

A SKETCH OF MILITARY MEDICINE IN CANADA



1867



2009



THE MEDICAL SERVICE OF AN ARMY HAS NO EXISTENCE IN ITSELF. IT IS A VITAL PART OF A LIVING FABRIC, PERFORMING A PECULIAR FUNCTION, CONTROLLING YET BEING CONTROLLED. DIS SEVERED, IT DECAYS AND THE MAIN BODY PERISHES. THIS LAW OF LIMITED EXISTENCE APPLIES TO AN ARMY ALSO. ARMIES NEVER ATTAIN TO COMPLETE VIGOUR THROUGH ALLIANCE ALONE. THEY MUST BECOME ONE AND INDIVISIBLE, ANIMATED BY A SINGLE SPIRIT.

– SIR ANDREW MACPHAIL



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**A SKETCH OF MILITARY MEDICINE IN CANADA
1867 - 2009**

Gary H. Rice



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TO DUTY

To the Soldiers, Sailors and Airmen
who have sacrificed so much for Canada

and

To our Combat Medics
who have been killed or wounded
in Afghanistan

– *Duty Done, Stand Easy*

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FOREWORD

Colonel Gary Rice devoted forty-eight years of his life to Canada's military medical system. Beginning in 1953 enlisting as a private in the Royal Canadian Army Medical Corps, he retired as Colonel in 2001. During that time he worked his way through nearly every rank in the Canadian Forces and as far as the medical military is concerned, he has trained and served all across Canada and indeed across the world. It is clear from this book that he has been and remains a keen student of international affairs and more specifically for this book – a keen observer with scholarly and well informed views - on the delivery of medical care to Canadian soldiers. Vast experience entitles one to opinions and Colonel Rice has specific views that may not be shared by all, but he has earned the right to voice them. For example, he warns against the dangers of multinational integration of medical support structures in NATO, warning that this should not become a national justification “to wear away a nation’s increasingly scarce medical capabilities,” to name but one of a number of thoughtful views.

Colonel Rice modestly calls his book a “sketch.” This is an understatement. It is a sage review in clear well written language of the long history of medical care to armed forces – dating back to Roman times. It is focussed on and details the Canadian history of our subject. The book is in my view a useful addition to the growing literature on Canada’s experience in delivering medical care to our serving men and women. In reading the book it is apparent that it would be a useful adjunct for training purposes for new entrants into the field, and indeed those now involved who wish to better understand the history and depth of the Medical Services field. As well it would be an excellent and ready source of information for members of parliament, legislative committees and others in policy positions, as well as journalists and citizens who wish to be informed to name only some who would find helpful Colonel Rice’s book. The book has many other features. The history of the Medical Services in the first war and the story of Major John McCrae and a careful re-reading of “In Flanders’ Fields” should bring tears of pride to every Canadian.

In looking at Colonel Rice’s book as a whole it makes one proud to be a part of the Canadian Forces Medical Services and indeed honoured to be Canadian in a country that has in past and present provided our men and women with the very best medical care available anywhere in the world. Finally and building on this remarkable past Colonel Rice in an “Epilogue” gives some ideas of the future ahead. One cannot read the book without sharing his excitement for the new world order and the novel challenges ahead. He concludes by referring to the fact that the military “medical operation” will most certainly evolve into a much broader field of endeavour than it has occupied in the past. One leaves this book thinking that there will indeed be exciting new opportunities for the Canadian Forces Medical Services in the days ahead.

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Honorary Colonel
Colonel Commandant Designate
Canadian Forces Medical Branch¹
October 13, 2009

¹The Honourable Mr. Justice T. David Marshall is a Judge of the Ontario Superior Court of Justice.

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PROLOGUE

After years at the margins of military history, Canada's involvement in the Afghanistan War and the accompanying media reports of killed and wounded Canadian troops has shifted the relationship and military medicine has earned a place on centre-stage. This story outlines the development of military medicine in Canada from Confederation through to the end of 2009. During this period, military medicine rose to occupy an important position in Canadian military life, especially during the last century's two world wars when our nation's work force was at a premium. Good medical provisions were vital to the conservation of people, protecting troops from disease and returning the sick and wounded to duty in the shortest possible time. A detailed knowledge of the service member's mind and body enabled the authorities to calculate and standardize rations, training and disciplinary procedures.

Spanning Canada's battlefields, and covering a range of national issues, this account provides some insights into changing military medical organizations and priorities. We also outline the relationship between military medical personnel and the armed forces as a whole, by observing on such matters as the prevention of disease, the treatment of psychiatric casualties and developments in the field of medical science. The narrative as a whole shows that military medicine has become an increasingly important part of military life in the era of modern warfare, and suggests new avenues and approaches for future consideration.

During the American Revolution, more soldiers died of illness than from combat. This was the reality of the state of the art of medicine and would be so right up to the First World War. It was not so much that medical science had advanced to such a degree as to reverse this situation as it was that military science had advanced even further. Clouds of gas could wipe out thousands in minutes, not to mention the machine guns and advances in explosive technologies. Humans were suddenly more capable of killing fellow humans than the scourges, plagues, and various bugs pursuing us, although the bugs were a very close second: it was The Great War that introduced the world to the Spanish Flu killing an estimated forty million around the world, most of whom died after the war ended.

In the late sixteenth century, army medical departments could very well predict the number of patients, hospitals, physicians, and amount of medicine needed in battle because of a Frenchman, Hugues Ravaton who, in 1768, had written, "... one could assume that three of every 100 soldiers would be ill at the beginning of a European campaign. Halfway through the campaign, a probable five or six of 100 would be out of combat because of disease, and by the end of a campaign, if the victims of venereal disease and non battle injuries were counted, ten to twelve of 100 would be unable to fight because of illness. A day's battle would produce, he estimated, ten wounded per 100 combatants, but this percentage would drop as the number involved approached 100,000." There was one thing wrong, however, with this formula, one factor that was missing: smallpox.

To suppose that an invading army's lack of knowledge of civil and military medicine could be a reason for Canada not being annexed by the United States may seem unbelievable, but history tells another tale. The American attack on Canada is a

remarkable story of two very different enemies: one in uniform and the other, tiny, highly infective, subtle, and invisible; something no human being would see for at least one hundred years. The major military operations of 1775 and early 1776 were not around Boston but in far-distant Canada, which the Americans tried to add as a fourteenth colony. Canada seemed a tempting and vulnerable target. To take it would eliminate a British base at the head of the familiar invasion route along the lake and river chain connecting the St. Lawrence River with the Hudson. Congress, getting no response to an appeal to the Canadians to join in its cause, in late June 1775 instructed Major General Philip Schuyler of New York to take possession of Canada if “practicable” and “not disagreeable to the Canadians.”

Smallpox was a major factor during the American invasion of Canada. Rumours over the British use of biological warfare, and controversy over inoculation, and attempts to control the spread of smallpox, all impeded the progress of the war. Recruitment was adversely affected, desertions increased, and commanding officers were forced to continue with inadequate forces because of smallpox. This frightening disease affected the actions of the Revolutionary army and its generals, reduced the American ability to attract and hold recruits, and influenced the controversial development of preventive medical policies.²

It is the early fall of 1775, and the American Continental Army prepares for an attack on Canada. General Philip Schuyler is to lead the invasion. He has no department physicians and some of his units have no surgeons. As of August, he has no hospital supplies and already 100 of his 500 men are ill. He gives his own supply of wine to the sick, purchases medical supplies and hires a surgeon, Dr Samuel Stringer, with his own money. On September 14, General Schuyler learns that Stringer has been officially approved and his expenses are being reimbursed, but now the General is temporarily unable to join the attack, having come down with smallpox. Brigadier General Richard Montgomery replaces him.

The nucleus of what is called the Northern Army grows to about two thousand, and although Dr Stringer accompanies Montgomery to Fort George, he remains behind to run the hospital when Montgomery continues north to take Montreal. On November 12 Montgomery holds Montreal, but his army, due to disease, desertions and expiring enlistments, is down to 500 men. He marches on Quebec in December with only 300 men, having lost 200 more to illness. These 300 contain the seeds of an epidemic.

In Quebec, Montgomery joins forces with Colonel Benedict Arnold who had arrived with approximately 11,000 men after a gruelling march through the thick New England swamps and forests. Arnold brings along a 22-year-old regimental surgeon, Isaac Senter, and one of his assistants. Because of an extended incubation period, when smallpox does strike, it leaves a trail of casualties from Quebec to Fort George. Dr Senter is ill in Canada; Dr Stringer and his Hospital Department are ill on the banks of Lake George.

Montgomery is soon reinforced but falls in battle that January. Brigadier General David Wooster takes command in the spring of 1776, but half his 1,900 men are sick with smallpox. The outbreak spreads as officers and enlisted men secretly inoculate themselves and pass on the contagion to those who have not been inoculated. The British, recently

reinforced, attack the Continental Army, forcing them to evacuate. Smallpox victims fight alongside the others as they retreat to Montreal. They finally arrive outside Montreal to regroup with the forces there, but 1,200 of the 3,200 are unfit for duty, sick with smallpox. In late May, Stringer complains that he is out of medicine and supplies. He receives permission to hire more staff.

In early May, the Continental Army in Canada numbers 8,000, but by June 6, a promoted Brigadier General Arnold reports that he has got only 5,000 fit for duty. Two weeks later he evacuates Montreal with just 4,000 fit. Half his army is down with smallpox. Dr Jonathan Potts writes, "large barns [being] filled with men at the very height [sic] of smallpox and not the least things, to make them comfortable and medicines being needed at both Fort George and Ticonderoga." John Adams writes, "The smallpox is ten times more terrible than Britons, Canadians and Indians, together."

By mid-July, three thousand are sick, three thousand are well, and five thousand are unaccounted. Dr Stringer and his staff at the Fort George hospital are desperate. Soldiers are dying from smallpox at a rate of sixty per week. There are not enough healthy individuals to bury the dead. Dr Stringer asks Gates, "In the name of God, what shall we do with them all, my dear General?"

Smallpox and other diseases took their toll and never did the supply line bring in adequate food, clothing, or ammunition. Meanwhile, the British received reinforcements and in June 1776 struck back against a disintegrating American army that retreated before them almost without a fight. By mid-July the Americans were back at Ticonderoga where they had started less than a year earlier, and the initiative on the northern front passed to the British.

INTRODUCTION

*“War is the father of all things,
even Of medicine, military and
civil too.”*

— *Heraclitus*

Time and place change the ways of caring for the sick and wounded in battle, and troops in their garrisons.³ As civilizations developed in the ancient world – Sumer, Egypt, Assyria – about 4000 B.C.A., so did professional armies. As science, technologies and populations advanced the composition and size of the armies grew, their weapons and tactics improved, and the care of their sick and wounded became increasingly complex.

The western world was introduced to military medicine by the Romans who used a military medical organization in which each cohort of 500 men had a physician, and each legion of about 9,000 men a highly trained medical assistant. The greatest contribution of Imperial Rome to medicine, however, was its hospital system, which was closely linked to its army. Every military camp had a hospital for the sick and wounded,⁴ and when legions were on the move, any casualties were moved by wagon to the nearest town, or nested in tents. The legions carried their medical supplies with them.⁵ With the fall of the Roman Empire, however, military medical services and hospital systems in Europe passed away. In the Middle Ages, surgeons, physicians, and soldiers were hired for the duration of the wars, and the sick and wounded were sent to the monasteries or billeted upon local civilians.

The first trauma centres were, by their very nature, military facilities. Many medical advances have occurred during times of conflict – from the use of a makeshift “ambulance” by Baron Dominique Jean Larré,⁶ for example, to quickly move casualties off Napoleon’s battlefield and back to surgical units in the rear, to the achievement of blood transfusions during the Great War. Lessons learned by military physicians during times of war eventually make their way into peacetime practice. During the Second World and in Korea, Viet Nam, Iraq and Afghanistan, field surgical teams working at advanced surgical centres were deployed to decrease the transit time from the site of injury to definitive surgical treatment. One great advance that made the transition from past battlefields to the present urban landscape has been the development of civil trauma centres and systems. The helicopter, the advanced medical training of ordinary soldiers and field medics, the

concentration of surgical resources in a single centre, and telemedicine, all speeded up the development of civilian centres for trauma care.⁷

Efficient military health care services are great conservators of manpower and are essential for the conduct of successful military operations. By its insistence on the principles and practice of hygiene, it keeps troops healthy and avoids people wastage from sickness. It is also a great motivator for morale, as troops know that if they are wounded they will be well cared for.⁸ Canada holds its commanders responsible for the maintenance of health within their forces.

The statutory basis for the provision of health care for members of the Canadian Forces (CF) rests in Section 91.7 of the Constitution Act 1867 (and is part of the Constitution Act, 1982) that gives the Federal government responsibility for defence and the military. This is further clarified in the National Defence Act that gives the Minister of National Defence (MND) responsibility for the management and direction of the CF — including its integral health care services. Conversely, Section 92.7 of the Constitution Act 1867/Constitution Act 1982, gives provinces responsibility for health care only as it applies to their citizens. Moreover, members of the CF are neither designated as “insured persons” in the 1984 Canada Health Act, nor eligible to be insured under the Public Service’s Health and Dental Care Plans.

Military medical services include the proffering of professional advice to commanders on health discipline, preventive medicine, and other matters related to the health and well being of the troops under their command. They also have a direct responsibility for the prevention of disease, and the restoration to duty of the sick and injured by the practice of therapeutic medicine and surgery, rehabilitation, and the provision of medical supplies.

Military health care providers try to employ the advanced techniques and knowledge available within the nation’s allied health professions. They practice these skills and knowledge under conditions that are often confused, as during combat; or chaotic, as after a civil disaster. Through careful preplanning, the necessary health care means are arranged to cope with such events. Military Medicine is concerned primarily with the ability to organize, provide and manage health care treatment and care facilities under unfavourable conditions.⁹ In combat, casualties must be quickly treated and transported to rearward facilities. Supplies, equipment, and the means of sheltering and nourishing troops must be provided and brought forward. Health care providers have to be recruited and trained. Methods to prevent disease and promote healing must be developed.¹⁰

In peacetime the essential task of the military health services is to help develop armed forces that are physically and mentally fit, well clothed, well fed and of high morale.¹¹ In time of war, the overriding task is conserving the nation’s finite reservoir of trained military manpower through the application of preventive, curative and restorative medicine.

Throughout history the level of medical knowledge in civil society has affected the course of warfare. Civil society has, in turn, been significantly influenced by medical

advances brought about by military health care services mobilized in support of military operations and campaigns. In Canada today the CF Health Services (CFHS), incorporating the CF Medical and Dental Services and the allied health care professions, is the single agency responsible for the provision of health care to members of the CF. The CFHS health care delivery system is the product of incremental organization changes that have taken place since the end of the Second World War and ultimately led to the unification of the former Royal Canadian Army Medical Corps (RCAMC), Royal Canadian Dental Corps (RCDC), Medical Branch of the Royal Canadian Navy (RCN), and the Royal Canadian Air Force (RCAF) Medical Branch. Before their merger each of Canada's three armed services maintained their own health care service.

This story is a chronological sketch of the evolution of military medicine in Canada from the last few years before Confederation in 1867 to the present day. Its purpose is to acquaint readers with the beginnings and important milestones that mark the development of military medicine in Canada. It does not claim to be an authoritative or full account of the manifold activities of this indispensable part of the CF.

CIVILIAN FOUNDATION FOR MILITARY MEDICAL SERVICES

Sometimes we lose sight of how closely the CFHS and its forerunners, are associated with the civil medical history of Canada. For sixty years and more after the fall of Quebec, the colonies of British North America that were one day to join to form Canada were too poor and too thinly populated to be able to establish and support medical schools, or to attract doctors, either from Europe or the United States. As a result, those physicians who came to Canada with their British regiments found their services in such demand that many of them elected to remain when their regiments were recalled; others had come north in 1783 with fleeing Loyalist refugees. These former army doctors soon became the recognized leaders of the profession. They established civilian medical services, and as the British regular army withdrew and Canada's population increased, they founded medical schools and hospitals.

In Lower Canada, for example, two out of the four founders of the Montreal General Hospital and the Medical School that became the Medical Faculty of McGill College, were old army doctors. Another army surgeon was the founder of the profession in Upper Canada. Similarly in Acadia it was the old army doctors who arrived in 1783 with loyalist fugitives from the south, who became the pillars of the profession, while later, the British regiments at Halifax and elsewhere provided for two generations the top practitioners of Nova Scotia, and of New Brunswick, when in 1784 it became a separate province.

Through this process, Canada created the requisite civil base upon which a military medical service could later be built. At first, though, there was only a regimental medical service, with each militia unit choosing its own surgeon-major from among the local doctors, and whom they looked upon as the personal attendant of the colonel of the regiment.¹²

THE BATTLE OF RIDGEWAY

As the British withdrew from Canada, small Canadian Militia garrisons were kept at strategic points such as Quebec, Kingston and Winnipeg. These led to the need to provide their troops with health care. This was done by selecting local doctors to be part-time garrison medical officers (MO). At the time of the Fenian Raids, for example, added civilian doctors voluntarily made up any shortfall. The irregular character of the military health services provided during the attacks is illustrated by the haphazard arrangements during the retreat from the Battle of Ridgeway on June 2, 1866.

The Fenians night-marched north across Frenchman's Creek, then turned and marched inland on the morning of June 2, taking up a defensive position near the present town of Ridgeway. There they clashed with 850 advancing Canadian militia commanded by Lieutenant-Colonel Alfred Booker. Both armies were inexperienced, and the skirmish that followed was marked by confusion and ill-timed retreats by each side. In the end, after a battle described by various observers and participants as lasting between one and three hours, the Canadians fled the field. The Fenians then fell back themselves toward Fort Erie. Canadian casualties included nine dead and thirty-seven wounded.

After the battle, the dead and severely wounded were left on the field until the afternoon and evening. Local citizens then collected and moved the casualties into nearby houses where they provided some initial care and waited for the arrival of professional medical personnel from Toronto. Several physicians, some who had served as medical officers in the American Civil War, arrived at Port Colborne the next day, and on the morning of June 3, they met with the Surgeon of the Queen's Own Rifles battalion who had accompanied his regiment.

No military patient transport was available so farmers' wagons were seized and put into service. The Toronto doctors then went on to the battle area, arriving that afternoon, and treated the wounded waiting in the neighbourhood houses. A train was arranged to move the wounded back to Port Colborne; the dead were carried there in wagons. Some of the more severely wounded were in need of rest and surgical care and they were left in charge of doctors who had remained at Port Colborne; those with less important wounds were relocated to an improvised hospital in the town hall at St. Catharines.

The remaining casualties were brought to Port Dalhousie and carried aboard the lake steamer, "City of Toronto," on mattresses and stretchers. The bodies of six of the dead, in wooden coffins, were also put aboard the ship, and it then sailed for Toronto.¹³

THE FENIAN RAIDS

The need for military medical services that are efficient, well organized, and properly supervised became evident during the Fenian raids of 1866-1870, but was only partially recognized. In 1866, Dr. G.P. Girdwood,¹⁴ was appointed as a Medical Staff Officer in the Canadian Militia at Ottawa, a part-time position. A former assistant surgeon in the British Army's Grenadier Regiment of Foot Guards, he had previously seen service with his battalion in Canada, and on returning to England in September 1864 he left the

army and moved back to Montreal, where he graduated from McGill College in 1865 and was chosen as surgeon to the military prison in Montreal. The following year, as surgeon to the 3rd Battalion of Rifles (Victoria Volunteer Rifles of Montreal), he took part in defending the colony against the Fenian raids.¹⁵

During the summer of 1866, militia field brigades were established in Canada, each with a surgeon on their staff, and one MO for every 400 men. Panniers were purchased for use by the staff surgeons, and sufficient stores were acquired to provide one field hospital per battalion, with a condition that the tentage was not to be used if buildings were available. Such medical regulations as were required were also published from time to time in General Orders.¹⁶

THE RED RIVER EXPEDITION

In 1870, a combined force of British Regulars and Canadian Militia under the command of the Deputy Quarter Master General in Canada, Colonel Garnet Wolseley,¹⁷ was dispatched to Fort Garry in the Red River Settlement, (now the province of Manitoba) to put down a rebellion led by the Métis leader, Louis Riel.¹⁸ For that historic journey many guides, Indians and voyageurs were hired to help with the transportation of Wolseley's 1,400-man force. The difficult part of the expedition began on the shores of Lake Superior, near the present-day city of Thunder Bay, Ontario. It ended thirteen weeks and 1,050 kilometres later at Fort Garry. The men travelled in boats measuring nine metres in length, and along the way they encountered a difficult chain of raging, rock-strewn rivers and many lakes. They also endured backbreaking portages through thick forests and swampy muskeg.¹⁹

The MO of the 1st Battalion 60th Rifles, Surgeon Major E. W. Young, was chosen to lead the Army Hospital Corps Detachment assigned to support Wolseley's force. He was appointed Principal Medical Officer (PMO) and given six assistant surgeons, including J.H.L. Neilson, who was later to become the first Canadian Medical Director General. Although the force moved 965 kilometres and made forty-seven portages in some seven weeks, and endured some forty-five days of rain, Colonel Wolseley reported: "Never had any body of men on active service been more cheerful nor more healthy."²⁰

THE SUDAN EXPEDITION - NILE VOYAGEURS

In the winter of 1884-85, Canadian boatmen and lumbermen — many of them native peoples — were attached to British General Sir Garnet Wolseley's 5,400 man Nile Expedition.²¹ Their nonmilitary job was to help transport the force sent to rescue Major-General Charles Gordon who was besieged in the Sudanese capital of Khartoum, on the Nile approximately 2,000 kilometres south of Cairo, Egypt. Although these men wore no uniforms, did not bear arms, and took no part in the few skirmishes that occurred, they made up the first Canadian contingent that included its own medical support and served overseas. At the end of their mission, all the volunteers received the special British medal commemorating the expedition.

Known at the time as the Nile Voyageurs, the Canadians, were hired to operate the specially constructed river boats that would carry the relieving force of British soldiers up the Nile, the longest river in the world. Tough and reliable, these men were recruited because of Wolseley's experiences in Canada during the Red River Rebellion of 1870, when he led an expedition against Métis leader Louis Riel's insurrection at Fort Garry, Manitoba.

In all, Wolseley recruited 379 "generally suitable" boatmen and seven officers. Some of them had seen service with the 1870 Red River Expedition. One Red River veteran, was the MO of B Battery, Regiment of Canadian Artillery, Surgeon-Major John Neilson, who served as the contingent's doctor. Hospital Sergeant Gaston P. Labatt from the same unit accompanied him. During their deployment, sixteen Canadians lost their lives to typhoid fever, smallpox, drowning, and other accidents.

THE NORTHWEST REBELLION

In 1885 the Dominion government ordered a full-scale military expedition to put down a rebellion in Saskatchewan led by Louis Riel. This campaign was the first independent experience of active service for the Canadian militia that had been created in 1868 by the Militia Act, and provided for an Active Militia of 40,000 volunteers. The Militia Act had provided that "a military train, and a medical staff, as well as commissariat, hospital and ambulance Corps" might be formed when required; but this was not done until 1885 when the rebellion occurred. Since 1868, there had been little medical guidance on the governance of military hospitals, and health care of troops under field conditions, in the General Orders issued by Ottawa to the military districts. At the outset of the rebellion there was only a regimental medical service that saw each Canadian regiment recruiting its own medical practitioners, and a complete medical service to support the mobilizing North West Field Force was urgently needed.

In April 1885, the Minister of Militia and Defence appointed Lieutenant-Colonel Darby Bergin^{22,23} as Surgeon General (Surg Gen) with responsibility to organize the required medical service. Within a week of his appointment, Bergin had selected and appointed Doctor Thomas George Roddick²⁴ as Deputy Surg Gen and Chief of the Medical Staff in the Field. A professor of Surgery at Queen's University, Kingston, Senator Michael Sullivan, a physician, was Darby's chosen Purveyor-General with responsibility for all medical equipment and supplies.

The situation was urgent, and time was short. Many problems had to be speedily overcome and resolved by Colonel Bergin to field an effective medical support system able to support the hastily assembled North West Field Force of 5,000, of which the General Officer Commanding (GOC) and some of the troops had already left for the front, and were operating in separate columns in unfamiliar territory. Most of the required field medical equipment did not exist and had to be ordered from New York. Transport was lacking, especially for the medical services. The area of operations in what is now Saskatchewan was separated by a very great distance from its support base in Ottawa, and communications between them was scarce.

Discipline was lacking among the regimental medical officers (RMO). Some went on active service with scarcely any medical equipment, while one, without prior authority, spent \$500. for his unit's medical stores and supplies; enough for several units. There was no trained medical other ranks. The spring weather in Western Canada was bitter. The journey to the area of operations had to be made in open railway cars, and by long marches over wild country between the completed sections of the railway.²⁵

Despite such obstacles Colonel Bergin, within seven days of taking over, had the first field hospital on its way to Winnipeg, and a second soon after, followed by reserve supplies. Surgeon Major Campbell Mellis Douglas, VC,²⁶ was appointed to command No. 1 Field Hospital (1 F) in Saskatoon, and Surgeon Major Henry Raymond Cas grain of Windsor, was selected to command No.2 Field Hospitals (2FH) at Moose Jaw, Saskatchewan.²⁷ The key physician staffs of both units came from the medical faculties of McGill University and the University of Toronto. Medical assistants and orderlies from Quebec and Ontario also volunteered for the campaign.

It was on the decision of the GOC the expedition, Major General Frederick Middleton, based on his knowledge of their value in the Crimea, that Canadian nurses were employed on field medical operations for the first time. Under Mother Hannah²⁸ and Miss Miller,²⁹ twelve nurses were sent to Saskatoon and Moose Jaw³⁰ where they helped in the hospitals. A Red Cross Corps of unpaid graduates in medicine and surgery also gave useful service.³¹



Photograph No. 1. A group of Anglican nuns from Toronto in No. 2. Field Hospital, a 40-bed hospital in Moose Jaw during the Northwest Rebellion of 1885.

medical transport affected the campaign strategy. The Hudson Bay Company's steamer, the SS Northcote, for example, had first to transport the patients from Batoche, to Saskatoon; they were then carried by wagon for some fifty miles to Moose Jaw, and finally on a barge for a further 1,800 kilometres to Winnipeg.

At Fish Creek, when the steamer failed to arrive to pick up the wounded, General Middleton reported to the Minister of Militia: "The sick are a regular anchor." Only after Surgeon Major, George T. Orton, his brigade surgeon, intervened and improvised "stretchers made of canvas and fresh cowhide to sling to the sides of the wagon boxes, protected by canvas awnings supported by bent willows," to transport his casualties to Saskatoon, was the General able to get on with his plan.³²

Despite its hasty assembly, the medical services support throughout the campaign was exceptional. In a letter to the Minister of Militia, Caron, on July 21, 1885, Middleton detailed how they evacuated the last of the Canadian soldiers wounded in action from Saskatoon on the Hudson's Bay Company steamers, Sir John A. Macdonald and Alberta, via the North Saskatchewan River all the way to Winnipeg. His letter also told of the support provided by the settlers of Saskatoon, the contracts established with the Winnipeg General Hospital for the continued care of the patients once in that city, and the convenience of travelling by steamer instead of overland, which would have been tremendously hard on the wounded. It also provides an account of his trip to the communities of Fish Creek and Batoche where they provided military medical supplies and treatment for wounded Métis.³³

Some of the first Canadian military comments on specifications for equipment and supplies for warfare were put forward by Brigade-Surgeon Orton, who reported on such practical matters as the type of clothing, footwear and rations needed in Canada, and the need for a water bottle to be carried by each man. In his report on the campaign, Colonel Bergin pointed out that surgeons recruited in an emergency without previous military training had been found inefficient, lacking in discipline and difficult to control. His recommendations included the need to form a military medical service, a university military cadet corps as a source for surgeons, collective training for medical services and the issue of field medical equipment to each military district. The government of the day heeded few of his recommendations in the inevitable lapse of military activity at the close of the campaign. It was not to be until 1898, in time for its deployment to South Africa in the Boer War, that Canada would form a permanent military medical organization.³⁴

Overall, the improvised and quickly assembled military medical service placed in support of the North West Field Force, despite its lack of experience or previous training, rose to the occasion, which fortunately did not, medically speaking, become grave, and effectively coped with the demands made upon it, its task being easier by the low incidence of disease and the low casualty rate. Casualties totalled 129.

THE YUKON FIELD FORCE

The early links between nursing and the military were not restricted to wartime situations. The Yukon Field Force was authorized by Order-in-Council No. 596 of March 21, 1898. It was despatched to the Yukon in May 1898 to help the North West Mounted Police (NWMP) maintain order and to bolster the Canadian government's presence in the Territory. The discovery of gold in the Klondike region and the subsequent influx of many miners and adventurers had strained the slim resources of the NWMP. The Force consisted of 203 officers and men drawn from all three branches (cavalry, artillery and infantry) of the Permanent Force.

Shortly after its inauguration, Lady Aberdeen, the founder of the Victorian Order of Nurses of Canada received an appeal for nurses in the Klondike. Four nurses, Georgia Powell, Rachel Hannah, Margaret Payson, and Amy Scott were selected, and outfitted in clothing appropriate for a long, rough journey. Georgia Powell travelled with one troop detachment to Fort Selkirk where she learned of a raging typhoid fever outbreak. Leaving

Amy Scott to wait for the other nurses, Georgia went on to the newly-constructed Good Samaritan Hospital in Dawson. There, she fought against the epidemic and sent word to Fort Selkirk. Immediately after landing at the fort, Rachel Hanna and Margaret Payson, with Amy Scott, travelled to the hospital. Amy Scott was assigned to nursing duties at the NWMP. Margaret Payson staffed the hospital at Grand Forks, and Georgia Powell took over the duties of Rachel Hannah who was ill with typhoid.

By late 1899, as the great gold rush had peaked and no civil disturbances had occurred, the need for the Force was no longer felt. Since the Field Force represented nearly one-quarter of the total strength of Canada's Permanent Force, there was pressure from the military establishment itself to return the troops to their barracks in the south so they could get on with their normal tasks. In September 1899, approximately one-half of the Force was withdrawn and the remainder, including the nurses, left in the Spring of 1900.

DEVELOPMENTS BEFORE THE SOUTH AFRICAN WAR

The part-time regimental medical services then in existence remained in being after the brief North West campaign. Central directions from Ottawa continued and covered such matters as claims on medical grounds; particulars of field medical equipment, published in 1894; and physical standards for recruits, published in 1897. In 1896, Sir Frederick Borden, a former medical officer, became Minister of Militia and Defence. Shortly after, a Medical sub department of the Militia was established. In February 1898,³⁵ Colonel Hubert Neilson was appointed Director General of Medical Staff; an appointment he held until 1903. In Ottawa, a railed-off section at one end of a building corridor was Neilson's first office and stores depot and contained his complete reserves of medical stores.³⁶ In 1899, consideration was given to reorganizing the Canadian Militia on an army basis with the necessary administration elements, including the medical services shown in Chart 1.

Chart No. 1. Canadian Militia - Field Medical Elements - 1899

LEVEL	ORGANIZATION	REMARKS
Regimental / Battalion	1 Stretcher Bearer Section, 1 Corporal Medical Orderly	Under command of the regimental/battalion surgeon.
Field Brigade	1 Bearer Company	3 medical officers, 61 men 10 ambulance wagons
Division	3 Field Hospitals	Each: four medical officers, One quartermaster, 40 men Transport to be provided on contract
Independent Cavalry Brigade	1 Field Hospital	
Independent Brigade	1 Field Hospital	
Base	To be formed on civilian hospitals	Where distance prohibited the Director General to organize temporary base hospitals.

Training was based on twelve days a year. The bearer companies, known as city units, were to train for nine days at their local headquarters and three days at camp. The field hospitals were classed as rural units and were to train at camp for twelve days, and also function at the same time as camp hospitals — rather incompatible roles. Personnel were to attend Canadian Militia and Army Medical Training Schools run by the District Officers Commanding military districts on advice from the regular PMO. At the summer camp in 1900, courses of instruction were arranged for the qualification of personnel up to the rank of major or surgeon-major.

From July 1899 on, a PMO - a part-time position - was appointed in each military district. During annual summer camps he was responsible for the medical arrangements and used the district's medical equipment to form a field hospital. PMO were also responsible for training, using as their guide, the British handbooks, "Manual for the Medical Staff Corps, 1894" and "Regulations for the Army Medical Services, 1898."

At that time the proposed Canadian Militia Army Medical Services was to consist of a Militia Army Medical Staff Service comprising all officers, including many regular PMO, who would exercise command and medical supervision in districts, and a Militia Army Medical Staff Corps containing all other ranks. Briefly, the proposal provided that, excepting a small permanent officer staff, medical duties for both militia and regular units were to be carried out by part-time personnel. To ensure that some militia officers would gain practical knowledge, many of them were to rotate through the duties of the few regular PMO assigned to the military districts.

In the autumn of 1899 Colonel Neilson gained Parliament's approval for the formation of an Army Medical Corps (AMC) consisting of six bearer companies and six field hospitals. The officers of the Corps were to hold substantive rank, and to receive promotion by seniority as vacancies occurred. The order recognized the existing regimental officers and formed them into a Regimental Medical Service, which included all medical officers appointed to the regiments. These officers were to receive promotion not by seniority but by length of active service, and be able to rise from the rank of lieutenant to major. The order also detailed the relationship of the two services — the AMC and the Regimental Medical Service and, in the event of mobilization, laid down a course of instruction for those seeking to qualify as MO.

THE SOUTH AFRICAN WAR

When the Boer War broke out in September 1899, Canada decided to send troops overseas for the first time. Ultimately, three contingents, totalling 8,372 all ranks, were deployed, of whom 244 were killed in action or died of disease, and 252 were wounded. When the first contingent, comprising an infantry battalion, was despatched the organization of the AMC had not progressed sufficiently to enable it to send anything with the battalion beyond the RMO and regimental stretcher-bearers. The latter being supplied by the Halifax Bearer Company, the only body of trained orderlies in the country at the time, and four professionally trained Canadian nurses. The nurses were issued khaki military uniforms and accorded the status of junior officers. The AMC shortcomings were

not due to a lack of officers, men and nurses, but because its reorganization was incomplete.

The RMO saw extensive service. Three of them accompanied the first contingent, but only one, Captain Eugene Fiset of Rimouski, Quebec,³⁷ was with the battalion during the greater part of its service in the field. Joining the contingent as the junior MO at the last moment before it sailed, Fiset remained with it during its whole tour of duty. He received the D.S.O. for distinguished service at Paardeburg, an honour that also was gained by Major Keenan, of Montreal, who was serving with the Lord Strathcona Horse.

Unlike MO, Canadian nurses were not permitted to go into the field with the troops. They were employed in British Army general hospitals to teach RAMC hospital orderlies, and not permitted to provide patient care. As casualties mounted, especially from disease, however, this restriction gave way and they were soon fully employed. Under the leadership of Georgina Fane Pope,³⁸ of Prince Edward Island, the nurses in the First Contingent demonstrated their worth, and four more were sent with the Second Contingent that departed Halifax in the late winter of nineteen hundred.³⁹

On August 1, 1901, Canada formally authorized a regular component of the Canadian Army Nursing Service (CANS) to consist of nurses who had served, or were serving, in South Africa, and a reserve component consisting of other nurses who were available for military service. The eight nurses who were attached to Canada's first two contingents were the first Canadian women to serve in military uniform.

After the October 30, 1899 departure of the first contingent, comprising the 2nd Battalion (Special Service Force), The Royal Canadian Regiment of Infantry from Quebec, three Field Artillery Batteries and two battalions of Mounted Rifles, the 1st Canadian Mounted Rifles (CMR), and the Royal Canadian Dragoons (RCD), were mustered and despatched in January 1900. In March, the Lord Strathcona Horse followed, and it was succeeded later in the year by another large draft of Canadians to help fill the ranks of the new South African Constabulary that was being patterned after Canada's NWMP.

The fall of Pretoria in 1900 marked the end of the beginning of the South African War. Shortly after, the Boers reverted to guerrilla warfare and the British Army responded. The demand for Canadian troops continued and with it came a high casualty rate caused largely by improper sanitation, and the sorry management of communicable disease.

It was not until January 1902, some six months before the end of the war, that the first Canadian medical unit, the 10th Canadian Field Hospital (10 CFH), was ready to join the third contingent and embark aboard a ship at Halifax under the command of Colonel A. Norris Worthington, M.P. for Sherbrooke.⁴⁰ Numbering only 61 all ranks and 29 horses, it was organized into a hospital staff of five officers, a ward section of 35 other ranks, and a transport section of 21 other ranks to move and transport the wounded.

The 10 CFH was formed in keeping with British Army practice with Canadian innovations, including the Hubert tent — so-called after Colonel Hubert Neilson, who devised it — which replaced the British Army's hospital tent, and Canadian wagons built upon the lines of a Canadian express wagon and lighter than their British counterpart, ambulances, water trailers, and an acetylene gas lighting system.

The role of 10 CFH was to improve the standard of care for Canadian soldiers by providing continuing case management, and unite into viable teams the separate Canadian medical staffs that were then in the country. This was among the very early first steps in the long and ongoing process of centralization and coordination of military health care resources that continues to this day.

Arriving at Durban, Natal, in February, the 10 CFH moved to Vaalbank, 55 kilometres away on the Lichtenberg blockhouse railway line. Here it opened as a stationary hospital and received sick and wounded from the columns operating in the area. By June 18, 1902 it had treated over a thousand patients, British, Boer and Black South African. The hospital's ambulances evacuated patients for longer-term care to Klerksdorp. In this role it proved to be an important medical factor in the final decisive operations of the war.

Under the command of Major G. C. Jones, a mobile detachment of 10 CFH was formed and attached to Cookson's column with the 2nd Regiment, CMR where it took part in the operations in the Transvaal and Northern Cape Colony. This detachment never rejoined the unit, and was present at the Battle of Hart's River. By all accounts, the 10th CFH provided outstanding medical services during its stint in South Africa.

The war had exposed the weak points in the militia medical system and action was necessary to rectify its deficiencies. There was still no proper provincial or district medical organization. Where a permanent unit was stationed, its RMO had been the channel through which the Director-General kept in touch with local needs. There were, however, large districts with no permanent units, and therefore with no local heads. To change this, PMO were assigned to supervise the medical units in the districts and to keep Ottawa informed regarding personnel and equipment matters. Later, when the districts were subsumed in larger commands, PMO were appointed to oversee the commands and district medical matters became the responsibility of a Senior MO.

After the war Lieutenant-Colonel Fiset was sent to the United Kingdom to undergo training with the RAMC. Upon his return in 1902 he was appointed Staff Officer to the DGMS, Lieutenant-Colonel Neilson and, in 1904, he succeeded him.

PREPARING FOR THE NEXT WAR

"The finest surgeon, however, is powerless unless his patient and his materials can be brought to him ... the success of the treatment of our wounded depends to a large degree upon efficient and rapid movement of the cases.

— T.B. Nichols

To bring all military health care providers together under unified command and control, the formation of a Canadian Army Medical Corps (CAMC) was authorized by Ottawa on July 2, 1904 in General Order Number 98. Its regular component comprised eight officers (all doctors), thirty-six noncommissioned orderlies and stores men, and MO who were attached to the regiments of the Non-Permanent Active Militia (NPAM). The CAMC reserve component included dental officers, members of the CANS — who held officers' rank but were not authorized to exercise military authority — and noncommissioned orderlies and logistics personnel such as stores men and drivers.

In 1906, when Colonel Eugène Fiset was promoted from DGMS to Surg Gen he shaped the CAMC into mobile field units by adopting the British field ambulance (fd amb) unit organization. This was done by expanding the rural "field hospitals" and city "bearer" units, wherever possible, into complete fd amb units. Colonel Fiset also introduced the army to modern military field sanitation — acknowledging a need that had been exposed by the high number of disease casualties in South Africa. At this time, Canadian troops in camps were as uninterested in field sanitation as their British Army predecessors had been fifty years earlier, during the Crimean War.⁴¹ Also, in 1906, members of the Army Medical Staff Corps were made part of the CAMC.

Experience in South Africa had led the British Imperial authorities to combine the existing bearer company and field hospital into one unit, the fd amb. The purpose was to attain increased mobility at the front, and more particularly to combine under one command the two intimately related functions of collecting the wounded and affording immediate but temporary care. The bearer company function was retained in the fd amb bearer section, while its new tent and transport sections took on the role of the field hospital, but without their heavy iron cots and large marquee tents.

The wisdom of these changes was upheld during the Great War, when one day a fd amb unit might be operating two or more Advanced Dressing Stations (ADS) close to the trenches, the next day a Main Dressing Station (MDS) four or five kilometres back of the line, and on the third, a Divisional Rest Station further behind the front lines.

The British fd amb personnel establishment was ten officers and 241 other ranks, of whom sixteen were NCO in the rank of sergeant or higher. The Canadian unit's establishment, called for the same number of officers and NCO, but provided only for seventy-five other ranks, i.e., one-third the number. Further, where the British organization consisted of three sections, the Canadian fd amb had only one, with the other two being skeleton organizations; the idea being that upon mobilization recruiting the rank and file to bring them up to full strength would be easier, and it would also help induce more civilian practitioners to accept commissions.

In 1906, Colonel Fiset was appointed Deputy Minister of Militia and Defence and Lieutenant-Colonel Guy Carleton Jones,⁴² succeeded him as DGMS. Shortly after taking up his new duties, Jones gained the cooperation of the army staff and began an army wide hygiene campaign. In 1907 instructions were issued that commanding officers (CO) instead of quartermasters would in future be responsible for unit sanitation; ensuring that they would consult their MO on the subject. The PMO conducted courses in military medicine and sanitation for all regular and militia medical officers within their jurisdiction. As a

result of these initiatives, sanitation in the summer camps showed rapid improvement, and one of the major advances in the Canadian Militia between 1909 and 1914 was its recognition of the importance of preventive medicine.

In the years before the First World War the DGMS insisted that during the winter months, schools were to be set up in Ottawa where courses would be presented on the medical history of past campaigns, and personnel would be trained in laboratory work, sanitation, and bacteriology. This arrangement left the summer period free for more practical training.

On May 1, 1909, instructions were issued that all future MO appointments would be to the CAMC, and the practice of appointing RMO would be discontinued. Thus, the regimental medical service, which dated through the British Army back to the English Civil War and in 1643, disappeared in Canada. Two militia general hospitals were authorized to be formed in 1910 to provide medical support to the summer camps at Niagara and Aldershot. This freed up the field ambulance units for training. In 1913 the general hospitals were converted into clearing hospitals organized on British lines.

In the years before the First World War, under the leadership of the British Director General Army Medical Services, (DGAMS) Sir Alfred Keogh, the medical services of all Commonwealth countries cooperated in the development of an Imperial field medical support doctrine that was embraced by all. Consequently, when war broke out the medical services of Canada and the rest of the Commonwealth were largely organized, trained, and equipped to work as one system under British direction.⁴³

Because of CAMC improvements in organization, equipment and training Canada's military medical services were well prepared for active service. In 1914 all medical units in Eastern Canada were attending summer camps at London, Ontario and Farnham, Quebec. Six of these units underwent sixteen days of training under field conditions, working out in detail the medical services arrangements up to divisional level. In the same year, the British War Office's Inspector General Overseas Forces, Sir Ian Hamilton,⁴⁴ reported: "In Canada, as elsewhere, the medical corps keeps well ahead of every other branch of the services in the completeness of its preparations for war."⁴⁵

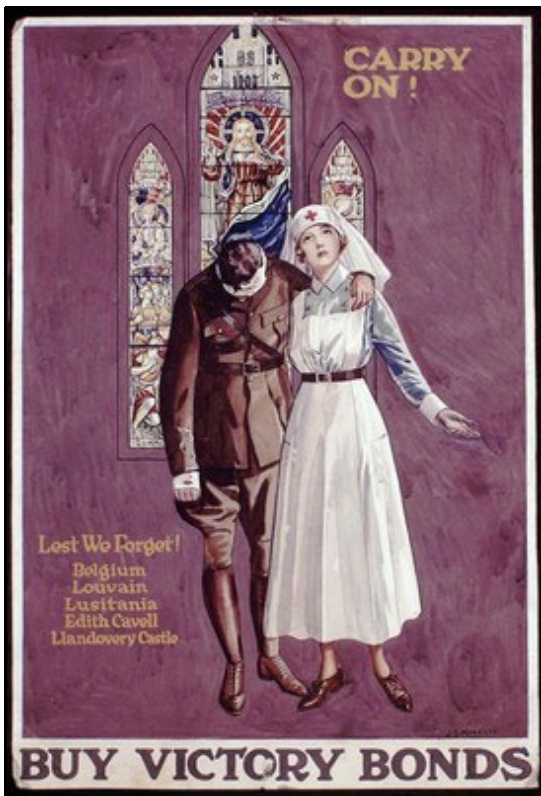
THE FIRST WORLD WAR

"It has often been said that those who can produce a last 100,000 men will win a war. If the Medical Service is inefficient, or is deprived of anything necessary to enable it to function properly, this last 100,000 will be in hospital and NOT on the battlefield, where their presence might turn the scale."

— T.B. Nichols

The strength of Canada's permanent CAMC on the eve of the First World War was 20 MO, five nursing sisters and 102 noncommissioned members. The CAMC militia organization included the regimental medical establishments of militia units, eight cavalry fd amb, fifteen fd amb, and two clearing hospitals.

During the Great War Canada's military medical services overseas came under the British DGAMS, and the nursing services reported to the British Matron-in-Chief. The Commonwealth medical planning of prewar years made such unity of control effective and enabled the DGAMS to use Canadian medical units to meet commitments in other theatres. Four Canadian stationary hospitals, for example, were employed in the Mediterranean to help move casualties from Gallipoli; two at Mudros, one in Salonika in Greece, and another in Cairo, Egypt. Four units accompanied the forces sent to Vladivostok in Northern Russia in 1918.



Photograph No. 2. Carry On World War I Poster for Canadian Victory Bonds

administration of Canadian Medical Service were issued.⁴⁸

By 1915, first aid training for members of the CEF was fully underway, and being carried out by instructors from the St. John Ambulance Association who had been appointed to the CAMC for this purpose. By war's end the Association had trained close to 200,000 members of the CEF in first aid.⁴⁹

Canada declared war on August 4, 1914. The first contingent of the Canadian Expeditionary Force (CEF), raised from the Active Militia, began deploying overseas in October. Early on, our medical services were impeded for a time by the government's ill conceived mobilization policy that at the outset of the war saw more than 33,000 troops converging too rapidly in the hastily chosen and unprepared camp at Valcartier, Quebec, that in its early days had little in the way of the necessary on-site sanitary and hospital facilities. There were similar trials for the medical services when the first Canadian contingent arrived on Salisbury Plains in the United Kingdom, and were confronted with unseasonably heavy rainfalls, cold, and mud, and shortages of medical supplies and equipment.⁴⁶ The general medical arrangements in the field, are shown in Chart No. 2.⁴⁷

Out of necessity the CAMC expanded almost exponentially in size, complexity, and professional expertise. Fortunately, in 1914, the first regulations governing the organization and

By 1918, Canada's overseas military medical establishment included, dozens of fd amb units, four Casualty Clearing Stations (CCS), ten Stationary Hospitals, sixteen General Hospitals, five Special Hospitals and three Convalescent Hospitals. In addition, Canadian doctors, nurses and auxiliary medical staff also served in many British medical units.

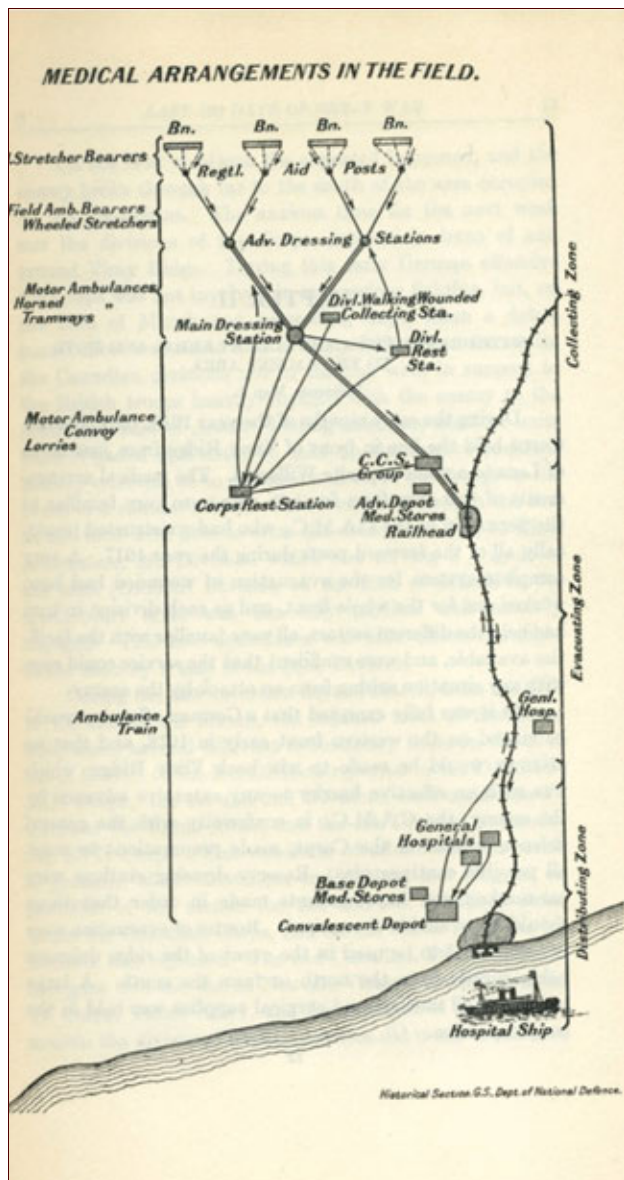


Chart No. 2. First World War
Chain of Casualty Evacuation

Canadian General Hospital (1 CGH) — raised from the CAMC reserve — deployed to France. On October 21, 1914, while Canada's combat units were still undergoing training in England, 1 CGH opened and began receiving patients. Four months later, in the spring of 1915, when the 1st Canadian Division, supported by No. 1, No. 2, and No. 3 Fd Amb,

At the beginning of the war a typical general hospital's bed capacity was 520 beds, but in 1915 this was increased to 1,040; afterwards, their bed capacity was altered as necessary up to two thousand. Some general hospitals in 1918 had an even greater capacity, viz., No. 2 - 2,210 beds; No. 7 - 2,290 beds and No. 16 - 2,182 beds.

The stationary hospitals, which originally had a bed capacity of 200, were later enlarged, in 1915, to 400 beds. But even this capacity varied, according to patient demand, from 400 to 650 beds, with one of them, No. 3, in 1918, reaching a capacity of 1,090 beds.

Special hospitals were opened up to meet the needs of orthopaedic, tubercular, eye and ear, rehabilitation, and venereal disease cases. Their bed capacity varied, according to the type of patient being care for.

Three convalescent hospitals, with a total capacity of 770 beds, were opened in 1915; their numbers rose to eight in 1918, with a capacity of 7,456 beds. The two largest were Woodcote Park, Epsom, with 3,900 beds; and Princess Patricia's Bexhill, with 2,250 beds.

When the first contingent of the CEF went overseas, the 1st Canadian General Hospital (1 CGH) — raised from the CAMC reserve — deployed to France. On October 21, 1914, while Canada's combat units were still undergoing training in England, 1 CGH opened and began receiving patients. Four months later, in the spring of 1915, when the 1st Canadian Division, supported by No. 1, No. 2, and No. 3 Fd Amb,

arrived in the Ypres area, 1 CGH treated nearly 3,000 patients. By June 1, 1918, the CAMC overseas was providing comprehensive health care for the 425,000 strong Canadian Corps. with a medical establishment of 15,519 men and women and sixty-eight medical units,

In France the need for sanitary training was evident from the very beginning of the war. To meet this need, sanitary squads were formed and their personnel trained at the British Army's School of Hygiene in France. In the battle area, the extensive use of motor vehicles, and narrow and broad gauge railways, met the transportation need of mobile medical units. Under optimum conditions a casualty could be evacuated from a unit in the front lines to a hospital in the United Kingdom within forty-eight hours. Although Canadian equipment was taken overseas, much of it, because of poor manufacturing at home, had to be replaced from British stocks. The British eventually having to supply most of the equipment required in France.

The principal medical challenges were shock and infection. The troops, medical personnel and combatants alike, all lived and fought in mud. Machine guns and high-explosive artillery shells inflicted most wounds, which meant flesh torn by blast and shrapnel, and wounds contaminated by the filth of the battlefield. The sick were numerous, suffering from respiratory ailments of all kinds, water and food-borne diseases, old afflictions such as typhus, and new ones such as "trench foot."

This was an infection of the feet caused by cold, wet and insanitary conditions. In the trenches men stood for hours on end in waterlogged trenches without being able to remove wet socks or boots. The feet would gradually go numb and the skin would turn red or blue. If untreated, trench foot could turn gangrenous and result in amputation. Trench foot was a particular problem in the early stages of the war. For example, during the winter of 1914-15 more than 20,000 men in the British Army were treated for trench foot.

The only remedy for trench foot was for the soldiers to dry their feet and change their socks several times a day. By the end of 1915 British soldiers in the trenches had to have three pairs of socks with them and were under orders to change their socks at least twice a day. As well as drying their feet, soldiers were told to cover their feet with a grease made from whale-oil. It has been estimated that a battalion at the front would use ten gallons of whale-oil every day.

In the Canadian Corps the medical services were the responsibility of a Canadian Deputy Director of Medical Services (DDMS) who was the adviser to the Corps Commander in all corps medical matters. In the divisions of the corps, the medical services were the responsibility of an Assistant Director Medical Services (ADMS) who advised the GOC division in all division medical matters. Under the control of the DDMS, the ADMS deployed the units of his divisional medical services as required

At unit level the RMO was the responsible advisor to the unit commander in all unit medical matters. Under the DDMS, for corps troops, or under the ADMS, for divisional troops, the RMO was in charge of the medical service of his unit. In combat, he treated the unit's casualties at a Regimental Aid Post (RAP) that was set up close to the battalion headquarters. By conducting daily inspections he kept the unit's sanitary conditions under close observation, and during the daily sick parades he and his staff immediately treated

and returned unit members to duty, or arranged to transfer them elsewhere for further care.⁵⁰

There were three fd amb units⁵¹ with each infantry division, and one with the Canadian Corps at large. The latter customarily operated a Corps Rest Station. The fd amb was a highly mobile unit that moved with, and immediately in rear of, the front line. It had eleven officers, including a dental officer, and 232 other ranks, seven motor ambulance cars, three horse drawn ambulance wagons, and sufficient tent accommodation and transport for all of its equipment and personnel. The unit was organized so that it could be divided into three complete and self-contained sections. By this means a fd amb unit could simultaneously operate up to three dressing stations.

In the Corps and Division areas there were also a variety of other medical units. These included: rest stations that were established and operated by a non divisional fd amb. These stations were a development of trench warfare, where formations held the same part of a line for long periods, and they were organized and staffed to provide tented accommodation and medical care for minor short-stay cases, and included special clinics for certain classes of patients.

The location of a rest station was not changed so long as the Corps occupied the same sector of the front, and they were usually situated toward the rear of the corps boundary or divisional area. To transport patients within the corps area, motor ambulance convoy units were deployed. These were mobile medical units, each with six officers and 120 other ranks. With fifty motor ambulance cars, their organization included a complete mobile workshop for all routine repairs. Mobile sanitary sections, comprising one officer and twenty-seven other ranks, also were established, and their organization included a workshop for the construction of sanitary appliances.

The Dental Service of the Corps was an integral part of the Medical Services. A Corps dental laboratory was unique to the Canadian Corps and proved a valuable adjunct to the service. It operated as the principle dental centre for the Corps, and had a complete staff of dental mechanics for the manufacture of dentures of all sorts.

For emergency use, each soldier carried a first aid dressing. If wounded it was applied either by himself, by a comrade, or by stretcher bearers. If he could not walk, he was picked up by regimental stretcher bearers and carried to his RAP. His RMO examined him there and, as necessary, adjusted or changed his dressing, and administered morphine to counteract shock. The patient was also given hot drinks and stimulants, tagged with a label containing the details of his identity, diagnosis, and any medications administered. He was then made as warm and comfortable as possible while waiting to be evacuated rearward.

From the RAP the casualty was transported to an Advanced Dressing Station (ADS) by stretcher bearers, wheeled stretcher, horsed ambulance, motor ambulance, or narrow gauge railway. At the ADS he was again examined and his dressings were changed or adjusted as required. Hot drinks or stimulants were provided, any additional medications administered noted on his casualty label, and he was made warm and comfortable while awaiting further evacuation.

From the ADS, the patient was transported to a Main Dressing Station (MDS) by field ambulance transport, motor ambulance convoy transport, truck, or train, as arranged. At the MDS he was dealt with in the same manner as in the ADS, and received an injection against tetanus. His identity label was removed and replaced by a field medical card that held his personal particulars, and a full treatment record. If his condition was such that it warranted urgent surgery, the surgery could be done at the MDS. From the MDS the patient was evacuated outside the corps area to a Casualty Clearing Stations (CCS) by vehicles of the motor ambulance convoy; trucks were used for transportation of the walking wounded, and when available, use was made of the existing railway system.

During the war an unsupported and ill informed political argument arose in Canada over a hastily compiled report criticizing the control and employment of our medical services in England. The report was put together by a newly commissioned officer in the Canadian militia medical service who had served only a few weeks overseas, but had nonetheless been appointed by the Minister of Militia in Ottawa to “. . . make an inspection of all the Canadian hospitals and medical institutions to which the Canadian Government in any way contributes and to report on his observations with any recommendations deemed advisable.”

The ensuing report primarily focussed on the then established practice of, when warranted, providing care for Canadian patients in British hospitals, and deploying Canadian hospital units to support non Canadian military operations. A subsequent investigation of the report's findings determined that they were inaccurate and that the existing arrangements were militarily fully justified.⁵²

At home there was criticism of the policy that allowed a civilian organization to handle returning casualties. In 1917, military sick and wounded in Canada were being cared for by the Military Hospitals Commission (MHC), a civilian body, whereas under the Geneva Convention, to which every civilized sovereign power had subscribed, it was an indefeasible principle that the military sick and wounded shall be cared for by military authority.

It was not until February 21, 1918, however, that this essential tenet was recognized by the government and full military control was given to the Adjutant General. By April 1, 1918, all the hospitals operated by the MHC were completely controlled by the military medical services.⁵³ After the war, to avoid the maintenance of large permanent military medical services, veterans' hospitals that had also been operated by the military were handed over to civilian control.⁵⁴

The strength of the Canadian Corps' medical services ultimately reached some 5,500 personnel, and included sixty-five hospitals with a bed capacity of some 12,000 were in operation. During the war some 21,453 personnel served in the CAMC at home and overseas, including 3,141 nursing sisters.

Despite incurring 1,325 casualties, including 504 killed in action or died of wounds and 127 who died of disease, the CAMC performed well. It coped with such complex tasks as the management of 540,000 cases requiring hospital care; the treatment of the 5,500 Canadian casualties that were inflicted during the first gas attack in April 1915; the care

of the 134,000 wounded in the Canadian Corps between September 3 and October 16, 1916 during the Battle of the Somme; and innumerable other heavy if unspectacular demands of the war.

The Victoria Cross (VC) was awarded to two CAMC officers: Captain F.A.C. Scrimger,⁵⁵ and Captain B.S. Hutcheson.⁵⁶ There were 325 lesser honours awarded to members of the CAMC.

The distinction of being the Great War's most celebrated Canadian military medical personage falls to Colonel John McCrae, CAMC, who wrote the best-known poem of the war. A Professor of Medicine at McGill University before his enlistment, McCrae had been a doctor for years and previously served in the Boer War as a gunner. During the First World War he went to France as a MO with the first Canadian contingent.

As a surgeon attached to the 1st Field Artillery Brigade, Major McCrae, had spent seventeen days treating injured men - Canadians, British, Indians, French, and Germans - in the Ypres salient. Later he wrote of it: "I wish I could embody on paper some of the varied sensations of that seventeen days . . . Seventeen days of Hades! At the end of the first day if anyone had told us we had to spend seventeen days there, we would have folded our hands and said it could not have been done."⁵⁷

One death particularly affected McCrae. A young friend and former student, Lieutenant Alexis Helmer of Ottawa, had been killed by a shell burst on Sunday morning, May 2, 1915. He was buried later that day in the little cemetery beside McCrae's dressing station, and McCrae had performed the funeral ceremony in the absence of the chaplain. The next day, sitting on the back of an ambulance parked near the dressing station beside the Canal de l'Yser, just a few hundred yards north of Ypres, he vented his anguish by composing a poem.

He wrote in pencil on a page from his despatch book the poem that has come to be internationally known as "Flanders' Field," and which described the poppies that marked the graves of soldiers killed fighting for their country. McCrae was no stranger to writing, having authored several medical texts besides dabbling in poetry. In the nearby cemetery, McCrae could see the wild poppies that sprang up in the ditches in that part of Europe, and he spent twenty minutes of his precious rest time scribbling fifteen lines of verse.

The soldier who watched him write it was Cyril Allinson, a twenty-two-year-old Sergeant Major. He was delivering mail that day and spotted McCrae. The major looked up as Allinson approached, then went on writing while the Sergeant Major stood there quietly. "His face was very tired but calm as he wrote," Allinson recalled. "He looked around from time to time, his eyes straying to Helmer's grave." When he finished five minutes later, he took his mail from Allinson and, without saying a word, handed his pad to the Sergeant Major. Allinson said he was moved by what he read.⁵⁸

In fact, what McCrae had written was very nearly not published. Dissatisfied with it, McCrae tossed his poem away, but a fellow officer - either Lieutenant-Colonel Edward Morrison, a former Ottawa newspaper editor who commanded the 1st Brigade's Artillery,⁵⁹ or Lieutenant-Colonel J.M. Elder, depending on which source is consulted - retrieved it and

sent it to newspapers in England. "The Spectator," in London, rejected it, but "Punch" published it on December 8, 1915. McCrae's "In Flanders' Fields" remains one of the most memorable war poems ever written. It is a lasting legacy of the terrible battle in the Ypres salient in the spring of 1915.

In Flanders' Fields

In Flanders' Fields the poppies blow
Between the crosses, row on row,
That mark our place; and in the sky
The larks, still bravely singing, fly
Scarce heard amid the guns below.
We are the dead. Short days ago
We lived, felt dawn, saw sunset glow,
Loved, and were loved, and now we lie
In Flanders' Fields.

Take up our quarrel with the foe:
To you from failing hands we throw
The torch; be yours to hold it high.
If ye break faith with us who die
We shall not sleep, though poppies grow
In Flanders' Fields.

On January 28, 1918, now a Lieutenant-Colonel and CO of No 3 CGH (McGill) at Boulogne, McCrae died of pneumonia. He was buried with full military honours in the Commonwealth War Graves Commission section of Wimereux Cemetery.

The Royal Canadian Naval (RCN) Medical Service during the First World War consisted of three staff surgeons, eight surgeon lieutenants, and four surgeon probationers. In addition, twenty-four temporary surgeons and 142 surgeon probationers were serving in England and aboard ships in English waters. The surgeon probationers were first or second year medical students who had taken a short course in the naval hospital before being sent to sea as MO in ships considered being too small to warrant a qualified surgeon. Surgeon J.A. Rousseau was in command, and all but two of the medical personnel were Canadians.⁶⁰

The naval hospital at Halifax had a staff of three surgeons, two nurses and ten attendants, with accommodation for fifty patients. At Sydney a surgeon lieutenant, a probationer and a sick berth petty officer was stationed for the treatment of officers and men of the patrol area based on that port. In the work of evacuating the sick and wounded to Canada, the RCN employed five hospital ships, which made a total of forty-two voyages. The names of the vessels, number of voyages made, and number of patients carried are shown in Chart No. 3. In addition five voyages were made by other transport ships carrying 2,369 convalescent patients.⁶¹

The first women enrolled in the RCN were six nursing sisters who served during August 1914 on His Majesty's Canadian Hospital Ship HMCHS Prince George, the only Canadian hospital ship ever to sail with the RCN. The nursing sisters appointed to the Prince George were: Elizabeth Pierce, Anne Dover, Gertrude Black, Penelope Mellen, Mabel Lindsey and Bessie Watson. They paid them approximately ninety dollars per month.

The CAMC suffered great losses when the British hospital ship, HMHS Llandoverly Castle, assigned to the Canadian service was sunk by a German submarine on June 27, 1918. The attack was barbaric; even the escaping lifeboats were pursued and sunk.⁶² Of the entire ship's company of 258 only twenty-four survived. Of these only six — one officer and five other ranks — were from the ninety-five persons in the CAMC compliment. Among the CAMC personnel who were lost were six officers, fourteen nursing sisters, and sixty-nine other ranks.⁶³

After submarines and mines had destroyed sixteen hospital ships, the conclusion was forced upon the British Admiralty that the Red Cross and the Geneva Convention no longer afforded protection. Thus far the Allies had painted their hospital ships white with a green band from stem to stern and a red cross amidships. By night a row of red and green lights burned around the whole circuit of the ship. In the new circumstances that had arisen all distinctive marks were removed and the hospital ships sailed as ordinary transports. Their hospital equipment remained unchanged, but they were designated as ambulance transports, armed to repel attack, supplied with a naval escort, and sailed under the Red Ensign.

Chart No. 3. RCN Hospital Ships

SHIP	VOYAGES	PATIENTS CARRIED
Araquaya	20	15324
Essequibo	9	5106
Llandoverly Castle	5	3223
Letitia	5	2635
Neuralia	3	1950
TOTALS	42	28238

By November 11, 1918, when the Armistice took effect, the population of Canada was less than ten million and 628,000 Canadians had served,⁶⁴ of which 619,636 had been enrolled in the CEF, and 424,589 officers, men, and nursing sisters had served overseas. The CEF casualty toll was 59,544 dead and 172,785 wounded; Canadians serving in British and other allied forces brought the true total much higher.⁶⁵

EVENTS BETWEEN THE WARS

The predictable budgetary measures imposed by government after the First World War limited the size of Canada's postwar army and curbed its development. The CAMC was returned to its prewar strength. The militia attempted to maintain the various types of medical units that were formed during the war, but popular interest declined, and each year there was a decrease in the numbers of CAMC personnel undergoing training.

On November 3, 1919, the CAMC was granted the title: "Royal"² and redesignated "The RCAMC" in recognition of its outstanding performance in the Great War. The militia was granted the title on April 29, 1936, and designated the RCAMC nonpermanent (RCAMC (NP)).⁶⁶

In 1921, the RCAMC strength was 105 all ranks, and deployed in detachments across the country. With negligible increases in strength, in 1922, the Corps was obliged to assume responsibility for the medical administration of the RCN, and the Royal Canadian Air Force (RCAF). It also administered a St. John Ambulance Special Centre for First Aid that had been set up at National Defence Headquarters in Ottawa.

In 1927 the RCAMC became responsible for conducting medical examinations for all military and civilian pilot candidates. By 1931, though, the strength and effectiveness of the RCAMC (NP) had dwindled to the point where a General Staff report for that year listed sixty-one of the existing eighty-one medical units as "moderate to poor" in organization and training for war. This was well below average.

During the depression, in 1932, the RCAMC provided medical supervision for the nationwide unemployment relief camps that by 1936 housed some 170,000 men. In 1933 the Corps took on the responsibility of providing hospital and specialist services for members of the Royal Canadian Mounted Police.

From 1936 on, there was a steady improvement in the readiness of the RCAMC (NP). The summer camp training strength in 1939 included some 190 officers. In 1939, its organization included: twenty-four fd amb units, twelve field hygiene sections, six CCS, and eighteen reserve general hospitals. Medical mobilization equipment, well stored since 1919, was in good condition but outdated.

In 1938, a skeleton fd amb company was assembled for a brief period of collective training in Camp Borden, Ontario; however, because its personnel were drawn from detachments across Canada, the training benefit was negligible. Moreover, the medical professional training courses that were available for MO in the United Kingdom were insufficient to enable most RCAMC officers to keep up to date with changes occurring in the larger and more effective RAMC.

²By tradition, the granting of the title "Royal" is a reward for service in the field.

The RCAMC took over the administration of the Canadian Dental Corps (CDC) in 1938. The CDC had come into being during the First World War and retained its own administration until 1938. In the Second World War it was again established as separate corps.⁶⁷ The RCAF commitment, by 1938, had grown to the extent that it became necessary to appoint PMO under the DGMS, and with equal in status to District Medical Officers, to look after medical matters related to the new Air Commands. In 1939 a Staff Officer Medical Services (Air) was added to the Medical Directorate in Ottawa.

By 1939 the RCAMC comprised 166 all ranks. The Directorate of Medical Services (DMS) in Ottawa had a strength of seven personnel. The remaining members staffed the District Medical Offices and the few existing regular units.

THE SECOND WORLD WAR

Canada's available means for waging war in 1939 were inconsequential. Like the army, navy and air force, the military medical services were almost at their 1914 level. On the eve of the war in 1938 the authorized personnel establishment of Canada's Permanent Active Militia (PAM) was 4,268, and the Non-Permanent Active Militia (NPAM) 86,308,⁶⁸ while the strength of her standing naval and air forces were about 1,800 and 3,100 respectively. By any measure the modest programme of improvements that had begun in 1936 was in no way proportionate to the size of the gathering crisis that was facing humanity.⁶⁹

Mobilization of Canada's armed forces began in late August 1939, before the nation's formal declaration of war on September 10. The Militia regiments and support units that were designated to be part of the two infantry divisions initially earmarked for overseas service began to enlist new recruits locally and process those volunteering for overseas service. In late September, the government confirmed that an expeditionary force of one infantry division would shortly be sent to Great Britain.

The health care policy for the armed forces stipulated that Canadian troops were to receive Canadian medical services to the greatest extent possible.⁷⁰ This was seen as good for morale, and allowed the development of the RCAMC in its organization, equipment, personnel and operational experience, under conditions of modern warfare.⁷¹

The medical mobilization plan prepared in 1936, and updated in 1938 and 1939, following the appointment of Colonel J.L. Potter as DGMS, was detailed and reasonably completed, except for the district medical arrangements. These were completed between June 26 and August 8, 1939.⁷² The finished plans detailed the medical arrangements for members of the overseas field force, those in the units at a planned intermediate base in the United Kingdom (UK), and the personnel remaining in Canada.

For the overseas field force, the number of hospitals and other medical units required, in addition to the regimental medical establishments and medical resources allotted to divisions, was specified. The number of staffed hospital beds was to be 10 per cent of the overseas force's strength;⁷³ and it was recommended that their distribution between the envisaged theatre of operations on the European continent, and the

intermediate base in the UK, be left to the discretion of the senior medical administrative officer overseas.⁷⁴ By the end of 1944, Canada had sent twenty-four general hospitals overseas with a total bed capacity of 19,600. In Canada, in the same year, from ten small prewar hospitals, the domestic bed capacity had expanded to 13,000.

On the outbreak of war, the DMS at National Defence Headquarters (NDHQ) in Ottawa was headed by the DGMS. It consisted of four officers and three other ranks. By March 1940 it, along with the rest of NDHQ, had been reorganized, and its strength had risen to twenty-seven officers and thirty-two other ranks. At the same time, the rapid expansion of the RCAF and the startup of the British Commonwealth Air Training (BCATP) led to the authorization, in September 1940, of a separate RCAF medical service.

Similarly, the independent but faded RCN Medical Service was reestablished in October 1941 to meet the health care needs of the men and women in Canada's rapidly growing navy. A further shake-up of the DMS took place in 1942 when it was split into two segments; an administrative branch and a professional branch. The DMS reached its peak strength in 1945 when it consisted of nine departments (Assistant Medical Directorates (AMD)) with 104 officers and 188 other ranks.⁷⁵

Between December 1939 and January 1940⁷⁶ the 1st Canadian Division, and its supporting medical units, comprising three field ambulances and one field hygiene section, were deployed to the UK.⁷⁷ The non divisional medical units required for a comprehensive overseas medical support system travelled along with it. These units included one CCS, one 600-bed general hospital, one 1,200-bed general hospital, a convalescent depot, and an advanced depot medical stores.⁷⁸ By late February 1940 the RCAMC personnel complement in Great Britain totalled 113 officers and 1,248 other ranks. It had been decided, however, that the nursing sisters who belonged to some of these units would temporarily remain in Canada.



Photograph No. 4. Blood Transfusion Unit operated during the Spanish Civil War. Dr. Norman Bethune is at the right.

The rise in strength of Canada's overseas force reflects the magnitude of the RCAMC responsibility to provide for its members' health care needs. Specifically, in May 1945, the authorized composition of the Canadian Army overseas was 217,371, all ranks, and included one army headquarters, two corps headquarters, two armoured divisions, three infantry divisions, two independent armoured brigades, corps, army, lines of communications, and base units, the 1st Canadian Parachute Battalion serving with the British Army, and the Canadian component of the joint Canada-United States 1st Special Service Force.⁷⁹ It is a noteworthy, and frequently overlooked

fact, that at the end of the Second World War, just as the Canadian Army had greatly

expanded in size and capability, Canada also possessed the third-largest navy and the fourth-largest air force in the world.

A pioneer in the use of blood transfusions in battle in the 1930s was Dr. Norman Bethune of Montreal. During the First World War he had served overseas with No. 2 Fd Amb, CAMC. While working as a stretcher-bearer in Ypres, Belgium, he was wounded and spent three months in England recovering in hospital.

On his return to Canada, he resumed his medical studies and completed his Bachelor of Medicine in December 1916. One of his classmates was Frederick Banting, who would later achieve fame as the co-discoverer of insulin. With the war still going on, Dr. Bethune joined the Royal Navy as a lieutenant-surgeon. At war's end, he took on a six-month internship at the prestigious Hospital for Sick Children in London, England.

In 1936 Bethune was an acknowledged Communist and serving as a physician in the Spanish Civil War on the side of the Soviet Union supported Spanish Republican Loyalists. His First World War experiences had taught him the importance of quickly helping the wounded, and he determined that a blood transfusion service was necessary. He then purchased and had transported to Spain, a station wagon, equipped with a kerosene-operated refrigerator, for use as a mobile transfusion unit. The vehicle was stocked with dressings for 500 wounds, and enough supplies and medicine for 100 operations. In Spain, Dr. Bethune's organized blood service collected blood from donors and delivered it to the front line, where he set up a blood bank and started a mobile blood-transfusion service, the first of its kind. By the spring of 1937, Dr. Bethune and his medical team were giving up to 100 blood transfusions a day.

At the same time, in Canada medical research was coming of age. In 1923 Frederick Banting and J.J.R. Macleod shared the Nobel prize for medicine/physiology, and by 1939 research institutes had been set up at the University of Toronto, McGill University, and elsewhere. Well before Canada was at war, some medical research was focussed on military matters. An Associate Committee on Medical Research (ACMR) had been formed at the National Research Council (NRC) in 1938. Of its four subcommittees that examined war problems, one studied shock and blood substitutes. When the ACMR offered its services to the British government, the latter responded that two areas needed the most work; one was Banting's research in high altitude aviation; the other was blood storage.

Doctor Charles Best of the University of Toronto, on the other hand, who had helped Banting in his Nobel-winning research, took a different tack. Collecting blood from student volunteers, he separated and concentrated the serum, or plasma, the part of the blood in which white and red cells are suspended, and used it to treat shock. This was the first Canadian experiment in blood derivatives, and the ACMR saw fit to give him a grant for further work in December 1939. Attempting to develop a process by which the serum could be concentrated, he and his staff found ways to dry it. The ACMR suggested it be put into production for Canada's army. In October 1940, the Committee recommended that sufficient serum be produced to deal with large numbers of civilian casualties, suggesting the production of 20,000 "shock treatments." The Red Cross was made responsible for rounding up donors.

Research was not only the domain of the university or NRC scientists. It was also carried out by officers of the RCAMC closer to the front. Captain D.E. Cannell and Lieutenant F.G. Kergin of the Army Blood Transfusion and Surgical Research Unit (ABTSRU), at Southmead Hospital in Bristol, aimed "to obtain blood from voluntary civilian donors in England and to transfer it abroad in such a manner, and at such a rate, as to provide a continuous supply of blood" for British and Commonwealth forces. Some of their work repeated that of Bethune's team in Spain, the Canadians deciding to concentrate on supplying Group O, as it could be given universally and would simplify administration. The group also experimented with a variety of alternatives, trying out such substances as citrated blood, haemoglobin Ringers' Solution, Ringers' Solution, glucose in saline, and simple plasma.

The ABTSRU focus on the treatment of shock brought on by blood loss (or haemorrhagic shock) determined that the rate of bleeding was more important than the amount lost. In their report of June 1940, Cannell and Kergin insisted that "There is no serious question of the commonly accepted fact that blood is, and probable [sic] always will be the best substance for infusion in cases of shock associated with haemorrhage - since these cases occur in war with relative frequency we may assume at the outset that there will be a field for blood transfusion."

Administering blood at the front posed no technical difficulties, but it still had not been determined whether it was wise to transfuse blood to a seriously wounded casualty at a front line RAP, or ADS, or whether it was better to evacuate the patient to more complete facilities first. In 1940 British and Commonwealth forces planned to move the blood in refrigerated trucks as far forward as CCS, the last stage in the evacuation of a wounded soldier before his arrival in a hospital. If possible, small amounts of blood could be delivered closer to the front, to MDS or even ADS.

After the fall of France in June 1940, the Canadian Army in Great Britain concentrated on defending England against an invasion. Aside from the disastrous raid on Dieppe, the Canadians suffered casualties from illness and accident, and if transfusions were necessary they were able to rely on British supplies, but they also had to prepare for operations in other theatres. Able to learn from British experience, in April 1942 the Canadians thus considered the formation of Field Transfusion Units/Teams (FTU/FTT). By coincidence, these units very closely resembled Bethune's team in Spain. It was not until January 1943, however, that a Captain Bigelow of the RCAMC became the first Canadian transfusion officer. He was sent to already-formed British units to familiarize himself with procedures and equipment. The following month authority was granted to mobilize No. 1 through 4 FTU and No. 1 through 5 Field Surgical Units/Teams (FSU/FST). Also required was a Base Transfusion Unit, which would receive whole blood from English sources and distribute it to the FTU for use closer to the front. The British would provide the military and medical supplies, but the Canadians would need to carry out their work.

When mainland Italy was invaded in early September, the Canadians were among them. In the field by this time was No. 1 RCAMC Research Unit, which stumbled upon a little-known phenomenon. Though blood typing had been discovered at the turn of the century, the Rhesus factor (yet another discovery by Karl Landsteiner) was not known until 1940, and its influence on blood transfusions not until much later. Those who lack the

factor (and who are thus Rh negative) may form antibodies if it is introduced into the blood stream, causing an immune reaction. The research unit first became interested in the possible consequences when the frequency of jaundice increased, leading to multiple transfusions and the possibility that some patients might become sensitized to the Rh factor as a result.

On June 4, 1944, the Allies' capture of Rome overshadowed the events in Northwest Europe when American, British, and Canadian divisions landed in Normandy two days later. The campaign in Italy that followed was a difficult one for 2nd Canadian Corps, which suffered some 18,000 casualties, of whom 5,000 died, almost the same number as in the entire 22-month campaign in Italy.

Such intensity was a severe test for the medical services, and the lessons of the Mediterranean, in which Canadians would fight until early 1945, were no doubt an important element in helping fd amb, FST, FTT, and others face the challenge.



Photograph No. 5. A Wounded Sergeant is Assisted by Two Fellow Soldiers, Bayeux, France, June 14, 1944

Canada's campaign in Sicily had taught that resuscitation, though usefully performed by the specialists of FTU, could also be made the responsibility of Field Dressing Stations (FDS), probably the most versatile units of the RCAMC. Number 4 FDS, for example, functioned in five different roles through the Normandy campaign. Located alongside a Fd Amb (on one occasion the 10th, on three others the 11th), No.4 FDS was responsible for admitting patients and performing triage. As the commanding officer reported, "If the FDS is to operate as a transfusion unit, this would appear to be the only satisfactory arrangement that they are set up in the same field or same building as the FD Amb and casualties sent direct from their admitting room."

That resuscitation techniques were now widely disseminated throughout the RCAMC was obvious in the commanding officer's note that "in the majority of times all resuscitation could be done by the fd amb or at least with a section of the FDS attached, so that the FDS as a unit was not needed for this type of work." In comparison, 12th Light Fd Amb reported that "No separate section of the ADS was reserved for resuscitating shocked casualties. When required, plasma was administered on the treatment table while the patient's wounds were being dressed. In this way, the average time of delay in evacuation of the patient caused by giving plasma was only about fifteen minutes, so that the fd amb as a whole incorporated resuscitation as part of its casualty clearing procedures. Usually two pints were transfused while the patient was on the table, another pint given on his journey to hospital."

All ambulance orderlies were capable of changing plasma bottles en route and discontinuing the transfusion if necessary. Preventive measures were thus taken at every stage possible in the evacuation of a wounded soldier, and according to No. 4 FDS commanding officer, "In the treatment of shock, it was found that all the apparent 'small' principles of treatment are of inestimable value and must not be overlooked at any time." After having gone through a RAP or come directly to the FDS, a patient was stripped of wet clothing, including boots, provided with hot water bottles and blankets for warmth, and even given a pillow if necessary. Orderlies provided not only cigarettes but reassurance as well, while giving the patient hot sweet tea unless he suffered from an abdominal wound; he might also get hot stew if such was available. While continually on the alert for fresh haemorrhage, all fractures were splinted, sucking chest wounds closed, burns treated with sulfanilamide cream, and morphia given for pain. "Blood plasma transfusion was given if indicated by Blood Pressure, which was taken on all severe wounds, or general condition of patient or as routine in wounds with extensive tissue damage." No. 5 FST reported in similar fashion, insisting that "Cases with abdominal eviscerations, rectal injuries, and gross intra peritoneal damage, should be resuscitated rapidly, i.e., with two to four bottles of blood and plasma, and operated on. Delay, especially where the gut is strangulated in the wound, is only asking for a fatal result."

By early 1945 practitioners had still not agreed whether whole blood or plasma was best. All agreed, though, that both should be plentiful, to the point where, at least where whole blood was concerned, wastage should be in excess of that used." If necessary, medical personnel could also act as donors, and fd amb, which stocked plasma exclusively, could also rely on their own people to donate whole blood if need be.⁸⁰

To meet its great responsibility, both overseas and in Canada, the strength of the RCAMC had grown by war's end to 34,786 all ranks, in 110 different types of units and establishments. Overseas, beyond the regimental medical establishments and divisional fd amb units, the RCAMC operated five CCS, twenty-eight General Hospitals, three Convalescent Hospitals, and one General Hospital specializing in neurology and plastic surgery. During the campaign in North-West Europe alone it provided hospital level patient care for some 150,000 cases.

For the first time in its history Canada's military medical services were simultaneously delivering comprehensive health care services for the nation's sea and air forces, an entire field army in the field, numerous base and lines of communications units, and in widely separated geographical and climatic locations ranging from, Canada to Spitsbergen, Hong Kong, Sicily, Italy, and North-West Europe. Overall, the RCAMC alone handled about 84,000 casualties, with a recovery rate of 93 percent for those who were wounded, and 99.91 percent for those falling victim to disease. There are few reports that reflect the outcome of the care provided to Canadian prisoners of war (POW) by the RCAMC members who went into captivity with them, but the available evidence reveals that it was an important factor and contributed to their survival.⁸¹

On October 27, 1941, four Canadian MO, two nursing sisters, two dental officers, and RCAMC other ranks were despatched to Hong Kong to help provide medical support for the two Canadian infantry battalions and regimental medical establishments (1,975

troops) that were deployed to bolster the British garrison in its defence against the forces of Imperial Japan. On Christmas Day 1941 Hong Kong fell to the Japanese. During the battle 287 Canadians were killed. Over the next three and a half years in brutal captivity four Canadians were executed for attempting to escape, and 266 more succumbed to hunger, disease and abuse.

Left behind in the prison camps of Hong Kong, the remaining RCAMC personnel worked selflessly with scant equipment and supplies under the direction of Major John Crawford to provide for the health care needs of their fellow prisoners. When most of the Canadian POW were assembled at North Point Camp, Major Crawford, the Senior Canadian MO, and the other three doctors found themselves responsible for the health of more than 1,200 Canadian prisoners. One MO, Captain John A.G. Reid, was later transferred to Japan along with 500 other Canadians where they were used as forced labour. It is thanks to Reid's success in wringing concessions from his captors and using limited medical resources, that only 25 of these prisoners died during captivity in Japan — many fewer than in the other national contingents of prisoners.

A historian later wrote that the skill and resourcefulness that the Canadian military doctors brought to the care of prisoners in such appalling conditions “must surely be without parallel in the story of the RCAMC in the Second World War.” Resourceful and dedicated though they were, they could not stem the rising tide of death over the forty-four months of their captivity, and sometimes they came near to despair. Nevertheless, the fact that 1,400 Canadians ultimately returned home is largely due to the care they received from these military doctors.⁸²

The ill-fated attack upon Dieppe in France took place on August 19, 1942. The troops involved totalled 6,100 of whom roughly 5,000 were Canadians, the remainder being British Commandos and 50 American Rangers.



Photograph No. 6. RCAMC soldiers during rehearsal in England for the raid on Dieppe.

No.11 Canadian FD Amb (11 CFA) was selected and trained with the main Dieppe forces, the plan being to supplement the regimental stretcher-bearers with sections of 11 CFA. Each section of the field ambulance was composed of an officer and eleven men. Special packs, containing shell dressings, morphine, sulpha drugs and plasma were equally divided amongst the troops.⁸³

By early afternoon, Operation Jubilee was over. The men who perished at Dieppe were later seen to be instrumental in saving countless lives on D-Day, June 6, 1944. While there can be no doubt that valuable lessons were learned, Canada paid an appalling price in those morning hours of August 19, 1942. Of the 4,963 Canadians who embarked, only 2,210 returned to England, and many of these were wounded.

Most of the men of 11 CFA never got ashore. Of the eighteen men in one of the sections that did manage to land, only six made it back to England - and three of those were wounded. The remainder was killed or captured.⁸⁴ In total, there were 3,367 casualties at Dieppe, including 1,946 POW who suffered through thirty-three months of captivity; 907 Canadians were killed in action, four of them were members of the RCAMC. Among the approximately 600 casualties admitted to Canadian hospitals in England the mortality rate was only 2.5 per cent.⁸⁵

Many Canadians who went into captivity owe their survival to the care received from the members of the RCAMC, and RAMC, who were imprisoned with them. It is worthwhile to compare the experiences of those Canadians captured in Hong Kong, eight months before their countrymen went into the bag at Dieppe. Of the 1,699 men captured by the Japanese, 1,418 came home and 281 died in captivity, a mortality rate of nearly 17 per cent. In contrast, of the 1,946 Canadians captured at Dieppe, seventy-two died in captivity, a mortality rate of only 4 per cent; 1,874 came home. Very much credit for this survival rate must go to the MO and medical orderlies, including the four RCAMC MO, 11 medical orderlies, and forty-eight Canadian stretcher-bearers who were taken prisoner on the beaches and its surroundings.⁸⁶

The regenerated RCN Medical Branch grew slowly and the first naval hospitals opened in 1941 at HMCS Naden in Esquimalt, British Columbia, and HMCS Stadacona in Halifax, Nova Scotia. As the war progressed, seven more RCN hospitals were opened. From 1942 onwards, the RCN, which had previously relied on the Royal Navy, began training its own medical personnel. During the war the RCN Medical Branch lost nine MO, one nursing sister, and sixteen ratings, who were either killed in action or died as a result of enemy action.

To serve the operational needs of the RCAF, its Medical Branch developed a network of small airfield hospitals across Canada to support its flying stations, and the flying schools of the BCATP. By the close of 1944, there were 100 station hospitals operating in Canada and Newfoundland. The RCAF Medical Branch did not open hospitals in the United Kingdom, but its medical personnel served in Royal Air Force (RAF) hospitals supporting Canadian air force units, particularly the RAF hospital at Northallerton, Yorkshire, when No 6 (RCAF) Group was set up in 1943.

In the United Kingdom, the RCAF formed approximately 50 per cent of one of the two Air Groups in the 2nd Tactical Air Force (2nd TAF) which provided close support of the armies invading North West Europe. The principal RCAF Medical Branch contribution to 2nd TAF was the 100-bed, No. 52 Mobile Field Hospital, comprising seven officers, of whom four were MO, two were nursing sisters, and one was an administrative officer, and 70 other ranks. A portable x-ray machine and equipment for emergency surgery was provided.

The hospital's role was to receive sick and wounded, army as well as air force, from collecting zones and retain them until they were either fit to return to duty or to be evacuated to base hospitals. In March 1944 an advanced surgical team was organized as one echelon of the unit. It consisted of a surgeon, an anaesthetist, and nine other ranks, and was completely self sufficient, mobile and capable of doing any emergency surgery. The hospital moved from England to the Continent, and opened in France at Bernières-sur-

Mer on June 8, 1944. It became non-operational on August 8, 1945 at Luneberg, Germany and moved to Dunsfold, England, where it was disbanded.⁸⁷

Throughout the war, the RCAF also conducted an aviation medicine research program using BCATP aircrew candidates as experimental subjects. This program focussed on equipment, such as the 'Franks Flying Suit,'⁸⁸ the precursor to today's G-suit, and extreme cold weather clothing for bomber crews. Of particular interest was the development by RCAF medical staff serving in East Grinstead, Sussex, of advanced plastic surgery techniques, supported by innovative psychotherapy methods, to treat severely maimed burn patients, many of whom were aircrews who had survived after being shot down in flames.

Meanwhile, the military medical services hospital construction programme in Canada was also progressing. Small camp hospitals operated by RCAMC, Navy and RCAF medical services were built as required at training and other centres all across the country. In urban locations larger hospitals were built. In his annual report for 1942 the DGMS observed that the total bed capacity of all military hospitals was 7,030 beds in ninety-four hospitals, ranging in size from fifteen to 500 beds. By February 28, 1945, the total beds available in hospitals operated by the three medical services and the Department of Veterans Affairs (DVA) totalled 20,909, of which the army had 8,877, DVA 8,142, RCAF 2,645, and RCN 1,245.⁸⁹

Closely linked with the hospital development in Canada was the formation of Conditioning Centres for convalescents and personnel in need of physical retraining, and two Women's Services Health Centres for the care of women from all three services, and those under the jurisdiction of the DVA Treatment Branch. Special Treatment Centres (STC) were also set up in existing hospitals to care for specific types of injury and disease. By the end of the war, STC had been established for plastic surgery, neurosurgery, orthopaedic surgery, and urological, tubercular and arthritic conditions.⁹⁰

Many Canadians serving overseas during the war received their medical branch training at British centres. In Canada, training for RCAMC personnel was split into two phases: individual and unit training, and unit and formation collective training. On January 13, 1940, a Medical Corps Training Centre for officers and other ranks — Army Training Centre A-22 — was opened in Ottawa. This school conducted both basic and advanced training courses. In February 1941, A-22 was renamed the Canadian Army Medical Corps Training Centre and relocated to Camp Borden, Ontario where it provided basic, and special to corps, training classes, as well as courses for many of the Corps' other trades. With several name changes, this Centre was retained in the post war era and today its successor is the central training school for all CFHS personnel.⁹¹

Early in the war, casualties returning to Canada went in westbound troopships with occasional assistance from British hospital ships. As the war progressed, however, it became necessary to take over suitable Canadian ships and refit them for this purpose. The first of these was the *Lady Nelson* in early 1943. The second ship was the *Letitia*, put into service in 1944. It is estimated that during their time in service the two ships together evacuated approximately 28,000 casualties and 2,700 POW.⁹²

The war's military medical innovations included the forward employment of Divisional FDS with attached FST and FTT as advanced surgical centres (ASC), the evacuation of casualties by air when possible, the adoption of emerging surgical techniques in the fields of general surgery, orthopaedic surgery, plastic surgery, neurosurgery, maxillo-facial surgery and vascular surgery, and the use of antibiotics, improved methods of anaesthesia, blood and plasma transfusion services, reparative surgery, and the improved treatment of burns.

The introduction of early ambulation following surgery combined with better rehabilitative measures was also a major advance, as was the application of improved immunization practices and preventive medicine techniques, the practice of psychiatry well forward in the combat zone, and acknowledgment of the preventive and therapeutic aspects of good nutrition.⁹⁴

By the end of the Second World War, 34,786 men and women, including 3,656 nursing sisters, had served in the RCAMC; 430 became battle casualties and 107 were killed because of enemy action.

EARLY POST WAR YEARS

In the years immediately following the end of the Second World War the RCN, Canadian Army, and RCAF were cut back to peacetime levels and reorganized. The Army was formed into a small compact force with the capability of rapid expansion should the occasion demand. Included in the Regular Army was a Mobile Striking Force (MSF) that was designed to be the nation's first line of defence should an attack be mounted across its far northern areas.

The three armed services retained their distinct military medical services and continued to provide for their members' health care needs. However, to avoid duplication of effort, several tri service committees were formed to coordinate their activities. Other committees coordinated military and civilian medical activities. This activity marked the beginning of the merger of Canada's military medical services, and wherever it was seen to be practical, their activities were consolidated.⁹⁵

To increase the efficiency of the postwar RCAMC and maintain its capability for active service, the RCAMC School, one regular field amb unit, and No. 1 Airborne Medical Section (1 ABMS), were authorized. The School conducted basic and special to corps training courses for all new entries, as well as trades, NCO and officer training courses. The role of 1 ABMS was to provide support and medical coverage to the three MSF battalions. For this purpose the Section was divided into three smaller subsections, each affiliated to a particular battalion. The Section was first established on January 9, 1952 and located at Camp Borden. On July 4, 1955, it was redesignated No. 1 Airborne Medical Platoon. The Platoon was disbanded May 31, 1958 and quickly replaced by another incarnation of 1 ABMS on June 1, 1958. On September 6, 1958, 1 ABMS was relocated to Camp Sarcee, Calgary, Alberta. The Section was disbanded on 18 September 1969.⁹⁶

Training, and the development of field medical equipment steadily progressed. Annual study groups for senior RCAMC Regular and Militia officers were conducted by the DGMS. Close liaison was maintained with the civilian profession. The scope and employment, and the numbers, of non medical officers in the regular RCAMC was increased. Commissioned pharmacists and quartermasters had been part of the CAMC during the First World War, and quartermasters were retained in militia medical units after the war, but before 1939 only three non medical officers were on strength of the Regular RCAMC.

During the Second World War, however, besides the quartermasters who were mobilized with their militia units, new non medical officer appointments were made. These included instructors, adjutants, staff officers at medical headquarters, technical officers such as pharmacists and bacteriologists, and stretcher bearer officers. Non medical officers likewise commanded some RCAMC units. Most of these positions were retained in the postwar army. Others, such as the major administrative officers at each command headquarters, were added. As a result, the Regular non medical officer establishment was about one-third of the male officer slate of the RCAMC.⁹⁷

The field organization and tactical doctrine adopted by the RCAMC during the Second World War were revised in 1947 to conform more closely with that of the RAMC. Changes included the adoption of one type of fd amb, comprising a headquarters, one company, and four sections, each capable of forming a CCP; the allotment of one FDS, reduced in size and function, to each infantry division; and the reintroduction of RCAMC other ranks in battalion medical establishments.

The early post war reorganization of the RCAMC was short lived, however, and the Corps was again required to further adapt and adjust its organization in the face of new commitments induced by the Korean War and Canada's overseas contribution to the nascent North Atlantic Treaty Organization (NATO). For the first time in its history the size and capabilities of the Canadian Army (Regular), including the RCAMC were expanded to enable the fielding of complete infantry division with all of the necessary supporting medical services. Importantly, the policy of providing Canadian military medical services for Canadians in uniform wherever practicable was maintained.

THE KOREAN WAR

During the summer of 1950 the United Nations (UN) response to communist North Korea's aggression against South Korea was a decision by the Security Council calling upon the member nations to provide armed forces for the support of the victim Republic of South Korea. The war turned out to be Canada's third most costly overseas conflict. In it Canadian soldiers served as part of a Commonwealth army formation and under a higher command which in the last analysis was not Canadian, not British and not American: it was a United Nations command.

At the outset of the war the on scene U.S. forces were immediately thrown into battle, while other member nations made preparations to help repel the attackers. Canada's military contribution to the UN initiative to forestall a Communist takeover of

South Korea was an army brigade group, an RCN task force of three destroyers, and an RCAF strategic airlift squadron.⁹⁸

With an army of only 25,000 in 1950, and no plans to field a brigade size expeditionary force, the government found it necessary to authorize the formation of a Canadian Army Special Force, and to hastily recruit, organize, and train a new formation — the 25th Canadian Infantry Brigade Group (25 CIBG). During the late summer, and on into the autumn and winter of 1950-51, 25 CIBG and its supporting units, including those from the RCAMC, prepared for deployment to the Far East.

In the spring of 1951, preceding the despatch of 25 CIBG, an RCAMC reconnaissance party travelled to the far East to assess the situation on the ground and formulate the medical support plan. It learned that 25 CIBG was to be one of the three brigades that would comprise a new Commonwealth Division with all of the necessary supporting arms and services, including a divisional FDS.⁹⁹ It also found that the U.S. Army Medical Department (AMEDD) was already operating Mobile Army Surgical Hospitals (MASH) in the immediate battle area, providing immediate surgical care for all types of casualties, and using its helicopters to transport patients directly to them from the front lines. The AMEDD had also arranged for its own field hospitals to be located near the front, and along the lines of communication to the port of Pusan. In addition, located in Kure, Japan some 800 kilometres by air from the front lines, was a combined British and Australian general hospital. Lastly, the Royal Australian Air Force was willing to transport Canadian casualties from air fields close to the front to the hospital in Kure.

The prevailing Canadian field medical tactical doctrine was for 25 CIBG to provide initial care for its wounded and sick where they occurred, transfer them to a RAP in the forward battle area, and clear them from the RAP, using the brigade's supporting fd amb transport, to hospitals located further back. This was accomplished, as required, in stages, from the RAP, to the CCP, to the ADS that were set up by the brigade's fd amb unit. From there, the patients would be moved to a Canadian general hospital. The ready availability of U.S. Army MASH, and a general hospital in Kure, Japan, however, obviated any requirement to deploy a Canadian hospital.

The policy applied in the two world wars that the Canadian Army would provide medical attention for its sick and wounded at all levels was maintained in Korea. This policy stemmed from Canadians' belief and tradition that their soldiers expected, and were entitled, to be treated by Canadian doctors and nurses wherever feasible. The policy was not considered a reflection of the professional ability of any foreign doctors or nurses, but rather the compassionate and normal expectation of our wounded for continued contact with their fellow citizens. The medical plan for the Far East theatre reflected this policy.

The first units of Canada's medical services that were deployed to the Far East comprised: 25 CIBG regimental medical establishments, 25 Fd Amb, and No. 25 FDS - to be employed as the Commonwealth Division's emergency surgery and short-stay hospital. No. 25 FDS included a Canadian FST and FTT. In addition, a Canadian Base Medical Section consisting of three MO, nursing sisters, and twenty-one RCAMC other ranks, was attached to the Commonwealth General Hospital (CGH) at Kure, Japan, to administer, and provide care for Canadian patients who were admitted there. Lastly, No. 20 Canadian Field



Photograph No. 7. Corporal (later Major) Werner Wilhelm Shuler, RCAMC, Going out as "Ballast" Aboard a US Army Medevac Helicopter, Kapyong, Korea, April 22-25, 1952

Dental Detachment was also deployed and in January 1952 it was redesignated No. 25 Canadian Field Dental Unit.

After the active opening mobile phase of the war, combat operations stabilized. At this time, 25 Fd Amb opened a field sick bay in its ADS located within the brigade area to address the brigade's lack of facilities for hospitalizing the minor sick, the difficulty of tracing evacuated personnel, and the very considerable and unnecessary loss of man-hours. Without this sick bay, a patient requiring four to six days hospitalization could be away from his unit from two to three weeks, and in some cases one month, if he was evacuated to medical installations further to the rear. The chain of casualty evacuation from the front line to Canada is shown in Chart 5.

More often than not, the front line consisted of a thin line of company positions with quite considerable gaps between platoon positions, or between units. It was conceivable that small enemy parties could infiltrate through these gaps. Although these areas were patrolled nightly, some enemy parties succeeded in ambushing vehicles. To afford protection to ambulance vehicles, infantry battalions provided a half-track, armed with a .30-calibre machine gun, to escort ambulances on night journeys from the CCP to the ADS. Similar protection was supplied, as circumstances warranted, to jeep ambulances travelling from the RAP to the CCP.

All evacuation of casualties from platoon positions was by hand-carry. At times, when companies were occupying or operating along the crest of the hills, hand-carries extended to 4.5 kilometres. Carries were always very difficult because of the topography (steep grades or along footpaths through rice paddies). The two-litter jeep ambulance was found to be a most valuable vehicle and was used for the bulk of evacuations to the CCP. One or two jeep ambulances were attached to the RAP of infantry battalions when the units were in the line. Heavy ambulances (3/4 ton) were used at all times for evacuation from the CCP to the ADS. All RAP were also equipped with a half-track ambulance vehicle. This vehicle was not used extensively, however, as it could not traverse rice paddies nor was it efficient in very hilly terrain. Its most useful function was to evacuate along a road that is under small arms fire. RAP were also supplied with a Bren-Gun carrier converted to carry two litters. The carrier could operate fairly well over rice paddies and its performance in the hills was far superior to that of the halftrack.

The Geneva Convention was not recognized by either the North Korean or the Chinese Communist forces. Furthermore, the enemy was a master of infiltration tactics. Because of these factors, 25 Fd Amb was obliged to organize its own local defence. The defence aspect - although not a governing factor - therefore had to be considered when siting its medical installations. Defence plans had to be prepared in all positions. At times, barbed wire entanglements or double-apron fences were erected around the defensive

perimeter. Bren light machine guns and additional small arms were issued and all ranks were trained in their use. Weapon pits were dug and rehearsals were held so that everyone knew his position in case of attack. CCP were dug into the rear slopes of the hills and large bunkers were built. All tents were sandbagged to a height of some 1.5 metres. Accommodation in well protected bunkers was available to hold up to ten stretcher cases.

At times, large-scale day patrols of up to battalion strength were mounted. In practically all cases, it was out of the question to take along vehicles. Evacuation of casualties had to be by hand-carry. To support these actions it became customary to supply one stretcher-bearer officer or a sergeant and 12-16 stretcher-bearers from 25 Fd Amb. These medical elements accompanied the combat troops and took charge of evacuating the casualties from the actual site of wounding to the nearest medical station, usually an advanced RAP. These stretcher-bearer parties rendered valuable aid and considerably speeded up the evacuation of the wounded.

Chart No. 5. Korean War - Chain of Casualty Evacuation

STAGE	LOCATION	FACILITY	TRANSPORT	CARE
1	Fighting position	Company Aid Post(CAP)	Walk, hand carry, litter	Self, comrade, or trained medical assistant
2	Battalion/ Regiment/ Unit HQ	Regimental Aid Post (RAP)	Walk, hand carry, litter	First treatment by medical officer Return to duty Evacuation
3	Brigade/ Division	US Army MASH or 25 Cdn FDS	US Army helicopter 25 Cdn Fd Amb vehicle	Initial surgery Medical Care Return to duty Evacuation
4	Theatre Base	British Commonwealth General Hospital Kure, Japan	RAAF DC 3 or other available aircraft	Definitive care Rehabilitation Return to duty Evacuation
5	Canada	Military or DVA hospitals in Canada	US Air Force and RCAF aircraft	Continuing care Rehabilitation Return to duty Medical discharge

The Korean experience of 25 Fd Amb provided the following important training lessons: Both RCAMC and logistics transport drivers must have a basic knowledge of infantry light weapons, and be able to use those weapons. Basic field engineering skills are an essential requirement in RCAMC training. As many RCAMC personnel as possible should be trained as drivers so they may relieve ambulance drivers and vice versa. The prevention of cold weather disabilities on injuries should be included in the basic training of all personnel. Water discipline must be stressed at all levels.¹⁰⁰

The role of No. 25 FDS was to act as a small, short-stay, field hospital for sick and injured personnel from the Commonwealth Division. Such cases were anticipated to be fit for full duty with their units in 14 days, thus eliminating the requirement of evacuation to Japan for treatment. It was situated on the main supply route 30 kilometres north of the capital city of Seoul and 25 kilometres south of the front lines, near the village of Tokchong.

No. 25 FDS also provided initial surgical treatment for battle casualties and had a helicopter landing pad enabling casualties to be flown in directly from the battlefield. The hospital was accommodated in tents, and in Quonset huts on a cement base. It initially contained 112 beds, 30 for major surgery, 42 beds for minor surgery, and a 40-bed medical ward. A small ward was maintained for officer patients and another for burn victims.

Nursing conditions were rudimentary - no running water, gasoline-fired Yukon stoves for warmth and immersion heaters for water heating. Patients' beds were low folding cots, which entailed a great deal of stoop nursing involving uncomfortable bending or kneeling to tend to the patients. Radiology, ophthalmology, psychiatry, physiotherapy and pharmacy departments were established. The hospital treated all battle wounds except large abdominal, chest and head wounds, which were sent to a U.S. Army MASH situated on the rear boundary of the Commonwealth Division or to the CGH in Kure, Japan.¹⁰¹

In the Commonwealth Division, beginning in May 1952, the ADMS was a Canadian appointee; the Deputy ADMS was British. The division's three fd amb generally worked with the brigades to which they were formerly attached. No. 25 FDS Station ultimately grew into a 200-bed hospital and treated many Commonwealth "minor sick and wounded" who otherwise would have had to be evacuated to Japan. Surgery could also be carried out by mobile surgical units of the U.S. and Norwegian Armies. No. 38 Motor Ambulance Company, Royal Canadian Army Service Corps (RCASC), provided transport between the facilities operated by the division's three fd amb units, and the rearward medical installations.

No. 25 Canadian Field Dental Unit was not of course the only dental element in the Division, but it was the largest. Its detachments were located at major Canadian units in the field and at the Reinforcement Group in Japan. These detachments provided comprehensive dental treatment for all Canadian personnel and also took care of emergency cases of other nationalities.

In July of 1953, when the armistice was signed between North and South Korea, and a demilitarized zone established, prisoners of war were exchanged, No. 25 FDS received more than a thousand Commonwealth prisoners in a period of two weeks, including 26 Canadians. As the soldiers arrived they were directed to a specially prepared tented area where they shed their clothes, took a shower, received new uniforms, and had a quick medical exam and inoculations. Most were seen to be in generally good health, apart from showing signs of vitamin deficiency and some undernourishment.

With all Canadian casualties being collected at Seoul, Korea for airlift to the CGH at Kure, Canada's medical support system adequately provided for the presence of Canadian medical personnel at all levels of care, from the point of wounding until they reached the base hospital in Japan. From this base hospital, patients unable to be returned

to duty in Korea and requiring further care, and those declared unfit for further service, were returned to Canada by available RCAF and U.S. Air Force (USAF) long range aircraft.

Canadian North Star transports flown by No. 426 Squadron flew round-trip flights between Mc Chord Air Force Base (AFB) in Tacoma, Washington, and Haneda airfield in Tokyo, Japan. While working with the USAF, RCAF flight nurses attended classes and practical training courses at Gunter AFB, Alabama, for seven weeks. This was followed by a three-month tour of duty carrying out medical air evacuations from in theatre in the South Pacific. All nursing graduates (USAF, USN and RCAF) flew with the U.S. 1453 Medical Air Evacuation Squadron and were stationed in Honolulu. They flew American and Canadian wounded between Haneda Airfield, through Honolulu, to Travis AFB, California. The RCAF flight nurses' program was in effect from November 1950 to March 1955, and employed some 40 nurses.

No. 426 Transport Squadron, which had been attached from the RCAF to the U.S. Military Air Transport Service in July 1950, operated between the State of Washington and Japan for eleven months. It then returned to its home base, at Dorval, Quebec, from which it continued in the same role. (The move was occasioned in part by a decrease in the requirements of the Pacific airlift.) By June 9, 1954, when this assignment ended, the RCAF transport aircraft had flown 600 round trips over the Pacific, carrying more than 13,000 passengers and 7,000,000 pounds of freight and mail without loss.

The RCAF No. 435 Squadron, stationed at RCAF Station Edmonton (and later Namao), was tasked with the delivery of the Canadian wounded from Mc Chord. The Squadron was equipped with DC-3 Dakotas specially equipped to carry 16 litter patients complete with oxygen. Occasionally, Ottawa's No. 412 Squadron (also equipped with the Dakotas) and No. 426 Squadron would participate in the evacuations from Mc Chord. Canadian Flight nurses who served in the U.S. or South Pacific were stationed at various Canadian airfields and always accompanied RCAF medical evacuation flights in Canada.¹⁰²

Throughout the balance of 1951 and 1952 Canadian medical units provided a very high level of medical and surgical attention for our soldiers fighting in Korea. Beyond the thousands of Canadian casualties who passed through our medical units there were additional thousands of Commonwealth and US Army casualties who received care and attention at the hands of RCAMC personnel. In addition to the Canadian medical effort there was an accompanying endeavour by British, Australian, Indian, and American medical units. All the medical units of the United Nations cooperated with one another and worked together to deliver the best possible medical and surgical care for all troops no matter from which nation they might have come.

Early in 1953 Canada made a further contribution to the Commonwealth Division's medical services in Korea. Because No. 25 FDS was doing appreciable surgical work within 15 miles of the front lines there was an earlier recovery of some of the wounded and an earlier return to their units. This would not have been the case had all of the wounded been given only sustaining care and then quickly evacuated some 800 kilometres to the Commonwealth General Hospital in Kure, Japan. Consequently, to further improve the standard of post operative care for its surgical patients, a detachment of RCAMC Nursing Sisters was assigned to the No. 25 FDS.

Besides providing for the care of sick and wounded soldiers of the Commonwealth and United Nations' forces, the RCAMC also provided, whenever possible, medical care to the local Korean population. In the relatively short interval between the Second World War and the Korean conflict the lessons learned in the fields of war medicine and surgery had not been forgotten. It was noted, however, that many newly enrolled medical personnel were without actual medical experience in a theatre of operation. Nevertheless, with guidance, they quickly adapted, applied accepted principles, and helped to develop new practices and procedures.

One of the major advancements of military medicine since the days of the North West Rebellion is the increased ability to save the lives of men wounded in battle and to prevent the needless waste of death from disease in the field. Chart No. 6. reflects this reduction.

Chart No. 6. Mortality Rates in Selected Conflicts¹⁰³

CONFLICT	DEATHS PER THOUSAND AMONG WOUNDED	DEATHS FROM DISEASE PER THOUSAND MEN PER YEAR
South Africa (British)	93	22
First World War (Canadian)	114 (1)	6
Second World War (Canadian)	66	0.9
Korea (Canadian)	34	0.7

The health care problems encountered in Korea were those of modern war fought with conventional weapons in a large mountainous country almost without roads, and with a climate that varied with the seasons from heavy rain to the heat and dust of summer and the extreme cold of winter, and the prevalence of endemic diseases such as the then little known haemorrhagic fever, and malaria, venereal disease, and jaundice.

During active hostilities in Korea the RCAMC chose the formation psychiatrist for the Commonwealth Division. He was stationed at No. 25 FDS and psychiatric treatment was provided as close to the front as possible to reduce the factor of gain through illness. Beyond the FDS, psychiatric cases requiring further hospitalization and care, were treated at the CGH.

The improvement in mortality rates in Korea over previous conflicts was due to a variety of factors: prompt forward helicopter evacuation, early surgery, use of body armour (flak) vests, the availability and use of abundant supplies of antibiotics, improvements in resuscitation techniques, and in the treatment of an impending or established renal shutdown. Resuscitation measures were particularly noteworthy for the large amounts of whole blood that was frequently employed, and for the introduction of plasma volume expanders.

The Korean conflict was essentially a small scale war for which abundant health care services and supplies could be provided. It served as a training and testing ground and, as with all wars, medical knowledge was advanced. Canada's involvement in the Korean War ended in July 1953. It involved 26,791 Canadian soldiers, sailors and airmen, of whom 516 were killed and 1,042 wounded or taken prisoner. One of the seven Distinguished Conduct Medals (D.C.M.) awarded was earned by RCAMC Corporal Ernest W. Poole for his actions while attached as the Company Medical Assistant to B Company, 2nd Battalion, The Royal Canadian Regiment, on April 18, 1952. The official citation for his award is reproduced at Appendix A.

Notably, the D.C.M. awarded to Corporal Poole for his bravery was the highest decoration next to the V.C. that could then be awarded to a Canadian or other Commonwealth nation soldier. His battalion commander, Lieutenant Colonel R.A. Keane recommended Corporal Poole for the V.C. The Canadian Brigade Commander, Brigadier John M. Rockingham, concurred, but the Commonwealth Divisional Commander, (UK) Major-General Cassels subsequently downgraded the award, and the overall Force Commander, (AUS) Lieutenant-General Bridgeford, confirmed his decision. It is the author's strong belief that Corporal Poole earned, and merited, the V.C.

THE COLD WAR AND BEYOND

"The other secret of success is rapid evacuation. All through the chain of medical units from the Front to the Base, the wounded man is kept the very minimum of time to attend to his wounds, and then he is moved on, and kept moving until he reaches either the Base or Home. Some, of course, are too ill to be moved, and these may have to be retained."

— T.B. Nichols

After the end of the Second World War Canada's armed services had an authorized active-service strength of 51,000: 26,000 in the army, 10,000 in the RCN, and 16,000 in the RCAF. The primary army component was the MSF. In 1949, in response to the threat of Soviet expansion in post war Europe, the North Atlantic Alliance came into being and the North Atlantic Treaty Organization (NATO) was formed by Belgium, Canada, Denmark, France, Iceland, Italy, Luxembourg, the Netherlands, Norway, Portugal, the United Kingdom and the United States, as a mutual-defence alliance to counter the increasingly hostile Soviet bloc.

Canada's commitment to the Alliance was one infantry division, one air division, and forty warships. In May 1951 it was decided to base three of the division's four brigades in Canada. The fourth brigade — 27 Canadian Infantry Brigade (27 CIB) — was to be permanently stationed in West Germany's Ruhr Valley as part of the British Army of the Rhine (BAOR).



Photograph No.8. 1 Cdn Fd Amb RCAMC Personnel Practice Application of a Thomas Splint, Germany, 1963.

However, until completion in 1953 of the construction of the necessary permanent garrisons, accommodations, schools, and the like, for the troops and their accompanying families, 27 CIB was temporarily located in Hanover. No. 1 Canadian Air Division (1 CAD) was stationed in France and Germany. It consisted of twelve fighter squadrons in four wings: No. 1 and No. 2 Wing in France; and No. 3 and No. 4 Wing in West Germany. By 1953 the combined overseas strength of 27 CIB¹⁰⁴ and 1 CAD was about 10,000 all ranks.

For the navy commitment, medical assistants manned the Canadian warships' sick bays, and MO were employed at sea in naval squadrons and aboard Canada's aircraft carrier. The medical support system for the sizeable Canadian Army and Air Forces assigned to NATO, and their accompanying dependants, was however, larger and more complex.

In Germany, for the direct support of 27 CIB, the RCAMC staffed the regimental medical establishments and deployed one fd amb unit. These resources exercised with, and provided minor non surgical care and outpatient services for the troops, both when in the field and when in garrison. They also provided staffs for the dependants' outpatients' clinics that were established in permanent married quarter areas located in the towns of Soest Werl, and Hemer.

Overall medical administrative control of 27 CIB medical services was exercised by a Senior MO who was headquartered at the Canadian Base Medical Unit (1 CBMU) located at Iserlohn. Definitive care, outpatient consultant services, and obstetrical care for members of 27 CIB and their families was available in the RAMC run British Military

Hospital at Iserlohn, and where there was co located to meet Canadians' needs, a Canadian ward staffed by RCAMC nursing personnel.

Chart No. 7. The Cold War - Chain of Evacuation

STAGE	LOCATION	FACILITY	TRANSPORT	CARE
1	Fighting position	Company Aid Post (CAP)	Litter, walk	Self, buddy, or medical assistant
2	Battalion/ Regiment/Unit HQ	Unit Aid Station (UAS)	Litter, walk	First treatment by MO Return to duty Evacuation
3	Brigade Area	Brigade Ambulance Station	Fd Amb road transport	Sustaining care Evacuation
		Brigade Clearing Station	Fd Amb road transport Helicopter	Sustaining care Medical care Return to duty Evacuation
4	(UK) Division Area	(UK) FDS	(UK) Motor Ambulance Company transport	Medical care Return to duty Evacuation
5	1 (UK) Corps Area	(UK) Advanced Surgical Centre (UK) Casualty Clearing Station	Helicopter Motor Ambulance Company Transport	First Surgery Short term medical care Return to duty Evacuation
6	Continental Europe Theatre Base	(UK) General Hospital	Motor Ambulance Company Transport Aircraft	Definitive care Rehabilitation Return to duty Evacuation
7	United Kingdom Theatre Base	(UK) General Hospital	Cross channel shipping Aircraft	Definitive care Rehabilitation Return to duty Evacuation
8	Canada	Military or DVA hospitals	Hospital Ship Aircraft	Continuing care Rehabilitation Return to duty Medical discharge

In 1 CAD the RCAF Medical Branch opened clinics with beds to provide minor, short stay medical care for members of the Division and their dependants at its air bases in France and Germany, and at the Division's Headquarters at Metz. At No. 3 Wing, specialist medical, surgical, and obstetrical care was available for all 1 CAD military personnel and their accompanying families. A clinic was also opened at Marville, where patients awaiting aeromedical evacuation to Canada could also be cared for.¹⁰⁵

In 1968-1969 the strength of the army's forces in Europe was halved. In 1970, the brigade group, with a reduced strength of about 3,000 troops, co-located one of its battalions with 1 CAD at Baden-Soellingen, the remainder was accommodated in the town of Lahr and its nearby airfield, in southwestern Germany's Black Forest. At the same time, the 1 CAD was reduced to three squadrons, withdrawn from France, and concentrated in southwestern Germany at Baden-Soellingen.

In 1993, all remaining CF were withdrawn from Europe. With each successive reduction in force size the in-place health care support system and all of its assets were proportionally decreased and either pulled out, or sold off; including a brand new, 50-bed, state of the art, CF hospital that had been built in Lahr and been in operation for little more than one year.

Throughout the period, and besides its ongoing NATO commitments, Canada's UN membership motivated successive federal government to commit the CF and CFHS to the support of an ever widening range of overseas operations. Examples of the disparate nature of these missions include: the UN Military Observer Group in India and Pakistan (UNMOGIP) in 1949; the UN Emergency Force (UNEF) in Egypt in 1956; the UN Force in Cyprus (UNFICYP) from 1964 to 1995; and the UN operations in the Balkans starting in 1991. There were many other UN related assignments for the CFHS, at home and abroad, all of which were usually hastily organized to meet the differing medical needs of each situation.

The federal government's fixation on deficit reduction initially led to a decrease in the strength of the CF from about 120,000 at its peak to about 89,000. By 1997 this number had further declined to 60,000.¹⁰⁶ Of major consequence to the CFMS was the closure of all of its regional tertiary care hospitals and the National Defence Medical Centre, and the accompanying personnel reduction from 3,000 to 2,400 Regular Force members.

Before imposition of the cuts, the CF medical support system, in 1990, was a balanced and flexible organization with training and research establishments, ship's medical staffs, air squadron medical detachments, unit and regimental medical establishments, field amb units, a field hospital cadre, fifty-two base and station hospitals and clinics with beds, five tertiary care hospitals, one national level medical centre of excellence, the National Defence Medical Centre, and six regional medical supply depots.

In 1959 it was determined that the three armed services no longer required exclusive medical support systems and the tri service CF Medical Services (CFMS) succeeded them.¹⁰⁷ Later, in 1968, the RCN, the Canadian Army and the RCAF were themselves unified to become today's CF. After the fall of the Berlin Wall and the breakup of the Soviet Union, in 1989, a politically anticipated post Cold War peace dividend spurred the federal government to impose deep defence spending cuts. It was the beginning of a decade of across-the-board defence budget reductions and the decline of the military medical services' capabilities.

Before 1959 the Army's central medical supply depot was sufficient to meet the needs of the three separate medical services. However, in the 1950s, in cooperation with Emergency Health Services (EHS) of Health and Welfare Canada (HWC), it was decided for

security reasons that regional medical supply depots should be dispersed and built across the country, and away from target cities, to meet the needs of the government and the armed forces, and for emergency use by EHS/HWC in case of a nuclear attack.

Existing CFMS resources following the Iraqi invasion of Kuwait, on August 2, 1990, enabled it to respond to Canada's decision, pursuant to the United Nations Security Council's Resolution 678, authorizing the coalition nations to act to push Iraq out of Kuwait. Canada was one of the thirty-five nations that participated, and approximately 4,000 CF members were ultimately involved in the intervention in the Persian Gulf area. These servicemen and women were attached to one of the four Canadian units operating there: The Canadian Task Group at Sea, The Canadian Air Task Group in Doha, Qatar, The Joint Headquarters, Canadian Forces Middle East, and the 1st Canadian Field Hospital (1 CFH).

Based in Petawawa 1 CFH (Cadre) was designated as the mobilization base for 1 CFH. After being brought up to strength from medical units all across the country, the hospital was deployed to Saudi Arabian in support of 1 (UK) Armoured Division. It opened for British and Iraqi patients on February 25, 1991, and closed shortly thereafter, and only a few days before the hostilities ceased, on March 4, 1991. All told, some five hundred and thirty CF personnel, not all of whom were Medical Branch personnel, were needed to staff and protect 1 CFH, which treated both British and Iraqi wounded. The fighting ended on March 3, 1991 and the hospital was returned to Cadre status at its home station. There were no declared Canadian casualties.¹⁰⁸

In addition to the ground deployment of 1 CFH, one Canadian surgical team was assigned to Canada's fleet replenishment ship, HMCS Protecteur, and another was stationed aboard the US Navy's hospital ship, USNS Mercy.¹⁰⁹ The latter deployment is seen to be the forerunner of the teams of CFHS physicians, nurses, physiotherapists and dental personnel that in later years would be routinely stationed for periods of four to six months, aboard USNS Mercy and her sister ship, USNS Comfort, to participate in humanitarian-type initiatives in under served areas of the South West Pacific, the Caribbean and Latin America, Philippines, Papua New Guinea, Haiti, El Salvador, Ecuador and Surinam.¹¹⁰ In addition, between May 29 and September 12, 2007, this practice was expanded to include another type of ship, and the CFHS assigned eight military health care personnel to the USS Peleliu in the South West Pacific region to gain practical experience in working aboard an amphibious assault ship.

In 1990, an Auditor General's (AG) report criticized the CF medical support system, saying that it had become primarily peacetime oriented. Some two years later the CF conducted its own analysis and supported the earlier AG conclusion, noting that the shift to a more operationally focussed medical service had not yet come about. About the same time, the ongoing effects of budget cuts introduced in 1989 motivated the top CF leadership to close three CF hospitals. In 1994, the CF leadership cut deeper and sounded the death knell for the military medical service's remaining tertiary care hospitals, when it erroneously concluded that the provision of medical care by military medical personnel at military hospitals was no longer affordable.¹¹¹

By 1995 overall military funding had been cut by 23 per cent, and the impact was being felt across the entire CFHS. No longer possessing the institutional means to provide hospital-based care for members of the CF, and experiencing significant medical workforce shortages, the CFHS resorted to a pay-as-you-go system to purchase its hospital-based services from provincially funded civilian hospitals. The temporary hiring of civilian health care practitioners on contracts was stepped up, and to help retain MO and maintain their clinical skills the diminishing supply of military physicians was authorized to be employed in civilian hospitals. Without military hospitals, the latter expedient ultimately proved to have a positive side, in that it allowed MO to keep up with the latest medical advances.¹¹²

The federal government's sanction of the CF leadership's endorsement of the CFHS pay-as-you-go system in effect sidestepped and ignored the Department of National Defence's (DND) statutory obligation to provide a comprehensive military health care system to meet the needs of members of the CF. Furthermore, the government's support of a policy that remunerates civilian hospitals for the provision of necessary hospital care, when the same funds might have instead been used to help retain and maintain some level of military hospital capability, ostensibly mocked the expressed notion of the CF leadership that CF Hospitals are unaffordable.

The federal government and the CF leadership also appear to have neglected to take into account the military risk associated with an arrangement that is now reliant on the nation's fragile civil health care systems; provincial organizations that are constantly struggling to meet the health care demands of their own citizens. Nationally, shortages of civilian physicians and other health care occupations continue to exist. Moreover, the CF is now needlessly engaged in direct competition with the provinces for resources that are being stretched to the limit by their own populations. In the civilian community at large, there are lengthy wait times for certain types of surgery, therapies, and diagnostic tests, and insufficient numbers of hospital beds. It is no longer a rarity for some provincial hospitals to send patients to the United States for essential care. What is more, in Ontario, for example, 30 per cent of its hospital beds are currently being occupied by patients awaiting vacancies in other specialized care facilities.

Faced with declining morale, a continuing shortfall of MO, and struggling to work within its reduced funding level, it became necessary for the CF and the CFHS to find ways to more effectively coordinate the duty assignments of military medical personnel, especially MO. The solution chosen by the CF leadership was to shake up the organization, unseat the incumbent Surg Gen,¹¹³ and bring all health care resources under the command of a DGHS¹¹⁴ who, for the first time, was a Health Care Administration Officer, rather than a medical practitioner. A replacement for the outgoing Surg Gen, a physician, reporting to the DGHS, was subsequently appointed.¹¹⁵

It is arguable that had the key elements of the CFHS hospital system been left intact some of the CFHS's earlier problems might have been averted? Might the closure of at least part of its tertiary care capability been avoided from the beginning had top government officials and the CF's leadership been fully informed early on of the several contraindications for developing a reliance on civilian hospitals, and been made aware of the political complications experienced during the First World War when great

dissatisfaction arose within the military when civilian practitioners were employed to treat wounded soldiers who had been evacuated to Canada?

As the Great War progressed, and mounting number of casualties were returning home for continuing care, a commission was struck to find solutions. The result was the establishment of 57 national institutions with a bed capacity of 3,980 using a combination of civilian hospital bed spaces, new buildings, and existing military establishments. Military hospitals were constructed in 11 districts from Charlottetown to Victoria and by the end of 1918 these had received 10,876 casualties.

Soon, however, a controversy arose because the commission responsible for operating the hospitals was a civilian authority, contrary to the provisions of the Geneva Convention, which required our soldiers to be cared for by military medical personnel. Government and military authorities quickly judged this situation to be untenable, and the civilian commission and its employed civilian practitioners were forthwith replaced by military MO who had experienced circumstances similar to the soldiers under their care. The result was greater patient satisfaction, improved general military and medical administration, and better discipline among the military patients due to the sense of comradeship that is engendered in all ranks through shared active service.¹¹⁶

In late 1999, the Chief of the Defence Staff directed a thorough review of the medical system and asked for recommendations on how to improve in-garrison health care. The review did not look at medical matters relating to the Reserves, health care support on operations or CF dental services.¹¹⁷ Looking to maintain an acceptable standard of service that was now largely dependant on the civilian sector for the delivery of in-garrison care, arrangement were made for the military medical personnel in the field medical units quartered in the garrisons to provide in-garrison care on an as-required basis. At the same time, though, military medical staffs were being reduced from more than 3,000 to 1,800; these were subsequently increased to more than 2,400, with civilians backfilling as required.

The expedient of employing field medical unit personnel to provide in-garrison care where possible did not prove to be successful in the face of the significant cuts to provincial health care budgets that were also being experienced; the cost of using personnel from the civilian health care sector proving to be higher than expected; the intake of students at medical schools dropping below that required to replace those leaving the profession; and the demand for medical services by ordinary Canadians increasing more rapidly than expected. In the remote and rural areas where large numbers of CF members are stationed there was also a critical shortage of some specialist medical services.¹¹⁸

At the same time as the operational tempo of the CF was beginning to dramatically increase, its annual budgets continued to decline. From the CFHS diminishing manpower pool, more and more MO were being required to serve on repeated deployments with little dwell time between them; as a result, they became increasingly dissatisfied with service life and many opted to leave the CF at the end of their contracted term. Simultaneously, the increased numbers of deployments to increasingly difficult missions in violent theatres of operation generated increased numbers of CF casualties and a wider variety of injuries.

In short, while the overall medical workload was expanding, the personnel resources needed to deal with it were on the decline.

As the first decade of the 21st century draws to a close, the conclusion reached in 1994 by the CF leadership that Canada's military hospitals were not affordable and which led to their closure is beginning to have unintended consequences. First and foremost, perhaps is the discovery that although tertiary care facilities no longer exist, the CFHS cost of delivering military health care, in 2005-06, has increased by 50 per cent over the preceding five years, and is spending more than \$8,600 per person on average, compared with the Canadian average estimated health care expenditure of about \$4,500 per person.¹¹⁹

Furthermore, some CF personnel have reportedly voiced concerns over the variations in the care and treatment they receive in contracted provincial hospitals. There is also evidence that a coordinated and centralized approach to overall casualty management is lacking; that there is no apparent nationwide military standard of hospital care; that civilian doctors seemingly do not understand the needs of hospitalized military personnel; and some hospitalized members of the CF are unhappy with their isolation from their comrades and the larger military community. These reports, together with the noted escalating costs, give rise to the question, should the CF and the CFHS reexamine the requirement for the restoration of a renewed tertiary care military hospital capability?¹²⁰

One indication that the requirement for military hospitals should be revisited was an AG observation in October 2007 on the unfavourable effect that the deficiency of civilian medical specialists was having on CF members. She confirmed that the public system cannot meet the growing demand of CF casualties and that the DND is unable properly to track and monitor the care of soldiers when they are placed in the hands of civilian practitioners.¹²¹

Another sign that a military hospital capability may again be required is the 2007 Draft Land Forces After Action Review on the Canadian contribution in Afghanistan in Regional Command (South) Kandahar. It acknowledged the importance of keeping wounded soldiers close together; soldiers who, due to serious wounds, have been taken to a foreign medical facility without Canadians on staff should be returned to a Canadian facility when possible. The longer a soldier is away from Canadian contact and particularly his peers, the deeper his emotional trauma is likely to be.¹²²

It is noteworthy that the CF exhaustively examined, and resolved, the question of maintaining and constructing military hospitals some thirty-five years ago at the behest of Treasury Board (TB) in NDHQ Study S 42.¹²³ The driving force behind the study was the 1962 Royal Commission on Government Organization (Glasco Commission) which recommended, in part, that "the hospitals of Service Personnel in Canada be gradually transferred to civilian hospitals, and no building of new Service hospitals or replacement or enlargement of existing institutions be undertaken."

DND, CF and CFMS authorities in 1975 subsequently upheld the continuing requirement for military hospitals,¹²⁴ and, in 1977, TB endorsed their findings.¹²⁵ It was this

unanimous conclusion that finally led to the opening of the government's pocket book, allowed the continuation of a CF Hospital capability, and permitted the replacement of decrepit Second World War era hospitals with modern facilities at locations such as Petawawa, Esquimalt, and Halifax.

Surprisingly, none of this vital background policy information appears to have been revealed, nor did it appear to have in any way influenced the mid 1990's decision of a federal government determined to cut defence spending. Similarly, neither the findings of Study S-42, nor their approval by the CF and TB, appear to have been brought to the attention of the military leadership of the day. Had this been done, perhaps the injudicious and unforesightful military decision to totally disassemble Canada's irreplaceable militarily tertiary care hospital capability might have been forestalled.

THE TWENTY-FIRST CENTURY

The beginning of the new century, on April 1, 2001, saw all military health care personnel and resources, Regular Force, Reserve Force, and civilians, unified, and under the command and control of a DGHS.¹²⁶ In this united organization the CF Health Services Reserve (H Svcs Res) plays a critical role. With over 1,500 members, it provides essential health services support at units and clinics, at home and abroad. The H Svcs Res supplies trained personnel to support, augment and sustain CFHS units for operations and training activities. The tasks of the H Svcs Res include: supporting affiliated Res Brigades; providing individual augmentation to units of the CF and CFHS at home and abroad ; and seeing that its members are qualified and fit to deploy. During fiscal year 2007-2008, approximately 81 Health Services Reservists were employed on operations in Afghanistan, Sudan, Haiti, and Germany.¹²⁷

Many reservists have full-time careers outside the CF in a wide range of civilian health care professions, including medicine, nursing and social work, while others are full-time students or members of other trades or professions. Reservists are typically employed in Primary Reserve units located in 14 cities across Canada, as shown on Chart No. 7, or on the national Primary Reserve List. A small Reserve Staff has been established in CFHSG Headquarters under a Director of H Svcs Reserves.

The majority of reservists employed in one of the fourteen CFHS Primary Reserve units, commit to serve approximately 38 days per year, mainly on week nights and/or weekends between September and May. In addition to unit activities, they can take advantage of unique military and health care related training opportunities (professional development courses, medical training exercises) as well as employment opportunities (short-term clinical replacements, or longer periods of full-time employment primarily during the summer period at various base/camp locations). In the course of the annual training cycle, the focus is on providing members with exciting medical and dental training within a military context.

Reserve paramedical personnel who are not civilian trained and employed, are trained, as a minimum, to the level of Emergency Medical Responder (EMR) as part of the ongoing initiative to revitalize the H Svcs Res. The EMR basic skill set, delivered in

accordance with recognized civilian standards, consists of: basic trauma and life support; pre-hospital trauma and life support; cardiopulmonary resuscitation level C; and St. John Ambulance Advanced First Aid.¹²⁸

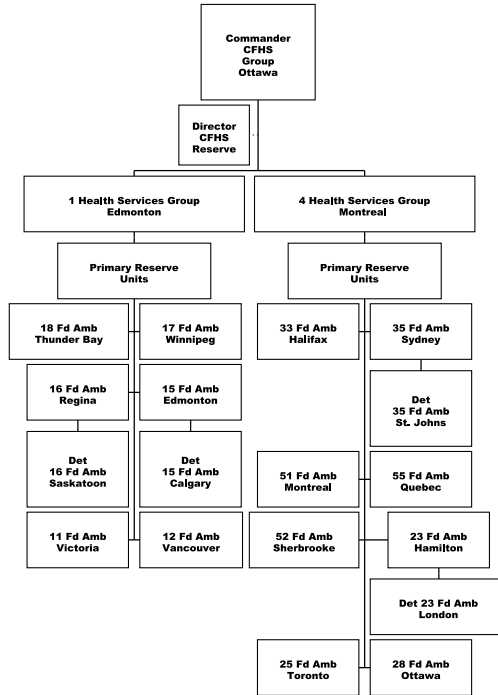


Chart No. 8. CFHS Reserve Organization

Following the terrorist attacks on the United States on September 11, 2001 the UN Security Council issued Resolution 1368, condemning them. Subsequently, the North Atlantic Council (NATO's senior advisory body) invoked Article 5 of the Treaty of Washington, which states that they will interpret any attack on a NATO nation launched from outside that nation as an attack on all the NATO nations. In response, Canada mounted Operation Apollo as its contribution to the international campaign against terrorism.

The Navy and Air Force deployments involved in this operation included their normal medical support assets and were the largest since the Korean War. Included were six warships, surveillance and transport aircraft, Sea King helicopters, and about 2,000 men and women.¹²⁹ In February 2002, the 3rd Battalion, Princess Patricia's Canadian Light Infantry (3 PPCLI) Battle Group, including a regimental medical establishment, became the first Canadian unit deployed on a combat operation since the conflict in Korean. Doctrinally, Canada's medical services were prepared for the support of land operations,

as evidenced by replacement in 2001 of the 1964 manual "Medical Services in Battle" with an updated version entitled: "Health Services Support."¹³⁰

UN Security Council Resolution 1386 of December 20, 2001 mandated the formation under NATO of the International Security Assistance Force (ISAF) to maintain security in and around Kabul, Afghanistan. Canada's commitment to NATO began on July 17, 2003 when the CF commenced Operation Athena with the installation of a Canadian commander as Commander of ISAF's Kabul Multi-National Brigade. On July 19, 2003, the 3rd Battalion, The Royal Canadian Regiment Battalion Group and its integral regimental medical establishment began deploying to Kabul as the first rotation of Canadian troops to support Operation Athena.¹³¹

In 2005, ISAF extended its operations to Kandahar. Canada's contribution was Task Force Kandahar, part of ISAF Regional Command (South), and headquartered at Kandahar Airfield (KAF). It includes: a headquarters, supported by intelligence, communications and field security assets, a battle group, comprising a full battalion of infantry, a battery of artillery, and a field squadron of military engineers; and logistics and medical support assets.¹³²

In February 2006, more than 160 members of the CFHS deployed to Kandahar after Canada agreed to take on the job of 'lead nation' for the NATO Role 3 Multi-National Medical Hospital (MNMH) that was to be developed for the care of about 20,000 international troops, including severely injured patients.¹³³ The new Role 3 MNMH replaced an existing American facility, and included expanded capabilities.¹³⁴

The hospital's accommodations are a mix of plywood buildings, modular tents, and hospital shelters, protected by slabs of concrete, and sited close the world's busiest runway¹³⁵ In 2009 the hospital's capabilities include: a CT scanner; a microbiology laboratory; a blood bank; an intensive care unit; three operating rooms; a blood detachment, and patient wards.

The international staff includes: a neurosurgeon; a vascular surgeon; three orthopaedic surgeons; three intensive care physicians specializing in critical care; radiologist; an anaesthetist; an oral/maxillofacial surgeon; psychiatrist; several general practitioners; nine operating room nurses; 24 intensive care unit nurses; two pharmacists; and medical technicians.¹³⁶ In addition to surgical cases, the medical staff also assists with more common medical problems such as multiple sclerosis, heart attacks, cancer, intestinal bleeding and asthma attacks, and handles between 60 and 70 outpatients every day.

Paradoxically for a military medical facility built to care for NATO soldiers, 60 to 70 per cent of the patients are Afghans. Many are soldiers and policemen, who have become a favourite target of the Taliban. There have also been an increasing number of Afghan civilians, the great majority of whom have been wounded in Taliban attacks, and civilians who are part of the army of foreign contractors who support NATO operations.¹³⁷

The cost of providing health care for Canada's troops in Afghanistan is sizeable. In 2009, a study of all CF members injured in Afghanistan from February 7, 2006, to February

6, 2007 identified those who were hospitalized at the MNMH, and determined the cost of providing their care in Kandahar, at Landstuhl Regional Medical Centre (LRMC) in Germany, for their evacuation to Canada, and in civilian facilities in Canada. During the one -year period, the CF spent more than \$24.3 million to provide health care to 1,245 patients.

One hundred twenty-seven of these patients were Canadian soldiers who required admission. A total of ninety-three soldiers required evacuation to LRMC, and of these, seventy-five required further care in Canadian civilian hospitals. The CF spent approximately \$2.5 million to provide trauma care in the MNMH for its 127 injured soldiers. Caring for our ninety-three wounded soldiers at LRMC cost approximately \$2.0 million. The air evacuation costs of seventy-five wounded soldiers back to Canada was \$3.9 million. The CF were charged approximately \$2.4 million for further care in Canadian civilian hospitals for seventy-five severely wounded soldiers. However, the estimated actual cost of this care in Canada was \$1.4 million.

Estimating the financial cost to care for our soldiers wounded on overseas duty in the conflict areas is critical for planning and forecasting. On average, it cost approximately \$20,000 for a wounded soldier who is cared for at a field hospital (MNMH) and later returned to duty, \$42,000 for the care of a wounded soldier treated at an out-of-theatre regional referral hospital (LRMC), and subsequently returned to duty, and \$113,000 to care for a wounded soldier who is repatriated and treated in Canada in a civilian hospital.¹³⁸

In 2008, the following components of Joint Task Force Afghanistan were carrying out the work of Operation Athena: the Canadian contingent in ISAF Headquarters in Kabul; the Canadian contingent in ISAF Regional Command (South) Headquarters at KAF; Joint Task Force Afghanistan Headquarters, operating as Task Force Kandahar Headquarters in the ISAF chain of command; and Task Force Kandahar, operating as part of ISAF Regional Command (South).

In 2006, the CFHS, confronted a chronic problem that was familiar to its provincial counterparts. It was the seemingly intractable capability to recruit and retain the numbers of physicians it required in the face of a chronic national shortage of health care professionals. The CFHS shortfall of physicians was becoming particularly troublesome in that a continuing deficit could quickly become a critical limiting factor in Canada's ability to complete the missions currently assigned to the CF, or to undertake new ones.

The action taken later that year to help resolve the problem illustrates the continuing importance of maintaining the close relationship that has existed since 1867 between the military and civilian medical professions. The DGHS invited the President of the Canadian Medical Association (CMA), to join her on a visit to Afghanistan. The President of the CMA agreed and said her trip had three goals: to provide support and recognition for the health services staff, and especially the physicians, serving there; to witness first-hand why they need these health care personnel in Afghanistan and in the military overall; and to raise public awareness of the superb job that Canadian MDs, nurses, and other health professionals are doing under extremely difficult and challenging circumstances. She also observed: "We realize that the competition to recruit physicians is fierce throughout Canada." Later, expressing support for her fellow members and

colleagues in the CF, she appealed to any health care professionals who might be interested to consider the military opportunities that presently exist at home and abroad.¹³⁹

Chart No. 9. Afghanistan - Chain of Casualty Evacuation

STAGE	LOCATION	FACILITY	TRANSPORT	CARE
1	Fighting position	On site/ LAV Ambulance	US Army helicopter	Self, buddy, Medical Technician Evacuation
2	Kandahar Airfield	Multinational NATO Role 3 Medical Unit	US Army helicopter	First surgery Medical care Return to duty Evacuation
3	Germany	US Army Landstuhl Regional Medical Centre	USAF, C-17 Globe master CF - C-117	Sustaining Care Return to duty Evacuation Typical stay is between 1-5 days. CF Medical Liaison Team determines where in Canada the patient will go for recovery
4	Canada	Civilian tertiary care hospital	CF - C-117 Globe master	Continuing care Rehabilitation Return to duty Medical discharge

By early 2008, major annual salary increases, that, for example, in 2009 for family practitioners, ranged from \$134,182. for a new entry captain, to \$234,106. for a Lieutenant Colonel,¹⁴⁰ combined with other incentives, such as a \$225,000 bonus in return for four years of service, have helped to turn MO recruiting around. "Basically, we are tripling the number of medical officers we are enrolling compared with five or six years ago," said the military physician responsible for recruiting.¹⁴¹ Retention of MO has also improved. "We are retaining two-thirds of the physicians who have reached the end of their four-year commitment," he said. Most significantly, he credited the President of the CMA for creating renewed interest in military medicine following her visit to Afghanistan, and afterwards becoming a vocal advocate of the need to fill the medical service's depleted ranks. After she returned from Afghanistan, the President of the CMA raised the issue in all her speeches to provincial and territorial medical associations, and at meetings of specialty societies. "There was a lot of interest," she recalled. Yet, there is a continuing shortage, however, of Medical Technicians, Physician Assistants, pharmacists, and biomedical equipment technicians.¹⁴²

No longer operating the tertiary care hospitals that once played a major role in the training of CFHS personnel, much of it, perforce, must now be purchased as required from

a variety of provincial health care organizations. Nevertheless, the CF continues to operate four health service educational establishments. The first of these is the

Canadian Forces Medical Services School (CFMSS) at Base Borden, Ontario. Its core activity is the provision of qualified Medical Technicians, the largest occupation in the Health Services Branch. Their training as credentialed Primary Care Paramedics coupled with specialized training in field medical operations, equips them well for their unique military role and provides them with the necessary qualifications to maintain their skills through civilian partnering.

This school also offers more advanced training for Physician Assistants and Preventive Medicine Technicians (military public health inspectors), both of whom are vital to the provision of primary health care in small units. The CFMSS is also responsible for the training of Health Care Administrators and the provision of military training for clinical occupations not initially qualified in-house such as, physicians, nurses, pharmacists, physiotherapists, social workers and bio-scientists.

The Canadian Forces Dental Services School (CFDSS), also in Borden, offers additional training for our dental personnel, many of whom have already received their initial qualifications in a civilian setting, enabling them to operate in a field environment and in mobile dental clinics. Here again, in support of all CF dental practitioners, partnerships are maintained with civilian schools of dentistry and dental hygiene. As a recent initiative, specialized distributive training programs have been developed to meet unique CF requirements.

The Canadian Forces School of Aero-Medical Training (CFSAT) located in Winnipeg, Manitoba, exclusively provides training for all Aero-Medical Technicians in the CF in aerospace physiology, enabling them to function as vital components of hypobaric and hyperbaric teams in support of both air and subsurface operations. It also offers, to international and civilian communities, various world-class programs of aerospace training in physiology and survival.

Lastly, the School of Operational Medicine (SOM) part of the CF Environmental Medicine Establishment (which is itself the military component of the Defence Research and Development Canada in Toronto) conducts all Flight Surgeon training, as well as courses at various levels in Diving Medicine, to Physicians, Medical Technicians and Physician Assistants. Medical awareness training for issues unique to their operating environment is aimed at non clinical personnel, such as Clearance Diving Officers and Technicians. These are all essential support components of the Canadian Forces' ability to safely operate air craft and submarines in all operational settings. As well, Aeromedical Evacuation Training is conducted at an air force training facility in Trenton, Ontario. The mandate of the aeromedical evacuation department training is to qualify nurses and medical technicians in the CF and from allied forces in aeromedical evacuation techniques and principles.

A significant volume of activity is outsourced to educational establishments throughout the country. All CF physicians, dentists, nurses, physiotherapists, pharmacists, social workers, and bio scientists are graduates of accredited schools in Canada. In other cases, focussed education such as, paramedic and health care administration programs are achieved through contracted delivery of curricula coordinated through CFHS training establishments. Where requirements of this nature have a uniquely military component, advantage is taken of the facilities of other nation's military health care services, particularly the U.S., where both an operational dimension to the training is imparted, and interoperability with allies in the medical and dental domains is enhanced.

With the closure of Canadian Forces Hospitals, it is no longer possible to expose CFHS clinical personnel to a broad enough spectrum of patient-care challenges in military facilities alone. In order for them to remain prepared for the uncertain demands of operational deployments and to maintain and enhance their skill sets in support of in-garrison care and deployed care, many are now placed in civilian health care settings.



Photograph No. 9. HMCS Halifax's Physician's Assistant and Stewards in Casualty Clearing Prepare the Wardroom as an Alternate Triage Area for Action Stations

Throughout Canada a significant number of military clinicians have become integral members of health service agencies, including hospitals, through an exclusive Maintenance of Clinical Skills Program (MCSP). This program hones professional skills through everyday practice and makes a valued contribution to community health care while at the same time, provides an experienced cadre from which to draw when the exigencies of operations demand it.

Some Physician Assistants and Medical Technicians are placed in regional trauma facilities or ambulance services, consistent with their equivalency qualifications, in order to rigorously exercise their skills and advance their expertise. Additionally, other Health Service Technicians, such as Medical Laboratory, Operating Room and X-ray are placed in civilian facilities in their respective fields of practice. While the MCSP is a complex program to administer, it has proven to be of enormous value both to the CF and to the health care organizations with which it partners. For members of CF Medical and dental teams employed in isolated or practice-limited environments, distributive learning opportunities are also being explored to ensure that MCSP objectives can be pursued.

The CFHS is a strong supporter of Continuing Professional Education (CPE) for all clinical occupations. The CFHS views CPE as a responsibility to practising professionals, facilitating lifelong learning and development and as a mechanism to constantly improve occupational knowledge and skills. Policy guidelines for the administration of CPE have been established for physicians, and are under active development for all remaining clinical

personnel. All initiatives are intended to mirror, to the maximum extent possible, those CPE practices already established in the civilian community.¹⁴³

Incorporating all members of the CFMS and CFDSS, the CFHS in 2009 is functionally and geographically organized for the delivery of health care as the CF Health Services Group (CFHSG). The CFHSG is commanded by a Brigadier General, DGHS, who reports to the Chief of Military Personnel, a Major General. The current DGHS also holds the appointment of CF Surg Gen. An outline of the CFHS organization is shown in Chart No. 10.

The DGHS commands, controls, and administers more than 6,000 Regular and Reserve Force and civilian personnel serving worldwide, and, in 2007, a budget of over \$500 million, annually.¹⁴⁴ No longer operating tertiary care military hospitals in Canada, CFHSG consists of 43 units at 77 military installations.¹⁴⁵ Thus far, six members of the CFHS have been killed in action while on duty in Afghanistan.¹⁴⁶

Authority for control of the professional and technical aspects of medical care in the CF rests with the CF Surg Gen who is always a MO appointed by the Chief of Defence Staff, and who reports directly to the DGHS. The CF Surg Gen's position has both a professional and an operational focus. At the professional level, the incumbent meets with other military and civilian health organizations including counterparts in NATO and non-NATO countries, Health Canada, Veterans Affairs Canada, provincial health care ministries, and provincial medical licensing authorities.

The CF Surg Gen also maintains a constant watch over evolving global health issues of potential significance to the CF; formulates strategy for the CFHS professional and technical organization, policies and procedures; and advises senior departmental authorities, including the MND, Chief of the Defence Staff, and members of the Armed Forces Council, on all health related matters.

Until the mid 1950s, with minor variations reflecting Canadian policy differences, Canada's field medical services' organization and the doctrine for its employment corresponded closely with that of the British Commonwealth,¹⁴⁷ and reflected the influence of the British Army's RAMC. With the advent of NATO, in 1949, however, and Canada's active participation as a founding member, that is no longer the case. At the present time it is the influence of NATO medical policy and American military medicine that is the most profound.

On October 22, 1993, the NATO Military Committee (MC) approved with document MC 335 the establishment of the Committee of the Chiefs of Military Medical Services (COMEDS). Composed of the senior military medical authorities of member countries and of major NATO Commands, it is the focal point for the development and coordination of the Alliance's military medical policy, and for providing medical advice to the MC.

The objectives of the COMEDS include improving and expanding arrangements between member countries for medical services coordination, standardization and interoperability, and improving the exchange of information relating to organizational, operational and procedural matters.

In recent years the scarceness of military medical personnel in all NATO countries has become a driving factor for the temporary multinational integration of medical support structures. NATO documents MC 326/1 "NATO Medical Support Principles and Policies" and Allied Joint Publication Nr 4.10 "Allied Joint Medical Support Doctrine," are the mutually agreed doctrinal cornerstones of all NATO nations. The ongoing operation in Afghanistan (ISAF) and the establishment of a NATO Role 3 MNMH at KAF, with a multinational staff and Canada as the first lead nation, exemplifies the Alliance's multinational approach to the delivery of health care. In October 2009, the CF handed over its lead nation role to the U.S. military.¹⁴⁸

Looking ahead COMEDS acknowledges that when faced with shrinking defence budgets, multi nationality offers opportunities for improved cost-efficiency in field medical support, but should not become a national justification to wear away a nation's increasingly scarce military medical capabilities, or disregard the fundamental responsibility of each nation adequately to provide the necessary health care resources for the care of its own troops.

Within NATO the care capabilities of deployable medical treatment facilities are classified according to their treatment capability in a system of roles, progressively numbered from one to four. Most of the care capabilities of each Role are intrinsic to the next higher Role:

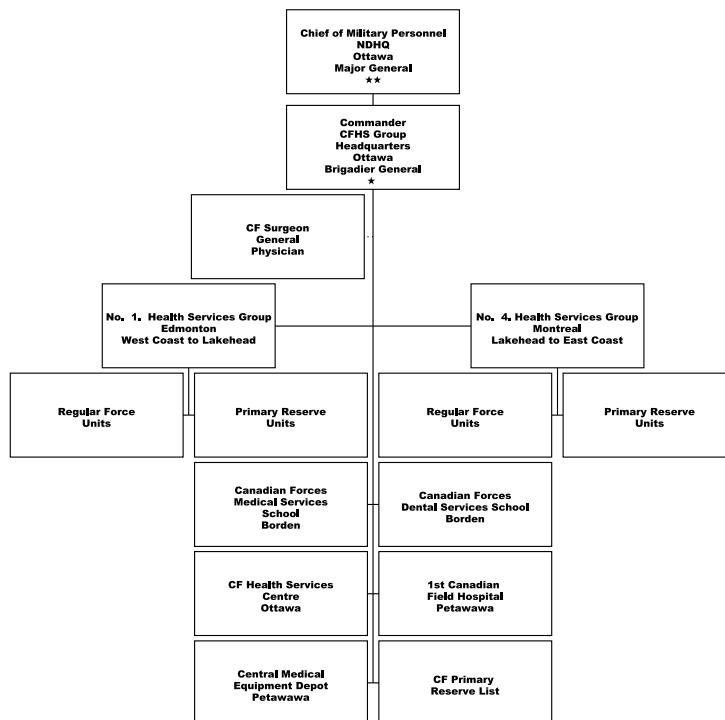


Chart No. 10. CFHS Outline Organization

Role one medical support provides for routine primary health care, specialized first aid, triage, resuscitation and stabilization, e.g., regimental medical establishments;

Role two provides an intermediate capability for the reception and triage of casualties, and able to do resuscitation and treatment of shock to a higher technical level than Role 1. It will routinely include damage control surgery and may include a limited holding facility for the short term holding of casualties until they can return them to duty or be evacuated. Role two may also include Dentistry, Environmental Health and Psychiatry or Psychology, e.g., Fd Amb units;

Role three is designed to provide secondary care within the restrictions of the Theatre Holding Policy. Role three medical support is deployed hospitalization and the elements required to support it. This includes a mission-tailored variety of clinical specialities including primary surgery and diagnostic support, e.g., Field Hospital units ;

Role four medical support provides the full spectrum of definitive medical care that they cannot deploy to a theatre or is too time consuming to be conducted there. It includes the provision of specialist surgical and medical procedures, reconstructive surgery and rehabilitation. They will normally provide it in the country of origin or the home country of another Alliance member.¹⁴⁹ Lacking it own tertiary care military hospitals, the CF purchases this capability from civilian health care providers.

Similar to the experience gained during both world wars, and in Korea and Vietnam, the wars in Iraq and Afghanistan have led to very significant declines in morbidity and mortality rates. Modalities such as body armour, protective eye wear, new surgical techniques, early intensive use of blood products for fluid resuscitation of casualties, improved medical data collection systems, better individual and vehicle first aid kits, better training of all soldiers in self and buddy-aid, better trained medical technicians, faster helicopter rescues, and rapid evacuation out of the theatre, all contribute to the lowest killed-in-action (KIA) rate in history.¹⁵⁰

The KIA rate thus far for US troops operations Enduring Freedom and Iraqi Freedom, for example, is 12.5 per cent, vs. 18.6 per cent for the first Gulf War and Vietnam, and 25.3 per cent for the Second World War. The KIA percentage measures the number of service members killed out of the number wounded. In Iraq and Afghanistan, 55 per cent of wounded US forces are returned to duty within seventy-two hours. Most observers generally overlook this latter point, but it clearly illustrates the importance of, and the vital role played by military health care services in maintaining an armed force's fighting strength.

In Afghanistan, fundamentals are making a difference. Not everyone who becomes wounded or falls sick is saved. Still, attention to basic lifesaving skills and techniques spares many of them. In both Canada and the U.S. extended training in combat lifesaving procedures have enabled a greater than 90 per cent survival rates for injured troops.¹⁵¹ These front line skills, combined with improved communications technology and the availability of the robust U.S. air evacuation support network,¹⁵² means our soldiers are surviving traumatic injuries at an unprecedented rate. Thanks in large part to this essential

American contribution, the NATO Alliance has made major advances over past conflicts in the speed of care of the wounded.

Before the wars in Iraq and Afghanistan the USAF relied on dedicated aeroplanes, C-9A Nightingales and C-141 Starlifters, reserved for the aeromedical evacuation (AE) mission. These dedicated transports flew on fixed schedules and the AE mission operated separately from the rest of the air mobility world. However, this effort reduced flight availability, and lengthened the amount of time it took to evacuate injured personnel.

Dedicated medical airlift today has been replaced with designated airlift. This mission is performed by highly trained AE and critical care air transport teams (CCATT). These teams, using portable patient-pallets and equipment, can use any mobility aircraft to perform an aeromedical evacuation. When an injured service member needs to be moved, the first available aircraft can be readily identified with up-to-the-minute knowledge of where the air-lifters are. The pallets, medical teams, and other personnel will already be ready to go.

The air-lifters used for medical evacuations are known as “back-haul” aircraft. The AE teams often board aircraft that have just delivered supplies to the forward area, and reconfigure them to carry patients out. Prior to the new AE procedures taking effect, medical personnel sometimes had to stabilize a casualty for several days beforehand until they were able to travel. Now, airlift is sometimes being coordinated as a patient is still in surgery on the ground in Afghanistan. At the same time, because very sick patients can also be fed into the medical evacuation system within hours or days, large hospitals do not have to be forward deployed. Instead a number of small hospitals can be positioned in the theatre and a large number of patients flowed through them, provided a solid aeromedical evacuation system is available.¹⁵³

Often it is only thirty minutes from time of injury until the casualty is in an operating room being treated by a surgeon. Nevertheless, it is the treatment rendered in the first 15-30 minutes either by the wounded man or a comrade in the field, and the training that they have had, that more often than not decides their survival. In modern warfare the one-time “golden hour” standard for a patient to reach first surgery is being replaced by what some have termed the “platinum 15-minutes.”

A major issue in Afghanistan is post traumatic stress disorder (PTSD). Events that are threatening to life or bodily integrity will produce traumatic stress in its victim. This is a normal, adaptive response of the mind and body to protect the individual by preparing him to respond to the threat by fighting or fleeing. If the fight or flight is successful, the traumatic stress will usually be released or dissipated allowing the victim to return to a normal level of functioning. PTSD develops: when fight or flight is not possible; the threat persists over a long period of time; and/or the threat is so extreme that the instinctive response of the victim is to freeze.¹⁵⁴

Canadian, and other allied military service personnel serving in Afghanistan experience the age-old physical and emotional problems associated with combat, but in a 21st century geopolitical and socioeconomic environment. The goal of killing or wounding a foe has not varied for many centuries. However, the means of causing fatal or permanent

injuries and the medical resources on hand for limiting death, dying, disability, and dysfunction have a significant effect on those going into and returning from combat.

In Afghanistan the leading cause of being KIA or WIA is not being cut down by bullets or shell fragments, but being struck by the blast from an improvised explosive device (IED), a concealed device designed to randomly kill and inflict serious wounds to the limbs and torso. IED cause less visible injury to the brain. Nevertheless, the incidence of traumatic brain injuries (TBI) associated with IED is clinically significant. The diagnosis of PTSD, major depressive disorder (MDD), and generalized anxiety disorder (GAD) is often confused by recognized and unfortunately, ordinarily unrecognized or unsatisfactorily recognized, TBI.



Photograph No. 10. Canadian soldiers evacuate injured personnel from Kandahar Airfield. March 31, 2006.

To provide optimal mental health care for members of the CF the CFHS carries out pre deployment screening, post deployment screening, and a follow-up screening at intervals after troops return. The follow-up assessment is important, because many troops do not report problems right after deployment, but these problems surface later. After our troops return to Canada, administrative, medical and mental health follow-up measures such as questionnaires and medical examinations monitor the physical and mental condition of personnel for some six months after a deployment.

These measures help to identify psychological and other types of injuries not evident immediately after a deployment. Personnel who need treatment have access to a network of Operational Trauma and Stress Support Centres (OTSSC) operated by DND and to stress injury specialists. Members of the CF as well as veterans also have access to the network of Operational Stress Injury Clinics operated by Veterans Affairs Canada, such as the Ste-Anne Centre, near Montréal. In addition, the OTSSC offers social support through its network of peer coordinators.¹⁵⁵

Nevertheless, in December 2008, the Interim Ombudsman for DND and the CF, after interviewing more than 360 individuals – including current and former military members suffering from mental health injuries – and thoroughly reviewing all relevant policies, procedures and programs, determined that some military members who suffer from operational stress injuries are not being diagnosed and are not getting the care and treatment they need so that they can continue to be contributing members of Canadian society – either within the CF or as civilians.

Significantly, the Ombudsman's investigators found that myths and stereotypes associated with PTSD and other operational stress injuries remain a real problem. In fact, mental health care givers from virtually every military establishment in Canada raised the

issue of stigma as one of the biggest challenges still facing the CF. In addition, the organization has yet to develop a database that accurately reflects the number of CF personnel who are affected by stress-related injuries. The office also noted that the Department and the CF continue to refuse to implement a critical recommendation: the appointment of a senior officer of significant rank whose sole duty would be to act as national coordinator for issues related to operational stress injuries.

Insufficient staffing levels emerged prominently in the Ombudsman's office's study. In fact, it noted, at CFB Petawawa, reductions and limitations in social work services stem directly from a lack of medical practitioners and specialists. What is worse, even if fully staffed, the base Care Delivery Unit would have an insufficient number of clinicians to treat the personnel that they serve.¹⁵⁶

One area that has also seen noteworthy progress is amputee rehabilitation for those wounded in Afghanistan. Canada's approach differs from that of the United States, where almost all amputees recuperate at the Walter Reed Army Medical Centre in Washington, D.C., which provides centralized physiotherapy and group rehabilitation that can boost the morale of recovering troops. The result has been that in the U.S., of their total number of amputees, they have returned 25 per cent to duty.

According to a former Canadian Surg Gen the idea of creating a similar "centre of excellence" for war amputees is not feasible here because there are so few soldiers who have lost limbs . . . the challenge is to "adapt" American practices to the Canadian model of care, delivered in co-operation with civilian hospitals across Canada. The plan is to "take the ideas and translate them into the Canadian construct," says the Surg Gen.¹⁵⁷

One such facility is Edmonton Alberta's Glenrose Rehabilitation Hospital, whose program is based on the Walter Reed Army system of amputee rehabilitation that involves the comprehensive integration of fitness, sport and rehabilitation. The director of the Adult Amputee Program at the Glenrose says, "There's a nice trickle-down effect," civilian and military amputees in Canada are benefiting from the United States military's investment in research aimed at improving equipment and rehabilitation services for wounded soldiers. The large number of military amputees treated in the U.S. has allowed development of specialized amputee treatment centres. It has also caused a growth in expertise which the Americans are willing to share with their allies.¹⁵⁸

We, like other NATO Nations, have also added several advanced medical procedures to the repertoire of both our medical and non medical soldiers. These call for decision-making skills for treating casualties when under fire, when not under fire, and during the evacuation process. The three main types of injuries afflicting all NATO troops in Afghanistan which shape the training includes those producing massive bleeding from extremity wounds, trauma to the chest cavity in which air pockets develop (tension pneumothorax), and the obstruction of airways.

To treat such injuries soldiers today are trained in the use of pressure bandages, one-hand operated tourniquets, nasal airway tubes, intravenous infusion, needle thoracentesis, and the use of haemostatic (quick blood clotting) dressings and sprays

designed to create an almost instantaneous clot on areas of arterial bleeding. All the same, the most common preventable causes of battlefield deaths remain, haemorrhage, 9 per cent bleed to death from a compressible site, 5 percent die of tension pneumothorax (the accumulation of air under pressure in the pleural space), and 1 per cent dies of simple airway occlusion.¹⁵⁹

In 2009, the CFHS continued to provide health care for the members of Task Force Afghanistan. Its deployed resources for this task include a temporary Health Services Support Unit (HSSU) of about 200 people in its two Health Service Support Companies. They provide, as required, medical technicians for Task Force Kandahar's manoeuvre units, personnel to staff the NATO Role 1 medical unit at KAF, and many of the medical staff, including the CO, of the MNMU.

The medical personnel needed to support our troops operating outside the wire, and staff the KAF Role 1 clinic, are largely drawn from fd amb units in Canada. The 1 CFH in Petawawa, Ontario, contributes most of the personnel assigned to the MNMU.¹⁶⁰ On occasion, HSSU MO, working in teams with nurses, nurse practitioners and physician assistants, conduct Village Medical Outreach visits where basic medical, dental and other essential health care is provided to local civilians. Illustration 5. depicts the usual chain of medical casualty evacuation.

Overall, Canada's military health care services at the close of the first decade of the new millennium give every indication that, with three exceptions, they are well led, acceptably organized, and capably managed.¹⁶¹ The remedial deficiencies are seen to be the absence of a dedicated helicopter air ambulance capability, the lack of an integral tertiary care hospital capability, and an unduly high risk dependency on the limited critical care resources of the nation's overstretched provincially operated hospital systems.¹⁶² To enable the CFHS to more comprehensively discharge its constitutionally mandated role as the health care provider for Canada's 83,000 Regular Force members, at home and abroad, in time of peace and in time of conflict, these reversible shortcomings should be addressed and resolved by the federal government and the CF leadership.

During the past one hundred and forty two years, Canada's military health care services, Regular and Reserve, have operated under many names. Yet no matter their title in a given period, they have laid down an inspiring record of selfless and outstanding service to the nation, and its fighting forces. Today, the ubiquitous nature of our military health care services which are so intimately bound up with the soldier, sailor and airman, at every stage of their career, in war and peace, in sickness and health, is taken for granted.

Few Canadians know of the formidable human challenges that have been faced and overcome by our military health care services in times of conflict and peace, or of the government indifference and military inertia that has had to be overcome before ultimately being granted the status, resources, command authority, and administrative powers, that are necessary to lighten the sufferings of their fellow Canadians on the battlefield, and in their barracks. Yet, the moral courage and perseverance of the many thousands of devoted men and women who have served in Canada's military health care services since 1867 has led to a military health care system that is now considered to be one of the most important operational factors in the realization of Canada's aims in times of conflict and peace.

*“Unarmed they bore an equal burden.
Shared each adventure undismayed;
Not less they earned the Victor’s guerdon,
Not least where these in the crusade”.*

— TB Nichols

EPILOGUE

Since the end of the cold war, the economic, social, political, strategic and health care environment has profoundly changed. After the fall of the Iron Curtain, most NATO Armed Forces faced the major challenges of declining defence budgets and sharply rising costs of equipment and personnel.

Globalization has brought an unprecedented interdependence of human activity, increased mobility of people, goods, services, and ideas. Lingered crises in remote areas can indirectly affect national supply lines, global economy, stock markets and jobs in almost all parts of the world. Increasing international competition for shrinking natural resources such as water and oil has boosted instability in some parts of the globe. And relentless media attention on these crises has focussed the attention of the political decision makers in the North Atlantic Council. Media coverage has a dramatic effect on public opinion, the morale of troops and the political will to sustain NATO missions. Significantly, credible health care for deployed troops has become one of the foremost preconditions for continuing public support.

Great progress has been achieved in the medical world since the sixties and the seventies. Medicine has become more and more sophisticated, but also more and more expensive. Military medicine has had to keep up, especially as public opinion and politicians expect the highest standards of care and will not tolerate large numbers of casualties in the types of deployments that we now face, especially while peoples in their homelands remain in uninterrupted peace. Today, the demand is for armed forces members to receive individual specialized care that is equivalent to civilian treatment protocols, and with the best possible outcome. This places, a tremendous strain on all nations' military health care support systems.

In the opening decades of the 21st Century, conflicts are tending to be asymmetric internal struggles, or crises in failing states, rather than classic interstate wars. The Atlantic Alliance's members have increasingly been asked to respond to these situations, as well as globally cope with humanitarian and natural disasters.

Individually, the governments of member nations continue to bear the ultimate political responsibility for the security of their own states, and to accomplish this they must, by necessity, continue to maintain credible and capable national armed forces, including comprehensive military health care services with the wherewithal to support territorial defence needs, and to promptly respond to domestic and natural crises occurring on their own soil. Even so, the capability of all member states to continue to be able to support "classic" high-intensity collective defence operations also remains a necessary requirement for all NATO nations' medical services.

Preventing and countering terrorist attacks, including the employment of weapons of mass destruction (WMD), and adapting to nonlinear battle space without clear front lines provides new challenges to NATO medical systems. International conflict management brings a high probability that national military medical resources will be required to deploy to remote locations, and to conduct new types of missions such as crises response, or

disaster relief, on very short notice. This demands highly mobile and expeditionary forces with suitable structured supporting medical support systems. Short time lines produce a special focus on movement and transport, and limit the logistic and medical footprint that can immediately be deployed. This leads to a whole new requirement for concerted multinational medical support integration, as not every NATO troop contributor can readily field a complete health support system.

Remote locations multiply the health risks compared to the old, well-known scenarios of homeland or territorial defence. Force health protection has gained a much greater impact on operational planning and conduct, as medical preparations (vaccinations or determination of fitness for deployment) and force protection measures (hygiene, communicable disease control, heat or cold injury prevention etc.) must be taken into account. These elements can best be addressed in a multinational and integrated approach.

Fortunately, medical services' partners are not only to be found on the military side: In failing states and during internal struggles by multiple belligerent parties, insurgent bodies or terrorist groups, as in Afghanistan, Somalia or Congo, we face what the UN Office for the Coordination of Humanitarian Assistance (UNOCHA) calls "Complex Emergencies." In the past, the military might have been involved in disaster response only in very initial stages, as a player with readily deployable forces, sustainable without local infrastructures, to rapidly hand over to civilian organizations.

The Canadian government has consistently demonstrated strong support for humanitarian assistance and disaster-relief operations throughout the world. Nationally and internationally, the CF has deployed to disaster-stricken regions to conduct humanitarian relief operations. International missions since 1990 include relief operations in Rwanda, Haiti, Honduras and Turkey.

In 1994, the CF deployed 2 Fd Amb to Rwanda to provide medical relief to the refugees suffering from the many ill effects of the conflict in that country. Despite the best efforts of all concerned, the relief effort arrived after the peak of a cholera epidemic that brought great suffering. This experience convinced the Canadian government of the need to create a rapid-response capability to provide effective humanitarian aid. The concept of the CF Disaster Assistance Response Team (DART) was born.¹⁶³

The DART is a military organization designed to deploy rapidly anywhere in the world to crises ranging from natural disasters to complex humanitarian emergencies. The DART: responds rapidly, in conjunction with national and regional governments and non-governmental agencies, to stabilize the primary effects of an emergency or disaster; provides purified drinking water and medical aid to help prevent the rapid onset of secondary effects of a disaster; and gains time for the deployment of national and international humanitarian aid to facilitate long-term recovery in a disaster-stricken community.

Comprising about 200 CF personnel ready to deploy quickly to conduct emergency relief operations for up to 40 days, the DART can either enhance emergency relief efforts or bridge the gap until members of the international community arrive to provide long-term help. The DART is designed to deploy only to permissive environments — that is, locations where it will not encounter any organized resistance or threat. For international missions, the DART can be activated by a request from either an individual country or from the United Nations (UN). Regardless of the source of the request, the final decision to deploy the DART rests with the Canadian government, based on advice from Foreign Affairs Canada, the DND, and the Canadian International Development Agency.

The DART is composed of highly trained military personnel drawn mostly from Land Force units. It comprises the following main elements:

DART Headquarters, consisting of about 45 personnel drawn mainly from the CF Joint Headquarters and the Canadian Forces Joint Signal Regiment, both based in Kingston, Ontario. DART Headquarters is responsible for command and control in theatre, and for the strategic-level liaison required to determine and co-ordinate the DART's humanitarian response with the governments of Canada and the host nation, and officials of international organizations and non-government organizations operating in theatre.

A logistics platoon of about 20 personnel, responsible for the logistical support services essential to the sustainment of the DART, such as maintenance, transport and movements control, supply, procurement and contracting, and food services.

An engineer troop of about 37 personnel, including both field and construction engineers. The field engineer element consists of a water supply section, a field engineer section and a heavy equipment section. The construction engineer element provides limited construction and utility services. The engineer troop produces bulk and bagged water from its Canadian-built Reverse Osmosis Water Purification Unit (ROWPU), which can produce purified drinking water for use by health services and for distribution to disaster victims. Once it has completed the DART camp — an austere facility — the engineer troop can take on other tasks in support of the host nation and humanitarian aid agencies.

A medical platoon of approximately 40 personnel is able to provide support to area hospitals or to operate a small medical aid station, a tented facility capable of providing care for 200 to 250 out-patients and ten in-patients per day, depending on the requirements of the mission. The medical aid station currently includes a laboratory, a pharmacy, limited obstetrics services, and re-hydration and preventive medicine sections; it has no surgical or trauma-care capabilities. The medical platoon provides treatment of minor injuries, disease control and routine health care services to relieve the host nation's medical facilities of these responsibilities.

A defence and security platoon of about 45 personnel to provide camp security and general support for DART operations.

Today, military and civilian players meet in 'Complex Emergencies' characterized by protracted humanitarian crises in potentially hostile environments – millions of people are threatened by starvation or disease, while armed conflict continues. Thus coordination of military medical activity with civilian governmental and non governmental organizations

(GO/NGO) is of paramount importance for the benefit of local populations, and ultimately as well to military mission success.

The vision of NATO/COMEDS as approved in 2008 demonstrates the expanded role for military medical services in comparison to the older approach that focussed entirely on support to a nation's own troops: "NATO's military medical services will promote health and contribute to the success of NATO's missions by expediting the full range of military medical activities in all phases of military operations and providing health care equating in quality to the best medical practice."¹⁶⁴

This vision statement includes all medical activity to support the NATO mission goals, including – as the current example of the operations in Afghanistan show – contribution to a 'Security Sector Reform' by training indigenous armed forces medical services, providing support to local populations in remote locations where even NGO cannot, or participate in the reconstruction of the public health system.

Maintaining a national capability to deliver state-of-the-art medical care to deployed Canadian troops, for battle casualties or any other injury or disease, must, of course, remain at the very core of the CFHS mission. But in the light of an "effects-based approach to operations," where every functional area must contribute the utmost possible to meet the common goals effectively, future "medical operations" will have to be regarded in a much broader way than in the past.

APPENDIX A

OFFICIAL CITATION FOR THE AWARD OF THE DISTINGUISHED CONDUCT MEDAL TO CORPORAL WILLIAM ERNEST POOLE, RCAMC

Canada Gazette April 12, 1952



"L 800192 CORPORAL POOLE, WE, RCAMC was the NCO in charge of stretcher-bearers with B Company during this operation; his actions in dealing with the casualties suffered gave evidence of courage of the highest order under Enemy Fire and contributed very markedly to the ultimate success of the operation.

Corporal POOLE proceeded forward through intense Enemy mortar and shell fire to render first aid and arrange for the evacuation of the wounded. He was warned that he could be killed but he insisted, 'I have a job to do and I am going to do it.' He searched meticulously the whole area and did not stop until satisfied that all casualties had been accounted for. Enemy artillery and mortars were harassing the area, and Enemy snipers and machine gunners made any movement hazardous, but nothing could deter him in his search for the wounded. Two of the casualties were again hit while he was tending them, but he continued with unruffled calm to render aid.

While still under fire Corporal POOLE improvised stretchers from rifles and branches of trees; he bound the casualties securely by using thick vines. He moved from man to man with complete disregard for his own safety; his steady hand and quiet courage brought relief to all the wounded. No. 5 platoon was ordered to pass through No. 6 platoon in order to maintain the momentum of the attack. They, too, came under heavy fire and suffered serious casualties. Corporal POOLE was on hand at once and urged the Platoon Commander, 'Go on, I will see that your men get good care.'

When the wounded had been prepared for evacuation, Corporal POOLE led his party of bearers back some three thousand yards in the dark to the Regimental Aid Post. The route was subjected to continuous shell fire. Enemy patrols had infiltrated along both sides, the area was heavily mined, and even the natural hazards were enough to deter any but the very brave. But Corporal POOLE led his party with confidence and all the casualties were borne safely to the Regimental Aid Post. Undoubtedly his leadership and the persistence with which he carried out his duties against any odds was vital in saving the lives of one Officer and three other Ranks and in preventing two of the wounded from falling into the hands of the Enemy.

Throughout the day of 3 OCT, all that night and the next day, Corporal POOLE continued his task of attending the needs of the wounded. Whenever first aid was required, he was present to administer it. He was utterly tireless in his work. During the operation one thought only dominated his action: That his duty was to tend his wounded comrades. No obstacles, no hazard, no personal danger, was allowed to stand in his way; his selfless devotion to his work was in the highest traditions of Military Service.

Corporal POOLE's conscientious determination to carry out his duties, his complete disregard for his own well being, his exemplary conduct under the most adverse conditions and his outstanding leadership resulted not only in saving the lives of five men and making possible the evacuation of and treatment of many others, but, even more, inspired his comrades to maintain the fight and contributed largely to the successful attainment of the objective."

ACKNOWLEDGEMENTS

This story started with a simple premise that in recent years the proud and selfless history of Military Medicine in Canada has faded from Canadians' consciousness and should, therefore, be retold. The search for material was widespread. As a result the author is deeply indebted to many people and many organizations, and herewith extends his sincere appreciation.

The author searched many magazines, books, and newspapers. Some furnished excerpts which were condensed, woven into the general story, and attributed to their author's in the text. Information gleaned from DND web sites has also been attributed in the text. However, it is not to be construed as representing an official DND version of the materials reproduced, nor as having been made, in affiliation with or with the endorsement of the DND.

Canadian Military History Magazine is thanked for its kind permission to cite passages from the article by Bill Rawlings: "Providing the Gift of Life, Canadian Practitioners and the Treatment of Shock on the Battlefield," published in the Winter 2001 edition. The author is particularly appreciative of the careful review of an early draft of the text, and the useful and discerning critiques provided by, Lieutenant-Colonel (Ret'd) W.E. Dauphinee, Lieutenant-Colonel (Ret'd) A.D. Scott, Major (Ret'd) D. Pilote, and Doctor Philip G. Winkelaar, CD, MD.

CHART AND PHOTOGRAPH CREDITS

The charts, and photographs in this book are listed with their source and any additional information on record. These abbreviations are used:

- CAW Canada at War Website
- CWM Canadian War Museum
- DND Department of National Defence
- KVA Korea Veterans Association of Canada, Inc.
- LAC Library and Archives Canada
- NGC The National Gallery of Canada

Charts

Chart No. 1. First World War- Medical Arrangements in the Field - The Chain of Medical Casualty Evacuation. A.E. Snell, Colonel, RCAMC, The C.A.M.C. With The Canadian Corps During The Last Hundred Days of the Great War (Ottawa: F.A. Acland, Printer to the King's Most Excellent Majesty, 1924). p 11.

Chart No. 2. Second World War-Plan of Casualty Evacuation in the Field,-The Chan of Medical Casualty Evacuation. W.R. Feasby, Official History of the Canadian Medical Services 1939-1945, Volume One Organization and Campaigns (Ottawa: Edmond Cloutier, Queen's Printer and Controller of Stationary, 1956).p. 86.

Photographs

Front Cover

Top left. A fellow soldier and medical personnel tend to a badly wounded Canadian. While one bandages his wound, the other lights his cigarette. Strong relationships forged in the trenches, and loyalty to one's chums, were among the primary factors in supporting morale. CWM 19920044-664.

Top right. Chaplains work closely with members of RAP and aid in evacuation of wounded, 3rd Canadian Infantry Division. 15 July 1944, Caen area, France. CAW.

Centre. "We're going on another foot patrol. During a routine patrol An elderly Afghan man is sitting at the side of the road, his trouser leg soaked with blood. He's been hit by a ricochet from one of the warning bullets fired at the motorbike driver A Canadian medic hurries over and begins first aid. It's a flesh wound. The Afghan is helped to his feet and hobbles his way to a car which takes him to a local hospital for further treatment. Canadians apologize and promise to follow up. Canadians have set up a cordon and have brought in an armoured vehicle as back up. Nobody is being allowed down this street until the wounded Afghan is on his way and the patrol can get moving."G. Thompson. Escalation of Force. communities canada.com/Edmonton Journal/blogs August 17, 2008. Internet: accessed: September 7, 2009.

Bottom left. Montage Canadian Medical and Dental Services Personnel in Korea with 25 FDS, 37 Fd Amb. 1951-1953. KVA.

Bottom right. Lieutenant-Commander Fred Day and officers of the auxiliary anti-aircraft ship HMCS PRINCE ROBERT with liberated Canadian prisoners-of-war at Shamshuipo Camp, Hong Kong, August 1945. LAC.

No. 1. A group of Anglican nuns from Toronto served in 40-bed hospital 2 Field Hospital in Moose Jaw during the Northwest Rebellion of 1885. They cared for sick and wounded from the battles of Batoche and Fish Creek. Twelve women in all were part of the first organized body of female nurses in Canadian military history. Note the group of wounded patients at centre, two of whom have lost an arm. Canadian Government. Canadian Military History Gateway. http://www.cmhg-phmc.gc.ca/cmh/en/image_536.asp. Internet: accessed October 2, 2009.

No. 2. Carry On World War I Poster for Canadian Victory Bonds, LAC, C-005792.

No. 3. Canadian Wounded are brought in from the battlefield at Vimy Ridge, W.I. Castle, Canada. DND. Over 10,000 Canadians were wounded in the battle; 3600 died. LAC, PA-001125.

No. 4. Canadian Blood Transfusion Unit which operated during the Spanish Civil War. Dr. Norman Bethune is at the right. ca. 1936 - 1937, Spain. LAC, PA-117423.

No. 5. A Wounded Sergeant Is Assisted by Two Fellow Soldiers, Bayeux, France, June 14, 1944. Sergeant W.G. Grant, who has broken his leg, receives assistance from Captain Colin McDougall (left) and Private M.W. Treganza. More than 18,000 Canadians were wounded during the 10-week Normandy campaign, over 5,000 of whom died. Lieutenant Ken Bell Photograph, Canada. DND, LAC, PA-152089.

No. 6. Royal Canadian Army Medical Corps Rehearse for Raid on Dieppe. Canada. Dept. of National Defence, LAC, PA-113242.

No. 7. Photograph No. 6. Corporal (later Major) Werner Wilhelm Shuler, RCAMC, Goes as "Ballast" Aboard a US Army Medevac Helicopter, Kapyong, Korea., 22-25 April, 1951. From the author's private collection..

No. 8. Medical Exercise, 1 Canadian Field Ambulance members practice application of a Thomas Splint on a simulated casualty while hosting medical specialists from the British and German armies during field training conducted by the unit in the Meschede training area, Germany, 1963. From the author's private collection.

No.9. HMCS Halifax's Physician's Assistant and the stewards in casualty clearing prepare the wardroom as an alternate triage area for action stations. Credit: HMCS Halifax, SLT Redshaw, http://www.marine.forces.gc.ca/halifax/2/2-s_eng.asp?category=232&title=1588, Internet, accessed September 20, 2009.

No. 10. Canadian soldiers evacuate injured personnel from Kandahar Airfield after their armoured vehicle was struck by an oncoming vehicle outside of Kandahar City. The March 31, 2006, incident wounded two Canadian soldiers. Redir: Robin Mugridge, Credit: CF Combat Camera.

ABBREVIATIONS

1 FH	No. 1 Field Hospital
1 ABMS	No. 1 Airborne Medical Section
1 CFH	No. 1 Canadian Field Hospital
1 CGH	No. 1 Canadian General Hospital
1 CAD	No. 1 Canadian Air Division
10 CFH	No. 10 Canadian Field Hospital
11 CFA	No. 11 Canadian Field Ambulance
2 FH	No. 2 Field Hospital
25 CIBG	25 th Canadian Infantry Brigade Group
27 CIB	27 th Canadian Infantry Brigade
3 CGH	No. 3 Canadian General Hospital
3 PPCLI	3 rd Battalion Princess Louise's Light Infantry
ABCA	American, British, Canada, Australian
ABTSRU	Army Blood Transfusion and Surgical Research Unit
ACMR	Associate Committee on Medical Research
ADMS	Assistant Director Medical Services
ADS	Advanced Dressing Station
AE	Aeromedical evacuation
AFB	Air Force Base
AG	Auditor General
AMC	Army Medical Corps
AMD	Assistant Medical Directorate
AMEDD	Army Medical Department
AMSC	Army Medical Staff Corps
ASC	Advanced Surgical Centre
AUS	Australia
B.C.A.	Before the common era
BCATP	British Commonwealth Air Training Plan
CAMC	Canadian Army Medical Corps
CANS	Canadian Army Nursing Service
CBMU	Canadian Base Medical Unit
CCATT	Critical care air transport team
CCS	Casualty Clearing Station
CEF	Canadian Expeditionary Force
CF	Canadian Armed Forces
CFB	Canadian Forces Base
CFDSS	Canadian Forces Dental Services School
CFH	Canadian Forces Hospital
CFHS	Canadian Forces Health Service(s)
CFHSG	Canadian Forces Health Services Group
CFMS	Canadian Forces Medical; Services
CFMSS	Canadian Force Medical Services School
CFSAT	Canadian Forces School of Aero Medical Training
CGH	Commonwealth General Hospital
CMA	Canadian Medical Association
CMR	Canadian Mounted Rifles
CO	Commanding Officer
COMEDS	Committee of the Chiefs of Military Medical Services
CPE	Continuing Professional Education
D.C.	District of Columbia

D.C.M.	Distinguished Conduct Medal
DART	Disaster Assistance Response Team
DDMS	Deputy Director Medical Services
DGAMS	Director General Army Medical Services
DGHS	Director General Health Services
DGMS	Director General Medical Services
DMS	Directorate of Medical Services
DSP	Distinguished Service Order
DVA	Department of Veterans Affairs
Fd Amb	Field Ambulance
FDS	Field Dressing Station
FST	Field Surgical Team
FSU	Field Surgical Unit
FTT	Field Transfusion Team
FTU	Field Transfusion Unit
GAD	Generalized anxiety disorder
GO	Government organization
GOC	General Officer Commanding
H Svc Res	Health Services Reserve
HMCHS	Her Majesty's Canadian Hospital Ship
HMHS	Her Majesty's Hospital Ship
HSSU	Health Services Support Unit
HWC	Health and Welfare Canada
IED	Improvised explosive device
ISAF	International Security Assistance Force
KAF	Kandahar Airfield
KIA	Killed in Action
LAV	Light Armoured Vehicle
LRMC	Landstuhl Regional Medical Centre
M.P.	Member of Parliament
MASH	Mobile Army Surgical Hospital
MBE	Member of the Order of the British Empire
MC	Military Committee
MCSP	Maintenance of Critical Skills Programme
MD	Medical doctor(s)
MDD	Major depressive disorder
MDS	Main Dressing Station
MHC	Military Hospital Commission
MND	Minister of National Defence
MNMH	Multinational Medical Hospital
MO	Medical Officer(s)
MSF	Mobile Striking Force
NATO	North Atlantic Treaty Organization
NCO	Non commissioned officer(s)
NDHQ	National Defence Headquarters
NGO	Non governmental organization
NPAM	Non Permanent Active Militia
NRC	National Research Council
NWMP	North West Mounted Police
OTSSC	Operational Trauma and Stress Support Centre
PAM	Permanent Active Militia
PMO	Principal Medical Officer(s)
POW	Prisoner of War

PTSD	Post traumatic stress disorder
RAMC	Royal Army Medical Corps
RAP	Regimental Aid Post
RCAF	Royal Canadian Air Force
RCAMC	Royal Canadian Army Medical Corps
RCAMC (NP)	Royal Canadian Army Medical Corps (Non Permanent)
RCASC	Royal Canadian Army Service Corps
RCD	Royal Canadian Dragoons
RCDC	Royal Canadian Dental Corps
RCN	Royal Canadian Navy
RMO	Regimental Medical Officer(s)
SOM	School of Operational Medicine
STC	Special Treatment Centre
Surg Gen	Surgeon General
TB	Treasury Board
TBI	Traumatic brain injury
U.S.	United States
UK	United Kingdom
UN	United Nations
UNEF	United Nations Emergency Force
UNFICYP	United Nations Force in Cyprus
UNMOGIP	United Nations Military Observer Group in Pakistan
UNOCHA	United Nations Office for the Coordination of Humanitarian Assistance
USAF	United States Air Force
USN	United States Navy
USNS	United States Navy Ship
VC	Victoria Cross
WIA	Wounded in Action
WMD	Weapons of Mass Destruction

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ENDNOTES

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Internet: accessed October 7, 2009.

Colonel commandants are an important part of the fabric of the military community. Honourary rank is granted to a person who has rendered distinguished service to the Canadian Forces or who, from a professional, educational, or administrative point of view is likely to promote the well-being of the CF. The responsibilities of a Colonel Commandant include fostering esprit de corps, developing, promoting and sustaining strong community support for the unit, establishing and maintaining liaison with unit charities and associations, establishing and maintaining a liaison with the Commander as well as with other persons with honorary appointments, participating in parades and official functions in which the unit takes part, and advising the unit's commander.

2. Ann M. Becker, "Smallpox in Washington's Army: Strategic Implications of the Disease During the American Revolutionary War,"

The Journal of Military History - Volume 68, Number 2, April 2004, p. 381-430.

3. A. E. Snell, Colonel, RCAMC, The C.A.M.C. With The Canadian Corps During The Last Hundred Days Of The Great War (Ottawa: F.A. Acland Printer to the King's Most Excellent Majesty, 1924). p. 1.

4. Peter Lovegrove, Not Least In The Crusade (Aldershot: Gale & Polden Ltd. 1951). p. 1.

5. W.G. Clever, Major, RCAMC, "The Royal Army Medical Corps." Canadian Army Journal, Vol. VIII, No. 3 (July 1954).

6. Larré was surgeon-in-chief of the Napoleonic armies from Italy in 1797 to Waterloo in 1815. During this time, he initiated the modern method of army surgery, field hospitals and the system of army ambulance corps. After seeing the speed with which the carriages of the French flying artillery manoeuvred across the battlefields, Larré adapted them as Flying Ambulances for rapid transport of the wounded and manned them with trained crews of drivers, corporals and litter bearers. Larré also increased the mobility and improved the organization of field hospitals, effectively creating a forerunner of the modern Advanced Surgical Centres units. He established a rule for the triage of war casualties, treating the wounded according to the seriousness of their injuries and urgency of need for medical care, regardless of their rank or nationality. Soldiers of enemy armies, as well as those of the French and their allies, were treated.

7. Shawn Christian Nessen, Dave Edmond Lounsbury, Stephen P Hetz ed, War Surgery in Afghanistan and Iraq - A Series of Case Studies, 2003-2007 (Washington, DC: Office of the Surgeon General, Department of the Army, USA. 2008). op. sit.

8. T.B. Nichols, R.A.M.C., Lieutenant-Colonel, Organization, Strategy And Tactics Of The Army Medical Services In War, (London: Bailliere, Tindal and Cox, 1937), p.5.

9. Department of National Defence. Manual Of The Canadian Forces Medical Services In The Field 1959. (Ottawa, ON : The Queen's Printers and Controller of Stationery, 1959). p. xi.

10. MacPhail, p.149.

11. F.A.E. Crew, The Army Medical Services, Administration Volume 1 (London: Her Majesty's Stationery Office, 1953). p. vi.

12. J. George Adami, War Story of the Canadian Army Medical Corps (Westminster, S.W. and : Published for the Canadian War Records Office by Colour Ltd., 1918) Volume I., The First Contingent.,

13. Canadian Genealogy Resources, Fenian Raids 1866 - 1870, The Battle of Ridgeway, <http://www.canadiangenealogy.net/fenian/battle-ridgeway.htm>.: Internet: accessed August 10, 2009.

14. Dr. G.P. Girdwood (1832-1917) of Montreal, referred to as the Father of radiology in Canada, was a founding member of the American Roentgen Ray Society (ARRS) and served as its President in 1902.

15. University of Toronto/Université Laval, The Dictionary of Canadian Biography, (Toronto, ON: University of Toronto Press, 2000). 1911-1920 (Volume XIV.).

16. Clever, op. sit.

17. 1st Viscount Wolseley, Garnet Joseph Wolseley, soldier (b at Golden Bridge House, Ire 4 June 1833; d at Menton, France 25 Mar 1913). Wolseley served with the British army in India, the Crimea and China. In 1861 he was sent to Canada as assistant quartermaster general, becoming deputy quartermaster general in 1865. In 1870 he commanded the expedition to the Red River where his organizational skills won plaudits. After 1871 he alternated between the War Office and field command and was commander in chief of the British army 1895-1900.

18. James H. Marsh, ed, The Canadian Encyclopaedia Website, Red River Expedition, <http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1ARTA0006726>. Internet: accessed August 15, 2009.

19. Jean Boileau, "Voyageurs on the Nile." Legion Magazine, (January , 2004).

20. E.W. Young, Surgeon Major, Army Medical Department Great Britain Report for the Year 1870, Volume XII, Medical History of the Red River Expedition in the Months of May - October 1870, (London: Printed for Her Majesty's Stationery Office by Harrison and Sons, 1872). Appendix XL.

21. Boileau, op. sit.

22. Darby Bergin, Lieutenant-Colonel, MD, MP for Cornwall, Commanding Officer of the Stormont and Glengarry Battalion had served as a Captain at Laprairie in 1863, and as a Major in the Fenian Raids. He had practiced since 1847 and held the highest medical appointments in Ontario.

23. MacPhail, p.9.

24. Thomas George Roddick, Sir, surgeon, medical administrator, politician (b. at Harbour Grace, Nfld 31 July 1846; d. at Montréal 20 Feb 1923). A McGill medical graduate, he was the first chief surgeon of the Royal Victoria Hospital in Montréal, professor of surgery and dean of medicine of McGill.

25. Clever, op. sit.

26. Douglas won his VC with the British Army in the Andaman Islands in 1867, In 1885 he took a medical detachment to Calgary and then paddled 200 miles alone down the South Saskatchewan River to get to the scene of action. He was appointed Director of the Ambulance Corps for the campaign.

27. Desmond Morton, The Last War Drum, The North West Campaign of 1885, (Toronto, Hakkert, 1972). p. 38-39.

28. Mother Hannah, of the newly-established Order of St. John the Divine, Church of England, was from Toronto.

29. Miss Miller was head nurse of Winnipeg General Hospital.

30. G.W.L. Nicholson, Canada's Nursing Sisters, (Toronto: Hakkert, 1975). p. 23-25.

31. The Red Cross stems from the efforts of a Swiss, Henri Dunant, who in Italy in 1859 spent several days caring for men who, because of the inadequate medical facilities of the armies of the day, had been left unattended on the battlefield of Solferino. His writings led to the Geneva Convention of 1864 concerning the treatment of those wounded in war and the protection of medical personnel and the international adoption of the Red Cross flag as protection for medical services. The Geneva Convention of 1864 was later amended and revised by the Conventions of 1907, 1929 and 1949. The Canadian Red Cross Society was organized in 1896.

32. Clever, op. cit.

33. Letter from Bergin to Caron, 21 July 1885, North-West Field Force – Register of all Expenses, Wages, Rations, etc. RG 9, Militia and Defence, Series II-A-3, Volume 6, Reel T-10395, NAC.

34. Nicholson, p.26.

35. J.H.L. Neilson, Colonel, was a bilingual Canadian educated at Laval University, His service included: Surgeon of the Quebec Provisional Brigade of Garrison Artillery, 1869; Assistant Surgeon of B Battery School of Gunnery; Surgeon-Major with the Red River Expedition of 1870s; service in the Fenian Raids of 1870s; Red Cross surgeon in the Russo-Turkish War of 1876; Surgeon to the Canadian Voyageurs in the Sudan Expedition under Sir Garnet Wolseley in 1884-85; two years' attachment to the British Army. He had made studies of the medical services of the United States and of various European countries.

36. Adami, op. cit.

37. Eugene Fiset is an example of a unique French Canadian officer who rose to high rank and distinguished recognition while serving his country in the Boer War. He later rose to the position of Director General of the Army Medical Service. Following military service he was a Deputy Minister of Militia and Defence, a Major-General, a Member of Parliament, and finally the Lieutenant Governor of Quebec.

38. Georgina Fane Pope, a native of Prince Edward Island, had served in the North-West Rebellion 15 years before. Later she would finish off her distinguished career in Canada's military nursing service as the first matron of the CAMC.

39. One of the four additional nurses to deploy with the second contingent in January 1900 was Margaret Clotilde Macdonald, She later became matron-in-chief of the Canadian Nursing Service in WW 1. All eight nurses who served in South Africa ended their exacting tour of duty in mid-December 1900. As the Boers were forced back, the nurses were moved forward to take charge of or help staff hospitals in larger urban centres.

40. The Canadian Parliament. Biographical Sketches and Photo-engravures of the Senators and Members of the House of Commons of Canada. Being the Tenth Parliament Elected November 3, 1904. (Montreal: Perrault Printing Co.1906). Arthur Norreys Worthington was Surgeon to the 53rd Regiment and to the Sherbrooke Protestant Hospital; Governor of the College of Physicians and Surgeons of the Province of Quebec ; President of the District of St. Francis Medical Association. He served in the Northwest Rebellion in 1885, and took part in the South Africa Campaign in 1900-01, In 1902, he commanded the Canadian Field Hospital in South Africa. He was promoted Lt-Colonel for South African Service and appointed PMO of the 5th and 6th District. He was a Conservative,. Sherbrooke, QC, and was first returned to Parliament at the general elections of 1904.

41. Clever, op. cit.

42. Lieutenant-Colonel Guy Carleton Jones later became Lieutenant Governor of Nova Scotia. He was second in command of 10 CFH during the South African War and commanded its mobile detachment in support of 2 CMR during operations in the Transvaal. In the First World War, he was DGMS for the CEF in France.

43. MacPhail, p. 145.

44. Ian Standish Monteith Hamilton, General, Sir, GCB, DSO, Inspector General Overseas Forces, British War Office, was later the Commander in Chief of the Mediterranean Expeditionary Force in the unsuccessful campaign against Turkey at Gallipoli.

45. MacPhail, p. 12.

46. Ibid, p. 29.

47. Ibid, p. 11.

48. The Militia Council, Regulations for the Canadian Medical Service 1914. (Ottawa, Government Printing Bureau, 1915).

49. Christopher McCreery, The Maple Leaf and the White Cross (Toronto: Dundurn Press, 2008) p. 66.

50. Snell, p. 6.

51. Ibid, p. 3.

52. Macphail, Ch 13-14.

53. Ibid. p. 320.

54. Ibid, p. 180.

55. V.C. awarded during action with the 14th Battalion, in the Second Battle of Ypres.

56. V.C. awarded during action with the 75th Battalion, at the Drocourt-Queant Line.

57. John Bassett, John McCrae. (Markham: Fitzhenry & Whiteside, 1984). p. 44.

58. William D. Mathieson, My Grandfather's War. (Toronto: Macmillan, 1981). p. 264.

59. National Archives of Canada, Record: MG 30 E I33, volume 4, "Origin of 'In Flanders' Fields.'"

60. MacPhail, p. 230.

61. Ibid. p.239

62. Ibid. p.243.

63. The Sinking of H.M.H.S. Llandoverly Castle

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64. C.P. Stacey, Official History of the Canadian Army in the Second World War, Volume 1, Six Years of War, The Army in Canada, Britain and the Pacific, (Ottawa: Edmond Cloutier, Queen's Printer and Controller of Stationery, 1955). p. 4.

65. Snell, p.11.

66. W.R. Feasby, Official History of the Canadian Medical Services 1939-1945, Volume One Organization and Campaigns (Ottawa: Edmond Cloutier, Queen's Printer and Controller of Stationery, 1956). p. 8.

67. Ibid. p.10.

68. Stacey, Six Years of War, p. 19.

69. C.P. Stacey, The Canadian Army 1939-1945 An Official Historical Summary (Ottawa: Edmond Cloutier, King's Printer, 1948). p.2.

70. E.L.M. Burns, Manpower In The Canadian Army 1939-1945 (Toronto: Clarke, Irwin & Company Ltd. 1956). p. 48.

71. Clever, p. 36.

72. Feasby, Organization and Campaigns. p. 33.

73. Burns, p. 48.

74. Feasby, Organization and Campaigns. p. 20..

75. Ibid, p. 58.

76. Ibid, p. 46.

77. Stacey, Six Years of War, chap. 2.

78. Feasby, Organization and Campaigns p. 48.

79. Stacey, Six Years of War, p.109.

80. Bill Rawling, "Providing the Gift of Life, Canadian Medical Practitioners and the Treatment of Shock on the Battlefield." Canadian Military History, Volume 10, Number 1, Winter 2001. p.70-20.

81. World War II Forums. Prisoners of War in Hong Kong.
<http://www.ww2f.com/cbi-theater/23242-medical-personnel-pows-hong-kong.html>

Internet: accessed August 15, 2009.

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