Mass Evacuation and People with Disabilities
Final Report

Table of Contents

Introduction

Section authored by:
Kaitlynne Lowe, Research Assistant, MacEachen Institute for Public Policy and Governance | Dalhousie University

Dr. Kevin Quigley, Scholarly Director, MacEachen Institute for Public Policy and Governance | Dalhousie University

This report summarizes research activities for the Interdisciplinary Study of Evacuating Persons with Disabilities from an Urban Centre funded by Accessibility Standards Canada. The study analyzed four key stages of evacuation: communication and alert, transportation, shelter, and return to community, with a focus at each stage on improving evacuation for people with disabilities. The four sections in this report detail the key observations, methods, and recommendation for each phase of evacuation.

The people responsible for mass evacuations are confronted with significant challenges: they must coordinate limited resources in a dynamic context, often in degraded conditions, and their decisions are consequential, time-constrained, and sometimes irreversible. These events are happening more often and at a growing and significant human, financial, and environmental cost. Evacuations have increased in frequency and severity over the past ten years. Over 670,000 people have been evacuated in Canada during 273 evacuation events between 1990 and 2020. The most common events resulting in evacuation are floods and wildfires (Public Safety Canada 2023). There is a need to develop robust governance arrangements that are agile, adaptable, and take these complex issues into account, that are rehearsed in advance, and have appropriate governance mechanisms in place to connect with the right people at the right time.

Advancements in accessibility and rights for people with disabilities have increased concern at all levels of government for improving emergency services for people with disabilities. Often the main focus of emergency managers is to increase public emergency awareness, but how can emergency processes be better informed by the perceptions and needs of the public, especially people with disabilities?

The United Nations emphasizes the need for states to make and action commitments that respect and protect the human rights of people with disabilities. This requires shifting the culture of accessibility from a charity model to recognition of persons with disabilities as subjects with rights who can make decisions about their own lives and are active members of society. The goals of the Sendai Framework are "the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries." (United Nations Office for Disaster Risk Reduction n.d.). Canada is committed to working with other countries to support the rights of people with disabilities and ratified the United Nations Convention on the Rights of Persons with Disabilities (CRPD) in 2006 (Government of Canada 2020; United Nations 2006). Canada is also a signatory on the Sendai Framework, adopted at the Third United Nations World

Conference on Disaster Risk Reduction in Sendai, Japan, on March 18, 2015 (Public Safety Canada 2018).

There is diversity in the access, functional needs, and barriers experienced by people with disabilities. They are more likely to experience barriers to income, social, and information supports, leading to increased vulnerability in emergency situations. People with disabilities are not a homogenous group. They have complex identities, and their lives and experiences are shaped by multiple intersecting structures and characteristics such as poverty, gender, race, class, sexual orientation, culture, ethnicity, religion, language, and physical and mental disabilities (Saxena 2020). These needs must be taken into consideration in emergency planning and throughout all four phases of evacuation.

The study focused on Nova Scotia, but the project's Research Committee included national and international perspectives (see Appendix A for the list of Research Committee members). The research was led by Kevin Quigley at Dalhousie University, who was the principal investigator for the study and lead for the communication/alert and return and recovery sub-projects. See Table 1 for the list of sub-projects and academic leads.

Table 1: Academic Leads for Sub-projects
Communication/Alert, Transportation, Shelter, Return and Recovery

Sub-projects: Evacuation Phases	Lead Academic
Communication/Alert	**Dr. Kevin Quigley** MacEachen Institute for Public Policy and Governance (Dalhousie University)
Transportation	**Dr. Ahsan Habib** Dalhousie Transportation Research Collaboratory (Dalhousie University)
Shelter	**Dr. Katie Aubrecht** Spatializing Care Lab (St. Francis Xavier University)
Return and Recovery	**Dr. Kevin Quigley** MacEachen Institute for Public Policy and Governance (Dalhousie University)

The city of Halifax was used as a case study throughout the research. The MacEachen Institute for Public Policy and Governance and Dalhousie Transportation Research Collaboratory are based at Dalhousie University in Halifax, Nova Scotia. The Spatializing Care Lab is based at St. Francis Xavier University in Antigonish, Nova Scotia. Halifax has a long history of emergency management, dating to the 1917 Halifax Explosion. The city is on a hurricane path, is subject to extreme flooding, and has only five exits, some of which can be blocked during an extreme weather event due to flooding or high winds. Nearly 40 per cent of Nova Scotians report a disability, which is the highest proportion of persons with disabilities of any province in Canada (Statistics Canada 2023). Nova Scotia also has an aging population, one of the three most senior-aged populations in Canada (Statistics Canada 2021a). While aging does not necessarily indicate disability, there is a co-relation between the two. It is estimated, for example, that more than

17,000 Nova Scotians live with dementia (Alzheimer Society of Nova Scotia 2021). These factors taken together make Halifax an excellent location in which to base the research.

Finally, note that for the most part the recommendations in the report focus specifically on the needs of those with disabilities. There are, however, recommendations that generally fall under 'good practice' in emergency management, which can help many people, including those with disabilities, such as raising awareness about what is covered by insurance policies.

The following four sections summarize key results from the study and are based on reports and briefing notes authored by the lead academics and research assistants from each of the studies. More information about the project, including full reports and briefing notes in English and French can be found here (LINK).

Communication/Alert

Section authored by:
Kaitlynne Lowe, Research Assistant, MacEachen Institute for Public Policy and Governance | Dalhousie University

Dr. Kevin Quigley, Scholarly Director, MacEachen Institute for Public Policy and Governance | Dalhousie University

This section focuses on the communication and alert phase of the project. We surveyed 29 people with disabilities, some caregivers, and eight emergency managers to understand key considerations from different perspectives. The data from this survey was used for both the communication/alert and return and recovery sub-projects (see section 5 of this report). Survey responses were collected between October and December 2021. We reviewed academic literature and other publicly available material, such as reports, media articles, and policies.

On June 14, 2022, the MacEachen Institute for Public Policy and Governance hosted a virtual roundtable with 25 invited participants. They represented academics, public agencies, emergency managers, non-profit organizations, and organizations that represent persons with disabilities. Invitations to attend the virtual roundtable were sent to Advisory Board members and partners for the project. These representatives met to discuss our survey results and opportunities to improve communication/alert during evacuations for persons with disabilities. Following the presentation, participants discussed the issues raised and their perspective on them from their professional and personal experiences. Their comments are summarized but not attributed. Unless otherwise stated, we refer to "communication" as the act of conveying information to a given audience, specifically information about evacuation and associated risks more generally.

Key Observations

The key findings from the scholarly literature
Many factors influence risk perception for individuals. The behaviour of others, personal experience with risks, trust in institutions and authorities, and socio-demographic considerations are among key factors that influence how a person receives, interprets, and responds to risk messages. Sources of information are not trusted equally.

Sociological and institutional factors influence how risks are shaped and managed; emergency management is a highly complex, multi-sectoral, and interdisciplinary field. Risk communication is complex with focus shifting from physical infrastructure to social systems. There are several organizations and sectors involved in the development and distribution of risk messages, which further complicates the space.

Mental Model approaches can be expanded to improve integration of expert knowledge between people with disabilities and experts in risk communications; lived experience of people with disabilities can be thought of as a form of expert knowledge. Mental Model approaches are risk communication methods that work to align different ways of thinking of risks by experts and the public (Aliperti et al. 2020; Boase et al. 2017;

Sheppard et al. 2012; Bostrom et al. 1992). When working with people with disabilities, mental models should be informed by the knowledge and lived experience of people with disabilities in addition to risk-expert knowledge.

The key findings from the surveys (conducted between October and December 2021)
There is a lack of public experience with evacuation. 90% of survey respondents (people with disabilities and caregivers) have not experienced an evacuation, which poses significant challenges for emergency managers. People's plans likely have significant gaps. People may also experience physical and psychological stress that will further complicate an evacuation.

There is a lack of awareness of evacuation supports for people with disabilities. All survey respondents (people with disabilities and caregivers) rated the perceived accessibility of current evacuation processes between 3 and 6 out of 10, with 30% rating this 4 out of 10. This suggests modest to low confidence in current evacuation processes to meet a variety of functional needs and current awareness of supports for people with disabilities and caregivers.

People with disabilities are looking for information on accessible transportation options, expected access to supplies, and who to contact for support in an evacuation. Survey respondents (people with disabilities and some caregivers) identified areas of concern relating to evacuation and accessibility—transportation, access to equipment and supplies, reliance on someone to intervene—especially for people without personal support networks, knowledge of where to relocate, how to get there, and how to access medical treatment.

There are jurisdictional and organizational differences. 60% of respondents (emergency managers) rate the accessibility of current evacuation processes at 6 out of 10 whereas the remaining 40% rate this 2 out of 10. This suggests a discrepancy, even within the emergency management community, about the degree of accessibility of current evacuation processes. Part of this can be attributed to differences between jurisdictions, the disconnect between strategy, standards, and implementation, as well as issues communicating evacuation planning in advance that reaches the public effectively.

Recommendations

- Implement mechanisms where people with disabilities support the development and evaluation of risk communications. Knowledge and lived experience of people with disabilities should be treated as a form of expert knowledge.

- Design universally accessible and user-friendly tools to help people better understand the complexity of evacuation for persons with disabilities. These should account for a variety of social, cultural, practical, and legal considerations, as well as respond to diverse functional needs. Brochures and infographics are common communication tools. Halifax Regional Municipality, for example, has an opt-in service to receive municipal alerts with a variety of alert types (e.g., mobile app, telephone, and email).

- Identify and engage with key stakeholders (e.g., emergency organizations, first responders, volunteers, building managers) and improve understanding of their responsibilities. Ensure roles and responsibilities for an emergency evacuation are well known and communicated in advance of an emergency, including:

    o Members of the public, specifically people with disabilities, knowing what they are responsible for, how to connect with necessary services, what their expectations for support should be, and their options for transportation and shelter.

    o Staff and volunteers for various organizations and orders of government involved in evacuation;

    o Building owners, employers, and business owners, focusing on understanding liability considerations to plan for evacuations, and developing communication strategies and incentives to promote emergency preparedness. How regulators monitor regulations is also important.

    o Communities of people with disabilities and policymakers, raising awareness about how demographic changes and government policies are changing the context in which evacuations are occur. For example, more people with disabilities and seniors are living at home; and rates of disability increase as the population ages.

- Identify disparities between communication standards and practice; training and behaviour change can help fill in these gaps.

- Develop strategies to prepare for many first-time evacuations since many people have not experienced an evacuation. Communication strategies to prepare for many first-time evacuees will be especially important. Communities should be engaged in advance of an emergency to prepare, but many challenges can still arise with first-time evacuees even with advance preparation.

- Ensure risk communications are readily available in accessible formats, developed to meet the needs of specific communities and populations, and distributed through several sources with particular attention to grassroots organizations and community leaders. This is especially important when there is distrust of authorities. Community-led committees and groups that supported the COVID-19 response can be adapted to other emergency response purposes by strengthening these community relationships.

Transportation

Section authored by:
Dr. Ahsan Habib, Director, Dalhousie Transportation Collaboratory | Dalhousie University

Dr. Jahedul Alam, Postdoctoral Research Associate, Dalhousie Transportation Collaboratory | Dalhousie University

DalTRAC developed a Mass Evacuation Decision Support (MEDS) tool to analyze and improve mass evacuation processes for the Halifax Peninsula. The study develops a large-scale traffic simulation model to test and evaluate contrasting evacuation scenarios and countermeasures, considering two shelters, namely Charles P. Allen High School and Nova Scotia Community College Akerley Campus. The figure on the following page provides a visualization of our traffic evacuation microsimulation model and evacuation traffic flows in Halifax.

This research investigated the temporal and logistical requirements for evacuating persons with mobility needs located on the Halifax Peninsula of the Halifax Regional Municipality. Given its inherent vulnerable proximity to the surrounding coastline and limited routes for evacuation, this focused investigation seeks to provide policymakers with insights into challenges associated with the evacuation of persons with mobility needs and help develop strategies to account for often overlooked community members. This study is novel in combining optimization and traffic simulation modelling to account for multiple risks and factors in developing and testing an evacuation process for persons with mobility needs.

Key Observations

One of the variables that our model predicts is evacuation time. This is the time required to evacuate the last person in the city due to hurricanes or floods. We found that it requires 22 hours to evacuate 65,000 passenger vehicles from the peninsula with an assumption of no disruptions to traffic on the road (Alam and Habib, 2021a; Alam et al., 2019).

The model found that a flood of 3.9m water level relative to Canadian Geodetic Vertical Datum of 1928 (CGVD28) increases the evacuation time to 23 hours due to the flooding of several road links on the peninsula (Alam, 2021). We have also tested mass evacuations considering the possibility of collision occurrence. Depending on the locations and patterns of collisions occurrence, it may take 23 to 33 hours (50% increase compared to 22 hours) to evacuate the same amount of traffic from the peninsula (Alam and Habib 2021b). Results of the traffic evacuation simulation model indicate that auto-based evacuation requires a larger clearance time and creates heavily congested traffic conditions when everyone gets onto the road simultaneously during a mass evacuation. This highlights the importance of alternative evacuation planning, including transit and/or countermeasure enabled evacuations.

Accommodating persons with disabilities, particularly those requiring mobility assistance during a mass evacuation, is a critical consideration for emergency planners and engineers. Our model was also extended to evaluating an evacuation scenario

accounting for the mobility needs of this specific group of the population to identify the logistical requirements and the associated evacuation times. We have found that it may take 21 hours for 90 ambulances to evacuate 512 individuals needing mobility assistance from the hospitals and nursing homes located on the peninsula (Alam et al., 2022). This presents a longer clearance time for such a small group due to the special evacuation requirements (e.g., ambulance, pick-up/drop-off patients). It warrants further special treatments such as dedicated emergency route for ambulance to evacuate persons with mobility needs with no/limited obstructions from traffic.

To improve the evacuation processes, we modelled two countermeasures: (i) bus-based evacuation; and (ii) staged evacuation. We identified marshalling point locations and optimum bus routes to use transit and school buses for evacuations efficiently. Results indicate that evacuation time can be reduced to 17 hours (22.7% less compared to 22 hours) if a fleet of 322 transit and 88 school buses are used to carry people during an evacuation. This is because it enables a 7.7% reduction of passenger vehicles from the road, resulting in less congestion and delay in reaching shelters (Alam and Habib, 2021a). Our models also explored the evacuation time for a staged-evacuation scenario that phases the entire evacuation demand spatially and/or temporally. To facilitate phasing of evacuation demand, we have developed a vulnerability-based prioritization model that assesses the social, geophysical, and mobility vulnerability of populations across four planning districts of the Halifax Peninsula including Halifax Downtown (DT), North-End (NE), South-End (SE), and West-End (WE). Our model identified the vulnerability of the four planning districts in descending order: DT > NE > WE > SE. These districts were evacuated accordingly within our evacuation simulation model. Results show that considering the vulnerability-based prioritization does not negatively impact the evacuation time. Rather, it reduces the evacuation times by 2.68% to 70.37% across the four planning districts when compared to an evacuation without the countermeasure applied (Alam, 2021).

The MEDS tool is the first of its kind that addresses uncertainties and risks associated with a mass evacuation. The tool is useful for emergency professionals to understand what types of strategies are effective, how to plan the countermeasure implementation process, and what potential consequences are associated with countermeasure implementation. This tool can also assess evacuation scenarios in other areas, as the information required by the modules is readily available in almost all other jurisdictions. The tool will be particularly effective in planning evacuations using all modes available in other areas as it offers the flexibility to include additional modes of transportation in the evacuation plans. The tool can also be used for smaller community evacuations that would require consideration of the household as the smallest spatial unit for trip production in the simulation. Even the evacuation of a concentrated demand zone (e.g., stadium evacuation) can be modelled using the MEDS tool.
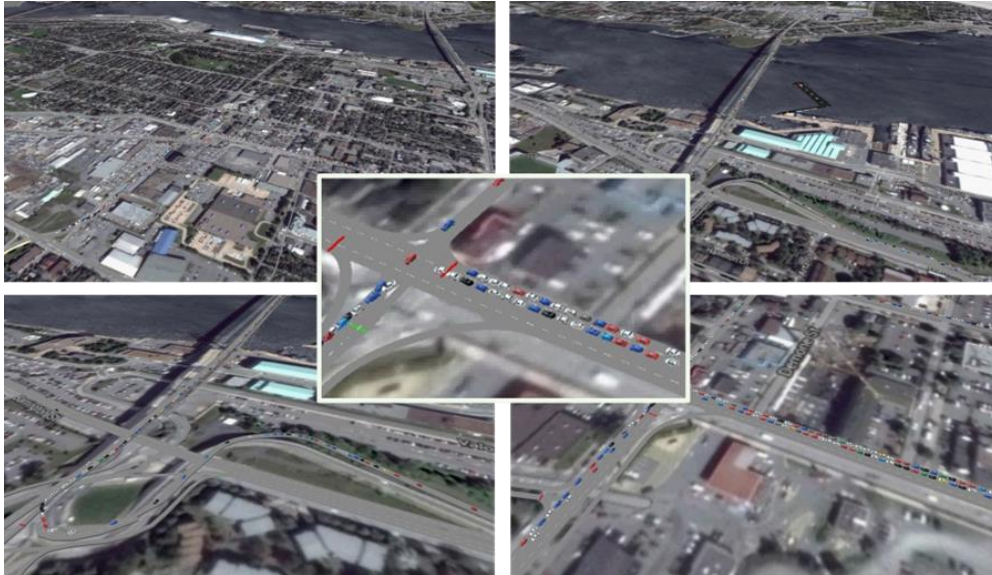
Figure 1: Visualization of the traffic evacuation microsimulation model, traffic evacuation and congestion in the Halifax transport network

Recommendations

Carrying out mass evacuations from disaster-prone areas is a difficult task with many operational challenges in egress and corresponding traffic congestion. Evacuation planning is a critical part of emergency response for disaster-prone cities, particularly for historical and coastal cities such as Halifax, which have few exits and narrow roads. DalTRAC recommends that the municipality develop a comprehensive mass evacuation plan inclusive of all people and modes. Effectiveness of countermeasures depends on the structure of the transportation network and demographic characteristics of a region. Evacuation plans for Halifax should include both single and combined countermeasures for implementation if needed in an evacuation scenario.

Resource allocations should be optimized and dedicated emergency evacuation routes should be determined using a traffic simulation modelling framework to improve the evacuations of people with disabilities.

Shelter

Section authored by:
Rosanne Burke, Research Manager and Associate, Spacializing Care Lab | St. Francis Xavier University

Mary Jane Kelly, Research Assistant, Spacializing Care Lab | St. Francis Xavier University

Dr. Katie Aubrecht, Director, Spacializing Care Lab | St. Francis Xavier University

In 2021–2022, researchers at the Spatializing Care: Intersectional Disability Studies Lab at St. Francis Xavier University conducted an environmental scan of information on accessible and functional sheltering in emergency situations for people with disabilities in Canada. Our overarching goal was to collect and generate information that could be used to identify the most suitable facilities to use as shelters for people with disabilities during a mass evacuation in Halifax, Nova Scotia. Federal and provincial evacuation policies and programs were reviewed and analyzed, academic and public commentary, and current knowledge about promising practices and directions was also considered. Emergency sheltering practices in Halifax were contextualized using genealogical methods and information from the Nova Scotia Archives. The approach and data interpretations were guided by a critical disability studies perspective. Conversations with subject matter experts and lived experience advisors enriched and validated our findings.

The study aimed to contribute to knowledge about accessible and functional sheltering during an emergency for all people, including people with disabilities. We conducted an environmental scan of federal and selected provincial/territorial jurisdictions for legislation, policies, programs, services, action plans and publicly available information on emergency sheltering for persons with disabilities. The scan generated information that can be used to identify the most suitable facilities in Halifax to use as shelters during an evacuation. The issue of how to identify and locate people who may experience barriers to safe, accessible, and functional sheltering during a mass evacuation was raised by the project advisory group early in the project and guided our work and recommendations. This briefing note summarizes what we learned from the scan and shares recommendations.

The environmental scan was completed between May and August 2021. Information was collected and organized using multiple methods and included: (1) reviewing publicly available information on the sheltering phase of evacuations and analyzing how the access and functional needs of persons with disabilities are included in legislation, policies, programs, services, plans, and publicly available information including websites and brochures; (2) interviewing subject matter experts and people with lived experience of disability and emergency situations; (3) visualizing potential shelter locations and places where people with disabilities may be more likely to reside, using Google Maps.

The jurisdictional scope of the scan included the federal government, six provinces (BC, AB, MB, ON, NB, NS) and one territory (NWT). Only one municipal jurisdiction was included (Halifax Regional Municipality). The rationale for inclusion of Nova Scotia,

Ontario, Manitoba, and British Columbia was having accessibility legislation in place at the time of the scan; Alberta because of the historical context of evacuations due to forest fires; New Brunswick as an additional Atlantic province in closest proximity to Halifax; and Northwest Territories because of their work with the 'On Thin Ice' project. Information from not-for-profits involved in emergency management preparedness or response (e.g., Red Cross, Salvation Army, St. John Ambulance) and disabled persons' organizations (e.g., Nova Scotia League of Equal Opportunities) and allied groups and networks (e.g., Disability Rights Coalition of Nova Scotia) was also included.

An adapted three-phase, ten-step approach was used for the policy scan (Mullen 2014). For each jurisdiction, multiple government domains were searched (e.g., Department of Health, Department of Community Services, Department of Municipal Affairs) using specific search terms (e.g., evacuation, sheltering, disabilities, older adults) for information relating to emergency services and people with disabilities. In each jurisdiction, an attempt was made to find information in six categories: legislation, policies, training, action plans, public awareness, and non-government/disabled persons' organizations.

Key Observations

People with disabilities are overrepresented in institutional spaces such as hospitals, nursing homes, and a range of residential care facilities. As such, it is crucial that such places are meaningfully engaged, included, and represented in HRM's emergency management preparedness and planning work. Overcrowding and waitlists also suggest that such spaces should not automatically be identified as potential sheltering sites for persons with disabilities without abundant consultation with health and continuing care sector leaders and first voice disability organizations.

Accessibility legislation, regulations, and changes in public expectations could lead to more suitable places to shelter in HRM. The access and functional needs (AFN) approach allows greater flexibility to address individual needs irrespective of diagnosis rather than focusing on people with disabilities as a broad, homogenized category (CDC 2021). To help operationalize the AFN approach, the CMIST Framework was developed based on five categories that should be addressed in emergency preparedness and response:

1. **C**ommunication
2. **M**aintaining health
3. **I**ndependence
4. **S**afety, support, self-determination
5. **T**ransportation

The AFN framework and approach is widely used in emergency management in the United States but appears to be less so in Canada. The Disability Alliance BC (2016) created several functional needs frameworks for use by individuals and local authorities. The Red Cross in Nova Scotia, which has the contract to operate emergency shelters, uses the Sheltering Handbook by the American Red Cross. It

includes guidelines to meet access and functional needs of persons with disabilities in shelters.

Under Nova Scotia's Accessibility Act (2017), the provincial government, municipalities, and other prescribed public sector bodies are required to have accessibility plans developed in consultation with persons with disabilities, the organizations that represent them, and organizations impacted by the Act (Government of Nova Scotia 2018). The Act also requires the development of accessibility standards, with the following areas prioritized: Built Environment, Education, Employment, Goods and Services, Information and Communication, and Transportation. While work to implement the Act is ongoing, it has catalyzed changes in HRM that align with an AFN approach. One relevant instrument is the municipality's accessibility plan.

Central to the plan is HRM's adoption of Rick Hansen Foundation Accessibility Certification (RHFAC) standards to advance accessibility of the built environment (RHFC 2024). Future objectives of the HRM Accessibility Plan identified at the time of this environmental scan include: using RHFAC standards for current and future infrastructure; developing a review system to audit buildings and public facilities; ensuring that signage is accessible; and increasing training for municipal staff, including fire and police (Myers 2021). HRM has also committed to ongoing collaboration with organizations representing persons with disabilities to improve accessibility in the municipality and update the municipal website with information that is accessible, in plain language and in accordance with Web Content Accessibility Guidelines (Myers 2021).

Emergency preparedness for persons with disabilities is a collective responsibility. Personal preparedness guides for persons with disabilities and older adults at the federal and provincial levels share similar advice. Plan to be self-sufficient for 72 hours; know the risks; create an emergency kit with extra medical supplies; develop a personal network of friends, family, neighbours, and coworkers who can assist in an emergency; and prepare a plan for service animals and pets. However, not everyone has the resources or capacity to independently prepare and plan for an emergency. People with intellectual disabilities, cognitive impairment, and mental health conditions and challenges, as well as persons with disabilities who are parents or caregivers, and/or have limited or no social or familial supports, are precariously housed and/or living in poverty may require assistance and decision-making supports and may not have the time, resources, or capacity to independently develop and action emergency sheltering plans.

Effective planning at the personal and collective levels requires information about resources and available options. Municipal and provincial bodies often advise individuals to prepare evacuation routes and know in advance the location of their nearest shelter. Yet, the locations of shelters, usually predetermined by municipalities, are not often made public until the time of an emergency.

The scan yielded limited public information on the types of facilities or locations of possible shelters in the various jurisdictions. When this information is communicated there

is an overreliance on text-based and digital forms of communication and inadequate consideration of communication barriers experienced by people with disabilities.

The scan did not identify publicly available information that suggested there was a coordinated approach towards emergency sheltering. When Category 5 Hurricane Dorian hit Halifax in 2019, shelters were in community centres. Three shelters were opened for evacuees: Canada Games Centre, St. Margaret's Centre, and East Dartmouth Community Centre. At the time there was no standardized approach to supporting access and function across these sites.

Training for emergency staff and volunteers is an important consideration. Emergency support services depend on volunteers to operate shelters and provide services including reception and registration of evacuees, food, clothing, and to meet individual needs. While most jurisdictions provide opportunities for Emergency Management Office of Nova Scotia's training of staff and volunteers involved in emergency management, there was limited information on training specifically for the provision of emergency support services in shelters that accommodate the access and functional needs of persons with disabilities. COVID-19 has negatively impacted the availability of volunteers for the delivery of emergency support services (Community Sector Council, 2020), and this is a future consideration in the planning and management of emergency social services.

The most suitable locations to use as shelters during an evacuation are:
- buildings operated by prescribed public bodies under Nova Scotia's Accessibility Act, and specifically colleges, universities, and schools;

- community halls and recreation centres (including ice facilities); and

- buildings certified by the Rick Hansen Foundation and/or buildings operated by public and private bodies that choose to go "above and beyond" the minimum accessibility standards [a municipal or provincial voluntary designation system may be required].

Universities and Colleges: Subject matter experts and people with lived experience of disability identified community colleges, universities, and schools as preferred locations.

- Nova Scotia Community Colleges are owned by the province and, as such, can be used as shelters without any permission or negotiations required. There are seventeen campuses located in the province and three in HRM. Amenities vary between the campuses with cafeterias, gymnasiums, residences, and childcare centres available in some locations. Some are waterfront campuses (e.g., Ivany Campus), which may render them unusable during a flood.

- Dalhousie University has committed to exceeding basic standards and requirements under the law and was the first institution in Atlantic Canada to have a new building certified with the Rick Hansen Foundation. Its central location in the city of Halifax makes it a less desirable location during a mass evacuation. Acadia University in the town of Wolfville may provide a suitable alternative. Wolfville piloted the first municipal accessibility plan in the province and has worked closely with the Government of Nova Scotia's Accessibility Directorate, housed in the Department of

Justice and responsible for administering the Act and advancing disability issues within Government (Nova Scotia Accessibility Directorate 2019).

Community Halls and Recreation Centres: Other common facilities that may be used as shelters during an evacuation include ice facilities, aquatic centres, multi-purpose facilities, churches, and community centres. Data from Statistics Canada (2021) indicates that ice facilities are deemed to be the most accessible type of facility in Canada.

- HRM owns and operates nearly 70 recreation centres (Halifax 2021).

- Ice, aquatics, and multi-purpose facilities in HRM include the Canada Games Centre, Zatzman Sportsplex, Dalplex, Saint Mary's Homburg Centre for Health & Wellness, Centennial Arena, Cole Harbour Place, Halifax Forum, Scotiabank Centre, Sackville Sports Stadium, and RBC Centre.

- Arenas in other parts of the province include the Membertou Sport & Wellness Centre, East Hants Sportsplex, Rath Eastlink Community Centre, Clearwater Seafoods Arena (LCLC), Queens Place Emera Centre, Sandy Wickens Memorial Arena, and Andrew H. McCain Arena at Acadia University (Recreation Facility Association of Nova Scotia 2020). The recently renovated Zatzman Sportsplex had new accessibility features added per the recommendations of the Accessibility Advisory Committee (Halifax 2021).

Recommendations

- One or more 'permanent' or 'central' emergency evacuation shelter/s should be identified with information about the shelter posted on the HRM website. The location of additional shelters should be added to the website and communicated as soon as that information is available.

- Information about the location/s of all shelters should be housed on the municipality's website and promoted publicly in accessible formats using a multi-pronged approach engaging radio, television, social media, with targeted outreach to people and communities that may be disproportionately impacted by accessibility and functional barriers during a mass evacuation.

- Information about access and functional barriers that may exist in shelters should be included to support the public's informed decision-making about where to shelter.

- Emergency sheltering guidelines should be required to include information about how to support the diverse access and functional needs of people with disabilities. Emergency guidelines should be developed in consultation with organizations representing people with disabilities, and people and communities disproportionately impacted by access and functional barriers during emergencies (Mi'kmaq and other First Nation and Indigenous people, African–Nova Scotian, Immigrant and Refugee, Francophone and other linguistic minorities, 2SLGBTQ+).

- Facilities that meet and/or exceed the baseline expectations in guidelines should be able to voluntarily apply for a designation as an accessible emergency shelter. All

facilities should be eligible for the designation, without requirement of certification from private entities involving fees. The designation process could be led by municipal or provincial governments, or by an organization representing persons with disabilities with support from the municipal or provincial government.

- Municipal and provincial governments should invite the Council of Nova Scotia University Presidents and Nova Scotia Community Colleges leads to collaborate on an emergency strategy that clarifies the role universities and colleges can play in supporting accessible and functional sheltering in emergency situations in HRM, and the province more broadly. Municipal, provincial, and university and college accessibility advisory committees and organizations representing people with disabilities should be consulted and engaged in this process.

Return and Recovery

Section authored by:
Kaitlynne Lowe, Research Assistant, MacEachen Institute for Public Policy and Governance | Dalhousie University

Dr. Kevin Quigley, Scholarly Director, MacEachen Institute for Public Policy and Governance | Dalhousie University

We surveyed 29 people with disabilities, some caregivers, and eight emergency managers to understand key considerations from different perspectives. The data from this survey was used for both the communication/alert and return and recovery sub-projects (see section 2 of this report). Survey responses were collected between October and December 2021. We reviewed academic literature and other publicly available material. On April 17, 2023, the MacEachen Institute for Public Policy and Governance hosted a virtual roundtable with 15 invited participants. They represented academics, public agencies, emergency managers, non-profit organizations, and organizations that represent persons with disabilities. The research findings and the roundtable discussions, including recommendations, are summarized below. Participants discussed the issues raised and their perspectives on them from their professional and personal experiences. Their comments are summarized but not attributed.

There are four key stages to evacuation: communication and alert, transportation, shelter, and return to community. This phase focused on return to community and recovery from evacuation. The purpose is to understand how we can improve the return and recovery phase of an evacuation for people with disabilities. Unless otherwise stated, we refer to "recovery" as the restoring of livelihoods and health, including economic, physical, social, cultural, and environmental assets, systems, and activities, of a disaster-affected community (Kushma 2022, xx).

There are many different functional needs and experiences throughout the disability communities that should be accounted for in emergency responses. For example, emergency responses should consider diverse physical, sensory, and cognitive needs as well as the varieties of experiences in the disability community, even between people with seemingly similar disabilities. There are unique needs to consider, such as access to supplies and supports such as food, transportation, medical treatment, mental health services, support workers, and service animals.

Key Observations

The key findings from the scholarly literature
Managing safe return to communities following an evacuation is a significant challenge. In many ways, the decision to announce the return to a community is comparable to a decision to mandate an evacuation (Stallings 1991, 183). There are similar concerns for public safety and individual risk perceptions that are important to consider. The Government of British Columbia enlists the help of volunteer engineers to support this work.

People with disabilities and caregivers have unique requirements to ensure their residences are safe and accessible for their return, including access to assistive devices and equipment, access to utilities and telecommunications, considerations for service animals.

Insurance and disaster relief programs have a role in disaster recovery, but processes and policies need to be clear and user-friendly. Residents need complete knowledge of their coverage and claim systems should be easy to use and efficient, with payments made quickly.

Disasters can have significant impacts on mental health, particularly post-traumatic stress, and cause long-term health and economic impacts. Access to trauma-informed psychosocial supports can support disaster recovery over the long term.

The most resilient communities are often the most connected. Strong interconnectedness between members of a community often means the community can be more resilient to disasters. Social capital of individual members of a community and the community overall are also important factors for resiliency.

The key findings from the surveys
(conducted between October and December 2021)
Top concerns with return to community relate to addressing damage and debris, alongside restoration of utilities and access to necessities (e.g., safe food and water). Respondents with disabilities and caregivers noted that repair work is a concern, as are considerations for managing repairs while also providing caregiving support.

There is a lack of public experience with evacuation. 90% of survey respondents (people with disabilities and caregivers) have not experienced an evacuation, which poses significant challenges for emergency managers. People's plans likely have significant gaps. Regardless of advance preparation, people may experience emotional and psychological stress that will further complicate an evacuation.

Respondents identified their reliance on insurance to recover and replace lost or damaged property. Some people with disabilities noted they felt comfortable with their insurance coverage and felt fortunate to have financial resources to help recover from an emergency. It was also raised that people have varying degrees of insurance coverage and may not be able to pay out-of-pocket expenses (e.g., insurance deductibles).

Emergency manager respondents identified that emergency personnel need to have knowledge of requirements to ensure a residence is accessible and operational (e.g., access to utilities, free of hazards, access to supplies and supports such as food, transportation, mental health services, and support workers). There are also considerations for medical equipment and assistive devices that impact safe return to community for people with disabilities, as well as service animals and their needs.

Summary of roundtable discussion
Each jurisdiction has its own process to lift an emergency order that has mandated an evacuation. At times, third parties (e.g., contractors) are involved in repair work. Concerns about impacts on dignity of risk were raised as a caution to ensure responses

are not paternalistic and limit the dignity of the people processes are intended to support.

The fact that evacuations are rare events and most Canadians have never experienced them means there will be significant challenges for first-time evacuees as these events increase in frequency and severity. Members at the roundtable raised that it is important to ensure that emergency responses consider the needs of renters and people in poverty in addition to homeowners.

Personal support workers are often strained for resources and capacity and this would be accentuated during an emergency situation where there will be increased reliance on personal support workers. There needs to be support for workers in these fields.

The role of insurance is important as recently demonstrated in the response to post-tropical storm Fiona. Residential insurance claims in response to Fiona were 4 to 5 times higher than other disasters. Losses were most significant in Nova Scotia and Prince Edward Island. Support to navigate insurance and relief funding processes following an emergency was recommended.

Typically, insurance companies have the goal to repair and rebuild in the same location. The importance of implementing "build back better" concepts emerged, particularly with respect to insurance processes and the current focus on adhering to minimum standards. While insurance companies will make repairs according to the most up-to-date building codes, more should be done to incentivize and encourage principles of building back better to improve resiliency rather than returning people to exactly what they had in place before the disaster. "Managed retreat" was also discussed as processes to relocate families living in vulnerable areas (e.g., coastal).

Training should be put in place for all professionals and volunteers involved in emergency response (e.g., responders, insurance adjusters, non-profit volunteers) that is led by people with disabilities with the aim of making emergency responses more accessible to diverse functional needs.

Implications of widespread issues with access to safe and accessible housing on emergency responses were raised. It is also important to recognize the needs of rural communities and implications of access, or lack thereof, to transportation.

The roundtable discussion informed our recommendations and will continue to inform our research in this area. For more information about the project, see the MacEachen Institute website [LINK].

Recommendations

- Emergency responders need specific knowledge about the needs of residents with disabilities to ensure a residence is safe, accessible, and operational according to their needs.

- Opportunities for people with disabilities, caregivers, and emergency managers to engage directly with emergency planning are vital. The disability community is not homogenous.

- The process must provide caregiving services to enable caregivers to complete their own return and recovery tasks (e.g., repair work, insurance processes, clearing damage or debris).

- The process must also provide support to obtain insurance and disaster-relief funding in a timely manner.

- Most people have never been evacuated. Strategies to prepare for first-time evacuees will be important for return and recovery.

- Training should be developed for emergency responders and other professionals (e.g., insurance) and volunteers involved in return and recovery processes with the goal to improve accessibility. Such training programs should include disability organizations in a leading role.

- We need a better understanding of who the key stakeholders are (e.g., emergency organizations, first responders, volunteers, service providers) and their responsibilities during and following emergencies.

Conclusion

The project generated many findings (see our website). We identified gaps in the ability to share information between jurisdictions, the absence of specific theories of the field, the limited amount of research about the Canadian experience with evacuation, and the importance of sharing academic and practitioner expertise across the country. There are also many interdependencies between each of the evacuation phases (i.e., communication/alert, transportation, shelter, return and recovery).

There are opportunities for further research, including liability considerations for building owners, employers, and business owners with respect to evacuating persons with disabilities from their premises. Improving communication strategies to support first-time evacuees also requires more attention because not many people have personal experience with evacuations. Much of the research to date has focused on the experiences of people with disabilities following an evacuation or disaster; the data demonstrates the value of considering accessibility needs in advance of an emergency. Also, the research needs to distinguish more clearly between people with disabilities who are institutionalized, living in the community, and a part of transient communities (e.g., unhoused, tourists, migrants) to account for differences between their needs.

Increases in disasters have intensified discussions of voluntary registries of vulnerable persons, where volunteered information is collected and accessed for emergencies. Many emergency managers may not be aware of the access needs within their communities, who would be the most vulnerable in an emergency, and where those people are located. Vulnerable persons registries are a tool to help address this, but there are many challenges regarding information management, communication, and governance. There are Canadian and international jurisdictions using these registries to reference.

This study contributes to developing an operational evacuation modelling framework for assessing the evacuation of persons with disability using a dedicated evacuation route. Future efforts in evacuation simulation modelling should incorporate more planning considerations, for example shelter accessibility and return and recovery.

Future shelter operations will need to have a broad view of accessibility and work to accommodate many different functional needs. The legal context regarding accessibility is continuously evolving, and emergency shelter locations will need to account for this in evacuation plans, especially as more people with disabilities are given supports to live at home and age-in-place. In 2013, the Nova Scotia Government committed to a roadmap that would lead to the closing of institutions and to the inclusion of persons with disabilities living in community-based options by 2023 (Disability Rights Coalition 2021). In 2014 the Disability Rights Coalition launched a human-rights claim against the Province of Nova Scotia on the grounds that barriers to social assistance for persons with disabilities created barriers to living in the community of their choice and, for some, resulted in disenfranchisement and institutionalization. The 'remedy' to the finding of systemic discrimination by the Nova Scotia Court of Appeal in

2021 includes closing institutions, moving most people into communities, and removing barriers to social assistance (Disability Rights Coalition 2023).

Other areas of future study include improved engagement with people with disabilities in advance of an emergency, the role of community bonds and social capital in building community resilience, specific considerations for caregivers, and comparisons between urban and rural communities.

References

Aliperti, G., Nagai, H., and Cruz, A. 2020. "Communicating Risk to Tourists: A Mental Models Approach to Identifying Gaps and Misperceptions." Tourism Management Perspectives 33: 100615. https://doi.org/10.1016/j.tmp.2019.100615

Alam, M. J., & Habib, M. A. (2021a). A dynamic programming optimization for traffic microsimulation modelling of a mass evacuation. Transportation research part D: transport and environment, 97, 102946.

Alam, J., Habib, M. A., & Venkatadri, U. (2019). Development of a multimodal microsimulation-based evacuation model. Transportation research record, 2673(10), 477-488.

Alam, M. J. (2021). Development of a Mass Evacuation Decision Support Tool, PhD Dissertation, Dalhousie University

Alam, M. J., & Habib, M. A. (2021b). Mass evacuation microsimulation modeling considering traffic disruptions. Natural Hazards, 108(1), 323-346.

Alam, M. J., Habib, M. A., & Husk, D. (2022). Evacuation planning for persons with mobility needs: A combined optimization and traffic microsimulation modelling approach. International Journal of Disaster Risk Reduction, 80, 103164-.https://www.sciencedirect.com/science/article/pii/S2212420922003831?via%3Dihub

Alzheimer Society of Nova Scotia. (2021). Donate. https://alzheimer.ca/ns/en/take-action/donate

Boase, N., White, M., Gaze, W., & Redshaw, C. 2017. "Evaluating the Mental Models Approach to Developing a Risk Communication: A Scoping Review of the Evidence: Evaluating the Mental Models Approach." Risk Analysis, 37(11), 2132–2149. https://doi.org/10.1111/risa.12789

Bostrom, A., Fischhoff, B., Morgan, M. 1992. "Characterizing mental models of hazardous processes: A methodology and an application to radon." Journal of Social Issues, 48 (4) (1992), pp. 85-100.

Centers for Disease Control and Prevention. (2021). Access and functional needs toolkit: Integrating a community partner network to inform risk communication strategies. https://www.cdc.gov/cpr/readiness/afntoolkit.htm

Community Sector Council (2020). Initial impact of COVID-19 on Nova Scotia's Nonprofit and voluntary sector. https://novascotia.ca/nonprofitsector/documents/COVID-19-IMACT-REPORT.pdf

Disability Alliance BC. (2016). A functional needs framework for every community: A toolkit for local governments planning for people with disabilities in emergencies and disasters. https://disabilityalliancebc.org/wp-content/uploads/2018/06/DABC-EPToolkitCMIST2016.pdf

Disability Rights Coalition. (2021). Call to Action: The road to inclusion and equality for people with disabilities government accountability on the roadmap.

https://www.disabilityrightscoalitionns.ca/wp-content/uploads/2021/07/Disability-Rights-Road-to-Inclusion-2023-FINAL-REPORT.pdf

Disability Rights Coalition of Nova Scotia. (2023). Systemic Human Rights Remedy Ordered. https://www.disabilityrightscoalitionns.ca/2023/07/13/systemic-human-rights-remedy-ordered/

Government of Canada. (2020). Promoting rights of persons with disabilities. https://www.international.gc.ca/world-monde/issues_development-enjeux_developpement/human_rights-droits_homme/rights_disabilities-droits_handicapees.aspx?lang=eng

Government of Nova Scotia. (2020, December 23). Prevalence of disabilities in Nova Scotia. Accessibility Directorate. https://novascotia.ca/accessibility/prevalence/

Government of Nova Scotia. (2018). Accessibility Act. https://nslegislature.ca/sites/default/files/legc/statutes/accessibility.pdf

Halifax. (2021). Comfort centres. https://www.halifax.ca/fire-police/fire/emergency-management/comfort-centres

Kushma, J. (2022). Case Studies in Disaster Recovery: A Volume in the Disaster and Emergency Management: Case Studies in Adaptation and Innovation Series. Elsevier Science & Technology. https://books.google.com/books/about/Case_Studies_in_Disaster_Recovery.html?id=aXf5wgEACAAJ

Mullen, J. (2014). The policy scan in 10 steps: A 10 step guide based on the Connecticut chronic disease policy scan. Connecticut Department of Public Health. https://portal.ct.gov/-/media/Departments-and-Agencies/DPH/dph/hems/chronic_dis/PolicyScanGuideFINAL2pdf.pdf

Myers, M. (2021). Accessibility strategy. Creating an inclusive environment for individuals with disabilities within the Halifax Regional Municipality. https://www.halifax.ca/sites/default/files/documents/city-hall/regional-council/210518rc1116.pdf

Nova Scotia Department of Seniors. (2017). Shift: Nova Scotia's Action Plan for an Aging Population. https://novascotia.ca/shift/shift-action-plan.pdf

Nova Scotia Accessibility Directorate. (2019). Accessibility Plans Municipal Toolkit. https://novascotia.ca/accessibility/Municipal-Toolkit.pdf

Public Safety Canada. (2018). Sendai Framework for Disaster Risk Reduction 2015-2030. https://www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/dsstr-prvntn-mtgtn/pltfrm-dsstr-rsk-rdctn/snd-frmwrk-en.aspx

Public Safety Canada. (2023). Canadian Disaster Database. Government of Canada. https://www.publicsafety.gc.ca/cnt/rsrcs/cndn-dsstr-dtbs/index-en.aspx

Rick Hansen Foundation. (2024). Attract more visitors & employees – get rated & certified. https://www.rickhansen.com/become-accessible/rating-certification

Saxena, L. (2020). Intersectionality and disability-inclusive development. Inclusive Sustainable Development. https://disabilitydevelopment.com/2020/11/09/intersectionality-and-disability-inclusive-development/

Sheppard, B., Janoske, M., and Liu, B., 2012. "Understanding Risk Communication Theory: A Guide for Emergency Managers and Communicators, Report to Human Factors/Behavioral Sciences Division, Science and Technology Directorate." U.S. Department of Homeland Security. College Park, MD: START. https://www.start.umd.edu/sites/default/files/files/publications/UnderstandingRiskCommunicationTheory.pdf

Stallings, R.A. (1991). Ending Evacuations. International Journal of Mass Emergencies & Disasters, 9(2), 183–200. https://doi.org/10.1177/028072709100900205 [https://training.fema.gov/hiedu/downloads/ijems/articles/ending%20evacuations.pdf]

Statistics Canada (2021a). Map 4: The populations of the Atlantic provinces are aging quickly. Government of Canada. https://www150.statcan.gc.ca/n1/daily-quotidien/220427/mc-a004-eng.htm

Statistics Canda. (2023). Canadian Survey on Disability, 2017 to 2022. Government of Canada. https://www150.statcan.gc.ca/n1/daily-quotidien/231201/dq231201b-eng.htm

Statistics Canada (2021). Percentage of publicly owned culture, recreation and sport facilities which allow accessibility, Infrastructure Canada https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410019001

United Nations. (2006). Convention on the Rights of Persons with Disabilities. https://www.un.org/disabilities/documents/convention/convention_accessible_pdf.pdf

United Nations Office for Disaster Risk Reduction. (n.d.). Sendai Framework for Disaster Risk Reduction 2015-2030. https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030

Appendix A: Research Committee Members

Name	Institution
Sheila Wildeman	Dalhousie University, Faculty of Law
Eli Manning	Dalhousie University, Faculty of Health
Ahsan Habib	Dalhousie University, School of Planning/DalTRAC
Haorui Wu	Dalhousie University, School of Social Work/Architecture
Deborah Stienstra	University of Guelph, Department of Political Science
Katie Aubrecht	St. Francis Xavier University, Department of Sociology
Rosanne Burke	Mount St. Vincent University, Department of Family Studies and Gerontology
Mary Jane Kelly	St. Francis Xavier University, Department of Sociology
Paul Kovacs	Western University, Institute for Catastrophic Loss Reduction
Mary Ann McColl	Queen's University, Faculty of Health
Kevin Ng	Rick Hansen Foundation
Nancy Beaton	Canadian Paraplegic Association (Nova Scotia)
Ancel Langille	Nova Scotia Red Cross
Leslie Taylor	Nova Scotia Community Transportation Network
Ellen Johnson	Nova Scotia Community Transportation Network
April D'Aubin	Council of Canadians with Disabilities
Jewelles Smith	Council of Canadians with Disabilities
Dawn Stegen	NS Accessibility Directorate
Lashauna Smith	NS Accessibility Directorate
Lori Errington	NS Emergency Management Office
Alice Born	Statistical Geomatics Centre, Statistics Canada
Erica Fleck	Halifax Regional Fire and Emergency
Paul Carey	Northwood

Institutional Support Provided By:

MacEachen
INDEPENDENT. INFORMED.

DALTRAC
DALHOUSIE TRANSPORTATION COLLABORATORY

ST. FRANCIS XAVIER UNIVERSITY

SPATIALIZING CARE LAB

DALHOUSIE UNIVERSITY

Research Committee:

ST. FRANCIS XAVIER UNIVERSITY

DALHOUSIE UNIVERSITY

UNIVERSITY of **GUELPH**

MOUNT SAINT VINCENT UNIVERSITY

Western

Queen's UNIVERSITY

Rick Hansen Foundation

Canadian Paraplegic Association (Nova Scotia)
Association canadienne des paraplégique (Nouvelle-Écosse)

CANADIAN RED CROSS

Community Transportation Network
Connecting Nova Scotians

Council of Canadians with Disabilities
A VOICE OF OUR OWN

Northwood
LIVE MORE

Canada

HALIFAX

NOVA SCOTIA