



## Three Years After the Tragedy: How the Le Granit Community is Coping

On July 6, 2013, the population of Lac-Mégantic faced one of the worst railway disasters in Canadian history. In the middle of the night, a train that included 72 tank cars filled with crude oil derailed, setting off a series of explosions and igniting a major fire in the community's downtown area. The catastrophe resulted in 47 deaths, along with the destruction of several private residences, apartments and commercial establishments. The disaster also triggered an environmental spill involving large amounts of crude oil (more than 100,000 litres, according to the *Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques* (MDDELCC)). Many families were forced to leave their homes for several weeks, a number of which have not yet returned due to soil contamination.

Researchers and public authorities acknowledge that such events often lead to negative repercussions for a community's health and well-being over the short and long term, as well as on the personal, conjugal, family, social and professional lives of those involved. Such repercussions can spread far beyond the initial scope of the disaster. In addition, victims of technological catastrophes face different challenges than victims of natural catastrophes, as they often remain in a state of anticipation regarding the potential consequences of high toxicity exposure. Fortunately, not all victims face long-term psychological distress. Through adequate social support, some negative repercussions can fade with time, but they never fully subside. According to a number of studies, exposure to a disaster can have a positive long-term effect on the beliefs and values of certain individuals and create a stronger sense of family and collective solidarity. In addition, some individuals will often discover personal strengths which had been left largely untapped until then.

It is imperative that communities struck by a natural or technological catastrophe learn to monitor the evolving physical and psychological health of its population in order to implement curative and preventive measures that can properly respond to the needs of the individual and wider community, as well as to the different adaptation stages involved. For this reason, the

Public Health Branch of the Estrie region, in collaboration with the *Université du Québec à Chicoutimi* (UQAC), has spent the last three years tracking the evolving health of those living in the Le Granit area using population surveys conducted in 2014, 2015 and 2016.

This bulletin presents the highlights of the 2016 survey and targets the following two objectives:

1. To examine how various psychological challenges have evolved in the Le Granit area over time and under different levels of tragedy exposure.
2. To assess the negative and positive impacts on the lives of the Le Granit residents three and a half years after the tragedy.

### METHODOLOGY

In the summer of 2014, the Public Health Branch of the Estrie region conducted its first public health survey, the *Enquête de santé populationnelle estrienne* (ESPE). A total of 8,737 adults from the Estrie region took part in the survey, 800 of which live in Le Granit. Recruited at random, this representative sample of the Estrie population responded to a telephone survey covering a variety of physical and mental health issues. The second phase of the ESPE was carried out in the fall of 2015 and sought to better understand the Estrie population's health and well-being, along with its possible link to the July 2013 railway disaster. In total, 1,600 adults were recruited randomly in 2015 to take part in this large-scale telephone survey. These included 800 from Le Granit (261 in Lac-Mégantic), and 800 from elsewhere in the Estrie region (Généreux, Perreault, Petit *et al.*, 2016). In the fall of 2016, Prof. Danielle Maltais of the UQAC, in collaboration with the Public Health Branch of the Estrie region, co-directed a third survey, similar in nature, as part of a large-scale, five-year study (2015-2020) financed by the Social Sciences and Humanities Research Council of Canada (SSHRC). This effort also involved a telephone survey and focused on residents of the Le Granit area,

including 387 adults from Lac-Mégantic and 413 from elsewhere in the area, all of which were chosen randomly. Every year since the 2013 tragedy, a sample of 800 residents from Le Granit responded to a series of questions. A number of questions were identical across all three telephone surveys, allowing for the comparability of results over time (years 1 to 3 following the tragedy). In addition, the 2016 survey questionnaire included a number of new questions designed to gather data on the presence of complicated grief for those who lost loved ones, perceptions of community cohesion (the feelings of residents toward one another), and the positive impacts of tragedy exposure across five areas of interest: relationships with others, new possibilities, personal strengths, spiritual changes and appreciation for life. Other questions helped us document personal, family, social and professional consequences, along with the disruptions that resulted from the catastrophe and potential repercussions for those younger than 18 who were living with respondents. Respondents were classified according to the following categories, and each psychological health issue was compared to these specific levels of tragedy exposure:

- High exposure: Three types of loss (human, material and subjective)
- Moderate exposure: One or two types of loss
- Low exposure: No loss

A human loss refers to losing a loved one, fearing for one's life or that of a loved one, or sustaining an injury. A material loss refers to relocating (temporarily or permanently), or sustaining property damage. Finally, a subjective loss refers to the perception that the event was stressful, that something important was lost, that something important was interrupted, or that harm will potentially occur in the future.

## KEY FINDINGS

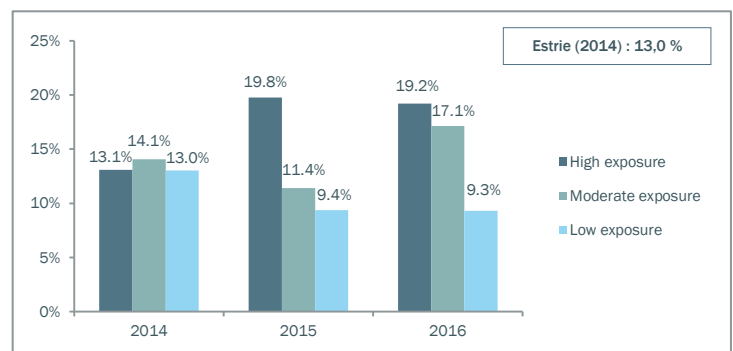
### Which Adults Underwent the Highest Tragedy Exposure?

Among the 800 participants who took part in the 2016 study, a quarter were considered to have undergone high exposure to the 2013 tragedy (25%), half underwent moderate exposure (53%), and a quarter underwent low exposure (22%). Those having undergone high exposure display profiles that differ from other Le Granit residents in several respects. Firstly, most live in Lac-Mégantic (four out of five). Compared to other residents, this group includes a higher number of 30 to 64 year-old individuals who are gainfully employed, married or bound by common-law union, and have at least one child under the age of 18. On average, they are slightly more economically advantaged than other residents of Le Granit.

### Section 1: The Evolution of Various Psychological Health Issues in Le Granit

1. In 2014, perceptions surrounding the health status of residents in Le Granit were similar, regardless of their exposure to the tragedy. Since 2015, however, a higher proportion of high-exposure cases began reporting their health status as either fair or poor (19%). Other authors have noted a similar evolution, including Nomura (Nomura et al., 2016), and Morey and Segerstrom (2015). It is worth noting that this group also appeared more inclined to consult a family physician, with 82% having done so in the past year.

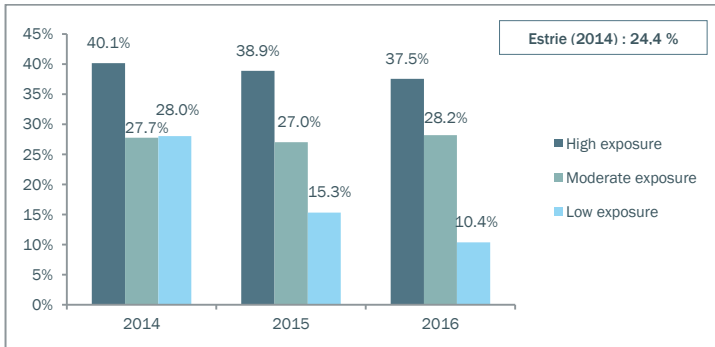
**Figure 1**  
Fair or poor health status by exposure level, Le Granit area, 2014 to 2016



2. Various measures were used to monitor symptoms of anxiety and depression in Le Granit residents over the past three years. These include:
  - Daily stress levels;
  - Psychological distress during the past few months, based on the Kessler scale (K6);
  - Depressive episodes during the past year (feelings of sadness, melancholy, depression or loss of interest in most activities for a period of two weeks or more).

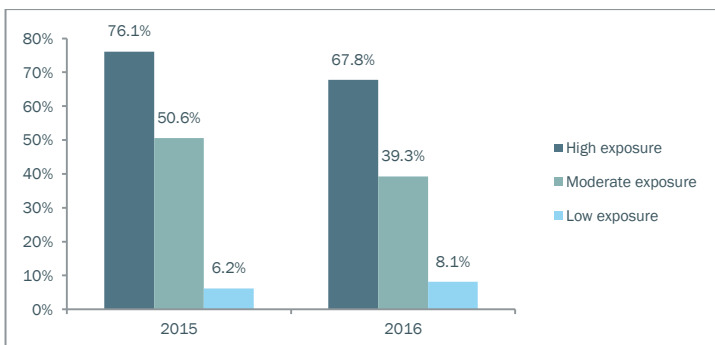
While symptoms of anxiety or depression were more common among those with high exposure, as compared to those with moderate or low exposure, they appear to have stabilized over time. For example, roughly 40% of those with high exposure reported psychological distress during years 1, 2 and 3 following the tragedy (scores of 7 or higher). It should be noted that this number is estimated at 24% in the Estrie region overall (ESPE, 2014).

**Figure 2**  
Psychological distress by exposure level, Le Granit area, 2014 to 2016



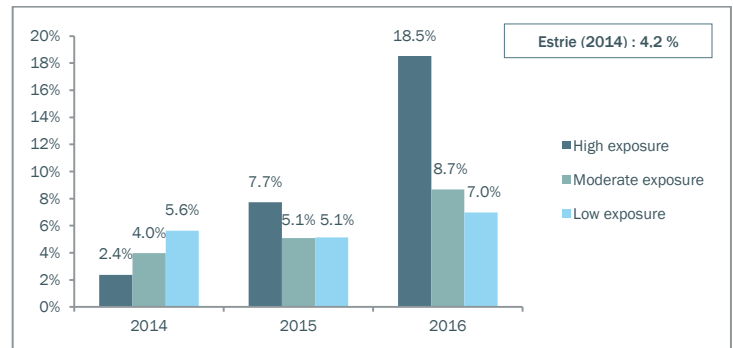
3. In 2015, investigations began to assess the risk of post-traumatic stress reactions in Le Granit residents using what's known as the Impact of Event Scale. This tool helps detect intrusive reactions (ex.: nightmares), or post-tragedy avoidance (ex.: keeping away from anything that reminds one of the event). Here, a 76% to 68% drop in moderate to severe post-traumatic stress reactions (score of 26 or higher) was observed between 2015 and 2016 for those who underwent high exposure. During the same period, a 67% to 49% reduction was noted in those showing moderate to severe post-traumatic stress reactions in Lac-Mégantic as a whole. These numbers are consistent with observations made following previous technological catastrophes that involved a 15% to 75% prevalence of post-traumatic stress (Drescher, Schulenberg & Smith, 2014). The prevalence of post-traumatic stress reactions in populations exposed to traumatic events varies according to the number of lives lost and injuries sustained, along with the amount of destruction surrounding personal and public property. In addition, most of the scientific literature regarding the psychological impact of disasters on individuals shows a reduction in post-traumatic stress reactions over time, while some anxieties often resurface at critical moments, such as anniversary ceremonies, for example.

**Figure 3**  
Moderate to severe post-traumatic stress reactions by exposure level, Le Granit area, 2014 to 2016



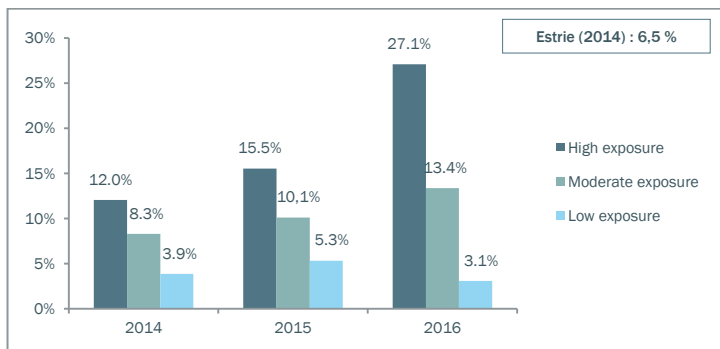
4. Investigations have been underway in Le Granit since 2014 to assess levels of resilience when facing day-to-day challenges, as opposed to more specific, tragedy-related challenges. In 2014, there were very few cases of low resilience observed in Le Granit residents (scores of 0 to 20 on the 10-Item Connor-Davidson Resilience Scale), regardless of their level of exposure. But such cases, particularly among those with high exposure, appear to have increased over the past two years, from 2% in 2014, to 8% in 2015, to 19% in 2016.

**Figure 4**  
Low resilience by exposure level, Le Granit area, 2014 to 2016

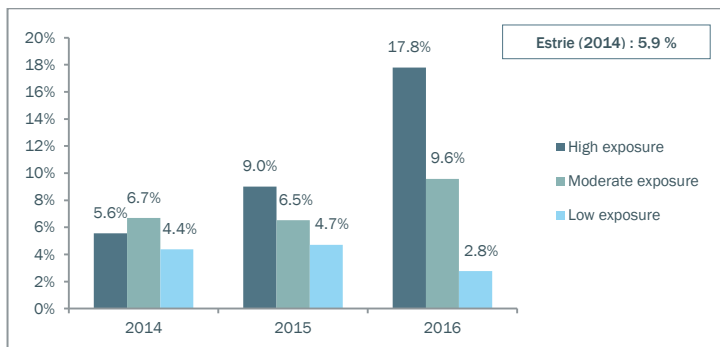


5. While reported cases of anxiety or depression appear stable over time, and while post-traumatic stress reactions seem to have dropped in 2016, diagnoses of mental health problems appear to have increased in Le Granit (22% in Lac-Mégantic and 17% elsewhere in Le Granit). In 2014, 15% of high-exposure cases reported anxiety disorders (ex.: generalized anxiety disorder), or mood disorders (ex.: major depression). This number rose to 17% in 2015, then to 36% in 2016. By comparison, an estimated 10% of the Estrie population suffers from either disorder (ESPE, 2014). Anxiety disorders are especially prevalent in those with high exposure (27% in 2016), while both types of disorder, considered separately, underwent a significant increase between 2014 and 2016. By comparison, one study conducted after a railway accident in the United Kingdom reported that close to 40% of those affected by the accident felt unsafe or anxious every time a train passed by (Chung, Werrett, Farmer, Easthope & Chung, 2000).

**Figure 5**  
Diagnosed anxiety disorders by exposure level, Le Granit area, 2014 to 2016

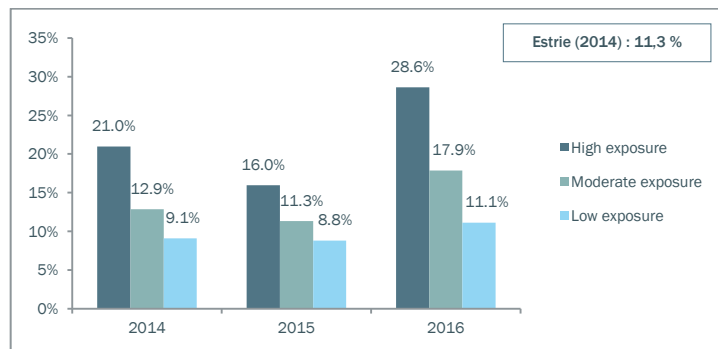


**Figure 6**  
Diagnosed mood disorders by exposure level, Le Granit area, 2014 to 2016



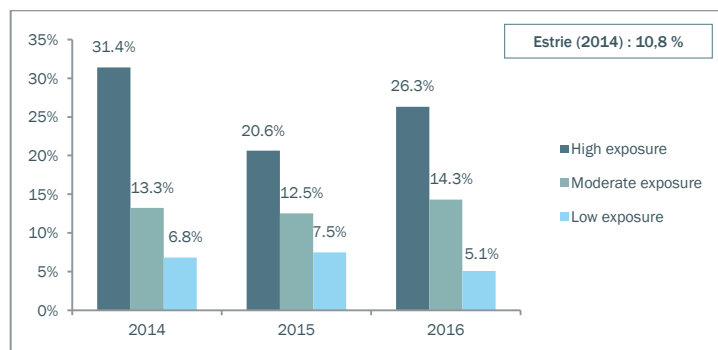
6. In addition to the increase in diagnosed mental health problems, 2016 saw a significant amount of psychotropic drug consumption (anxiolytics and anti-depressants) in Le Granit. This was particularly noticeable in those with high exposure (36%). According to the data, available since 2014, anxiolytics consumption (sedatives and tranquilizers) has all but doubled over the past year, from 16% to 29%, after dropping between 2014 and 2015. It is worth noting that anxiolytics consumption in 2016 was common throughout the Le Granit area (22% in Lac-Mégantic and 16% elsewhere in Le Granit). One study surrounding a 2001 industrial catastrophe in France revealed a direct link between high catastrophe exposure and psychotropic drug consumption levels (Diène et al., 2014).

**Figure 7**  
Anxiolytic drug consumption by exposure level, Le Granit area, 2014 to 2016



7. The previous findings suggest that the number of Lac-Mégantic residents who receive medical and pharmacological assistance appears to be on the rise, particularly among those having suffered losses. Such residents are also more inclined to seek support from psychologists and social workers. The proportion of high-exposure residents who sought professional help during the past year has dropped from 31% in 2014 to 21% in 2015, before rising again to 26% in 2016.

**Figure 8**  
Consultations with psychologists and social workers by exposure level, Le Granit area, 2014 to 2016

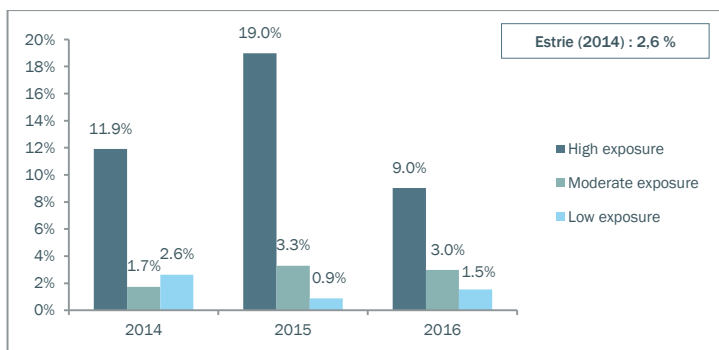


8. Regardless of exposure levels, many residents in Le Granit (roughly 6 out of 10) report having received a considerable amount of social support (scores of 69 or higher on the Multidimensional Scale of Perceived Support). This suggests that most residents have access to the support of loved ones when needed (friends or family). The amount of social support received in Le Granit has been stable since 2015. This is encouraging, since social support has been clearly identified as a key component in collective healing (Cline et al., 2010).



9. Lastly, fewer Lac-Mégantic residents reported feelings of neighbourhood insecurity in the past year (6% in 2016, compared to 13% in 2015). While the numbers remain high among high-exposure cases (9%), insecurity appears to have dropped in the past year, following a 19% peak in 2015. It should be noted that neighbourhood insecurity remains fairly rare elsewhere in the Estrie region (less than 3%, ESPE 2014).

**Figure 9**  
Neighbourhood insecurity by exposure level, Le Granit area, 2014 to 2016



## Section 2: A Catastrophe With Multifaceted Consequences for the Personal, Family, Social and Professional Lives of Individuals

1. A substantial number of individuals who underwent high exposure have reported difficulties when managing both the catastrophe and its consequences on their personal or family lives. Here, 24% of respondents reported an inability to resume their normal rhythm of life, 28% reported difficulties in facing the emotions triggered by the derailment, and 23% reported difficulties in maintaining good morale. In addition, 21% stated an inability to seek assistance and moral support. But the vast majority of those with high (90%) and moderate (84%) exposure levels believe they have adequately responded to the needs of home and family and provided both with sufficient reassurance over the past three years (86%).
2. More than a quarter of the 271 individuals who lost loved ones in the tragedy (26%) have sought psychological support, reporting a significant amount of difficulty in managing their grief. These individuals obtained a score of 26 or higher on the Complicated Grief Inventory, which measures incidents of pathological grieving, such as anger, disbelief and hallucinations. An analysis of the 2016 survey data shows that losing loved ones had a profound impact on a number of aspects in the personal, conjugal, family, social or professional lives of respondents. For example, 59% believe that their health status has deteriorated over the past three years, while 83% have experienced moderate to severe post-traumatic stress reactions.

Research has shown that rates of complicated grief vary between 8% and 76%, depending on the type of tragedy and context involved in the loss of their loved ones (sudden or violent death) (Li, Chow, Shi & Chan, 2015).

3. When compared to those with moderate and low exposure levels, high-exposure cases were more likely to believe that their family relationships (with spouses, children, brothers, sisters and parents) have either improved or deteriorated over the past three years.
4. A substantial portion of high-exposure individuals have reported both positive and negative changes in their personal lives and relationships over the past three years. Among them, more than a quarter reported lower levels of tolerance to frustration (29%), more difficulty in sleeping (37%), and a deterioration in mood (29%). They also reported a more negative outlook on the future (26%). On the other hand, more than half of all high-exposure cases (55%) currently report a greater appreciation for life, with 41% claiming to have made positive changes to their spiritual lives, and 38% having improved their relationships. This suggests that these respondents have, for example, strengthened ties with loved ones, re-established relationships with estranged family members and friends, began making choices according to their personal objectives, developed greater compassion toward others along with a stronger desire to change what needs to change, including their values and priorities, while trying to live each day to the fullest. These positive changes have been observed in different proportion and at relatively high rates among other victims of catastrophe: 66 % (Thompson, 1985) and 70 % (Jayawickreme & Blackie, 2014). The results observed in the Lac-Mégantic community are therefore similar to those found in other studies.
5. High exposure appears to have had a positive impact on the social lives of many respondents in this category. Of these, 21% reported an increasing amount of interaction with their social network, and 26% reported greater quality with regard to these interactions. Many also reported increased participation in leisure activities and outings (29%). Such increases have also been observed in various other studies, particularly with regard to the social network mobilization that took place following the 1998 ice storm crisis (Sweet, 1998). The emotional bonding that occurs when victims of a catastrophe provide mutual support during the recovery process was also observed within two communities exposed to the July 1996 flooding in Saguenay-Lac-Saint-Jean (Maltais, 2003).
6. High exposure to the train derailment appears to have had a negative impact on the professional lives of a substantial amount of respondents over the past three years. Here, 12% of those highly exposed reported deteriorating relationships

with work colleagues, 18% reported a decline in their work performance, and 29% reported lower levels of motivation. In addition, a third of those highly exposed (33%) stated an increase in work-related stress levels, along with a greater number of sick days used (16%). These results may be caused by difficulties in managing an accumulation of stressful events, such as relocation, sadness and anguish, alongside existing professional responsibilities. These findings are also in line with studies that were conducted following the July 1996 flooding.

## DISCUSSION

### Key Findings

A study of the data from the three annual population surveys conducted between 2014 and 2016 revealed that residents of Lac-Mégantic, and elsewhere in Le Granit, continue to suffer from the consequences of the tragedy, particularly those who underwent greater exposure. Stability in psychological health has been observed in the most highly exposed group since 2015, while certain aspects appear to have improved (ex.: reductions in post-traumatic stress and feelings of insecurity). Experience with previous catastrophes reveals that psychological consequences can persist for years (Maltais & Simard, 2005). It is normal to experience difficulties, even three to four years after the initial trauma. This is especially true when a community struck by catastrophe is confronted with a variety of stressors after the fact. In Le Granit, a number of such stressors have been observed, including the class-action suit, the demolition and reconstruction of the downtown area, and the challenges surrounding a bypass route. In this context, seen by many as a collective shockwave, residents have been strongly encouraged to seek assistance. Following a drop between 2014 and 2015, several indicators have suggested greater use of medical and psychological services in 2016: more diagnosed mental disorders, more psychotropic drug consumption, and more consultations with psychologists and social workers. Finally, and despite the negative impacts on the lives of high-exposure residents, positive tendencies appear to have surfaced in Le Granit, particularly with regard to the family and social lives of respondents, along with their perceptions of life. New values have also emerged within the community, pointing to the possibility that those in the Le Granit area have become more inclined to listen and understand the feelings of those around them. Among the beneficial aspects that were observed with regard to personal growth, respondents appear to have developed greater awareness toward the difficulties of others, along with more openness and empathy.

There have been a number of advances in psychological recovery and community mobilization, along with greater means by which to strengthen an individual or community's

power to act. In February of 2016, the Public Health Branch of the Estrie region unveiled the results of the ESPE, Phase 2. This public release of information became an important catalyst for mobilization. Within a month, some fifty stakeholders came together to reiterate the importance of maintaining psychosocial resources while strengthening their relevance with regard to the population's living environment. Those who were on hand that day, including decision-makers, stakeholders and citizens, developed a common vision for the community: They would look to the future with hope. This vision laid the ground work for an action plan that would foster community health in Lac-Mégantic and the Le Granit area. It includes four components:

- Creating a space for dialogue that also acts as a gathering place for citizens;
- Developing a positive information campaign, including the Photovoice project, in which citizens can express positive ideas through photography;
- Creating a psychological health profile for children and youths in Le Granit, in addition to the existing adult profiles created under the ESPE;
- Creating a permanent outreach team, including professionals from the health and social services sector, all working together on the ground to provide services adapted to the needs of the community.

In June of 2016, the government awarded \$250,000 on a recurrent basis to consolidate the psychosocial recovery team and to promote much needed outreach measures (Component 4 of the action plan), along with a non-recurrent sum of \$125,000 dedicated to support the community and citizen projects earmarked by the action plan (components 1, 2 and 3). In the fall of 2016, the Red Cross reiterated to the Public Health Branch of the Estrie region its intention to finance various well-being and health-related programs in Le Granit, in addition to the government support mentioned above.

Along with the recent awarding of government funds to support community mobilization and outreach services in Lac-Mégantic, it may be said that speaking openly and publicly about the psychological suffering of the Le Granit population in 2016 has done much to promote the help-seeking behaviour we have observed in this study.

It is important that we pursue the efforts that began in 2016 by implementing all four components of the action plan, while fully adapting the service offer to the ever-evolving needs of the community. For example, better support is needed for local stakeholders working in various sectors (municipal, economic, community, social health and services, education, etc.), many of which have been noticeably fatigued, and for good reason. Citizens in their own right, these stakeholders have been promoting the community's development from the front lines for over three years. But we must also deepen our

understanding of the difficulties experienced by young people in Le Granit who, let us not forget, were never interviewed during the three population surveys, which dealt exclusively with those 18 years and over. Component 3 of the action plan specifically intends to profile children and youths from the school sector (elementary, high school, professional training centres, adult education centres and CEGEPs), as well as from the community sector. The new data will help adjust measures intended for this age group. Component 3, which also includes financing from the SSHRC and involves some one hundred semi-structured interviews with individuals from Lac-Mégantic, is intended to shed more light on the community's current recovery and resilience process over the next two years. Offering a platform to these individuals will help identify the factors that have allowed them to overcome the many pitfalls they have encountered, along with the adaptation strategies they have used to confront their grief and bereavement.

## CONCLUSION

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The assessment of medium and long-term consequences surrounding natural and technological catastrophes is a subject matter that remains poorly documented in Quebec, and elsewhere in the world. It is fundamental that we understand how individuals and their communities cope with these events in order to implement services that can properly respond to their needs. Catastrophe and post-catastrophe interventions in Le Granit require initiatives that go well beyond the usual scope of public and community agencies (Maltais & Larin, 2016). When assessing the needs of those involved, it is also imperative that we monitor physical and psychological health over time. This is what the Public Health Branch of the Estrie region and the UQAC have done by conducting a three-year population survey while working with various partners to establish an action plan that seeks to help the Lac-Mégantic community adapt and rebuild. The third population survey, conducted in 2016 with financial support of the SSHRC, has shed much light on the community's ongoing resilience process, as well as its negative and positive impact on the physical/psychological health and beliefs of those who were exposed to a traumatic event, along with their personal, family, social and professional lives.

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### Authors

D<sup>re</sup> Méli<sup>ssa</sup> Généreux, M.D., M.Sc., FRCPC  
 Direction de santé publique de l'Estrie

P<sup>re</sup> Danielle Maltais, Ph.D., Chaire de recherche  
 Événements traumatiques, santé mentale et résilience  
 Université du Québec à Chicoutimi

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