td>Comprehensive audits</td>
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<tr>
<td>Risk assessment</td>
<td>Emergency plans</td>
<td>Diagnosis and treatment</td>
<td>Home care</td>
<td>Hot washes</td>
</tr>
<tr>
<td>Scenario analysis</td>
<td>Emergency resources</td>
<td>Evacuation</td>
<td>Psychiatric care</td>
<td>Simulations</td>
</tr>
<tr>
<td>Secondary prevention</td>
<td>Emergency training</td>
<td>Incident command centers</td>
<td>Recovery operations</td>
<td>Virtual education</td>
</tr>
<tr>
<td>Stakeholder analysis</td>
<td>Environmental scanning</td>
<td>Logistics</td>
<td>Rehabilitation care</td>
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<tr>
<td>Strategic forecasting</td>
<td>Mitigation planning</td>
<td>Information management</td>
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<td></td>
<td>Recovery plans</td>
<td>Military command centers</td>
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<td></td>
<td>Response plans</td>
<td>Primary hospital care</td>
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<td></td>
<td>Simulation exercises</td>
<td>Resuscitation/stabilization</td>
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<td></td>
<td>Surge capacity planning</td>
<td>Search/rescue operations</td>
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<td></td>
<td>Threat analysis</td>
<td>Security controls</td>
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<tr>
<td></td>
<td>Vulnerability analysis</td>
<td>Social media networks</td>
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<tr>
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<td>Tertiary hospital care</td>
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<td>Transportation care</td>
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<td>Triage</td>
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</tbody>
</table>
This key informant study points to significant authentic transformational leadership attributes and competencies needed in emergency medical systems.

**Methods**

The extant leadership literature reports on a competing values framework that suggests the appropriateness of an open systems model of leadership, with its emphasis on external engagement, adaptability, human relations and cohesion in response to emergency events [49]. Both transactional (internal processes) and directive (rational goals) leadership are also relevant and central in emergency medical systems. Moreover, the literature stresses the importance of transformational leadership in organizational effectiveness and change [43]. When merged with adaptive complex and open system models, a theoretical framework emerges that best reflects leadership in the context of emergency medical systems. As shown in Figure 1, authentic transformational leadership mediates between strategic environments (the context of emergency events), value constructs (caring values, visions and compassion), performance effectiveness and the emergency systems (with its self-organizing emergency processes).

**Figure 1:** Authentic transformational leadership mediates between strategic environments, value constructs, emergency systems and performance effectiveness.

Emergency medical systems are patient-centric systems that extend well beyond traditional hospital walls to incorporate a diverse range of professional care providers in positive activities focused on reducing mortality and morbidity rates in emergency events. An adaptive systems model of authentic transformational leadership is posited to best approximate emergency medical systems with its focus on, synergistic problem-solving and transformational processes in highly complex, dynamic and uncertain contextual environments. These environments suggest the need for authentic transformational leadership skill sets that emphasize flexibility, vision and foresight, innovation, high-order negotiation and persuasion skills to coalesce and orchestrate the work and performance of diverse stakeholders within a range of organizational coalitions and structures that transcend institutional confines. Such systems require leaders who have regional perspectives of a range of emergency events and forge collaborative networks of diverse care professionals for the benefit of those encumbered by emergency events. Furthermore, authentic transformational leadership requires caring and compassionate values that preserve and uphold health, well-being and communal integrity as crucial.

As in all qualitative studies of human subjects, the study objectives, protocol and research instrument were reviewed, then approved by an institutional research ethics board. Purposive sample size was determined by the six-week response time limit and the study objectives. In addition, chain referral sampling was used whereby professional bodies, such as the Canadian Association of Fire Chiefs, the Canadian Association of Social Workers, the Canadian College of Health Leaders and the Canadian Information Processing Society were points of entry that consented to issue a general invitation to their membership to participate. The key
informant recruitment strategy was voluntary and confidential, as were the responses. Within a six-week limit of the study, professional
members were sent a link to a confidential online survey questionnaire in a secure database under the researcher’s name with an
explicit consent statement before proceeding with the questionnaire. Respondents had the option to elect to complete the same
questionnaire through a teleconference. There were 26 semi-structured and open-ended questions on perceived leadership attributes
and skills, personal emergency experiences, systems performance, future threats, emergency preparedness, technological
developments and coalitions.

A total of 103 key informants were sent invitations to participate and complete the research instrument online or, as in seven cases,
through a teleconference with the researcher within the six week limit. Seventeen online questionnaires had negligible responses and
were dropped from the study. The response rate was 83.5 percent with 86 key informants representing 81 organizations across
Canada, including two from the United States. These organizations included: 16 Federal government agencies; 17 Provincial
government and regional health authorities; 16 municipal government and first responder units; 14 private sector firms involved with
health care; 13 hospital and health care facilities; and five national professional associations. Of the total respondents, 89 percent
were senior professionals with ten or more years of experience. Moreover, there were 28 health professionals, 15 government officials,
14 fire and rescue officers, 11 medical care providers, ten military officers, four social workers and four information system
professionals—all with relevant emergency management experience. Seven key informants opted to answer the questions by
teleconference during which the interviewer made detailed notes of the responses. The interviewer verbally summarized the key points
to the interviewee to correct or clarify any points.

The results of all questionnaires were culled, analyzed and summarized into major themes. Through the open-ended online
questionnaire format, the key informants espoused, provided and elaborated on textual data descriptions of what they experienced
and perceived as leadership challenges in emergency medical systems from their professional perspectives. This open-ended
approach evoked responses that were meaningful and particularly salient to each key informant and produced an array of results that
were explanatory, textually rich and unanticipated. Consonant with a grounded theory approach, qualitative data was collected with
repeated ideas, concepts and elements as tagged codes and part of the substantive coding. Theoretical memoing identified the first
concept and continued right through the comparative analytical processes of the text data. The tagged codes were grouped and
integrated into concepts and constructs. The theoretical base that emerged was that of authentic transformational leadership operating
within an open-system context that was at once adaptive, complex and dynamic. The validity of this approach was underscored by
the high degree to which evoked concepts fit with the text data and echoed the concerns the key informants. The emerging concept
of authentic transformational leadership showed how problems are resolved and was adaptable in that new data could lead to changes
to the model. The results suggested the importance of accountable and caring emergency leadership, adaptive organizational
cultures, knowledge management, systems transformation and performance outcomes defined in terms of mortality, morbidity and
community integrity.

Results

This qualitative study produced a diverse and rich range of perspectives of key informants on emergency experiences, emergency
leadership, emergency preparedness, performance management, perceived threats, private and public sector coalitions and relevant
technological developments—all of which were duly tagged, coded and analyzed. Table 2 highlights the salient highlights that emerged
from the first stage of theoretical memoing of the key informant perspectives on emergency leadership challenges in the future.

| Table 2 Salient highlights of key informant study of leadership of emergency medical systems |
|---------------------------------------------|---------------------------------------------|
| **Threats and vulnerability analysis**       | **Systemic integration of emergency management systems** |
| Compounding and escalation of regional, national and international threats | Community and social recovery |
| Continuous monitoring and situational awareness of environmental threats | Emergency medicine |
| Risk mitigation strategies                  | Emergency preparedness |
|                                           | Incident command centers |
|                                           | Interoperability of telecommunication systems |
|                                           | Physical, mental and social rehabilitation processes |
|                                           | Primary and secondary prevention strategies |
|                                           | Professional burnout and post-traumatic stress disorder |
|                                           | **Collaborative network communities and coalitions** |
|                                           | Cogent and stable collaboration through mutual trust and professional respect |
|                                           | Community group support |
|                                           | Critical role of military command |
|                                           | Engagement of regional, national and international governance organizations |
|                                           | Stakeholder identification and analysis |
|                                           | **Equanimity, composure and control in the face of horrors and tragic events** |
|                                           | Ambiguity with great uncertainty in the face of fluid situations |

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Courage and humility
Decisiveness under conditions of informational and sensory overload and stress
Objectivity, while maintaining compassion
Personal integrity
Prior emergency and clinical experiences
Understanding human and socio-political limitations

Performance management
Ability to identify <mudas> (wastages) through <gemba> walks (walking through the frontlines)
Adaptive learning culture
Lean engineering to leverage efficiency
Metrics to assess performance outcomes
Metrics to monitor operational and response efficiencies
Outcome-orientation that focuses on saving lives and reducing morbidities
Performance analysis of emergency management components
Promulgating a culture of continuous learning

Vision of future technological innovations
Autonomic support to complement human perception and understanding
Big data support of unstructured to create meaningful cognitive pictures
Bringing the ER and surgical suite to the field
Change management strategies
Drones monitoring of emergency scenes
Robotic deployments
Ubiquitous embedded sensor and tracking technologies

Coopting and engagement of private sector
Ability to bridge the different paradigms
Collaboration in business continuity, emergency preparedness and recovery planning
Innovation and implementation of information, communication and transportation technologies
Private sector recognition of and actualization of social responsibilities

Through subsequent processes of theoretical memoing, four interrelated significant constructs emerged that point to particular competencies for leadership of emergency medical systems, including: (1) strategic leadership attributes, (2) emergency preparedness, (3) technological coalitions, and (4) performance management. These are presented below with a sample of salient perspectives, as expressed by the key informants.

Strategic leadership attributes

A (recently retired) hospital administrator stated: “We need someone with the qualities of a General Eisenhower, or a General Patton to take command of implementing IT [Information Technology] collaboration. This leader will need legislative authority so that they can deal appropriately with naysayers and foot-draggers. The command and control structure of the military…Nothing short of that will work!”

Key informants confirmed the extant literature by emphasizing the central importance of leadership attributes, including: astuteness; integrity; interpersonal influence; networking ability; personality traits; perspicacity; political skills; social competencies, all of which promote confidence, respect and trust. They also espoused that leaders should have a cogent knowledge and proven expertise in all emergency medical systems, grounded in a solid understanding of the legal and sociopolitical contexts. Cognitive skills, such as strategic and systems thinking in the face of complexity and pressing uncertainty, were also deemed important. Key informants repeatedly stressed the need for emergency medical leadership in forging collaborating networks and coalitions of diverse professionals and community stakeholders through relationships, based on mutual professional respect and trust. Change management, conflict resolution, innovative decision-making and negotiation skills were also highlighted. Highly-developed communication and interpersonal skills were deemed important, as were emotional intelligence and professional competence. Leadership competencies also included analytical abilities and performance management. Also underscored were key leadership attributes such as accountability, discipline, empathy, a high tolerance for stress and uncertainty, personal integrity and professional ethics. Repeatedly, the key informants underscored the importance of adaptability, courage, discipline, equanimity, initiative and tenacity in the heat of battle. Situational awareness and self-awareness of personal limitations, as well as the ability to delegate authority, were also deemed important. Key informants felt that emergency medical leaders had duties and responsibilities to work closely with all levels of governing authorities to encourage cogent, proactive and visible approaches to emergency management. Some key informants believed that leaders had an important responsibility to mitigate and lobby for pertinent legislation and regulations that would facilitate systems interoperability and effective inter- organizational collaboration and coalitions in emergency management. Some of the key informants were of the view that those with military background had the greatest chance of having the composite range of leadership attributes to be effective in the heat of emergency situations.

Emergency preparedness

A senior military officer in health care responded: “Create a sense of urgency. All parties must understand that it is crucial to recognize, prepare for, plan and understand what faces them.”
One provincial government official commented: “It [the local disaster] was beyond anyone’s experience and came on unexpectedly and viciously. The organization of communication was a significant challenge. As always, politics came into play and some key leaders were not visible to those having to make decisions at the front line. It seemed the leaders were jockeying for more “air time”, than concerned about [emergency] effectiveness. Roles and responsibilities were not clear. We were flying by the seats of our pants. There was no one stepping up to the plate.”

Key informants underscored the importance of competencies in risk management and threat analysis. Table 3 summarizes five categories of emergency threat categories and examples. It also highlights the direct front line emergency experiences of 46 key informants, as well as what they perceived to be the major future threat categories in Canada. Here it would appear that emergency leaders view technological, biological and sociogenic threats as the most important source of future emergencies, accounting for over 70 per cent, in Canada. This is followed up by meteorological and topological sources of future threats. The key informants emphasized that identifying and articulating clear and specific threats with probability estimations would be helpful in streamlining effective emergency management strategies.

### Table 3 Threat categories, examples, key informant experiences and future threat probabilities

<table>
<thead>
<tr>
<th>Threat categories</th>
<th>Threat examples</th>
<th>Key informant experiences</th>
<th>Future threat probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological</td>
<td>Biological agents and attacks</td>
<td>Cardiovascular emergencies</td>
<td>26%</td>
</tr>
<tr>
<td></td>
<td>Cardiovascular emergencies</td>
<td>H1N1 epidemic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Epidemics and pandemics</td>
<td>Public venue suicide</td>
<td></td>
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<tr>
<td></td>
<td>Food /water contamination</td>
<td>SARS outbreak</td>
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<tr>
<td></td>
<td>Food and/or water shortages</td>
<td>Sudden deaths on public venues</td>
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<td></td>
<td>Immunity to antibiotics</td>
<td>Suicidal crisis intervention</td>
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<td></td>
<td>Infectious diseases</td>
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<tr>
<td></td>
<td>Pandemic</td>
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<td></td>
<td>Psychiatric disorders</td>
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<td></td>
<td>Sports injuries and falls</td>
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<td></td>
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<tr>
<td></td>
<td>Suicidal ideation and behaviors</td>
<td></td>
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<tr>
<td>Meteorological</td>
<td>Blizzards</td>
<td>Hurricane Katrina restoration</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Heat emergencies</td>
<td>Tomados in rural Ontario</td>
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<tr>
<td></td>
<td>Hurricanes</td>
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<td></td>
<td>Ice storms</td>
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<tr>
<td></td>
<td>Tornadoes</td>
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<tr>
<td></td>
<td>Wind storms</td>
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<tr>
<td>Sociogenic</td>
<td>Border emergencies</td>
<td>911 command center operations</td>
<td>18%</td>
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<tr>
<td></td>
<td>Criminal violence</td>
<td>G8 and G10 emergency operations</td>
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<tr>
<td></td>
<td>Cyberattacks</td>
<td>Family homicidal incident</td>
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<td></td>
<td>Explosive devices</td>
<td>Suicide bomber in hospital emergency unit</td>
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<tr>
<td></td>
<td>Gang and tribal conflicts</td>
<td>Olympics 2010 emergency preparation</td>
<td></td>
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<tr>
<td></td>
<td>Homicides</td>
<td>War injuries and casualties in Afghanistan</td>
<td></td>
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<tr>
<td></td>
<td>Infrastructural destruction</td>
<td>Public venue suicide</td>
<td></td>
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<tr>
<td></td>
<td>International conflicts</td>
<td>Suicidality</td>
<td></td>
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<tr>
<td></td>
<td>Public health system collapse</td>
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<tr>
<td></td>
<td>Social unrest and anarchy</td>
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<tr>
<td></td>
<td>Terrorist violence</td>
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<tr>
<td></td>
<td>Violence</td>
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<td></td>
<td>Wars</td>
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</tbody>
</table>
Key informants stressed that emergency medical leaders must engage individuals, organizations and communities in emergency preparedness as a social responsibility. This remains the vital core of planning and the praxis of the emergency management. Resilience depends on engaging and creating a social consciousness and motivation to help others. Without effective business continuity, emergency response and recovery plans, individuals, organizations, and communities are far less able to effectively respond, cope and fully recover. Forty-five per cent of respondents reported that updated business continuity, emergency preparedness and disaster recovery plans were in place in their organizations; 33 per cent had one or two of these in place; 21 per cent had none or did not respond. Key informants perceived emergency preparedness as not just the domain of the trained emergency professionals, but central to all who are concerned with the lives and well-being of people and the integrity of organizations and communities. Emergency systems performance ultimately depends upon emergency preparedness and its integration as a social responsibility organizationally, regionally, nationally and internationally. Yet some key informants stressed that even with effective planning and exercising of those plans, actual emergency events have a shock quality to them that can temporarily paralyze proactive responses.

### Technological

<table>
<thead>
<tr>
<th>Category</th>
<th>Event Description</th>
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</thead>
<tbody>
<tr>
<td>Technological</td>
<td></td>
</tr>
<tr>
<td>Airline accidents</td>
<td>Plant fire and toxic fumes plume</td>
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<tr>
<td>Conflagrations and forestfires</td>
<td>Bicycle/MVA collision</td>
</tr>
<tr>
<td>Chemical and gas explosions</td>
<td>Bus accident with pediatric emergencies</td>
</tr>
<tr>
<td>Electrical grid failures</td>
<td>Bus/semi-tractor trailer collision</td>
</tr>
<tr>
<td>Environmental accidents</td>
<td>HAZMAT response to ammonia leak</td>
</tr>
<tr>
<td>Facility and plant fires</td>
<td>Chemical explosion and conflagration</td>
</tr>
<tr>
<td>HAZMAT accidents</td>
<td>Chemical recycling plant explosion</td>
</tr>
<tr>
<td>Home and farm accidents</td>
<td>Collapse of public structures</td>
</tr>
<tr>
<td>Industrial/ workplace accidents</td>
<td>Commercial building fire</td>
</tr>
<tr>
<td>Infrastructure collapse</td>
<td>Ferry boat sinking</td>
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<tr>
<td>Loss of energy, power and water resources</td>
<td>Hospital fires</td>
</tr>
<tr>
<td>Marine accidents and disasters</td>
<td>Motorcycle accidents</td>
</tr>
<tr>
<td>Motor vehicle accidents (MVA)</td>
<td>Multi-automobile collisions</td>
</tr>
<tr>
<td>Nuclear accidents</td>
<td>Oil refinery explosion</td>
</tr>
<tr>
<td>Oil and toxic spills</td>
<td>Pedestrian/automobile collision</td>
</tr>
<tr>
<td>Pedestrian accidents</td>
<td>Pediatric MVA</td>
</tr>
<tr>
<td>Rail accidents</td>
<td>Rail transport collisions</td>
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<tr>
<td>Recreational/sports accidents</td>
<td>Recreational burn accident</td>
</tr>
<tr>
<td>Space accidents</td>
<td>Residential complex fire</td>
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<tr>
<td>Structural accidents</td>
<td>Residential house fires</td>
</tr>
<tr>
<td>Transportation accidents</td>
<td>Rural All-Terrain Vehicle (ATV) accident</td>
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<td></td>
<td>Small aircraft crash Swiss Air 111 tragedy</td>
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<tr>
<td></td>
<td>Train/pediatric accident</td>
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<td></td>
<td>Transport truck tumbles off a bridge into a dry river bed</td>
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</tbody>
</table>

### Topological

<table>
<thead>
<tr>
<th>Category</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>Topological</td>
<td></td>
</tr>
<tr>
<td>Droughts and water shortages</td>
<td>Catastrophic flooding</td>
</tr>
<tr>
<td>Earthquakes</td>
<td>Earthquake disaster Haiti</td>
</tr>
<tr>
<td>Catastrophic floods</td>
<td>Forest wildfires</td>
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<tr>
<td>Forest and grassland fires</td>
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<tr>
<td>Landslides and sinkholes</td>
<td></td>
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<tr>
<td>Sinkholes</td>
<td></td>
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<tr>
<td>Space weather (solar flares)</td>
<td></td>
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<tr>
<td>Tsunamis</td>
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</tbody>
</table>

An emergency social worker reflected: “Partnerships and integration of vision and processes between IT professionals and health care staff in emergency rooms, police, paramedics and home care services are the key ingredients to the successful delivery of medical care to patients. IT plays a key support role for linking these services together by assuring clear and effective communication by all parties who are delivering the care to the patient.”

A (untimely decedent) hospital CEO stated: “Time!”

The key informants concurred that technological innovations and deployments are crucial in emergency management. From advanced transportation technologies, such as drones and driverless vehicles, to autonomic computers, massive terabyte storage capacities, nanotechnology, robotics and ubiquitous sensor technologies- all will have the potential to save lives and decrease injuries in the future. This optimism was tempered with the realization that the deployment of innovations is and will continue to be diffuse and inexorably slow in the light of sociopolitical and financial realities in Canada. The effectiveness of emergency management systems above all depends on reliable and secure telecommunications between critical organizations that comply with interoperability standards. Key informants stressed that the lack of systems interoperability was one of the single greatest barriers to effective
Strategic thinking and foresight subsume the need for a systems thinking, proactive precognition skills and astute situation awareness.

Disastrous for individuals, organizations and communities. Emergencies challenge set beliefs, expectations, perceptions and panoply of emergency organizations, financing, governance and functioning of emergency management systems. Strategic thinking systems. Integral to this leadership are a number of important competencies and skill sets that are specific to this domain. These fall into four categories: (1) shared caring values, vision and compassion, (2) strategic thinking and foresight, (3) strategic engagement and coalitions, and (4) strategic pursuit of performance excellence.

Performance management

As a national health leader noted: “The health system normally operates at close to 100% capacity and there is little slack, other than reducing elective work to create capacity. A major disaster, serious pandemic or a destabilizing terrorist threat would all have the potential to collapse the system.”

A senior provincial government official stated: “The greatest barrier is one of [sectorial] culture. In the private sector, poor performance is not tolerated. In the public sector, poor performance is. Very few were dismissed for poor performance during a [major] epidemic that cost [the city] approximately $1 billion in lost revenue. If a business in the private sector lost $1 billion, there would be significant accountability implications.”

Performance management is predicated on emergency efficiency (response, transport and discharge rates) and effectiveness (mortality, morbidity, recovery, professional burnout and patient/family satisfaction rates). Most key informants reported that emergency response systems performed as well, or better, than expected, even if there was a 100% mortality rate, due to the catastrophic nature of the emergency event. Two key informants reported that despite excellent emergency response and care provided, professionals suffered from burnout and long-term post-traumatic stress disorder for which there was little recognition, nor support for. This underscored the importance of emergency professionals who themselves are potential victims in the course of their exercise of their duties and responsibilities. Comments by the key informants also raise the question of cost-effectiveness and over-capacity in normative situations - both of which are central to the issues of performance management in emergency management.

Discussion

This qualitative study based on grounded theory underscored the need for authentic transformational leadership of emergency medical systems. Integral to this leadership are a number of important competencies and skill sets that are specific to this domain. These fall into four categories: (1) shared caring values, vision and compassion, (2) strategic thinking and foresight, (3) strategic engagement and coalitions, and (4) strategic pursuit of performance excellence.

Shared caring values, visions and compassion

A senior emergency planner postulated: “Leading by example from the front means that a visible champion is required with sufficient authority and power to make things happen with and outside their particular sphere of influence. They must wield enough influence to challenge and convince others to follow suit. They must have vision and perseverance.”

Emergency medical leaders must have foresight and vision informed by deep compassion. Foresight and a compelling caring vision that inspires and motivates others are hallmarks of emergency medical leaders. Leaders must have an intuitive understanding of the interrelatedness of environments and organizations. The ability to effectively communicate that vision and inspire others to collaborate and integrate emergency efforts is crucial. Deep empathy for others and compassion must inform that vision. Yet at the same time, leaders must understand human behaviour and limitations. Emergency medical leaders have the humility to know that the forces at work may at times be beyond human comprehension and control. Leaders are neither omnipotent nor are they deities. Yet even with that, foresight and vision must still see the day and inspire others in the continuous struggle of not only saving lives, but also increasing the quality of lives.

Strategic thinking and foresight

A senior military health official posited: “The Canadian Forces own the 14th health system that exists in Canada. As we must maintain a pan-Canadian perspective in all we do. I have to define my community as the Canadian Forces geographically located across Canada and throughout the world. Communication of clear concise direction that can be interpreted and applied at a regional level, attention to regionally specific issues and respect and value of the input of multiple health care providers are critical to the success of our system.”

Strategic thinking and foresight subsume the need for a systems thinking, proactive precognition skills and astute situation awareness. Strategic thinking and foresight points to the need for emergency medical leaders look beyond the bounds and walls of their institutions and adapt a regional systems approach to the delivery of emergency care. Leadership competencies point to an understanding of the panoply of emergency organizations, financing, governance and functioning of emergency management systems. Strategic thinking underscores the need for proactive precognition skills. Emergency medical leaders must think of the “unthinkable”. Emergencies often incubate silently and mask dangerous warning signals, latent problems and potential failures. Denial of red flags of smoldering crises continues to be one of the greatest challenges in emergency medical and that remain political and psychological by nature. On an individual level, the consequences of denial are shock, disbelief, paralysis, panic and even disregard. On an organizational level, failure to pay attention to warning signals leads to systemic paralysis, reactive responses, chaos and undue delays that often prove disastrous for individuals, organizations and communities. Emergencies challenge set beliefs, expectations, perceptions and
understanding of reality. Emergencies are rarely only visual assaults. They also engage auditory, tactile and olfactory senses that shock and paralyze the psyche. They often challenge the normalized view of ordered entities of reality and convolute them into the unthinkable. For example, the risks of emergencies and high-level training remain important as they are instrumental in overcoming the cognitive shock and information overload in actual emergencies. These cognitive skills allows authentic transformational leaders to maintain equanimity and decisiveness in the exercise of their duties and responsibilities to save lives, reduce physical and psychological injuries and maintain organizational and communal integrity.

Strategic foresight subsumes the need for astute situation awareness. Emergency medical leaders must analyze threats and vulnerabilities faced regionally, nationally and internationally. This points to the need for high-order environmental perception and situational awareness of the risks, threats, vulnerabilities, the potential impact of the resource misuse, and thereby the potentiality of the needed resources. Moreover, leaders understand that threats always have the potential to compound and to escalate posing further risks - all of which need to be prepared for. Mitigating risks include: closing socioeconomic gaps; community resilience; emergency preparedness; health promotion; integrating critical emergency infrastructures, medical care and recovery systems regionally, nationally, and internationally; judicious land use planning; and strengthening the public health and safety legislation. None of these happen without the development and exercise of cogent emergency medical leadership skills.

Strategic engagement and coalitions

A senior fire chief stated: "High level emergency public sector managers should take ownership of these [emergency] issues stressing the necessity for such programs. The public is generally complacent about emergency medical and require a trusted individual to get the message out."

An official with blood services management stated: "The lack of integration and standardization of emergency planning between federal, provincial and local government results in higher costs and ongoing difficulty in creating an integrated emergency system at all levels of government."

Strategic engagement includes skills in collaborative networking and the development of coalitions and emergency preparedness. Emergency medical leaders must forge effective collaborative networks and coalitions of diverse stakeholders across a wide spectrum of professionals and communities. The survivability of individuals and viability of organizations and communities ultimately depend on them. Effective collaboration leads to information and resource sharing and systems interoperability that underpin effective emergency responses. The importance of identifying and engaging multiple stakeholders in emergency management through such networks remains paramount. Diverse stakeholders not only include the gamut of emergency professionals and care providers, but also advocacy and community groups, the military, non-governmental organizations and the private sector. Such collaborative engagements are crucial in building understanding, trust and resilience. Effective collaboration requires cogent inter-organizational linkages and coalitions across multiple political and jurisdictional authorities regionally, nationally and internationally.

Strategic pursuit of performance excellence

As an emergency physician pointed out: "Getting the right patient to the right location is important. On occasions air ambulance services will often increase transfer times and the critically ill take longer to contact a receiving physician. A smart system looks at getting patients to where they need to be not just the closest hospital."

A hospital administrator maintained: "Emergency management is essentially a logistics problem and needs to be treated as such. We can learn a lot from airlines and aviation authorities. But none of this will solve the people issues, of course! That needs people working together regularly and getting to know one another, before all hell breaks loose."

Performance excellence points to the need for high-reliability emergency organizations. This underscores the need for competencies in emergency informatics, strategic logistics and systems engineering. The knowledge of emergency informatics, including the development and implementation and management of technological systems in the emergency systems domain. This would include an understanding of telecommunications and the imposing issues of systems interoperability. Emergency medical leaders must leverage innovative technologies to transform emergency medical systems. The potential to transform emergency medical through a panoply of technological innovations that are on the horizon is massive. Such technologies include advanced global communication and tracking systems, autonomic and intelligent systems, big-data storage systems, cloud-computing, driverless vehicles, drone technology, holographic applications, intelligent grid technologies, robotics, sensor nanotechnology, simulation learning systems, telemedicine, tele-surgery, and virtual incident command centers. Emergency leaders must pave the way through transformative changes in emergency medical in collaboration with diverse stakeholders, including those from the private sector. Leaders must be technologically knowledgeable and able to effect positive deployments of innovations through systems and change medical skills and strategies.

Strategic logistics implies the emergency medical leaders must have competencies in logistical planning and strategy formulation to assure effective access to supply chain networks, before they are needed. Deploying critical personnel, resources and supplies in place efficiently, harmoniously and effectively is of paramount importance, particularly in disaster and catastrophic situations. Forging strong linkages with military infrastructures with chains of command together with well-developed and secure transportation networks are key to effective delivery of emergency resources and relief. Moreover, leaders have to assure that logistical plans include access to effective supply chain networks through governance, military, non-governmental and private sector organizations.

Emergency medical leaders must strive to create high reliability organizations in emergency management through the deployment of a range of innovative technologies. Continuous learning and improvement and adaptability are the hallmarks of such organizations that mitigate the impact of, if not prevent, emergencies in environments efficiently and effectively. Creating and sustaining such
organizations remains a challenge in the absence of effective and reliable telecommunications and advanced decision support systems. Systems interoperability is the basis for data and resource sharability between organizations. Inter-regional commonality in information technology standards, policies, processes and procedures strengthens the effectiveness of critical emergency medical infrastructures. Germane to high-reliability organizations is the knowledge of and deployment of systems engineering techniques, such as benchmarking, Kaizen (continuous improvement), lean methodologies, root cause analysis, simulations and total quality medical in the pursuit of greater efficiency and positive outcomes in emergency medical systems.

In summary, authentic leadership implies core competencies that include strategic thinking and precognition skills with core values of caring. Transformational leadership includes the ability to engage communities of professionals and stakeholders to collaborate towards the common vision of performance excellence in emergency management systems. Authentic transformational emergency leadership is essential in reducing the scourges of emergency events from small scale mass emergencies to disasters to catastrophes.

**Conclusion**

A mental health social worker cited a case of suicidality: "An individual with intent to complete suicide was assessed and taken to the hospital. The hospital refused the patient. The system did not work. Trust and communication were lacking. Professional respect was not in existence. The hospital reacted to its perceived resource shortage and not to the needs of the patient. A community development approach that enlists the professional in the development of the process is needed, rather than having the process presented to them at the time of an emergency. This will require more training and involvement than currently in place."

The universe of emergency medicine is fraught with complex and competing health care priorities and challenges. As with emergency medical leaders must also look beyond the institutions and adapt a systems and regional approach to the delivery of care. Moreover, authentic transformational leadership with its emphasis on guiding transformational change, while maintaining strong caring values is paramount is relevant for emergency physicians. The importance of emergency preparedness, collaborating with regional health authorities and proactively recognizing the potential threats to communities underscore that hospitals must ever be at the ready. Whereas governing authorities assess and the institutional performance, it is the public themselves who will judge medical performance and their leaders come the time of the ultimate test of mass emergencies, disasters or catastrophes. They must not be found wanting. Emergencies never end at the door of emergency departments, but rather when victims, care providers and communities have fully recovered from and emotionally accepted the ordeals experienced. The magnitude and frequency of regional, national and global emergencies, disasters and catastrophes will undoubtedly increase in the face of growing populations exposed to increasing threats in vulnerable environments in the 21st century. Authentic transformational leadership in emergency medical systems will be crucial in the future evolution of effective emergency critical infrastructures nationally and internationally. In the face of financial and resource constraints and given limited political will and public support, effective and sustainable emergency systems will continue to require strong and cogent authentic transformational leadership. In the quest to forge continuous collaboration and integration of emergency medical systems, authentic transformational leadership will be crucial. Moreover, such leadership will be the catalyst that will create integrated virtual organizations through the deployment of advanced technologies that will interoperate regionally, nationally and internationally. Authentic transformational leadership that seeks to harmonize of emergency medical policies and strategies with the regional, national and global governments and communities will actualize this future for the common good.

**Limitations**

Other invited associations, including the Canadian Association of Chiefs of Police, the Paramedic Chiefs of Canada and the Canadian Nurses Association, did not respond within the given four-week limit. The perspectives of their membership would have been interesting. Nevertheless, the membership in the Canadian College of Health Leaders provided access to diverse public safety and care professionals across the spectrum of emergency medical systems in Canada.

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