3.1

Asset mapping to consider outcome measurement and stakeholder engagement

Authors

Mélissa Généreux, Estrie Public Health Department, Quebec, Canada; Department of Community Health Sciences, University of Sherbrooke, Sherbrooke, Canada.

Shannon Tracey, Institute on Aging and Lifelong Health, University of Victoria, Victoria, Canada.

Tracey O'Sullivan, Faculty of Health Sciences, University of Ottawa, Ottawa, Canada.

3.1.1   Learning objectives

To understand key factors to consider when using asset mapping to support research into health emergency and disaster risk management (Health EDRM), including:

1. The tradition of community health outcome measurement in disaster research.
2. The concept of asset literacy and how it can be leveraged as an outcome of asset mapping to support disaster risk reduction.
3. The value of engaging key stakeholders from the outset in order to develop a common vision of health deficits and assets and identify solutions to maximize community resilience.
4. The use of an asset lens in outcome measurement studies in pre- and post-disaster contexts.

3.1.2   Introduction

Communities affected by disasters may experience extensive impacts to the health and well-being of the population. Disasters also affect the economy, infrastructure and the environment. The impacts are not all inherently negative, and positive impacts may result from a disaster at the individual-level (such as post-traumatic growth) and the community-level (such as strengthening of social connectedness and safer or greener structures). In addition to reducing future risk, this underscores the essence of building adaptive capacity before a disaster and 'building back better' after a disaster (Chapter 1.3) *(1–2)*. All these issues need to be considered when planning and using research in Health EDRM. Furthermore, recognition of the need to understand the complexity of different types of impact in turn prompts recognition of the need for diverse research approaches and methods that can account for existing and emergent capacity in outcome measurement.

Disaster research has traditionally involved methods to develop risk and vulnerability profiles (Chapters 1.3 and 3.2), map hazards and assess adverse outcomes following events. Tyler and Moench *(3)* refer to this paradigm as 'predict and prevent' (to which we may also add 'protect') and underscore its limitations based on anticipation, surveillance and reaction to threats rather than building resilient systems. Further to this deficit-based approach, measurement of outcomes and associated predictors should be based on wider considerations, including protective factors and positive consequences arising from disasters.

The disaster literature has traditionally focused on financial or physical infrastructure, when referring to assets. However, as the field of DRR has become more interdisciplinary, understanding of assets has broadened toward inclusion of critical social infrastructure and a more balanced approach to understanding resilience, which focuses not only on risk and deficits, but also on physical and social assets within a community that can support resilience *(4)*. Here, resilience broadly refers to the intrinsic capacity of an individual or community to resist, adapt and recover after experiencing a disturbance, such as a disaster *(5)*.

This chapter describes asset mapping as it relates to both outcome measurement and stakeholder engagement, and the relevance of asset literacy from a public health perspective. The intent is to highlight the importance of outcome measurement that focuses not only on deficit-oriented measurement, but also on community assets to support resilience. The role of stakeholder engagement in supporting asset literacy is also discussed. Case Study 3.1.1 illustrates how these concepts fit together by highlighting a community initiative introduced to measure asset-based outcomes, map community assets and engage stakeholders in the monitoring of long-term impacts and the community recovery following the Lac-Mégantic train derailment and explosion in 2013.

Case Study 3.1.1
Psychosocial Impacts of the Lac-Mégantic Train Explosion

On 6 July 2013, a train carrying 72 cars of oil derailed in downtown Lac-Mégantic in the Estrie region of Quebec, Canada. The derailment provoked a major conflagration and a series of explosions. The disaster resulted in 47 deaths, the destruction of 44 homes and businesses, the evacuation of 2000 citizens (that is, one third of the local population) and an unparalleled oil spill. The disaster caused major human, environmental, and economic impacts *(6)*. In the first years after the disaster, the Estrie Public Health Department undertook several actions, including monitoring physical health and psychological consequences. Four cross-sectional health surveys (2014, 2015, 2016, 2018) were conducted by the Public Health Department and the University of Quebec in Chicoutimi among large and representative samples of adults living in and around Lac-Mégantic, gathering data on a variety of physical and mental health outcomes. Findings from the first two surveys in and around Lac-Mégantic revealed that about one in six adults were considered as having been intensely exposed to the disaster. Steep gradients were observed in the prevalence of adverse psychosocial outcomes as a function of intensity of exposure to the train derailment. The findings showed persistent and widespread health needs, such as PTSD, anxiety, and a

3.1

higher proportion of people seeking mental health services *(7)*. In addition to adverse psychosocial outcomes, various asset-based outcomes were considered in the surveys. This found, for instance, that intensely exposed adults were less likely to report optimal mental health in 2015 (as opposed to low exposed ones), suggesting that health assets can weaken with time among people directly impacted by a disaster, especially in the absence of adequate support and services.

Given the magnitude of the disaster, the Estrie Public Health Department hosted a collective reflection day, bringing together local stakeholders to discuss possible solutions for the health and well-being of the community *(8-9)*. A defining moment of this day was the asset mapping activity through which participants constructed together a historical timeline that traces key milestones in the recovery of their community and recognizes the progress made. By highlighting a series of interventions and initiatives previously implemented by social workers and other partners, the group identified benefits at the individual and community level, as well as features common to the actions that created positive effects.

During the reflection day, it became apparent there was a need to initiate a positive campaign to highlight the strengths of the community. A community-based participatory research approach was chosen to address this need, and an asset-mapping project using a Photovoice method was designed with the purpose of allowing local citizens to explain the aspects that make their community an attractive place to call home and to map assets that support resilience within their community (see also Case Study 4.12.1 in Chapter 4.12). Following this six-month initiative, the group hosted two exhibitions to share their photos and ideas with the public, including politicians and decision-makers. These events were an opportunity for the participants to enhance collective asset literacy and showcase the assets in their community and a collective vision for the community going forward.

Fostering community engagement was a hallmark of the physical, economic and social reconstruction process in Lac-Mégantic. The importance of identifying and leveraging existing assets or resources at the community level, including local health agencies, and working with existing capacities were strongly valued. A better understanding of the local needs and capacities gave residents in Lac-Mégantic the opportunity to become increasingly involved in personal or community projects, as well as collective events. Although the disaster has left its mark, the local community is gradually adapting to its new reality. The asset-based approach contributed to this "new reality" and emphasizes the importance of social capital to activate individual and community resilience in post-disaster contexts.

The outreach team published a report five years after the tragedy to highlight the different strategies used in this community to mobilize the local community in the post-disaster landscape *(10)*. All these initiatives have contributed greatly to empower citizens and mobilize the community of Lac-Mégantic and surrounding areas.

3.1.3   Outcome Measurement

In their asset model for public health, Morgan and Ziglio *(11)* present a model showing the theoretical base of salutogenesis (saluto = health; genesis = origin of) as the foundation for asset-based health promotion. They emphasize the need for enhanced outcome measurement methods, with a caution toward using a traditional deficit-oriented approach, which tends to focus on what produces disease and psychosocial problems (rather than health and well-being). Over the past few decades, many positive health concepts have emerged in science (such as self-efficacy, resilience, social support or participation, civic engagement). Public health actors, including those involved in disaster research or disaster risk management, are invited to consider and assess such asset-based outcomes (in addition to deficit-based ones) and to adopt more broadly a "salutogenic" orientation.

Outcome measurement is a core activity of public health and Health EDRM. It is used to assess prevention and preparedness programmes and initiatives, response and recovery activities, and community health impacts in the months and years following a disaster (see also Chapter 2.2). Measuring community health outcomes is critical for understanding how a population is impacted over time, allowing public health and the broader health system to develop and tailor programmes and services to meet the changing needs of the population *(12)*. Adverse impacts on physical and mental health are common outcome measurements for community health, requiring both short- and long-term monitoring *(7)*.

By causing body stress, mental workload, losses and disruption, injuries and lesions, and changes in lifestyle habits, disasters often lead to adverse impacts for individual and community health and well-being, over the short and long term. The acute consequences of large-scale traumatic events vary according to disaster type. Primary health problems are directly caused by disaster action (such as wounds, intoxication due to toxic fumes). Secondary health problems can also be observed, including infections, accidents, or dysfunction of physiological functions associated with disaster-generated stress (such as hypertension as a result of overexposure to stress) *(13–14)*. Finally, various somatic symptoms may affect victims of a disaster. These include sleep disorders, headaches, fatigue, abdominal pain, and shortness of breath. The prevalence of somatic symptoms, which can last several years, have been found to range from 3% to 78% *(15)*.

In addition to acute consequences of disasters (mostly physical health consequences), the population burden of mental health problems in the aftermath of disasters is substantial and potentially of long duration (Chapter 5.1) *(15–16)*. PTSD is the most common mental health outcome studied in a post-disaster context *(17)*. One review of the literature estimates the prevalence of PTSD to be 30-40% among direct victims, 10-20% among rescue workers, and 5-10% in the wider community *(18)*. Given the high prevalence of PTSD after a disaster, more research is needed to evaluate a broader range of psychosocial outcomes such as psychological distress, major depression, generalized anxiety disorder, panic disorder, phobia, complicated grief, maladaptive behaviours (including alcohol and drug abuse), suicidal ideation, but also positive outcomes (including sense of belonging to the community, sense of

3.1

coherence, positive mental health, and post-traumatic growth). Exposure to a disaster can also have a positive long-term effect on the beliefs and values of certain individuals and create a stronger sense of family, social capital and collective solidarity. Some individuals may even discover personal strengths which had been previously untapped *(19–20)*.

Communities struck by a disaster caused by natural or human-induced hazards need to learn to assess the evolving health of the population, in order to implement upstream and downstream actions that can properly respond to the needs of the individual and wider community. To do this, short- and long-term monitoring of both physical and psychological consequences through various quantitative methods is essential. A variety of data sources can be used for monitoring population health over time, including routinely collected information, such as medical and administrative databases and surveys, as discussed in Chapters 2.2 and 2.4. Surveys can be either clinical- or community-based, and cross-sectional or longitudinal in nature. Ideally, both exposed and unexposed individuals should be monitored over time. Indeed, having a control or comparison group allows investigation of the association between exposure to the disaster and health effects observed.

Regardless of the data sources chosen, in an ideal world it is important to ensure a complete set of measures is monitored over time, including physical health, psychological health, health behaviours, perceptions, access to services, social support, risk and protective factors, and so on. Negative and positive consequences should be considered. For example, following a major flood, researchers may wish to examine temporal trends in a given community, using repeated cross-sectional surveys to assess a wide range of issues such as injuries, respiratory health problems, post-traumatic stress, emotional and financial stress, depressive symptoms, excessive drinking, psychosocial support received, sense of community belonging and so on, among a random sample of the local population.

Disaster-related losses should be measured in order to be able to examine health outcomes as a function of the level of exposure to the disaster. Various types of losses can be considered, including human losses (such as loss of a loved one, fear for one's life or that of a loved one, suffering injuries), material losses (such as home damage, permanent or temporary relocation, job loss), and subjective losses (such as perception that the event was stressful, that something important was lost, that something important was interrupted, or that harm will potentially occur in future).

Such surveys are powerful tools for health promotion initiatives and local advocacy initiatives. They help with raising awareness, providing an understanding of the full scope of local issues, as well as understanding the preferences and needs of the community to inform priority setting. By doing so, they contribute to the tailoring of interventions aiming to support citizens, communities, and inter-sectoral partners, and, more generally speaking, to the promotion of resilience and recovery processes *(7)*.

Beyond traditional surveys and other quantitative methods, qualitative approaches (such as focus groups and interviews) are also valuable for ensuring that the voices of groups who are disproportionately at high-risk are heard, in order that their specific needs and capacities are taken into account (see Chapters 4.12 and 4.13). It is important to take time to listen

and learn from citizens, and to consider all members of the community as assets rather than victims *(2)*.

Regardless of the extent of the problems observed in the field, public health must seek a balance between a deficit-approach, which focuses on needs as well as disease or ill-health, and an asset-approach focused on strengths, capacities and resources of the community *(8)*. A good understanding and mastery of these two approaches is necessary for teams working in a psychosocial recovery context.

3.1.4   Asset Mapping

Bortel and colleagues *(21)* describe an asset approach to health as one which "...aims to identify those health-promoting or protective factors operating at different levels ... within individuals, communities, organizations and systems that are most likely to lead to higher degrees of overall health, well-being, achievement and sustainability". Asset mapping, which complements an asset approach, is a method that originated in the field of community development and is used to identify outcome measures that are asset-oriented *(22–23)*. Asset mapping was introduced by Kretzmann and McKnight in the early 1990s to promote citizen engagement and empowerment, by creating opportunities for participation *(22–24)*. It is based on a strengths-based approach to challenge traditional deficit-oriented mapping that has been employed in development initiatives. This method focuses on identifying resources that promote health and resilience in a community or organization, in contrast to deficit-oriented mapping, which has a pathogenic orientation to identify what makes people ill *(25)*. A balanced approach is needed if people are to be empowered *(11)*.

In the past decade, asset mapping has gained recognition as an upstream strategy for DRR (such as the CART Community Resilience Toolkit *(26)*, the EnRiCH Community Resilience Intervention *(2)*), and more recently for use in the recovery phase *(27)*. There is better understanding of the need to engage communities in identifying not only physical resources that can support resilience, but also social assets across multiple ecological levels (such as person, interpersonal, institutional, community, broader society).

The asset model for public health proposed by Morgan and Ziglio *(11)* describes asset mapping as an assessment method for intervention design. In support of this, Tracey and colleagues *(28)* developed a list of asset indicators that can be used for asset mapping to build organizational resilience. They used one-on-one interviews and focus groups to consult with representatives from essential service organizations. Thematic analysis was used to identify emergent themes related to organizational resilience from this qualitative dataset. The themes were then used to develop asset-oriented indicators which can be used by organizations to measure adaptive capacity within organizations to support disaster resilience.

For Health EDRM research, a diverse set of assets should be considered in pre- and post-disaster contexts. One of the challenges in asset mapping is to define and categorize different types of assets; both Hobfoll *(29)* and Moser and Satterthwaite *(30)* developed categories to address this challenge. The categories of assets span socioecological levels. They

3.1

include individual, household, institutional, community and societal levels. Table 3.1.1 shows four types of asset categories that can be used for asset mapping. This list was created by combining the categories identified by Hobfoll *(29)* and Moser and Satterthwaite *(30)* for the purpose of household asset mapping with families impacted by stroke *(31)*.

Table 3.1.1 Sample of Asset Categories *(31)*

| Asset Category	Description (and examples)
Social	Assets that involve people, community networks, social programmes, and are related to the social environment (such as family, friends, neighbours, culture, informal communication channels, social services, policy, bylaws).
Personal Characteristics	Assets within a person that can be mobilized to support resilience (such as knowledge, skills, attitude, perseverance, creativity).
Energy	Energy assets are those which can be converted into other assets to support prevention/mitigation, preparedness, response and recovery (such as money, time invested by an organization or group).
Physical	Tangible assets in the physical environment that support needs and operational functioning of different systems in the community (such as power grids, roads, housing, water treatment systems, transportation).

3.1.5   Asset Literacy

Literacy is a common term used to refer to learning and cognitive processing around different domains. The UN Educational Scientific and Cultural Organization (UNESCO) defines literacy as "the ability to identify, understand, interpret, create, communicate and compute, using printed and written materials associated with varying contexts... Literacy involves a continuum of learning in enabling individuals to achieve their goals, to develop their knowledge and potential, and to participate fully in their community and wider society" *(32)*.

Asset literacy, a type of literacy, can be improved through asset mapping and stakeholder consultation. This concept was developed through a series of studies in which the processes and outcomes of asset mapping were observed and discussed *(4, 28, 31)*. Basic asset literacy is being able to identify assets which can then be categorized according to the types described in Table 3.1.1. For utility, however, awareness must be fostered so that people and organizations understand the potential value and contribution of different types of assets to support resilience. Beyond this awareness is empowerment, where citizens understand how to mobilize different assets in their communities and how to get involved to contribute their own assets to support their communities. Opportunities for social participation (such as through stakeholder engagement) is key for asset literacy to expand to this actionable level. Finally, innovation and engagement are supported when people have self-efficacy and motivation to act on their knowledge of assets. Self-efficacy is similar to confidence, but includes perceptions of control *(33)*. O'Sullivan and colleagues *(31)* expand on this description of asset literacy in a research study with stroke

survivors who described assets they would rely on to support resilience in a disaster (Figure 3.1.1).

Figure 3.1.1 Components of Asset Literacy *(31)*
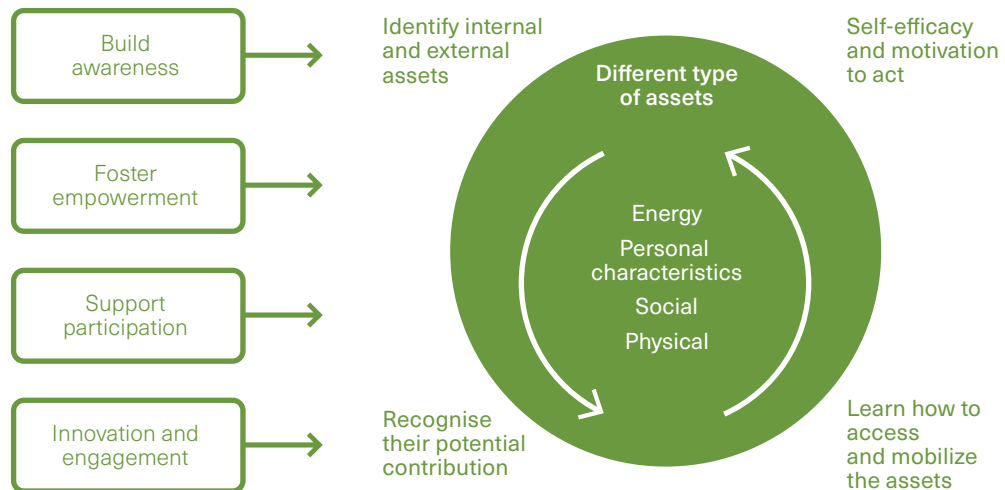
3.1.6   Stakeholder Engagement

Citizen engagement is central to the relevance and success of asset mapping interventions. It is critical to acknowledge stakeholders when identifying acceptable and effective solutions, taking into account evolving needs and the local context *(22, 26)*. Formally, stakeholder engagement refers to the active and equitable involvement of a diverse group of stakeholders, including the community, opinion leaders and media, in the research process *(34–35)*. Its purpose is to enhance the relevance of research to policy and practice, increase the transparency of the process, and reduce the time between knowledge generation and adoption into practice *(34)*. Engagement of the affected community can also contribute to the broadening of outcome measures by identifying assets within the community which can shape the research agenda and public health initiatives. It is not a trivial endeavour, but one that requires the time and commitment of researchers and decision-makers to redistribute power among all those involved, enabling communities to contribute their expertise and gain a shared sense of ownership *(36–37)*.

The tradition of involving stakeholders is evident in several academic research approaches, including community-based participatory research *(35, 38)*, participatory action research *(39)*, implementation science *(40)* and knowledge translation *(41)*. Although not new, stakeholder engagement is increasingly recognized as important by research funding organizations and many research initiatives. To effectively engage stakeholders in research projects, the research team must first identify the relevant stakeholders, broker relationships, collaboratively define roles and meaningful engagement activities. Any of these steps may be revisited throughout the research process to adapt and adjust to emergent needs of the stakeholders or community. The steps are outlined below.

Firstly, it is important to engage stakeholders and communities early in the process, so as to incorporate their ideas into the research questions while

3.1

the study protocol is still malleable. To help identify relevant stakeholders, Concannon and colleagues *(42)* developed the 7P framework which includes:

i)   patients and the public;

ii)   providers;

iii)   purchasers;

iv)   payers;

v)   policy makers;

vi)   product makers; and

vii) principal investigators.

Although this framework was developed for health services research, the categories are applicable to Health EDRM. For example, "providers" could refer to professionals in health care (such as nurses, physicians, paramedics and so on), emergency services (such as fire, police, ambulance), or emergency management (incident commander, for example). Another way to conceptualize stakeholders is at the micro (individual), meso (organizational), and macro (policy) level *(43)*. The goal is to bring together stakeholders with diverse backgrounds, expertise, and skills relevant to the area of inquiry. Oftentimes, stakeholders are identified within a research team's first- and second-degree network connections, meaning relationships are already established. In cases where the identified stakeholder is unfamiliar, the research team can reach out to the individual to introduce themselves and invite them to the table. This strategy of cold contacting requires time and patience to broker a meaningful relationship.

Once stakeholders are invited to the table, there are several considerations that must be made around the design of the research project. This requires, and is not limited to, planning the roles of stakeholders, recognizing the values and objectives of engagement, and scheduling activities to exchange information *(34, 37)*. Phillipson and colleagues *(44)* noted several ways stakeholders have contributed to projects, such as providing input on study design, participating as research participants, supporting data collection, providing resources (such as facilities and materials), giving feedback, and helping to disseminate findings. Consultation methods, such as the structured interview matrix (SIM) facilitation technique, are also effective for garnering feedback from stakeholders and stimulating solution-oriented thinking across different sectors in the community *(2)*. Other activities used to engage stakeholders include town halls, small group meetings, establishing a community of practice, lunch and learns, and online collaborative platforms, to name a few. The key is to ensure that stakeholder input is reflected in the research study, and that decision-making power is a shared responsibility so that engagement moves beyond symbolic partnership but becomes one that is active and mutually beneficial.

3.1.7   Applying an Asset Lens to Outcome Measurement

To redress the balance of a deficit-based approach, an asset lens can be applied to assess the strengths and capabilities of a community *(24)*. Outcome measurement is not only important for assessing the negative impacts to a community, but also emergent strengths and capacities *(11)*. Using a socioecological model can help to differentiate which level the strengths or assets reside in: individual, organizational, and community or society. Rippon and South *(45)* conducted a rapid review of the literature for the WHO to determine how asset-based approaches are being used in the field of health promotion and public health for intervention design and evaluation.

There is a need for better identification of what makes a community resilient, through an assessment of assets before, during and after emergency or disaster (that is, its characteristics, strengths, and resources) that are associated with greater community resilience *(26)*. Local knowledge should be considered in the same manner as scientific knowledge. Having been through a unique and informative experience, the local health workforce involved in psychosocial management can benefit from drawing and sharing lessons in the aftermath of a disaster.

Case study research has a strong foothold among academics and practitioners as a methodology for studying disasters, due to its emphasis on providing in-depth and comprehensive information about an event. Case studies can therefore be used to capture the experiences of communities preparing for or impacted by disasters, and further illuminate assets that bolster resilience. To fully realize the potential of this type of methodology, standard formats, which include both deficit- and asset-based outcome measures, are needed to guide case study reporting. This would facilitate the pooling and sharing of such local evidence. In time, these case studies could be subjected to meta-analyses, to distil common features that transcend each unique emergency or disaster ravaged community. Some guidelines for these types of case study might include sharing lessons about:

- the needs and assets in the local community

- how and by whom these needs and assets should be addressed

- barriers and success factors for sustaining resilience and recovery.

3.1.8   Conclusions

Given the context of disaster prevention, preparedness, response and recovery, it is natural to focus on risks, hazards and vulnerability. However, adoption of an asset-oriented lens can stimulate innovation and solution-oriented thinking to complement an all-hazards approach in Health EDRM. Asset mapping requires investment and commitment by leaders to support grass-roots initiatives that foster citizen engagement. This type of initiative is the essence of an all-of-society approach to disaster health research, but it requires meaningful opportunities for participation by all.

3.1

3.1.9   Key messages

o   **A balanced paradigm which recognizes both assets and risks is needed to support better outcome measurement in disaster research.**

o   **Stakeholder engagement must be part of asset mapping to ensure broad community perspectives and that local context is included in assessment and measurement.**

o   **Asset mapping can inform outcome measurement, but it is important that indicators reflect a balanced paradigm by including appropriate measures that consider assets in a community.**

o   **Asset literacy is both a process and an outcome measure, which emphasizes local knowledge and intervention strategies that support community participation.**

3.1.10   Further reading

McKnight J. A Basic Guide to ABCD Community Organizing. Illinois: Northwestern University. 2003. https://resources.depaul.edu/abcd-institute/publications/publications-by-topic/Documents/A%20Basic%20Guide%20to%20ABCD%20Community%20Organizing(3).pdf (accessed 25 January 2020).

Généreux M, and The Outreach Team. Promising initiatives to mobilize the local community in a post-disaster landscape. Centre intégré universitaire de santé et de services sociaux de l'Estrie –Centre hospitalier universitaire de Sherbrooke. 2019. https://www.santeestrie.qc.ca/clients/SanteEstrie/Publications/Sante-publique/Promising_Initiatives_DSPublique2019-11-01.pdf (accessed 10 February 2020)

3.1.11 References

1. Cardona OD, van Aalst MK, Birkmann J, Fordham M, McGregor G, Perez R, et al. Determinants of risk: Exposure and vulnerability. In: Field CB, Barros V, Stocker TF, Qin D, Dokken DJ, Ebi KL, et al, editors. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press, Cambridge, UK, and New York, NY, USA. 2012. pp. 65-108.

2. O'Sullivan TL, Corneil W, Kuziemsky CE, Toal-Sullivan D. Use of the structured interview matrix to enhance community resilience through collaboration and inclusive engagement. Systems Research and Behavioral Science. 2014: 32(6): 616-28.

3. Tyler S, Moench M. A framework for urban climate resilience. Climate and Development. 2012: 4(4): 311-26.

4. O'Sullivan TL, Kuziemsky CE, Corneil W, Lemyre L, Franco Z. The EnRiCH community resilience framework for high-risk populations. PLOS Currents Disasters. 2014: 2 October: 6.

5. Castleden M, McKee M, Murray V, Leonardi G. Resilience thinking in health protection. Journal of Public Health. 2011: 33(3): 369-77.

6. Généreux M, Petit G, Maltais D, Roy M, Simard R, Boivin S, et al. The public health response during and after the Lac-Mégantic train derailment tragedy: A case study. Disaster Health. 2015: 2(3-4): 113-20.

7. Généreux M, Maltais D, Petit G, Roy M. Monitoring adverse psychosocial outcomes one and two years after the Lac-Mégantic train derailment tragedy (Eastern Townships, Quebec, Canada). Prehospital and Disaster Medicine. 2019: 24(3): 251–9.

8. Généreux M, Petit G, Roy M, Maltais D, O'Sullivan T. The "Lac-Mégantic tragedy" seen through the lens of The EnRiCH Community Resilience Framework for High-Risk Population. Canadian Journal of Public Health. 2018: 109(2): 261-7.

9. Généreux M, Petit G, Lac-Mégantic Community Outreach Team, O'Sullivan T. Canada. Public health approach to supporting resilience in Lac-Mégantic: the EnRICH framework. In: Ziglio E, editor. Health 2020 priority area four: Creating supportive environments and resilient communities. Copenhagen, Denmark: WHO. 2018. 156-62.

10. Généreux M, and The Outreach Team. Promising initiatives to mobilize the local community in a post-disaster landscape. Centre intégré universitaire de santé et de services sociaux de l'Estrie –Centre hospitalier universitaire de Sherbrooke. 2019. https://www.santeestrie.qc.ca/clients/SanteEstrie/ Publications/Sante-publique/Promising_Initiatives_DSPublique2019-11-01. pdf (accessed 10 February 2020).

11. Morgan A, Ziglio E. Revitalising the evidence base for public health: An assets model. Promotion and Education. 2007: 14(2 Suppl): 17-22.

12. Khan Y, O'Sullivan T, Brown A, Tracey S, Gibson J, Généreux M, et al. Public health emergency preparedness: A framework to promote resilience. BMC Public Health. 2018: 18: 1344.

3.1

13. Lane K, Charles-Guzman K, Wheeler K, Abid Z, Graber N, Matte T. Health effects of coastal storms and flooding in urban areas: A review and vulnerability assessment. Journal of Environmental and Public Health. 2013: 913064.

14. Saulnier DD, Ribacke KB, Schreeb J. No calm after the storm: A systematic review of human health following flood and storm disasters. Prehospital and Disaster Medicine. 2017: 32(5): 568-79.

15. Goldmann E, Galea S. Mental health consequences of disasters. Annual Review of Public Health. 2014: 35: 169-83.

16. Warsini S, West C, Ed GD, Mills J, Usher K. The psychosocial impact of natural disaster among adult survivors: an integrative review. Issues in Mental Health Nursing. 2014: 35(6): 420–36.

17. Galea S, Nandi A, Vlahov D. The epidemiology of post-traumatic stress disorder after disasters. Epidemiologic Reviews. 2005: 27: 78–91.

18. Neria Y, Nandi A, Galea S. Post-traumatic stress disorder following disasters: A systematic review. Psychological Medicine. 2008: 38(4): 467-80.

19. Généreux M, Maltais D. Three years after the tragedy: How the Le Granit community is coping. Bulletin Vision Santé publique. Centre intégré universitaire de santé et de services sociaux de l'Estrie – Centre hospitalier universitaire de Sherbrooke. 2017: 34.

20. Maltais D, Lansard A-L, Roy M, Généreux M, Fortin G, Cherblanc J, et.al. Post-disaster health status of train derailment victims with posttraumatic growth. Australasian Journal of Disaster and Trauma Studies. 2020: 24 (1): 51-63.

21. Bortel TV, Wickramasinghe ND, Morgan A, Martin S. Health assets in a global context: A systematic review of the literature. BMJ Open. 2010: 9(2): e023810.

22. Kretzmann JP, McKnight JL. Building communities from the inside out: A path toward finding and mobilizing a community's assets. Chicago, IL: Acta Publications. 1993.

23. Kretzmann JP, McKnight J. Voluntary organizations in low-income neighbourhoods: An unexplored community resource. Evanston, Ill: ABCD Institute. 1996. https://resources.depaul.edu/abcd-institute/publications/publications-by-topic/Documents/VoluntaryAssociations.pdf (accessed 2 January 2019).

24. McKnight JL, Kretzmann JP. Mapping community capacity. In: Minkler M, editor. Community Organizing and Community Building for Health, Second Edition. Rutgers University Press: New Jersey USA 2011: pp158-72.

25. Antonovsky A. The salutogenic model as a theory to guide health promotion. Health Promotion International. 1996: 11(1): 11-8.

26. Pfefferbaum RL, Pfefferbaum B, Van Horn RL, Klomp RW, Norris FH, Reissman DB. The Communities Advancing Resilience Toolkit (CART): An intervention to build community resilience to disasters. Journal of Public Health Management Practice 2013: 19(3): 250-8.

27. The Lac-Mégantic Photovoice Group, Nault-Horvath E, Maillet M, Stewart C, Petit G, O'Sullivan T. Canada. Public health approach to supporting resilience in Lac-Mégantic: Photovoice. In: Ziglio E, editor. Health 2020 priority area four: Creating supportive environments and resilient communities. Copenhagen, Denmark: WHO. 2018. pp163-8.

28. Tracey S, O'Sullivan T, Lane D, Guy E, Courtemanche J. Promoting resilience using an asset-based approach to business continuity planning. SAGE Open. 2017: 7(2): 1-15.

29. Hobfoll S. The influence of culture, community, and the nested-self in the stress process: Advancing conservation of resources theory. Applied Psychology. 2001: 50(3): 337-70.

30. Moser C, Satterthwaite D (2008). Towards Pro-poor Adaptation to Climate change in the Urban Centres of Low- and Middle- income Countries, Human Settlement Development Series: Climate Change and Cities Discussion Paper 3. International Institute for Environment and Development (IIED): London UK. www.iied.org/pubs/display.php?o=10564IIED (accessed 2 January 2020).

31. O'Sullivan T, Fahim C, Gagnon E (2018). Asset literacy following stroke: Implications for disaster resilience. Disaster Medicine and Public Health Preparedness 12(3): 312-20.

32. Montoya S. Defining Literacy. UNESCO. 2018. [Powerpoint delivered to GAML Fifth Meeting, 17-18 October 2018, Hamburg, Germany]. http://gaml.uis.unesco.org/wp-content/uploads/sites/2/2018/12/4.6.1_07_4.6-defining-literacy.pdf (accessed 18 May 2020).

33. Bandura A. Self-Efficacy: The Exercise of Control. New York: WH Freeman. 1997.

34. Boaz A, Hanney S, Borst R, O'Shea A, Kok M. How to engage stakeholders in research: Design principles to support improvement. Health Research Policy and Systems. 2018: 16(1): 60.

35. Israel BA, Eng E, Schulz AJ, Parker EA. Introduction to methods for CBPR for health. In Israel BA, Eng E, Schulz AJ, Parker EA, editors. Methods for community-based participatory research for health, Second Edition. San Francisco, CA: Jossey-Bass. 2013: 3-37.

36. Israel BA, Coombe CM, Cheezum RR, Schulz AJ, McGranaghan RJ, Lichtenstein R, et al. Community-based participatory research: A capacity-building approach for policy advocacy aimed at eliminating health disparities. American Journal of Public Health. 2010: 100(11): 2094-102.

37. Norris JM, White DE, Nowell L, Mrklas K, Stelfox HT. How do stakeholders from multiple hierarchical levels of a large provincial health system define engagement? A qualitative study. Implementation Science. 2017: 12(1): 98.

38. Israel BA, Schulz AJ, Parker EA, Becker AB. Review of community-based research: Assessing partnership approaches to improve public health. Annual Review of Public Health. 1998: 19(1): 173-202.

39. Whyte WF. Participatory action research. Newbury Park, CA: Sage. 1991.

40. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. Implementation Science. 2009 : 4(1): 50.

41. Graham ID, Logan J, Harrison MB, Straus SE, Tetroe J, Caswell W, et al. Lost in knowledge translation: Time for a map? Journal of Continuing Education in the Health Professions. 2006: 26(1): 13-24.

42. Concannon TW, Meissner P, Grunbaum JA, McElwee N, Guise JM, Santa J, et al. A new taxonomy for stakeholder engagement in patient-centered outcomes research. Journal of General Internal Medicine. 2012: 27(8): 985-91.

43. Mendel P, Meredith LS, Schoenbaum M, Sherbourne CD, Wells KB. Interventions in organizational and community context: A framework for building evidence on dissemination and implementation in health services research. Administration and Policy in Mental Health and Mental Health Services Research. 2008: 35(1-2): 21-37.

44. Phillipson J, Lowe P, Proctor A, Ruto E. Stakeholder engagement and knowledge exchange in environmental research. Journal of Environmental Management. 2012: 95(1): 56-65.

45. Rippon S, South J. Promoting asset based approaches for health and wellbeing: Exploring a theory of change and challenges in evaluation, Project Report, Leeds Beckett, Leeds. 2017. eprints.leedsbeckett. ac.uk/4497/7/Promoting%20asset%20based%20approaches%20 Nov%202017.pdf (accessed 2 January 2020).