

Sepsis Canada: Building a national research network for sepsis awareness

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Sepsis is a life-threatening condition estimated to affect 49 million people annually worldwide; yet it is not widely understood. In this article, we hear how Sepsis Canada is working to promote sepsis awareness through supporting research, public education, and cross-disciplinary training

In 2017 the World Health Assembly declared sepsis, defined as the life-threatening organ dysfunction due to infection, a global health priority. They emphasized the critical need for advancements in prevention, diagnosis, and clinical management.

With a staggering cost exceeding \$2.6 billion annually and a mortality rate ranging from 20-35% for those requiring ICU care, the impact of sepsis on the Canadian healthcare system has been immense. ⁽¹⁾

In response, the Canadian Institutes of Health Research (CIHR) allocated \$5.7 million in funding to establish Sepsis Canada, a national research network dedicated to spreading sepsis awareness through research across CIHR's four pillars: biomedical, clinical, health services, and population health.

Comprised of a diverse spectrum of senior to early-career investigators, knowledge users, and individuals with firsthand experience with sepsis, the Network is organized into three teams: Population Health, Economics and Policy; Advocacy, Knowledge Transfer and Education; and Translational Biology, Clinical Trials, and Rehabilitation.

Since December 2019, the network has grown to include more than 250 scientists and a patient council of 31 members, all under the vision Suspect Sepsis, Save Lives, Support Recovery.

In this first of a series of five articles, we will describe the infrastructure and projects from the past four years, highlighting our achievements.

Improving the translational gap from bench to bedside

Preclinical research is essential to understanding the complexities of sepsis pathogenesis; however, translating experimental therapies into practice remains challenging.

This gap persists because of several factors, including the predominant use of young inbred male mice within a single research laboratory, the use of non-infectious models, incomplete reporting practices, and the omission of standard clinical therapies such as fluid resuscitation, antibiotics, and analgesia.

To address these gaps, we established the National Preclinical Sepsis Platform. We have focused on developing consensus around best practices for preclinical sepsis models, harmonizing model design, and conducting pilot tests in preparation for multicentre studies. (2, 3)

This foundational work will provide a robust pipeline, enabling rapid and standardized testing of potential therapies while incorporating comprehensive analyses of immune function, coagulation abnormalities, and organ injury.

Strengthening the clinical trial landscape

In Canada, most sepsis trials, particularly during the pandemic, were limited to larger academic health sciences centres; however, patients with sepsis often seek care in community hospitals.

To promote equitable access to research, Sepsis Canada championed the establishment of the Canadian Clinical Research Network, a multidisciplinary group of trialists, translational scientists, research coordinators and patient partners, working collectively to compile metadata and map the scope of current clinical trials and associated biobanks.

The goal of this infrastructure, in collaboration with groups like the Canadian Critical Care Trials Group and the Canadian Community ICU Research Network, is to bolster research capacity nationwide and ensure inclusive access to clinical trials.

Understanding Canadian sepsis awareness

Charitable organizations like the Global Sepsis Alliance promote sepsis awareness, yet the understanding among Canadians about what sepsis is, its causes, prevention, and impact remains unclear.

Our patient council members have shared that they had never heard of sepsis before their ordeal, resulting in delays in receiving sepsis care. A literature review revealed global disparities in sepsis awareness and definitions. (4) A national survey found that 54% of Canadians recognized 'sepsis,' only 23% could define it, and only 15% knew vaccination's important role in sepsis prevention. (5)

We have also endeavoured to evaluate sepsis knowledge among paramedics, emergency room nurses, and physicians, identifying barriers to timely care. Preliminary data identified patient recognition of the seriousness of sepsis, off-load delay from ambulances, and delays in timely treatment. (6)

It is crucial to address gaps in public health literacy and ensure sepsis education for school-age children and healthcare professionals. Strategies like prehospital alerts and early intravenous antibiotics show promise in aligning with the Surviving Sepsis Campaign guidelines to improve sepsis outcomes.

Investigating the consequences of sepsis

Sepsis Canada has been tasked with exploring the impact of diabetes on individuals with sepsis. Our population health team discovered that sepsis survivors are at increased risk of cardiovascular disease, ⁽⁷⁾ especially when coupled with pre-existing risk factors like hypertension.

Diabetes also enhances this risk in individuals without known cardiovascular disease before the septic episode; ⁽⁸⁾ for those with diabetes who survive sepsis, the risk for myocardial infarction within five years increases by 40% compared to non-diabetics. ⁽⁹⁾ This emphasizes the importance of recognizing a history of sepsis as a significant contributor to cardiovascular risk factors.

Building research capacity

Sustaining Sepsis Canada includes training a new generation of scientists. Our training team has developed a comprehensive two-year program that seamlessly integrates all four pillars of CIHR.

Applicants to the program have included a broad group of health professionals (physicians, nurses, dietitians, paramedics, physiotherapists, and pharmacists) and graduate students in biomedical research, clinical sciences, and health services research. Trainees in the program benefit from mentorship provided by educators with a keen interest in research and engaging in cross-disciplinary, hands-on learning experiences.

While individuals with lived experience contribute to all Sepsis Canada projects, grant applications and publications, we aspire to achieve the highest level of patient engagement in research. A distinctive strength of our training program is our inclusion of the public regardless of prior scientific training or research experience. Trainees, including patient and family partners, are empowered with opportunities and funding to lead their independent studies.

By cultivating a diverse community of scientists and patients and their families, Sepsis Canada is dedicated to reducing the burden of sepsis. Our Network's commitment to cross-disciplinary training, public engagement, and comprehensive programs reflects a proactive stance in addressing the urgent challenges posed by sepsis in Canada.

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