

Implications of the SARS outbreak for Canadian emergency departments

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SUMMARY OF RECOMMENDATIONS IN ORDER OF PRIORITY

1. Develop national standards for emergency department design and operations.
2. Canadian Council on Health Services Accreditation should develop ED specific accreditation standards to insure compliance with Recommendation 1.
3. Regional resources to be developed to implement infection control aspects of ED design and operations.
4. Implementation of a national strategy for ED information systems to ensure access to real-time data.
5. Eliminate ED overcrowding by ensuring adequate long-term and acute-care resources and enforcing strict adherence to occupancy limits.
6. Develop relationships and enhance communication between public health and the emergency community.
7. Call a National Forum on the shortage of human resources in emergency medicine and nursing and related issues.
8. Develop national and regional strategies for communication of important notices and information, and departmental tools for dissemination and education such as nurse clinicians.
9. Rapid triage assessment of arriving patients by appropriately trained nurses at all times should be a national standard.

RÉSUMÉ DES RECOMMANDATIONS PAR ORDRE DE PRIORITÉ

1. Mettre sur pied des normes nationales pour l'organisation et les opérations des départements d'urgence.
2. Le Conseil canadien d'agrément des services de santé devrait établir des normes d'agrément spécifiques aux départements d'urgence afin d'assurer le respect de la Recommandation 1.
3. Développer des ressources régionales pour implanter un protocole de contrôle de l'infection dans l'organisation et les opérations des départements d'urgence.
4. Mettre en œuvre une stratégie nationale pour les systèmes d'information sur les départements d'urgence afin d'assurer un accès à des données en temps réel.

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5. Éliminer l'encombrement des urgences en garantissant des ressources de soins à long terme et de soins actifs adéquates et en imposant un respect rigoureux des limites d'achalandage.
6. Établir des relations et améliorer la communication entre le réseau de santé publique et les services d'urgence.
7. Organiser un Forum National sur la pénurie de ressources humaines en médecine et en nursing d'urgence et sur des sujets connexes.
8. Développer des stratégies nationale et régionales de communication d'information et d'avis importants et créer des moyens de dissémination et d'éducation au sein des départements d'urgence comme le recours aux infirmières cliniciennes.
9. Une évaluation de triage rapide des patients dès leur arrivée en tout temps par des infirmières formées adéquatement devrait constituer une norme nationale.

Introduction

In March 2003, the son of Toronto's index SARS case (severe acute respiratory syndrome) presented to a local community hospital with symptoms suggesting community-acquired pneumonia. Because of hospital overcrowding, the patient was held in the emergency department (ED) for approximately 24 hours while awaiting admission. During this time he received oxygen by mask and nebulized bronchodilators, he was treated in an open area with only drapes to separate him from other patients, and he had numerous visitors. This sequence of events permitted nosocomial spread of SARS to nearby patients, health care workers and visitors (Dr. Donald Low, Microbiologist-in-Chief, Mount Sinai Hospital, Toronto; personal communication, May 2003). During the resultant SARS outbreak, several hundred people became ill, thousands were quarantined, and over 30 died. Hospital closures and service disruptions led to much indirect morbidity and mortality, and the outbreak had a huge economic impact on the region, the province and the country. The same thing could have happened in any Canadian ED.

The SARS crisis highlights many of the unique challenges that EDs face in dealing with contagious diseases. Emergency departments are the point of first contact and the primary destination for the sickest patients in the system. ED staff evaluate and treat patients before the risks and diagnostic possibilities are known, and typically base decisions on whatever incomplete information is available during the minutes-to-hours after patient presentation. Emergency departments have unpredictable workloads with large peaks and valleys that impose significant stresses on staff. Emergency physicians must make rapid decisions in a setting of high diagnostic uncertainty, cognitive loading and decision density.¹ In addition, there are no provincial or national standards for ED design or operation, and many EDs exist within small hospitals that cannot provide adequate infection control expertise. As the

Toronto SARS crisis demonstrated, the current practice of housing large numbers of sick admitted patients for prolonged times in open, densely-populated EDs is a potential public health hazard. In response to the many system problems exposed by SARS, the Board of the Canadian Association of Emergency Physicians (CAEP) commissioned this review, which offers prioritized recommendations aimed at improving emergency health care delivery and reducing the likelihood of similar public health crises in the future.

1. Emergency department standards

Canada has no national standards defining what constitutes an ED, nor guiding their design or operation. In 1988, the federal government published guidelines for hospital EDs,² but these were never mandated and they are now out of date. In 1989, the province of Ontario published guidelines for the operation and staffing of hospital emergency units,³ but a subsequent survey of 200 Ontario hospitals revealed that half could not meet the basic requirements specified.⁴ In 1998, CAEP published guidelines for regionalizing, staffing and equipping small rural hospital EDs, but these were never implemented nationally, nor endorsed by federal or provincial governments, and they did not address design elements related to infection control.⁵ In 2000, the Ontario government updated their 1989 guidelines with a more comprehensive set of standards,⁶ but these were never released, likely due to the funding implications of addressing identified concerns.

Comprehensive national standards that address ED design, staffing, equipment and operations would help push Canadian hospitals toward a common and safer model of emergency care delivery. These standards should include infection control safety requirements and clarify issues such as access control, triage safety, patient flow, protective equipment, ventilation standards, isolation room requirements, and protocols related to airborne, droplet and contact precautions. Although driven by SARS, they would

enhance preparedness and limit the future spread of pandemic influenza and emerging infections as diverse as drug resistant tuberculosis and monkeypox. National ED standards should also address key operational issues like triage systems, use of observation units, protocols for critically ill patients, and strategies for ED overcrowding. Finally, they should establish objectives for ED treatment time, consultant response time and ED length of stay. All of these concerns take on added importance in the new health care environment created by SARS.

2. Maintenance of standards

The Canadian Council on Health Services Accreditation (CCHSA) is responsible for hospital accreditation in Canada, and, in every onsite review, the ED is considered a mandatory area for evaluation. Despite this, and despite the unique, high-risk nature of ED operations, the CCHSA does not have a set of ED accreditation standards. Consequently, hospitals must select either the "Critical care" or "Ambulatory care" standards to apply to their ED review. Specific ED standards should be developed, reflecting the national standards for ED operations recommended above, and the CCHSA should assure compliance on behalf of the Canadian public.

3. Infection control resources and standards

SARS has clarified the urgent need to incorporate ED infection control standards into future accreditation reviews. Infection control standards in ED design should be as strictly enforced as fire code regulations currently are. Unfortunately, many community and rural hospitals have limited infection control resources, including expert staff, negative pressure rooms and specialized equipment to protect personnel during invasive procedures such as endotracheal intubation. Infection control experts should have input into ED design, renovation and process management, and they should provide education and support during disease outbreaks. Regional expertise should be developed and deployed to support facilities that require upgrading. Regionalization may even allow for sub-specialization of infection control practitioners who have specific expertise in ED design and function. Contingency plans should be developed for regional SARS (and other infectious disease) units so that the number of hospitals exposed to risk can be minimized.

4. ED information systems (EDIS)

Canadian hospitals collect extensive inpatient data but historically have had little interest in ED data. Most EDs rely

on paper charting and manual data collection. Databases created in this fashion are typically months out of date and of little value in real-time crisis management. Because of the lack of data, most EDs cannot track nor describe their case mix, care processes, workloads, utilization, efficiency or outcomes.⁷ Without data, it is difficult to characterize ED problems, let alone solve them.

Existing ED information systems and their related databases are most often used to track patient census and admission rates. More effective ED information systems will enable administrators to describe case-mix trends, measure critical processes, identify bottlenecks, modify staffing needs, and re-engineer ED systems to enhance patient flow and reduce overcrowding. ED information systems that incorporate diagnostic information can provide early warning of disease spikes in the community and can be linked to public health databases to facilitate contact tracking, disease surveillance and patient movements within departments — all critical in outbreak management.

The lack of national standards for health information systems has complicated EDIS introduction in Canada. Many departments are developing data collection systems but, without coordination, they are likely to establish different data sets and conflicting data definitions. Resulting variations in the way that ED data are defined and captured will limit their future utility. As hospitals and regions develop ED information systems, they must be aware of the functionality and the data elements required to support and measure ED performance.

Over the last several years, the Canadian Emergency Department Information System (CEDIS) group, consisting of emergency physicians and nurses, nurse managers, pediatric and adult clinicians, researchers, administrators and information technology (IT) experts from large and small hospitals across Canada, has collaborated in the development of national ED information system standards, including a Canadian ED data set and presenting complaint list.⁸⁻¹⁰ The CEDIS data set includes all National Ambulatory Care Reporting System (NACRS) data elements as well as indicators for tracking ED workflow and performance. CEDIS was designed for the ED environment and is the preferred system for Canadian EDs. As they implement local and regional health information systems, administrators should have a coordinated approach to vendor negotiations and support the installation of CEDIS-compliant systems in EDs.⁸⁻¹⁰

5. Overcrowding

ED overcrowding is widespread. The lack of long-term and

acute-care hospital beds has led to high hospital occupancy rates and cohorting of admitted patients in ED stretchers, holding areas or hallways. This impedes ED productivity, creates crowded waiting rooms and long care delays for patients, delays ambulance unloading, and spawns ambulance diversions and delayed ambulance responses. In addition, overcrowding prevents appropriate application of infection control safety measures, increasing the likelihood of infectious disease transmission as it did in the recent Toronto SARS outbreak. Overcrowding has been a growing and insoluble problem for a decade or more, yet during the SARS outbreak it was eliminated virtually overnight. This happened at the expense of other services, when hospitals delayed elective and urgent surgical procedures, and the Health Ministry created additional bed capacity by opening several chronic care facilities. These actions and their results confirmed both the primary causes and solutions to ED overcrowding — solutions that complement those advocated in the recent CAEP–NENA (National Emergency Nurses Affiliation) Joint Position Statement.¹¹

The Toronto SARS outbreak, which began in a community ED, demonstrates the need to control and monitor ED overcrowding, and to establish and enforce infection control standards. Infection control practitioners, public health experts and ED administrators should identify maximum ED occupancy rates and lengths of stay — just as fire codes have been established for other public facilities. When EDs exceed their capacity, hospital administrators should be required to take whatever steps are necessary to rapidly rectify the situation. ED occupancy violations should be monitored and reported to the Ministry's Public Health Branch or Commissioner of Public Health for review and action as needed. EDs should limit visitor access to a maximum of 1 visitor per patient, except in cases of critical illness or imminent death. During disease outbreaks such as Norwalk virus, SARS or influenza, only parents of small children and relatives of the critically ill should be allowed visitation.

6. Public health liaison

Most EDs lack formal relationships with public health departments and the two seldom interact. Important public health notices are typically faxed or emailed to regional distribution lists that include hospital CEOs and other key health administrators, but these may or may not reach ED managers and can take days to reach clinicians. Very early in the SARS outbreak, CAEP published guidelines to help EDs prepare for SARS.¹² These guidelines operationalized Public Health recommendations, which

by themselves were difficult to implement in Canadian EDs. This situation highlighted the disconnect between public health and EDs.

Public health units and hospitals must develop closer relationships and better information transfer mechanisms. Ontario will soon implement a province-wide public health information system (PHIS) to facilitate communications between public health personnel, other health care providers and the public. EDs will be able to access information directly from the PHIS via secure Internet connections, secure email or direct hospital–PHIS interfaces.

7. Recruitment and retention

Infection control procedures introduced during the SARS epidemic have increased the stress and discomfort of working in EDs. These new infection control protocols impair ED productivity, prolong care delays, reduce patient satisfaction and increase staff stress. Canada already lacks qualified emergency doctors and nurses, and SARS will aggravate the situation, but its impact on staff retention is not yet clear. There has been no noticeable exodus of emergency care professionals, but this reflects several factors, including the time and thought involved in making major career decisions, and the care providers' commitment to their patients and colleagues during a time of crisis. As the dust settles, we will begin to see post-traumatic stress disorders and the human resource fallout. These may threaten our ability to staff EDs, since there are already too few ED training positions to maintain the workforce. To assess the national emergency staffing situation, CAEP has commissioned a manpower review and has called for a National Forum on human resource and other related ED issues.

8. Communication and education

One of the greatest challenges during the SARS outbreak was the need to educate staff about rapidly changing protocols and procedures. Shift work, and the 24/7 nature of emergency care, make it impossible to meet with all ED staff simultaneously; consequently educational sessions must be conducted repetitively and frequently. Every ED should have access to an expert nurse clinician or a clinical nurse specialist who can keep staff oriented and up-to-date. Where hospital size or budget precludes this option, there should be funded regional resources to provide outreach programs. Electronic communication options like email, hospital intranet and personal digital devices may be helpful adjuncts to low-tech solutions like bulletin boards, which are easy to set up but difficult to keep up to date.

9. Triage

As the first line of defence against SARS and other infectious diseases, ED triage nurses are a prime target for public health information and education. In addition to recognizing illness acuity, they must be trained to assess the patient's potential infection risk to others, taking into account temporal infectious disease threats. Ontario has mandated 24/7 triage staffing by appropriately trained nurses, and this should become a national standard. Rapid triage within 10 minutes of arrival is an important national standard, but inadequate nurse staffing has prevented many Canadian EDs from achieving this goal.^{13,14}

Conclusion

Conditions in Canadian EDs have been deteriorating for more than a decade. EDs have been described as health care's "canary in the coal mine," and failure to address long-term ED problems was a prime factor in Canada's recent SARS outbreak. The costs of this outbreak, both in lives and in dollars, demonstrate the need for urgent action.

References

1. Croskerry P, Sinclair D. Emergency medicine: A practice prone to error? *Can J Emerg Med* 2001;3(4):271-6.
2. Health Services Directorate. Guidelines for establishing standards for special services in hospitals: emergency units. Report of the Subcommittee on Institutional Program Guidelines. Ottawa: Health and Welfare Directorate, Health and Welfare; 1988:41.
3. Ontario Ministry of Health. Guidelines for Hospital Emergency Units in Ontario. 1989.
4. Sublett S. Is it time to close your hospital's ER? *CMAJ* 1991; 145(11):1489-92.
5. Thompson JM, Berscheid R, Butt P, Dodd G, Drummond A, MacLellan K, et al, for the Canadian Association of Emergency Physicians. Recommendations for the management of rural, remote and isolated emergency health care facilities in Canada. Available: www.caep.ca/002.policies/002-01.guidelines/recommendations/rural.htm (accessed 2003 June 29).
6. Ontario Ministry of Health and Long-Term Care Emergency Department Standards Working Group. Draft Standards for Hospital Emergency Services in Ontario. Aug 2000.
7. Canadian Association of Emergency Physicians Working Group on the Future of Emergency Medicine in Canada. The future of emergency medicine in Canada: submission from the CAEP to the Romanow Commission. Part 1. *Can J Emerg Med* 2002;4 (5):359-68.
8. Canadian Association of Emergency Physicians. Canadian Emergency Department Information Systems (CEDIS). Available: www.caep.ca/002.policies/002-03.cedis.htm (accessed 2003 June 29).
9. Innes G, Murray M, Grafstein E, for the Canadian Emergency Department Information System (CEDIS) working group. A consensus-based process to define standard national data elements for a Canadian emergency department information system. *Can J Emerg Med* 2001;3(4):277-84.
10. Grafstein E, Unger B, Bullard M, Innes G, for the Canadian Emergency Department Information System (CEDIS) Working Group. Canadian Emergency Department Information System (CEDIS) Presenting Complaint List (Version 1.0). *Can J Emerg Med* 2003;5(1):27-34.
11. Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation. Access to acute care in the setting of emergency department overcrowding [joint position statement]. *Can J Emerg Med* 2003;5(2):81-6. Also available: www.caep.ca/002.policies/002-01.guidelines/overcrowding-march2003.htm (accessed 2003 June 4).
12. Canadian Association of Emergency Physicians. Severe Acute Respiratory Syndrome. Available: www.caep.ca/002.policies/002-01.guidelines/SARS/002-01i.SARS.htm (accessed 2003 June 4).
13. Beveridge R, Clarke B, Janes L, Savage N, Thompson J, Dodd G, et al. Canadian Emergency Department Triage and Acuity Scale: implementation guidelines. *Can J Emerg Med* 1999;1(3 Suppl) [English and French]. Also available: www.caep.ca/002.policies/002-02.ctas.htm (accessed 2003 June 4).
14. Warren D, Jarvis A, Leblanc L, for the National Triage Task Force members. Canadian Paediatric Triage and Acuity Scale: implementation guidelines for emergency departments. *Can J Emerg Med* 2001;3(4 Suppl):S1-27. Available: www.caep.ca/004.cjem-jcmu/004-00.cjem/vol-3.2001/cptas-egtp/cptas-e1.htm#main (accessed 2003 June 4).

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