IMPROVING THE CANADIAN MEDICAL SITUATIONAL INCIDENT VIEW

WHITEPAPER
“During SARS, timely and detailed information was in short supply, making decision-making more intuitive rather than fact-based.”

Dr. James Young, Provincial Coroner and Commissioner of Public Safety and Security for the Province of Ontario at the time of SARS outbreak
There is a big difference between a lesson learned and a lesson observed. The latter, a lesson observed, is witnessing an event occur and understanding that an action should be taken to improve upon the repeat occurrence of said event. A lesson learned is witnessing an event, understanding that an action should be made and then following through by actually making that action occur. Much of the reason that MedPost exists as it does today is because of the lessons observed from the Severe Acute Respiratory Syndrome (SARS) outbreak of 2003. According to the World Health Organization (WHO), there were 8,000+ SARS cases reported across 37 countries. Canada was the hardest hit country in the Western Hemisphere with a large majority of cases occurring in Ontario and specifically, in Toronto. The SARS outbreak illustrated in a very public way that the Canadian health care system had gaps in information flow. An outbreak such as SARS mirrors the impact and devastation that would result from a man-made biological event, and provides important information regarding what capabilities are needed to improve the management of such an event.

A SARS Commission Report was released after the outbreak and it studied in detail the difficulties public health authorities faced in responding to the outbreak. SARS was an outbreak where quarantine measures proved to work well and thus tracking of affected patients and those they came into contact with became the ideal solution. Having unidentified infected members of the public continue to travel is what led to many of the travel advisories and resulting economic hit for cities and countries. Many of the problems identified in the Commission Report have also been identified as Canadian research investment areas. MedPost addresses these problem areas, specifically:

Problem 15: Overwhelming and Disorganized Data- There was no order or logic in the frenzied, disorganized, overlapping, repetitious, multiple demands for information from hospitals and local public health units from provincial and federal governments, the Provincial Operations Centre, the Public Health Branch, the Science Committee and media. It was a competition to get information and the same people were asked over and over again for the same information. The work of front line responders in hospitals and health units was seriously impaired. Problem 15 refers as well to the overwhelming problem of providing information to many sources at once while still having time to set policy and implement it.
Hospitals, government, the public and organizations like WHO all need information and yet different particulars. They want it in usage for press releases, press conferences, websites, and social media.

**Problem 16: Inadequate data** - The data was produced from jerry-built systems that through the frenzy of information demands often proved inadequate. The Epidemiology-unit and local health units were often unable to provide adequate and timely data. The information systems and support structures were not in place.

**Problem 17: Duplication of central data systems** - There was no standard information system for the Public Health Branch and all local public health units. Each individual health unit developed their own data collection system during SARS. No one really knew who was gathering what information about whom and cases crossed boundaries because people worked and lived in different public health jurisdictions. There was no simple way for this data to be shared. As well, the local public health, the province and the federal government all had different data systems most of which could not talk to each other.

**Problem 18: Blockages of vital information** - During SARS the data was not available at the provincial level and beyond until it had been vetted by the Medical Officers of Health. This in part was because municipal and provincial systems were different and might count cases in different ways. This produced major delays in everyone having the necessary information.

MedPost has taken these lessons observed from SARS and transitioned them into a comprehensive “lessons learned” system.
ABOUT MEDPOST

MedPost was created to address the critical need of providing Medical Officers of Health (MOH) and other public health officials and practitioners quicker access to the important aggregate level of health information they need to properly manage a community-level (or higher) response to large scale disease outbreaks. MedPost was designed and developed with direct input from subject matter experts including the key medical doctors and medical health officers from all levels of government during SARS. An investment of $3M was initially made into MedPost, under a co-investment project between the Federal Government of Canada’s Chemical, Biological, Radiological-Nuclear and Explosives (CBRNE) Research & Technology Initiative (CRTI), AMITA Corporation and several partners from the public sector (municipal, provincial and federal governments), private sector and academic institutions. The medical scientific leads for MedPost were Dr. James Young and Dr. Ron St. John. Dr. Young co-managed SARS for the Province of Ontario, was the first Ontario Commissioner of Emergency Management, and a Special Advisor to the Deputy Minister at Public Safety Canada. Dr. St. John was the Canadian federal manager for the SARS outbreaks and served as the Director General of Canada’s first Centre for Emergency Preparedness and Response in the Public Health Agency of Canada. MedPost is designed to be the system that the scientific leads would like to have during an outbreak like SARS.
MedPost is a software system designed to support medical professionals, such as Medical Officers, gain access to timely and accurate medical information to help save lives. MedPost facilitates automatic and manual data collection from hospitals and the timely communication of data from the patient level to medical community decision-makers at all levels of government, depending on the scale of the event (i.e. local or nation-wide). Communication between hospitals, alternate treatment centres, first responders and medical decision makers is enhanced by providing near real-time accurate aggregated data such as the number of affected persons and their location. It is used to monitor health care events including disease outbreaks and alert public health communities, as necessary, regardless of the magnitude of the event.
MedPost Screenshot: Incident Summary View

MedPost Screenshot: Incident Line Data
### MedPost Screenshot: Case View - Choosing a Pathogen

![MedPost Screenshot: Case View - Choosing a Pathogen](image1)

### MedPost Screenshot: Case Status Report by Date

![MedPost Screenshot: Case Status Report by Date](image2)
MedPost was one of the first projects funded under the Government of Canada’s $40M Canadian Innovation Commercialization Program (CICP). CICP was put in place so that the federal government make better use of the substantial purchasing power to create demand for leading-edge technologies from Canadian suppliers. MedPost was selected in a competitive process to receive additional investment inline with CICP’s initiative to help bring innovations to a commercialization stage. CICP helps companies accomplish this by:

- Connecting innovators and government users
- Providing real-world evaluation of pre-commercial goods and services through feedback from government end users
- Providing information on how to do business with the government of Canada while also exposing the government to innovative products

Source: Office of Small and Medium Enterprises (OSME)

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1 Reference: Innovation Canada: A call to Action, PWGSC, 2011
The objective of the CICP MedPost project was to provide a series of simulated emergency situations to validate MedPost’s design, functionality and business flow in a public health setting with a variety of different emergency response players and decision makers in order to provide effective feedback for the solution. Public Health Agency of Canada (PHAC) was identified as the testing department for the project. The resulting exercises were conducted in real-time settings that allowed test participants to create incidents and link cases to incidents, create new case data, and share collected incident and case information, and aggregate incident case information within a dashboard view to facilitate understanding of the current situation.

Each of the tests was conducted with a unique scenario and a specific objective. These included Tuberculosis, Earthquake and Novel Coronavirus scenarios.
EXERCISE SCENARIOS

Exercise 1 – Tuberculosis
The first MedPost exercise held on May 24, 2012, was a workshop type of discussion-based exercise used to draw information from players regarding a specific topic.

The purpose of this Workshop was:

• To practice, test and validate MedPost with representatives from the Health Portfolio, including regional offices
• To raise awareness of the functionality of MedPost using simulated patient information

The exercise drew representatives from the following organizations:

• Health Canada
  • First Nations and Inuit Health Branch
  • Healthy Environments and Consumer Safety Branch
• Public Health Agency of Canada
  • Emergency Management and Corporate Affairs Branch
  • Health Promotion and Chronic Disease Prevention Branch
  • Infectious Disease Prevention and Control Branch

The exercise was held in a training environment at the PHAC offices in Ottawa, Ontario followed by a hands-on exercise event. This workshop was a controlled simulation to address the stated exercise objectives.

OBJECTIVES

The following objectives were addressed throughout the exercise:

1. Increase familiarity with the MedPost software
2. Validate usability of Search, Reports, and Import/Export features
3. Discuss placement of the MedPost tool within the federal government (Health Portfolio)
4. Confirm ease of use and identify gaps and areas for improvement
PROCESS

The day consisted of:

- A training session;
- A player briefing, followed by;
- A simulated health event.

The training session began with a MedPost overview presentation followed by hands-on training with each player assigned to a workstation with access to the MedPost application. The instructor-led session followed an outbreak scenario, allowing the players to perform the same MedPost entries, in order that they would gain experience for confirmation of the ease of use and usability objectives. There was documentation distributed to each player to perform and verify the MedPost activities and outcomes.

The player briefing described the exercise scenario and prepared the players for their roles in the subsequent simulated health event.

The simulated health event concerned the identification and tracking of a tuberculosis outbreak scenario spanning hundreds of potential cases from several provinces within Canada. The information was imported into the MedPost tool eliminating the need for data entry. Participants then had time for tool assessment with access to view the case details as well as aggregate information.

The exercise was intended to raise awareness of MedPost by providing an informal environment in which participants were asked to enter and analyze data using simulated patient information.

Following the exercise, a Hot Wash took place highlighting key issues from participant feedback and proposed recommendations for improvement.

A Player Feedback form was available to each participant. From this anonymized documentation, many suggestions and comments were compiled and itemized in the After Action Report (AAR) under the following sections:

- Workshop
- Training
- Product Applicability
- General Usability and Look and Feel
- User Aids
- Search feature
- Reports
- Import/Export
- Case and Incident functionality

**MedPost Performance:** Through the results of the Tuberculosis exercise, MedPost was proven as a tool that is easy to use and navigate and at the same time contributing considerable benefit for outbreak management. Specifically, MedPost is useful in the reporting of and data collection in National/Interprovincial outbreaks at the federal level. MedPost also demonstrated significant functionality for immediate benefits to Foodborne, Environmental and Zoonotic Infectious disease outbreaks.
Exercise 2 – Earthquake

The second MedPost exercise was held on October 18 and 19, 2012, as a real-time exercise. It took place with the Magnitude ’12 earthquake exercise in British Columbia. Magnitude ‘12 was British Columbia’s contribution to the Great Shakeout Earthquake drills. A total of 4.7 million people participated in numerous states and countries in the world. This exercise was led by Public Safety Canada, who had granted permission to allow PHAC access to the Control Cell for the duration of the exercise. This allowed the PHAC representative to have access to key exercise details to closely monitor the Master Scenario Events List (MSEL) of the simulated earthquake event and to be aware of changes as they happened.

The purpose of this exercise/test was:

- To validate MedPost with representatives from the Health Portfolio and Public Safety Canada, including regional offices
- To raise awareness of MedPost with federal and provincial partners using simulated patient information

The exercise drew representatives from the following organizations:

- Public Health Agency of Canada
- Public Safety Canada
- Industry Canada
- Royal Canadian Mounted Police
- Natural Resources Canada
- Fisheries and Oceans Canada
OBJECTIVES

The following objectives were the focus of this exercise:

1. Test MedPost during a "real-time" exercise
2. Confirm ease of use of MedPost and identify gaps and areas for improvement
3. Collect feedback on the use of MedPost in an earthquake disaster
4. Collect feedback on how MedPost supports collaboration between various levels of government involved in the exercise

PROCESS

This test was conducted through a “real-time” exercise aimed to meet the stated exercise objectives. Prior to and during the exercise, there was an opportunity for the Magnitude ‘12 Control Cell participants to view a MedPost orientation PowerPoint presentation to familiarize them with the MedPost tool.

The two days consisted of:

- Players following the Magnitude ‘12 agenda and MSEL with the focus on communication between federal government departments to share information,
- Simulation of the tracking of Magnitude ‘12 earthquake scenario casualties by executing timely bulk uploads of earthquake victim data,
- Ongoing overhead display of reports based on simulated MedPost casualty earthquake information, and
- Contribution of the MedPost aggregate casualty numbers for the Public Safety Situation Report (SitRep).

The exercise was intended to raise awareness of MedPost by providing an informal environment in which participants entered data using simulated patient information and observers monitored activity, asked questions and saw various screen shots and reports.

Following the exercise, observers were given a feedback form in order to provide recommendations and additional comments.

During and following the exercise, observers from other departments and agencies were asked to complete a feedback form to assess their views on the...
MedPost product, the process in which information was captured, the various screen shots within MedPost and the reports that were produced.

Observers were asked to comment on the use of MedPost during an earthquake scenario and how MedPost can support collaboration between various levels of government.

**MedPost Performance:** The results of the exercise demonstrated the applicability of MedPost’s usage during a naturally occurring mass casualty incident such as a large-scale earthquake. One test participant and expert in Business Continuity Operations believed that MedPost would be useful in any sort of disaster. MedPost also performed strongly and delivered ease of use in a crisis incident where limited information was available, which is often the reality in incidents such as earthquakes. It was evident that utilization of MedPost would support collaboration between government departments by providing up to date casualty numbers for the Situation Report in a real earthquake event.
Exercise 3 – Novel Coronavirus

The third MedPost Exercise was held on February 26 and 28, 2013, and was discussion-based in a tabletop format, in which players discussed and explored the response to a theoretical or probable emergency scenario.

This final exercise was meant to provide an opportunity to simulate the use of MedPost within the PHAC environment. The awareness session and exercise allowed a user to view how MedPost works to: create incidents and link cases to incidents, create new case data, and share collected incident and case information, and aggregate incident case information within a dashboard view to facilitate understanding of the current situation.

The purpose of this Tabletop Exercise was:

- To practice, test and validate MedPost with representatives from various stakeholders
- To raise awareness of the functionality of MedPost using simulated patient information

The exercise drew representatives from the following organizations:

- Public Health Agency of Canada
  - Infectious Disease Prevention and Control Branch
    - Surveillance and Epidemiology
    - Professional Guidelines and Public Health Practice
  - Health Promotion and Chronic Disease Prevention Branch
    - Policy, Planning and Coordination

OBJECTIVES

The following objectives were addressed throughout the exercise:
1) Confirm ease of use and identify gaps and areas for improvements
2) Collect feedback on how MedPost supports collaboration between stakeholders
3) Identify key reporting requirements
   a) in support of surveillance
   b) in support of briefing Senior Management
   c) for the potential ability to feed other systems

PROCESS

The first half day session began with a MedPost overview presentation followed by the description of a fictitious outbreak scenario. The MedPost tool was demonstrated showing features to capture the event characteristics and casualties as well as the reporting options. The instructor-led session was divided into two parts to allow for the remote-voting system to guide participant feedback with the focus on the different features of the demonstration.

The second half day session consisted of a brief background session and introduction of the exercise scenario. Predefined injects were used as a basis for participant discussion with the use of the remote voting system. The MedPost application was demonstrated to show how the tool could be used in such an event for PHAC and the provinces.

Following the exercise, a Hot Wash took place highlighting key issues from participant feedback.

MedPost Performance: All participants agreed that MedPost can offer an improvement over previous solutions used in past crises and greatly aid in medical health organizations' response to a crisis. Additionally, all participants concurred that MedPost:

- Can greatly improve the timeliness of an organization's ability to respond to an emergency event,
- Can easily be used for briefing senior management and medical decision-makers, and
- Shows great adaptability to be used for all varieties of medical crisis scenarios including: pandemic/disease outbreak, mass casualty disaster, seasonal influenza, and day-to-day medical events.
MEDPOST READINESS LEVEL

MedPost is ready for operational deployment. Under the product development principles of the Minimum Viable Product, MedPost contains the features necessary to allow it to be deployed. Minimum Viable Product or MVP is a strategy that targets early adopters interested in working with an evolved prototype and providing feedback to customize the product to their exact needs. It works as an iterative process. MVP helps minimize the spending by refraining from adding unnecessary features and functionality that the customer does not require and for which the innovator will not recoup their investment.

Through the exercise scenarios and workshop conducted, several ideas were generated to help deploy MedPost in an operational deployment. For instance, in epidemiological/outbreak tracing usage, it has been identified that MedPost may benefit from contact tracing, the process that tracks those individuals that have come into contact with an affected person. To expand upon the epidemiological usage of MedPost beyond purely human tracing, functionality could be incorporated to expand upon infection exposure from just person to person to animal to human.

Additional suggestions for functionality that were generated included: alerting, recording of genetic data, psycho-social elements and expanded reporting functionality.

Additional Challenges
Aside from additional functionality development for specific scenario usage, the greatest challenge in the deployment of MedPost includes the buy-in from the provincial/territorial levels and most importantly the usage of MedPost from the local hospitals. Hospital workers are the first line of care responsible for deriving and inputting data into the system. The most valuable component to maximize
MedPost’s benefits is the presence of data in the system. For a system like MedPost to be used, it must not require duplication of data entry. Direct data feed from Electronic Health Records (EHR) would ease the data entry since MedPost can import data, Health Level Seven (HL7)\(^2\) data feed. History has shown that in times of crisis; people will opt for the path of least resistance and adopt the simplest and easiest tasks to complete their job; which in many cases involves a pen-to-paper approach for hospital field workers. A near seamless and time-efficient process to data entry needs to be adopted for MedPost to become operationally deployed.

\(^2\) Health Level Seven (HL7), is a non-profit organization involved in the development of international healthcare informatics interoperability standards.
MedPost offers a shared common situational view on both a federal and provincial/territorial level that is currently not available. MedPost provides summary data consisting of key information.
MedPost helps address some of the issues plaguing Canadian Public Health chiefly as it relates to response during a medical health crisis. MedPost offers a shared common situational view on both a federal and provincial/territorial level that is currently not available. MedPost provides summary data consisting of key information (e.g., the availability of 'new cases' is important information during an event). Also, the sharing of information is critical. During an outbreak, MedPost enables all public health stakeholders to share a picture of the same data. MedPost allows users to create incidents and link cases to incidents. New cases can be created, case data collected and shared via HL7 data format from hospitals to public health units, etc. Incident case information can be de-personalized and aggregated within a dashboard view to facilitate understanding of the current situation. Incident summaries showing number/status of cases can be viewed, including line data regarding the status of individual cases. These features provide healthcare crisis management authorities with the aggregated essential casualty data necessary to reduce the rate of morbidity/mortality due to CBRNE/mass casualty events or naturally occurring disease outbreaks.

Through the exercises and workshop, it was discussed that had MedPost been used on retroactive crises such as SARS, H1N1 and Listeriosis outbreaks, it would have offered an improvement in medical health organizations’ response to a crisis. Additionally, the usage of MedPost would improve the timeliness of an organization’s ability to respond to a crisis.

One of the major issues during a medical health crisis is delays in the reporting of data. Currently, when data is reported it is often out-of-date because of the approval process of vetting the data prior to its release. The use of a system such as MedPost can aid quicker presentation of data.

MedPost offers end-users substantial time and cost savings in providing early detection and control in a disease outbreak situation. It also provides improved communication between healthcare facilities and public health organizations with respect to patient case-level details surrounding an event. The ‘real-time, on-
time’ aggregate of accurate information when the user wants it is a main non-financial benefit of MedPost. From a public health unit perspective, it is hospitals and healthcare facilities that have the line data regarding patients, and MedPost can provide the sharing of this crucial information to the health unit instantaneously. For users who have the data, in utilizing MedPost, they get to see the data aggregates and use the information for analysis, reporting and decision making purposes. It is accessible to them in both line data format and summary levels. These end-user benefits are unique in the marketplace today. These benefits, and others that will be added to the product over time, will be sustained throughout the lifecycle of the product through first mover advantage in the market as well as integration with other unique and complementary products that AMITA has to offer.

MedPost would be most effective in usage for Pandemics and Mass Casualty events because current reporting on the situation of these events is often slow and offer areas for improvement. MedPost would offer beneficial rate of growth in situational awareness for tracking of people and gathering data across jurisdictions.

One idea derived from the exercises was using MedPost in a post-crisis evaluation tool capacity. MedPost could serve as a research and educational tool, a historical archive of medical crisis data and a post-mortem evaluation tool to gauge lessons learned. In post-crisis evaluation, MedPost could provide answers to determine how a disease was spread and analyze how an organization responded to the crisis and the cases.

Another specific application of MedPost could be in the usage for Foodborne, Environmental and Zoonotic Infectious Diseases. While this epidemiological-like environment does not receive the same profile as person-to-person cases, the tracking, analysis and reporting of these outbreaks is in need of better efficiency and a system like MedPost could offer a great deal of benefit.

Health outbreaks and medical mass casualty incidents are not bound by borders and the issues affecting Canada are certainly not localized - this is a global issue. Research grants and bilateral agreements are in place between Canada and other countries to share health & research innovations. These opportunities can be explored to expand MedPost’s reach. The WHO has a platform, Global Outbreak Alert and Response Network (GOARN). GOARN is a technical
collaboration that aims to bring groups and resources together for the rapid identification, confirmation and response to outbreaks. A network such as this may be an opportune venue for MedPost.

A pilot between a province/territory and locals hospitals could be explored to position MedPost in an operational environment. This would allow MedPost to directly address one of the principle barriers to adoption, the entry of data into the system. The pilot program could examine leveraging existing data feeds and easing the burden on field workers to enter data into MedPost.
For Additional Information on MedPost

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