Calgary Fire Department Community Risk Index

USE OF DATA CASE STUDY

The Opportunity

Already a data-driven agency, the Calgary Fire Department (CFD) sought to expand on that institutionalized practice by examining the community's risk and developing mitigation strategies.

The Action

Based in part on the Calgary City Council feedback, Fire Chief Steve Dongworth, CFO, directed his staff to collaborate with other city departments and external stakeholder agencies to expand the array of social and historical response activity data points to create a more comprehensive community risk assessment.

DEPARTMENT INFO

CALGARY FIRE DEPARTMENT

POPULATION SERVED: 1.31 MILLION

TOTAL UNIFORMED PERSONNEL: 1,384

TOTAL CIVILIAN PERSONNEL: 177

STATIONS: 42

GOVERNANCE: MAYOR, CITY COUNCIL

EMS SERVICE: BASIC LIFE SUPPORT

ANNUAL BUDGET: $242.1 MILLION (CDN)

The Outcome

Using a variety of resources such as the National Fire Protection Association's (NFPA) 1300 "*Community Risk Assessment and Community Risk Reduction,"* Statistics Canada – Federal Data Aggregated, and the National Household Survey, as well as information from external partners, the agency created the "*Community Risk Index*" which focuses on outcome-based performance measures under a risk-based analysis. In addition, the project relied upon research, an environmental scan, and a literature review of best practices internationally for performance measurement, including data requirements, future station growth models, and other outcome-based measurement models. This research, along with input from a newly formed Performance Measures Working Group, has helped to define and develop indicators so that future evaluation efforts can clearly illustrate and support results and the factors contributing to those results.

Introduction

Accredited in 1999, CFD has developed and managed a robust planning and data analytics process to assess current and future service demands, trends, and outcomes throughout the community. Through this process, the department staff developed a detailed community risk assessment/standards of cover (CRA/SOC) document that examines the:

- Fire and non-fire risks in the community,
- Risk-reduction efforts used to mitigate those risks,
- Demographics of the individual communities served by the fire department,
- Identification of the resources needed to abate emergent incidents safely, and
- Development and monitoring of appropriate deployment practices.

The Opportunity

Starting in 2015, the department reviewed its processes as a part of the continual improvement model. As a result, it received input from external agencies and consultants that essentially asked how department members could use the CRA/SOC as a foundation to examine the value the community received compared to the cost of the resources used to deliver services. It further explored the results and outcomes of the services provided. Additionally, the department looked at how the CRA/SOC could be further developed as a tool for using a risk-based approach to targeting key areas and demographic groups.

Internal discussions started with adopting a methodology based on best-practice risk models, which was approved by an internal group of subject-matter experts and adjusted as needed. This guided the research work and the project's overall direction. At the same time, a parallel conversation regarding data literacy ensued. Gartner defines this as "Having the ability to read, write and communicate data in context, including an understanding of data sources and constructs, analytical methods and techniques applied, and the ability to describe the use case, application, and resulting value." In other words, everyone within the organization would know what data was being captured and how that data would be used. This extends from the front-line responders, the primary source of some of the collected data, to the end-user viewing the data analysis.

Data Literacy

"Understanding what data means: including how to read charts, drawing correct conclusions, and recognizing when data is used in misleading or inappropriate ways." Eastern Michigan University

The Action

The project was titled "Community Risk Index" and was led by the Strategic Services team. The project team included internal subject-matter experts and Executive Fire Leadership Team input. Members from across the department were engaged with the methodology and the timeline, including input into the index's weighting. In addition, the model was shared with and approved by the fire chief and Executive Leadership team.

A literature review, which utilized Fire Engineering and information from the Fiscal Policy Institute, took up the first half of 2016, along with published best practice documents available at the time. In addition, interviews were conducted with the leaders of the San Jose (CA), Los Angeles, and Toronto fire departments to learn from their experiences. Project managers also relied upon CFD data, available through the internal records management system. External sociodemographic sources were also used, such as the data/software "Environics" and the National Household Survey.

Best practices were also reviewed, as was information from the NFPA, Insurance Services Office (Verisk), Commission on Fire Accreditation International (CFAI), and the Municipal Benchmarking Network – Canada (MBN). Finally, a survey, led by the department but facilitated through Metroplanners/Comparative Canadian Cities, was initiated.

Index Performance Metrics

- Number and type of fire & EMS incidents
- Response time performance (Fire & Critical Medical Interventions)
- Dollar loss of fires
- Response reliability of first-due resources
- Flame spread
- Number of injuries due to fires
- Number of deaths due to fires

In the fourth quarter of 2016, project planners piloted the initial version of the Community Risk Index, which used specific criteria. The project team developed weightings of a community risk index, which was a part of the project. The initial evaluation of at-risk communities was sent to the CFD Community Safety Section (CSS) to implement the Index and reach out to the identified at-risk communities in Calgary.

The CSS comprises four staff members and provides risk-based education to vulnerable populations in Calgary, including new Canadians, lower-income individuals, seniors, children, and individuals with disabilities. It also develops and manages the more extensive public-facing programs where firefighters are expected to provide community engagement and education. CSS is one of three service lines in the CFD, including Fire & Emergency Response, Fire Inspection & Enforcement, and Fire Safety Education.

The Outcome

The Community Risk Index enhanced the existing CFD service level response time targets (SLRTT) by adding new outcome-based measures and emphasizing current ones. It has allowed more focus on criteria such as flame spread, fire loss, and the number of fire injuries and deaths. Risk-based, the index also emphasizes risk factors such as demographics, including age and income, age of the building, and high-risk factors based on the community risk assessment and historical response time analysis to help plan for future response.

Following the project completion, the CSS incorporated the assessment into its programming to assist in delivering education to the communities most in need and at the highest risk. The assessment includes criteria from the NFPA's 1300 (5.3.2) profiles, adding factors and local data from other pertinent sources.

Only minor additions have been made to the index since its inception. Still, the staff is currently looking at ways to filter the list of profiles to provide an even more detailed way of identifying those communities in need.

With some 26 measures in the index, CFD intends to work on a process to streamline the workload around the process, focusing on optimizing the workload and becoming more effective and efficient. They have found that the Community Risk Index has been underutilized. In retrospect, more than just CSS should have used this information. Engaging with CFD Inspections, Community Safety, and Operations in the future, the Community Risk Index could / should grow and be utilized even more.

Tips for Replication

- Focus on your current performance measures and census to develop an index.
- Develop a working group to determine what measures should be incorporated into the index and each measure's "weight/importance."
- Focus on what data is currently accessible to the agency (no cost/funding associated).
- Conduct surveys to determine the best practices of departments like your organization.
- Include a process for the timely update/maintenance of your index.
- Consider a way to streamline the process.

Additional Resources

Data Literacy: An Essential Skill for the Industry, https://link.springer.com/chapter/10.1007/978-3-030-97947-8_43

Data Literacy: https://www.gartner.com/en/information-technology/glossary/data-literacy

Data Literacy: Data Literacy - Data Literacy - Research Guides at Eastern Michigan University (emich.edu)

Municipal Benchmarking Network – Canada, http://mbncanada.ca/

National Household Survey
https://www.fema.gov/about/openfema/data-sets/national-household-survey

Statistics Canada https://www.statcan.gc.ca/en/start

About CPSE and Metro

The Center for Public Safety Excellence (CPSE) helps high-performing fire departments and emergency service professionals in their efforts to continuously improve through accreditation, credentialing, and education.
www.cpse.org

The Metropolitan Fire Chiefs Association brings fire service professionals together to address the challenges of large-jurisdiction departments across the globe, serving as an educational resource and promoting best practices for members to follow.
www.nfpa.org/metro

CPSE and Metro have partnered to develop this series highlighting proven practices of Metro departments accredited by CPSE's Commission on Fire Accreditation International.