

Catastrophe surgery: response to multiple casualties or individual patients with devastating injuries

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Picture this: you are a surgeon-on-call in a town in Saskatchewan and you receive word that a school bus has been in a head-on collision with another bus. Or the town is in British Columbia and a passenger train has derailed. Maybe you are in Nova Scotia when there has been a mine explosion or in Toronto for a gas depot explosion. Or you are in Montréal and a gunman has caused multiple casualties in a school. How would you react? Could you cope?

Catastrophe surgery is the surgical response to multiple casualties of a catastrophe and catastrophic injuries in an individual patient. Dealing with multiple severely injured patients is the daily reality for the Canadian-run military hospital in Kandahar, Afghanistan. Can we learn from the Canadian Forces Medical Service (CFMS) in order to prepare for civilian catastrophes like those mentioned above? This year marks the 50th anniversary of the consolidation, on Jan. 12, 1959, of the medical services of the Canadian Army, Royal Canadian Navy and Royal Canadian Air Force into the CFMS.¹ The demand for its service today has never been greater. It is an opportune time to briefly review the history of military surgery in Canada and to consider its relevance to civilian practice today.

Military medical services extend back long before the formation of the CFMS. A direct line can be traced from surgeons who performed autopsies on victims of scurvy for the Cartier and Champlain expeditions of the 16th and 17th centuries to the British and French armies to today but, for convenience, it is reasonable to start with Confederation in 1867. Initially, British regiments that had been transferred to Canada and militia units individually recruited regimental medical officers.² Larger medical units were specifically recruited for expeditions such as suppression of the 1885 Northwest rebellion and the South African wars of 1899–1902. The latter experience, during which Canada formed and deployed its first field hospital, suggested the need for a permanent central unit. In 1904, the Canadian Army Medical Corps (CAMC) was formed and over the next decade it was organized into field-deployable units.

Instead of using local training camps, the first CAMC medical-specific training exercise was held in London, Ont., over 16 days in 1911 to establish unit policies and preparations for deployment. So prescient was this exercise that CAMC was probably the best prepared medical service of all the combatants in World War I. The numbers are incomprehensible to us now. From a population one-quarter of our current size, CAMC recruited 21 453 personnel, 504 of whom were killed. Ten field or general hospitals were staffed around a core of members from Canadian universities. Unlike in other armies, Canadian nurses were given officer rank, albeit initially without permission to exercise military authority. The CAMC's role continued through 1919 in Russia and Siberia. The total number of casualties treated in the war has not been determined, but more soldiers were often cared for in a single day than in the entire conflict in Afghanistan to date. On Nov. 3, 1919, CAMC was designated the Royal Canadian Medical Corps (RCAMC) in recognition of this service.

The experience of World War I prepared the RCAMC for World War II, for which the same format of deployment was used. Again, extraordinary numbers of patients were cared for by enormous medical teams. Purposeful research was undertaken in coordination with the war effort. After the war, returning veterans revitalized university departments of surgery, to which many trace the origin of their current form. Those who remained within the forces looked after a large number of veterans and active members. The principle requirement of surgeons was to accompany the Canadian Forces on United Nations missions. Although these missions remained dangerous and required intensive surgical services, the number and acuity of patients at home declined. As a consequence, military surgeons were posted in the 1990s to civilian hospitals to maintain the skills required for missions. When Canada took over command of the military hospital at Kandahar Airfield in 2005, it was the first time in its 50 years that CFMS maintained a busy field hospital over a long period. In a manner similar to the reorganization of 1911, CFMS quickly met the challenge of a sudden increase in operational tempo. Seven complete teams of medical and support staff needed to run the hospital have now been trained and deployed in rotation. This effort has substantially increased Canada's capacity to deal with disasters at home and abroad.

Reviews of activity at the hospital at Kandahar Airfield have contributed to knowledge in areas of trauma surgery, including the type of additional training required by general surgeons to serve victims of conflict,³ the role in pre-hospital care of interventions such as needle decompression of pneumothoraces and tourniquet control of limb hemorrhage,⁴ early transfusion policy⁵ and the use of recombinant activated factor 7.⁶ In September 2009 at the Canadian Surgery Forum in Victoria, British Columbia, a postgraduate course in catastrophe surgery will be held

with a faculty consisting of civilian and military surgeons who have served in the hospital at Kandahar Airfield. The application of military techniques such as triage, evacuation, damage control resuscitation and damage control surgery to civilian disaster will be discussed, as will appropriate vascular, orthopedic, facial and skull surgical skills. The tradition of turning adversity to advantage continues with CFMS in Afghanistan. As before, the cost has not only been financial but also of individual sacrifice. Six members of the medical branch have lost their lives in Afghanistan. By increasing its surgical capacity in time of war, Canadian military surgery is not only meeting its commitment to victims of the conflict, but also contributing substantially to Canada's capacity for dealing with civilian catastrophe.

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