



Key Case

Disaster Planning: St. Boniface General Hospital A Case Study of the Flood of the Century

By Real J. Cloutier, Jan Greenwood, Jeffrey R. Malawski, Kenneth P. Tremblay



During the Spring of 1997 southern Manitoba experienced one of the most devastating floods in its history. While the Red River overflowed its banks at levels not experienced in the past century, thousands of individuals raced to protect lives, property, and land. The City of Winnipeg itself was saved thanks to the Red River Floodway (a massive flood diversion system constructed following the 1950 flood), along with other support resources. The 1997 floodwaters were several feet higher than those of the 1950 flood, and so the potential threat to the city was significant. Numerous people expressed concern regarding the Floodway diversion system's capability of holding back a flood of this magnitude, where water levels of this height in the region were experienced only once.

The St. Boniface General Hospital, located on the east bank of the Red River in the City of Winnipeg, was forced to take significant measures in order to protect patients, staff, and its physical assets, which took the form of evacuating the site and transferring programs to alternative sites in the city.

The Hospital is a 600-bed tertiary-care academic health sciences centre and the second largest hospital in the Province of Manitoba. It has many specialized programs that provide service to individuals throughout the province along with Northwestern Ontario. Specialized areas include neurosurgery, cardiac surgery, neonatal intensive care, medical intensive care, surgical intensive care, dialysis, invasive cardiology, and Magnetic Resonance Imaging. In addition, the Hospital has a free-standing Research Centre which houses millions of dollars in specialized equipment and laboratories.

SCALE OF THE FLOOD

By May 4th, 1997 the flood area of the Red River was 1950 square kilometers – a surface area greater than 28

countries in the world, bigger than the Dead Sea, and one-half the size of Lake Nipigon. This massive natural disaster caused the evacuation of 25,000 residents from their Red River Valley homes. Efforts to protect lives and property resulted in the mobilization of 8500 military personnel, thousands of volunteer civilians, dike-construction contractors, and the production of well over 10 million sandbags. It is estimated that flood-fighting efforts and damage costs to the region are in the range of \$250 million.

RESPONSE MANAGEMENT

The Hospital established a Flood Contingency Committee to plan and coordinate for what it initially thought would be an essentially localized event, with site-specific strategies to protect the facility's assets (e.g., sandbagging) and prepare for flood-related demands for service visits (e.g., ER). However, as the events in Grand Forks, North Dakota, and southern Manitoba unfolded, it became apparent that this disaster was taking on a much wider scope. Images of the destruction in Grand Forks made people realize that the floodwaters flowing north to Winnipeg were a threat never before encountered in our lifetime.

Thus, the main vulnerabilities of the St. Boniface campus were twofold:

1. *Proximity to the Red River.* The Hospital has approximately 1750 feet of frontage along the east shore of the river, protected by a permanent earthen dike. However, the crest was predicted to be within inches of its top. Preparation by the city provided an additional 18 inches (45 cm) of fill to this margin.
2. *An underground tunnel system, including electrical vaults.* The campus consists of several buildings connected by underground tunnel systems which are well below grade. Our Mental Health (McEwen) building has a loading dock a few feet from the river's edge. Any breach of the

permanent dike would have enabled access (albeit sandbagged) to the tunnel system. The same pedestrian tunnel system contains numerous electrical vaults and other mechanical services for the site. Since the same distribution system carried power for our emergency electrical system, there was a very real possibility that in the event of a breach of the dike, either along our property or up/downstream, there would be no power on the site. Past experience indicated that the tertiary patient population could not be evacuated easily or without power.

The levels of cooperation and effort witnessed during the Hospital's contingency period were nothing short of remarkable. Internally, the commitment of all staff to the protection and safety of patients and property was readily apparent, despite overall diminished morale as a result of change, downsizing, and reorganization. Externally, the system's efforts to plan for and then take the second-largest hospital in the province off-line were significant. The diversion and relocation of patients to other facilities within Winnipeg taxed their resources but not their resolve to cooperate. This level of cooperation among facilities was unprecedented. Many people recognized that such cooperation and flexibility could also serve the system well on an ongoing basis, and legacies, like a bed registry system for the city, have endured since the flood.

While the Hospital Contingency Committee did oversee all internal disaster-response planning, it became one cog in a broader healthcare-system planning process coordinated by Manitoba Health and the even broader disaster-management system that included local, provincial, and national disaster coordination processes.

Politics does play a part in disaster planning and the response to disasters. We experienced, at least at the outset, conflicting information, advice, and directions from Province of Manitoba

and City of Winnipeg emergency-measures personnel. The media, too, were victims of numerous sources of information that were sometimes in conflict. It quickly became apparent that communication needed to flow through one Hospital representative in order for the facility to interpret, amalgamate, and respond appropriately to sometimes diverse recommendations. This person was the chair of our Disaster Planning Contingency Committee. Over time the divergent information lessened and we essentially followed the direction of Manitoba Health at the provincial level.

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The entire event also presented a lesson in human behavior. While individuals responded incredibly well, there was an underlying fear that Winnipeg's Floodway system could not sustain the massive body of water migrating north. The national media focused on the "Race to Brunkild" – the construction of a 45-km dike running to the west and south of the city in order to contain the "lake," as water levels surpassed computer-generated models for the flood area. Thus, people at the Hospital caring for patients and responding to the crisis were also coping with the underlying fear for themselves, their families, and their homes.

ORGANIZATIONAL HIGHLIGHTS

Manitoba Health conducted daily

conference calls with delegates of the nine Winnipeg facilities as well as military, civic, and home-care representatives. The Winnipeg Hospital Authority (WHA), part of the provincial government's regionalization process, was in its infancy. The WHA model is intended to include city-wide management of all clinical programs under one governing body. Attempts to implement this city-wide program management model during the flood produced mixed results, primarily related to sources of authority, approvals, and so on. Modification of the surgical program across the city proceeded

relatively smoothly under the longest-standing WHA program leader. However, program decisions where program leaders did not exist or had less tenure proved to be less timely and/or coordinated.

Cooperation and both internal and external efforts allowed the hospital to divert and relocate patients city-wide. As a result, the hospital was able to reduce patient census to a level of both acuity and number that could be evacuated quickly if necessary (total evacuation notice 24 hours).

Relocation of patient groups and the establishment of off-site NICU, MICU, SICU, CCU, and dialysis programs also resulted in the relocation of staff, equipment, and supplies. This relocation was different than that experienced in a strike situation, where the least complicated

patients are transferred elsewhere or not admitted. In this instance, the reverse situation applied. Owing to risk factors and time constraints in organizing transfers, the most complex patients were moved out first.

Facility Protection included augmenting the permanent dike with a sandbag dike (a permanent dike was eventually constructed), modifications to the sewer system, and movement of supplies and equipment from lower levels. For example, 350,000 X-ray files were relocated from basement storage to semi-trailers situated off-site.

News releases were utilized to keep the public and surrounding community informed regarding the Hospital's need to reduce healthcare services and the eventual location of various programs and patients.

The presence of approximately 8500 military personnel in the province during the height of the crisis provided enormous support in many areas, although this military presence did place additional strain on the healthcare system. A heliport and ICU beds at the Health Sciences Centre were required for injured military personnel and other flood relief-related morbidity.

Communication to staff and physicians throughout this crisis included the Hospital's Contingency Committee providing written updates, e-mail updates, off-site faxes, a staff telephone hot-line, and information sessions with question and answer components.

LESSONS LEARNED

1. MAGNITUDE/IMPACT OF REMOVING ST. BONIFACE FROM THE WINNIPEG HOSPITAL SYSTEM

As the second-largest tertiary and teaching facility in Manitoba, our site-specific disaster planning quickly engaged the entire health system. In addition to diverting patients from the ER to adjacent facilities, planning to physically transfer programming (with staff, equipment, supplies, and furni-

ture) to alternative sites, and cancelling elective surgery to make bed capacity for medical admissions, we had to involve community agencies, home care, ambulance services, and the like. This system mobilization was a challenge to communication and organization as numerous decisions took place. At the same time, clinical teams assessed patients for discharge or transfer; transfer decisions created a cascade of logistics involving staff, materiel, transport, records, and communication plans. Meanwhile, there was a need to keep the ER open for walk-in traffic because the city could not cope with our ER totally off-line.

While many staff were focused on the safe care and transfer of patients, others were diverted to safeguarding assets, for example flood control or relocating computers, equipment, and other assets (and records) to areas in the facility which would remain dry. This effort also included our animal holding facilities. In short, we had to “bug out” from the site for an indeterminate amount of time while remaining “on-line” because we were just too big to close up shop for the duration of the flood.

2. TERTIARY FACILITIES

The “Flood of the Century” demonstrated to the system the need for two tertiary facilities in the event one had to be taken off-line at any given time (disaster, infectious outbreaks, strike, etc.). Just as our size was an issue as we evacuated the site, so was our case mix. Only one other facility, the Health Sciences Centre, could accommodate elements of our tertiary case mix. Even so, staff, equipment, and specialized supplies had to go with the transferred patients as well as be available for the additional patients that would continue to access the system (e.g., neonatal, ICU, dialysis, surgical, and medical ICUs). In some instances (e.g. coronary care, low risk obstetrics), staff and facilities were transferred to community hospitals. The fact that the

city and province had two tertiary sites capable of backing each other up minimized the potential of transferring programs into truly inappropriate locations or out-of-province.

3. ORGANIZATIONAL ISSUES

Under the WHA model, with a single leader, coordination of the Surgical Program city-wide proceeded well. However, the diversity of medical programs caused some problems. The crisis demonstrated the value of a system-wide approach to resource deployment. As in many Canadian cities, the health-care restructuring process in Winnipeg

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has created regional approaches to healthcare planning and delivery. The WHA had made some clinical leadership appointments as part of that agenda. The flood disaster planning and disaster management was an early test of a system approach for the city. Each program (there are some 12 for the city) was at a different point in its evolution, so our experiences with the various individuals in crisis was variable.

4. MICRO DISASTER PLANNING

The magnitude of the flood and its effects on the hospital healthcare system supports the position of “Planning for the worst, while hoping for the best”. Given the often conflicting and sensationalized information that found its way into both contingency planning and implementation, we ended up playing it “safe.” Otherwise should anyone be hurt, we would have been criticized for being reckless; and should “nothing” happen, we “over-reacted.” Thus, we made the decision to take every measure to anticipate and plan for the worst-case scenario. As an aside, the worst-case

scenario (which did not happen) was the flooding of a major portion of the city, which would have involved hundreds of thousands of people and the evacuation of additional facilities.

5. INFORMATION CONTROL

Owing to the constantly changing and over-abundant information, it was essential to ensure accurate information and carefully avoid “knee-jerk reactions”. The flood levels of 1997 exceeded all known computer models for the Red River Flood Plan. Experts were unable to predict fully the complete flood scenario, which was also

a function of precipitation, temperature, and wind. The Red River Floodway had not been subjected to the level and flow rate that was anticipated at crest. Media coverage of the US experience shifted north as all news outlets focused on the 700,000 people in Winnipeg and southern Manitoba. Speculation, theories, and rumors were rampant. In many instances, on-site reporting for network television coverage was from the St. Boniface General Hospital site, as the city core provided a visual backdrop for reporters. In short, the flood was a highly sensationalized, dramatic, and significant story, which also occurred during a federal election campaign. Information control was very problematic.

6. STANDARDIZATION

Having to move and relocate equipment and supplies clearly highlighted the consequences of a lack of system-wide standardization. Idiosyncrasies among many sites were troublesome during the crisis. As we moved staff, technology, supplies, and the like around the city, we

suddenly found the need for abbreviated inservices for staff, since resources taken for granted at a tertiary site were not available at community hospitals.

7. CRISIS BEHAVIOR

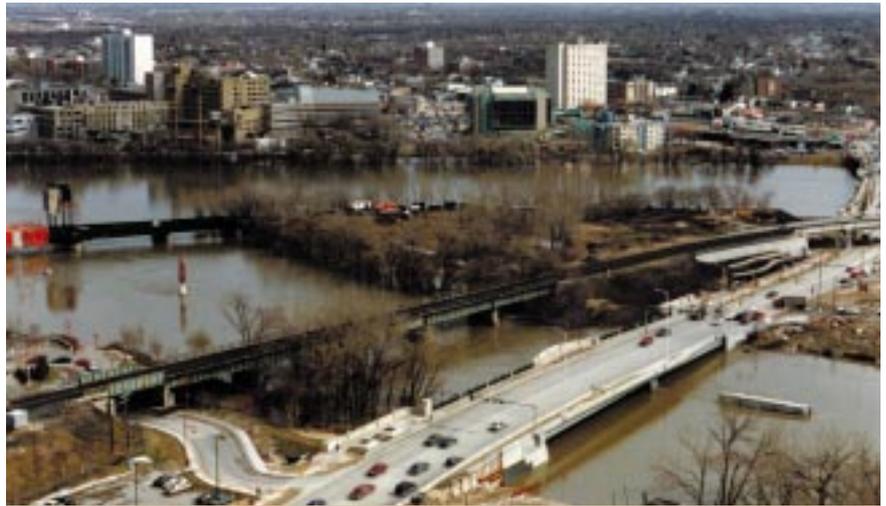
The flood was an example of crisis-induced collective behavior of the most compassionate type. People helped everywhere. This human side of the flood was also covered by the media. Strangers helped strangers, as the entire province mobilized to face a common threat. People pulling together was a hallmark of the flood response, both in the city and at the Hospital.

8. COMMUNICATIONS STRATEGY

Within the Hospital itself, there was never enough communication. Even though avenues to communicate were created with the patients, employees, and medical staff in mind, several misunderstandings surfaced. Starting sooner, doing more, and having all communication vetted through one person to avoid discrepancies between different methods of communication were lessons learned. Our Flood Contingency Planning Committee met daily, seven days per week, for the entire flood period. It followed a daily conference call with Manitoba Health. In our eventual internal debriefing, we felt that we had, for the most part, handled communications relatively well. But even the best plans can run into some conflicts with the media exposure/coverage occurring in the city. It was the speculative material that seemed to come from “nowhere” that was most problematic.

9. MACRO DISASTER PLANNING

The need for coordinated disaster planning at a system level is essential. This feature was beyond the scope of our disaster-planning responsibilities and authority. The flood response demonstrated the need for a macro as well as a micro approach to disaster planning. For example, the city does not



An aerial view from the West of the Forks (Red and Assiniboine Rivers meet). The campus is situated on the east bank of the Red River. Water levels are within feet of overflowing both the clay dike protecting the Hospital and the bridges leading into downtown Winnipeg.

have an ambulance bus, an asset that could help with several forms of patient/disaster transport. Similarly, portable ventilators, incubators, etc., for highly specialized, acute transport were limited and (although we had the time) could have been a critical, weak link in a more urgent evacuation. It is probably safe to say that few disaster manuals contemplate total evacuation to a temporary military hospital located at the local international airport – a scenario that could have happened at Winnipeg.

10. ON-GOING ADMINISTRATIVE DETAILS

Major issues and concerns related to the flood were usually the focus of the Hospital's Contingency Committee; however, regular administrative details such as physician privileges, parking passes, payroll, scheduling, and staffing still existed and required concentration and attention. Our Contingency Committee had to deal equally with these issues for almost a month. When the flood crested and the threat was over, the process repeated itself in reverse!

The crisis of the Spring of 1997 served to enhance the need to maintain appropriate disaster plans and to

acknowledge the power of people – our most important resource. ☞

This article was a joint effort of:

*Real J. Cloutier, B.A., M.P. Admin.,
Director of Strategic Alliances &
Planning,
Jan Greenwood, R.N., B.S.N., M.S.A.,
Manager, Risk Management and
Patient Care Systems,
Jeffrey R. Malawski, Health
Administration Resident Intern,
University of Minnesota; and
Kenneth P. Tremblay, B.Sc., M.H.Sc.,
CEO & President.
All from St. Boniface General Hospital.*