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Estimating Public Health Risk of Infectious Disease Events: A Canadian Approach to Rapid Risk Assessments — Clarence Tam

Introduction/program need and objectives:

The COVID-19 pandemic highlighted the need for a robust approach to infectious disease rapid risk assessments (RRA), to inform public health measures in rapidly evolving situations with limited information and high uncertainty. In 2022, the Centre for Integrated Risk Assessment developed a methodology for qualitative RRA of infectious disease threats, to help coordinate risk assessment activities across the Public Health Agency of Canada.

Program methods, activities and evaluation:

The RRA methodology was adapted from the Joint Risk Assessment Operational Tool (developed by the FAO/WOAH/WHO tripartite), following a review and testing of RRA approaches for public health identified through a literature search. The method uses the risk pathway approach as a unifying tool to describe the sequence of events leading from the hazard's source to the adverse event of concern and its resultant impacts. The likelihood of the adverse event is assessed together with impacts on directly affected individuals, the general population and relevant high-risk sub-groups, based on the most likely spread scenario within Canada. Qualitative estimates of likelihood, impact and uncertainty using standardized scales are derived by integrating evidence and expert opinion.

Program results or outcomes:

This methodology has been applied to four different threats of concern to Canada: the 2022 outbreaks of Sudan Virus Disease (SVD) in Uganda and mpox globally, the ongoing epizootic of avian influenza A(H5N1) clade 2.3.4.4b virus, and the 2023 outbreak of circulating Vaccine-Derived Polio Virus 2 (cVDPV2) in Kenya. Assessments provide a common understanding of the risk across the Agency as well as recommendations for action, surveillance, risk communication and research. These are shared with federal, provincial and territorial partners, and relevant stakeholders to inform their public health response, and are published online.

Recommendations and implications for practice or additional research:

Further developments to the PHAC RRA process include work to integrate quantitative information from modelling and forecasting and to capture broader impacts to the health system and wider society.

Why are multi-disciplinary voices essential for effective protection in a complex pandemic? — Dorothy Wigmore**Introduction/program need and objectives:**

The COVID-19 pandemic has highlighted the importance of multiple voices, including occupational hygienists, engineers, citizen scientists and patients with lived experiences, to ensure effective protection for all. Failure to include specialists trained to protect workers, use the precautionary principle and recognize aerosol transmission – contrary to the SARS-1 Campbell Commission recommendations – led to unprecedented, preventable harm. The place of occupational health and safety (OHS) and other disciplines in public health also suffered.

We will:

- examine explanations of SARS CoV-2 transmission
- discuss effective protection layers for aerosol transmission
- illustrate the need for occupational health, other specialists, citizen scientists, etc. in pandemic-related activities

Program methods, activities and evaluation:

The Canadian Aerosol Transmission [Coalition](#) and Protect our Province ([PoP](#)) groups emerged during the pandemic, responding to previous experiences and misleading messages. The OHS and respiratory protection specialists, physicians, scientists, engineers, librarians, lawyers, and others reviewed transmission routes and provided accurate information about effective protections, especially for workers. They met regularly, had and gave [presentations](#), connected with similar groups and individuals inside and outside Canada, and advocated for protection layers needed at work and elsewhere. Common topics were clean healthy air and respirators, with explanations about aerosol transmission.

Program results or outcomes:

The groups produced science-based information about proven aerosol/airborne precautions, sharing it in [webinars](#), guidelines (e.g., [Practical Solutions Based on Public Health Fundamentals for Homes and Workplaces](#)), social media and [websites](#), [infographics](#), and international events. Following wide-spread consultations, the Coalition produced pandemic preparation and response [recommendations](#) being shared nationally. Citizen scientists got clean air [legislation](#).

Recommendations and implications for practice or additional research:

- Public health – which includes OHS and other relevant specialties -- always must use the precautionary principle and primary prevention for collective protection.
- Multi-disciplinary voices -- including citizen scientists -- are essential for public health activities, especially in pandemics.
- Workers need multi/inter-disciplinary approaches to pandemic planning, protections and responses, based on prevention, precaution and enforceable rights.

Evaluating the Impact and Prospects: A Post-COVID-19 Analysis of the Stringency Index in Emergency Management and Response — Jessica Yau**Introduction/program need and objectives:**

The Public Health Agency of Canada's (PHAC) Stringency Index (SI) is a composite indicator for Canada adapted from the University of Oxford's SI, designed to gauge strictness of COVID-19 public health measures (PHMs) across jurisdictions and nationally. The SI has been an essential tool for PHAC and Health Canada (HC) to inform on PHMs during the COVID-19 pandemic and contextualize relationships between PHM and COVID-19 surveillance trends. Although developed to guide public health decisions, as pandemic-related policies stabilized, an evaluation to inform the future use of SI was performed.

Program methods, activities and evaluation:

PHAC reported the range of provincial/territorial PHMs impacting stringency weekly or more frequently as required. Web-scraped data were coded to provide a composite SI and international SI data were obtained through the Oxford Covid-19 Government Response Tracker. Data were translated into visualizations, routine reports, key messages, and presentations for internal use within PHAC and HC. The SI evaluation included a survey, a literature review, and comparative analysis of SI outside of PHAC.

Program results or outcomes:

SI data was used at PHAC to contextualize public health responses, as an attempt to evaluate the impact of PHMs, and provide situational awareness. Data visualization tools with these data proved informative, offering additional context across jurisdictions. Literature review results concluded that SI produced outside of PHAC were adapted to the existing epidemiologic context, aligned with organization's objectives, and were effective in understanding the impact of different interventions.

Recommendations and implications for practice or additional research:

Future use of SI requires an internal knowledge translation plan to enhance resource visibility, as the SI could support future work on many public health issues. While promising as an emergency preparedness and response tool beyond COVID-19, adaptation and collaboration with stakeholders is recommended for potential re-implementation based on context, situation, and pathogen.

Evaluating a novel national COVID-19 outbreak surveillance system in Canada - Kaitlin Patterson**Introduction/program need and objectives:**

Early in the COVID-19 pandemic, Canadian public health authorities identified a need to track COVID-19 outbreaks to improve understanding of SARS-CoV-2 transmission and populations at risk. In 2021, the Public Health Agency of Canada (PHAC) implemented the Canadian COVID-19 Outbreak Surveillance System (CCOSS) in collaboration with provincial/territorial (P/T) partners to monitor the frequency and severity of COVID-19 outbreaks at the national level. Participating P/Ts represent 93% of the Canadian population. This study evaluated the ability of CCOSS to meet its objectives and assessed key functional attributes to understand its impact and utility.

Program methods, activities and evaluation:

PHAC used the Surveillance Evaluation Framework (SurF) to evaluate CCOSS. Surveillance system attributes (e.g., flexibility, timeliness) were assessed within the SurF functional attributes: 1) organization and management; 2) processes; 3) technical implementation; 4) output; and 5) impact. A mixed methods approach using both quantitative (data analysis) and qualitative (interviews with internal stakeholders and P/T partners) methodologies was employed to collect and analyze data and synthesize results.

Program results or outcomes:

Based on attributes assessed, CCOSS attained an overall score of "good". A score of "good" was received for the following functional attribute groups: organization and management, outputs, and impact of surveillance. CCOSS received a score of "excellent" for the processes functional attribute group. The lowest score that CCOSS received was "good but needs improvement" for technical implementation. P/Ts indicated that there is value in conducting national outbreak surveillance.

Recommendations and implications for practice or additional research:

The novel surveillance system implemented for national COVID-19 outbreak surveillance is simple and flexible, and the data are used to produce meaningful outputs that assist in decision-making. Timely reporting and efficient processes are in place to manage data and conduct analyses. Recommendations focus on building on the strengths of CCOSS to inform future initiatives, including integration of outbreak surveillance systems and response.

A passing grade? How risk communication strategies aligned with the public's efforts to access health information during COVID-19: A rapid review — Rawan Farran**Introduction/background:**

Communication strategies are critical to enabling the public to manage risks during public health crises. The early COVID-19 pandemic provides a unique opportunity to evaluate the effectiveness of communication strategies and how these strategies aligned with individuals' experiences accessing and interacting with information. Two independent rapid reviews were conducted to: (i) identify best practices for risk communication during the COVID-19 pandemic, and (ii) synthesize the literature on public experiences accessing and interacting with COVID-19 information.

Methods:

Each review followed rigorous methodology, including a comprehensive search strategy (databases searched up to November 2022), systematic screening of retrieved articles for inclusion, as well as critical appraisal, data extraction and GRADE assessment of included evidence. Findings were characterized and synthesized descriptively within each review. Feedback from citizen partners was incorporated into key points. The reviews were conducted in parallel and key points were integrated across both reviews to strengthen recommendations.

Results and analysis:

Overall, 103 articles were included across the two reviews. Findings regarding the effectiveness of risk communication highlighted the importance of trusted spokespersons, addressing misinformation, developing government-community partnerships, and delivering clear and positively framed messages. The public used both established and informal channels (e.g., social media) to obtain health information related to COVID-19. Public preferences included personalized and community-specific health information. Ethnic minority groups and (im)migrant populations experienced a greater degree of literacy and language barriers. Evidence on risk communication and accessing health information was lacking for Indigenous communities and other equity-deserving communities.

Conclusions and implications for policy, practice or additional research:

There is a growing body of evidence exploring risk communication and public experiences accessing information during the COVID-19 pandemic. Multipronged interventions to support future public health crises response were recommended. Future risk communication strategies should seek to integrate both to apply best practices while also addressing gaps and serving the public's information needs.