

Introduction

SARS was a tragedy. In the space of a few months, the deadly virus emerged from the jungles of central China, killed 44 in Ontario and struck down more than 330¹ others with serious lung disease. It caused untold suffering to its victims and their families, forced thousands into quarantine, brought the health system in the Greater Toronto Area and other parts of the province to its knees and seriously impacted health systems in other parts of the country.

Nurses lived daily with the fear that they would die or infect their families with a fatal disease. The nine-year-old daughter of one nurse asked:

Mommy, are you going to die?

Respiratory technicians, doctors, hospital workers, paramedics and home care workers lived with the same fear.

1. For the purpose of this report, the Commission will use the number of SARS cases presented at its public hearings by Dr. Colin D’Cunha on September 29, 2003: 247 probable cases and 128 suspect cases for a total of 375. These numbers were also contained in the final version of the Health Canada document “Canadian SARS Numbers” issued on September 3, 2003 (see http://www.phac-aspc.gc.ca/sars-sras/cn-cc/20030903_e.html). This was the final tally of SARS cases reconciled between Ontario authorities and Health Canada. It is this number (375) that is used in the report.

A retrospective study by the Ministry of Health and affected public health units issued in July 2006 suggested there were 351 SARS cases in Ontario, 301 probable and 50 suspect. We may never know how many people actually had SARS. The numbers are uncertain because SARS mimicked other diseases such as community acquired pneumonia, because there was no ready diagnostic test and because governments never seemed able to agree fully on how to count the cases. The retrospective study of SARS cases in Ontario cautioned: “As a result of only including cases meeting the Health Canada definition, it is not possible to know the range of the clinical spectrum of SARS illness; this report would likely represent cases at the more severe end of the clinical spectrum for SARS. For example, there were children who were part of family clusters of SARS and had either fever or mild respiratory symptoms, but did not meet the clinical criteria of the case definition and were not included in the case count. Some of these children had serological testing and were positive for antibodies to SARS-CoV, therefore it is possible that SARS is a milder illness in children than in adults”. (Ministry of Health and Long-Term Care, in conjunction with the SARS Outbreak Analysis Committee, “Descriptive epidemiology of the severe acute respiratory syndrome (SARS) outbreak” Ontario, Canada, 2003, July 2006).

The Ontario Nurses' Association surveyed its members after the outbreak and found that almost two-thirds felt their health and safety had been compromised during the SARS outbreak. More than half felt their SARS work was not adequately respected or they were unsure if it was respected.

Their concerns were reflected in comments such as these:

I was torn between staying and quitting because my husband was scared.

Nobody listens to nurses.

Totally devastating on family life.

Hospitals closed; cancer treatments and heart surgery were postponed. Patients were denied visitors. The sick and the dying suffered without the consolation of their families. The dead were disposed of quickly and in the absence of family and friends. The wider impact of SARS through cancelled heart surgery and delayed cancer treatments will never be known. And SARS was also an economic disaster for the country, the province and the GTA in particular.

Things happened that should never have happened: deaths, unspeakable loss, untold suffering. Where should we direct our outrage, our anger?

The evidence discloses no scapegoats. This was a system failure. The lack of preparation against infectious disease, the decline of public health, the failure of systems that should protect nurses and paramedics and others from infection at work – all these declines and failures went on through three successive governments of different political stripes. So too, in a sense, we as citizens failed ourselves because we did not insist that these governments protect us better.

SARS taught us lessons that can help us redeem our failures. If we do not learn the lessons to be taken from SARS, however, and if we do not make present governments fix the problems that remain, we will pay a terrible price in the face of future outbreaks of virulent disease.

Why was Ontario so unprepared for SARS? Our public health and emergency infrastructures were in a sorry state of decay, starved for resources by governments of all three political parties. The health system's capacity to protect its workers was in a state of neglect: what little existed was badly malnourished. There was no system in place to prevent SARS or to stop it in its tracks. The only thing that saved us from a worse disas-

ter was the courage and sacrifice and personal initiative of those who stepped up – the nurses, the doctors, the paramedics and all the others – sometimes at great personal risk, to get us through a crisis that never should have happened. Underlying all their work was the magnificent response of the public at large: patient, cooperative, supportive.

But once is enough. If the deep systemic problems revealed by SARS are not fixed before the next crisis, will these individuals and the public step up once more? Will they throw themselves again into the breaches left open by the inaction of governments?

While SARS was a vicious disease, it presented us an opportunity to see a window into our strengths and weaknesses and to ask “what if” about many health issues. Asking those questions and holding governments accountable for their answers is the only way to ensure that we are protected when we are hit with the next outbreak or pandemic.

In the wake of SARS many questions arise, including:

- Why does SARS matter today?
- How bad was SARS?
- What went right?
- What went wrong?
- Were precautions relaxed too soon?
- Who is there to blame?
- Was information withheld?
- Did politics intrude?
- Was SARS I preventable?
- Was SARS II preventable?
- Were health workers adequately protected?
- Are we safer now?
- What must be done?

This third and final Commission report, based on public hearings, government and hospital documents, and confidential interviews of more than 600 people connected with SARS, tells the story of SARS and addresses these questions.

The Commission’s first interim report, in April 2004, addressed the deep problems of public health infrastructure in Ontario and what must be done to make us safer. The Commission’s second interim report, in April 2005, addressed glaring deficiencies in Ontario health protection and emergency response laws and what must be done to correct them.

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Although the Ontario government has taken significant steps to improve our level of protection from infectious outbreaks like SARS, serious problems persist and much remains to be done.²

Why should we care about SARS now, three years after the event?

We should care about SARS because we should never forget the loss and suffering, and we should never forget the courage shown by so many. We should care about SARS because it was a wake-up call and it holds the lessons we must learn to protect ourselves against future similar outbreaks and against the global influenza pandemic predicted by so many scientists.

On February 23, 2003, Mrs. K, the 78-year-old matriarch of a large Scarborough family, returned home from a visit to Hong Kong. Unknowingly infected with SARS after staying at the same hotel as a doctor from China's Guangdong Province, she died at home from apparent heart failure on March 5. Her son, Mr. T, was admitted to Scarborough Grace Hospital (the Grace) on March 7. Suffering from a febrile respiratory illness, he waited in the crowded emergency ward for over 16 hours. During these hours he transmitted SARS to two other patients, sparking a chain of infection that spread through the Scarborough Grace Hospital, then to other hospitals through patient transfers and ultimately killed 44 and sickened more than 330 others.

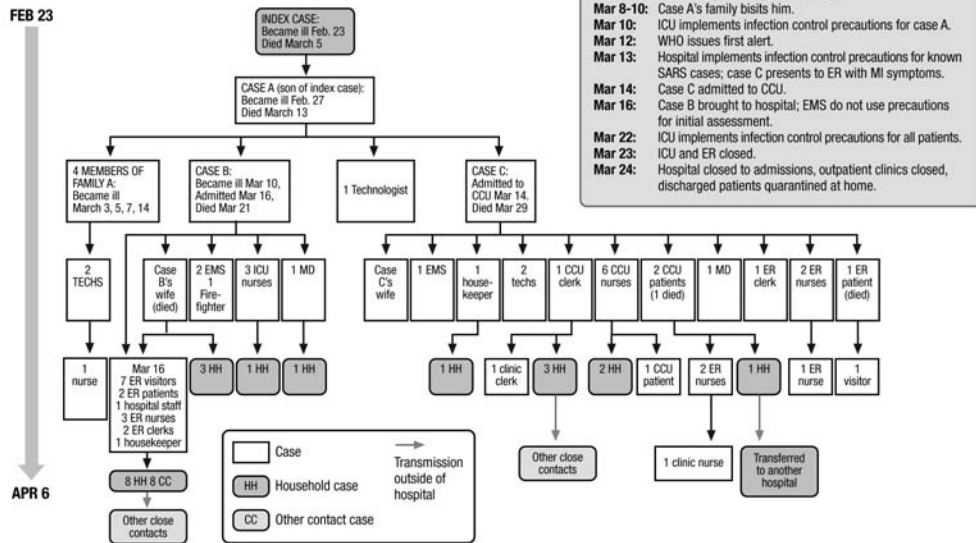
On March 7, British Columbia's index patient, who had stayed at the same hotel in Hong Kong as Mrs. K, was admitted to Vancouver General suffering from SARS, but there was no further spread. A combination of a robust worker safety and infection control culture at Vancouver General, with better systemic preparedness ensured that B.C. was spared the devastation that befell Ontario.

By contrast, at the Grace, the early chain of transmission from Mr. T to the first 84 cases, as shown in the following chart,³ took place very quickly. The transmission of these 84 probable and suspect cases could be linked to the six members of the index family (the index case, her son and four members of the son's family).

2. *The Health System Improvements Act*, 2006 was introduced to the Legislative Assembly on Tuesday December 12 after this report was in the hands of the typesetter. The Commission has had no opportunity to analyze it in detail and this footnote is added in the stage of proof correction. Bill 171 is a step forward in the sense that it proposes to implement approximately seven of the unimplemented recommendations of the Commission set out in the April 2004 and April 2005 interim reports. For concerns about the lack of accountability of the proposed CDC North to the Chief Medical Officer of Health see the recommendations in this final report.

3. Varia et al., "Investigation of a nosocomial outbreak of severe acute respiratory syndrome (SARS) in Toronto, Canada," *Canadian Medical Association Journal* 170, no. 6 (March 16, 2004): 927 (Varia et al., "Investigation of a nosocomial outbreak of SARS.").

FIGURE 2: Transmission of 84 probable and suspect cases of SARS in the nosocomial outbreak that could be linked to the 6 members of the index family (the index case, her son [case A] and 4 members of case A's family)



SARS spread rapidly from the Scarborough Grace Hospital through the Toronto-area hospital system. The largest group of victims was health workers, because occupational safety⁴ and infection control systems,⁵ which are supposed to act together seamlessly, one focused on safeguarding workers, the other on protecting patients,⁶

4. “The purpose of an Occupational Health (OH) program is to promote the health and well-being of employees by providing a safe and healthy workplace, to prevent or decrease transmission of infection to or from health care workers due to workplace hazards, including biohazards, and to adhere to legislation”. (Health Canada, *Prevention and control of occupational infections in Health Care: An infection control guideline* [Ottawa: Health Canada, 2002], p. 1).
5. “Nosocomial infections, acquired by patients as a result of receiving health care, are under the purview of IC [Infection Control]” (Health Canada, *Prevention and Control of Occupational Infections in Health Care*, p. 2).
6. Close cooperation between these two medical disciplines is essential for the safe operation of a health care facility. Health Canada’s *Prevention and Control of Occupational Infections in Health Care* (2002) states:

A component of the OH [occupational health] program relates specifically to infection control and must be planned and delivered in collaboration with the Infection Control (IC) program of the workplace. While this document supports the close collaboration of OH personnel with those responsible for the IC program, it does not discuss measures that IC practitioners use to assess and control infections in the patient population. Rather, it notes the essential collaboration of both groups working together where responsibilities overlap, especially in the management of outbreaks. Various workplaces will define the distinct roles of OH and IC practitioners differently

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failed to save them from harm. Two nurses and a doctor died. A provincial emergency was declared on March 26 and strict measures were taken to contain the outbreak. “Code Orange” froze hospital transfers and admissions, paralyzing the health system.

There was very little spread into the community. Community spread was stopped immediately by bold public health efforts and stringent quarantine measures. By the last week in April, the tough countermeasures had proved successful and the outbreak subsided.

Ironically, it was just then, on April 23, that the World Health Organization (WHO) issued a travel advisory against Toronto, an economic disaster for the city and the province. Ontario’s Minister of Health and others flew to Geneva and the travel ban was revoked after a week.

On May 1, Ontario and Health Canada took out large newspaper ads saying “Canada Has Turned the Corner on SARS,” that Toronto was safe for business and tourism. Muted declarations of victory were heard. Soon it became official. The emergency was lifted on May 17, the province breathed a big sigh of relief, infection control and worker safety precautions were relaxed, hospitals held celebrations and the health system returned to the “new normal.”

Then something terrible happened. On May 23, officials called a press conference to announce that a few new SARS cases had been discovered at St. John’s Rehabilitation Centre. It was revealed, almost as an afterthought, that a “few” patients at North York General Hospital also were being investigated for possible SARS. Under questioning by the media, the truth emerged. A major outbreak of SARS had erupted at North York General Hospital. SARS was back with a vengeance.

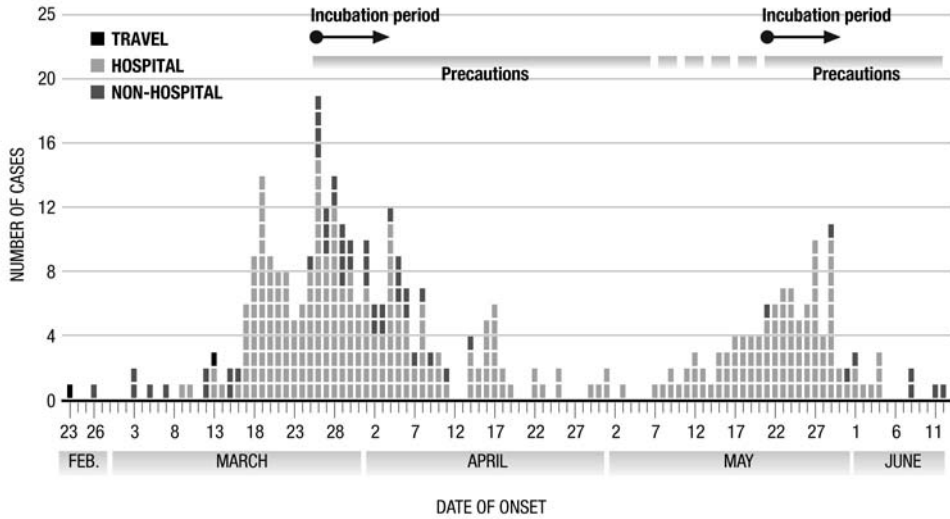
We know now that SARS never went away. It had continued to simmer undetected at North York General Hospital. As soon as precautions were relaxed in early May, the disease surged back and spread, again undetected, to patients, staff, visitors and their families.

Stringent infection control and worker safety precautions, so recently relaxed, were imposed once more. Health workers donned their N95 respirators and gowns and gloves again. As soon as precautions were reinstated, the disease again subsided. We

outbreaks. Various workplaces will define the distinct roles of OH and IC practitioners differently to suit their health care environment, p.17.

know now that behind the scenes a simple rule of nature was at work. Precautions up, disease down; precautions down, disease up. This chart⁷ shows the remorseless pattern.

The Distribution of Cases in the Severe Acute Respiratory Syndrome (SARS) Outbreak in Ontario, Canada, from February 23 to June 12, 2003.



The second outbreak was devastating. In the end, 118 people contracted SARS through their affiliation or contact with North York General Hospital. Of these 118 people, 54 were health workers and 64 were patients or visitors.⁸ Of these of the 127 people, 17 died. Of these 17, one was Nelia Laroza, a highly respected and much loved nurse who worked on 4 West, the orthopedic unit where SARS simmered undetected and undiagnosed. For those who fell ill and for those who lost loved ones, the cost of SARS II is immeasurable.

Whenever one speaks of cost, the cost to the government to protect us better, the cost to hospitals of better infection control, surveillance, and worker safety, we should never forget the cost of SARS in sickness, pain, suffering, and unspeakable loss.

The second outbreak also had a terrible impact on the morale of health workers. Many lost faith in the system and the ability of their employers to protect them. It was not only the public who had been led to believe that SARS was gone. Nurses and health workers were told that SARS was contained and that there were no new cases

7. Dr. Donald Low and Dr. Allison McGeer, "SARS – One Year Later," NEJM 349:25, December 2003.
8. Presentation of Dr. Colin D’Cunha, SARS Commission Public Hearings, September 29, 2003.

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of SARS. SARS was over. Nurses at North York General, concerned about outbreaks of staff illness and clusters of SARS-like illness were told again and again by the hospital “Not SARS” when it turned out that these cases were in fact SARS.

On May 23rd, 2003, nurses and others at North York General learned, along with the rest of the world, that SARS was not in fact over. It was not contained. There were new cases of SARS right in their midst. Many of their colleagues were ill with SARS. In the coming days it turned out that 39 workers⁹ at North York General had fallen ill with SARS, after they had been told SARS was over.

But yet again these nurses and doctors and clerks and technicians were asked to step into danger. And once again they did. Once again they risked their lives and health for the sake of others. What is it in their character and their professional culture that produced this courage? Will they heed that call the next time if they lack confidence that governments and hospitals will protect them better?

The stories of the outbreaks at Scarborough Grace Hospital and North York General Hospital reveal the systemic province-wide inadequacy of preparedness, infection control and worker safety systems. Common problems and themes emerge from the stories of both outbreaks. They reflect seven systemic problems that run like steel threads through all of SARS, through every hospital and every government agency.

- Communication
- Preparation, planning
- Accountability: who’s in charge, who does what?
- Worker safety
- Systems: infection control, surveillance, independent safety inspections
- Resources: people, systems, money, laboratories, infrastructure
- Precautionary principle: action to reduce risk should not await scientific certainty

The lesson from the stories of Scarborough Grace and North York General, and others, is not that they deserve blame. The lesson is that because of systemic weaknesses what happened there could have happened at almost any other hospital in the province.

We must also remember that both Scarborough Grace Hospital and North York General are home to some of the finest and most dedicated physicians, nurses, administrators and health workers in Canada. Many of those doctors, nurses and

⁹ Presentation of Dr. Colin D’Cunha, SARS Commission Public Hearings, September 29, 2003.

other health workers worked tirelessly on the front lines during SARS, putting their lives at risk to help others. They watched their friends and colleagues fall ill, at times they had to care for them, all the while hoping they would not be next. As one Scarborough Hospital nurse so eloquently described her SARS experience:

To watch this unfold, I don't have vocabulary to express it. Just thinking about it has been difficult. I think you can't comprehend especially SARS I how scary it was at that time because we had no idea. As we were shipping these people out to West Park and we are gloved, gowned and masked and you are reaching to touch these people not knowing if you will ever see them again, helping them get onto bus, all we knew in media was that people were dying. They probably had no idea what they were facing either. In my nursing career I have never faced anything so frightening. Looking back I think at the time because we were tired and we were working, because it was so surreal you didn't have the opportunity to absorb it. That's when the nightmares came. The going in circles, the questioning, did we do it right, could we have done it better?

One nurse from 4 West, the epicentre of the second outbreak at North York General Hospital, who worked the weekend of May 24 and 25, 2003, after learning that SARS was back and that many of her friends and colleagues were ill, recalled how afraid she and her family were, knowing she had to go back to work the next day, in the epicentre of the outbreak:

I remember going Saturday morning and I said to my husband, he was in the other room, and I said, I'm going to go, but I am so afraid, and I saw my husband's face and we both had tears in our eyes because I thought I was the next one to get it. I was just so emotional. I just felt so awful. I have to go in, I'm still standing here, I haven't got SARS-well, to me I didn't have SARS-but I thought I was going to be the next one, cause all our nurses were falling down.

When she was asked by the Commission if she ever considered not going to work, she said:

I was one of the ones that could go in, to help my work. I think it's your duty to go in as a nurse, to go to the last, to the very end.

These are the heroes of SARS. Nothing in this report detracts from their dedication, hard work and sacrifice. Nor does it detract from the distinction of the Scarborough

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Hospital or North York General as excellent hospitals. To tell their stories is not to point fingers or assign blame, it is simply to tell what happened without any findings of civil or criminal liability and without any adverse finding against the hospitals or anyone associated with it.

The surprise is not that Ontario's response to SARS worked so badly, but that it worked at all, given the lack of preparation and systems and infrastructure. Despite these problems, and despite the inevitable mistakes with a new disease and a system unprepared for it, SARS was stopped by the front-line workers and the scientists and specialists who stepped up and who were not afraid to take the strong measures that worked in the end.

One of the most contentious issues during SARS was the N95 respirator, which was supposed to protect nurses and other workers during close contact with SARS patients.¹⁰ Although Ontario law required, since 1993, that anyone using an N95 had to be properly trained and fit tested to ensure full protection, few hospitals complied with this law and some even denied its existence. Fit testing was the subject of official confusion and heated public debate. It became a lightning rod for all the underlying problems of worker safety in hospitals.

The real problem is not the N95 respirator but the deep structural contradictions in hospital worker safety. These problems include a profound lack of awareness within the health system of worker safety best practices and principles. They include the failure of the Ministry of Labour to proactively inspect SARS hospitals until June 2003, when the outbreak was virtually over. In B.C., by contrast, the workplace regulator took decisive action and began inspections in early April, wanting to ensure that workers were being protected from the start as required by law. The problems include those in hospital administration and health bureaucracies who resist advice and enforcement on hospital turf by independent worker safety experts and the provincial Ministry of Labour. Most important, the problems include Ontario's failure to recognize in hospital worker safety the precautionary principle that reasonable action to reduce risk, like the use of a fitted N95 respirator, need not await scientific certainty.

There were during SARS two solitudes: infection control and worker safety. Infection control relies on its best current understanding of science as it evolves over time. It is unnecessary to point out again that infection control failed to protect nurses during SARS.

10. The N95 was sometimes required in other areas of a hospital even when not caring for SARS patients. The provincial directives for the use of the N95 changed throughout SARS were not always clear or consistent.

Worker safety relies on the precautionary principle that reasonable action to reduce risk should not await scientific certainty. More will be said below about these two solitudes.¹¹

The debate about the N95, respiratory protection and fit testing can be understood only in the context of the heavy burden of disease that fell on hospital workers, paramedics and others who worked in Ontario's health system during SARS. Two nurses and a doctor died from SARS. Almost half those who got SARS in hospital were people who got SARS on the job from working there.

Part of the heated debate during the SARS outbreak was over whether N95 respirators were really necessary. Those who argued against the N95, which protects against airborne transmission, believed SARS was spread mostly by large droplets. As a result, they said, an N95 was unnecessary except in certain circumstances and a surgical mask was sufficient in most instances. They made this argument even though knowledge about SARS and about airborne transmission was still evolving. That more and more studies¹² have since been published indicating the possibility under certain circumstances of airborne transmission, not just of SARS but of influenza,

11. This is a good place to note that Chief Medical Officer of Health Dr. Sheela Basrur has taken steps to improve this situation. Only time will tell if these steps are effective. Dr. Basrur notes in her letter of March 9, 2006, to Linda Haslam-Stroud, RN, President, Ontario Nurses Association:

We recognize the need to ensure that the perspectives of occupational health and infection control receive consideration. In light of this, an occupational health physician is included in the membership of PIDAC and has been sitting on the committee since the inception of PIDAC in 2004. However, we see the importance in continuing to strengthen our links with the occupational health field and a physician delegate from the Ministry of Labour is now also sitting on PIDAC. This highlights our commitment to ensuring that occupational health and safety expertise is brought to the table during all PIDAC deliberations now and in the future. We are confident that building on this approach will assist in ensuring stronger linkages between occupational health and infection control on matters of science.

12. I.T.S. Yu, Y.Li, T.W. Wong, et al., "Evidence of airborne transmission of the severe acute respiratory syndrome," *New England Journal of Medicine* 350 (2004): 1731-1739; Chad J. Roy and Donald K. Milton, "Airborne transmission of communicable infection—the elusive pathway," *New England Journal of Medicine* 350 (2004), www.nejm.org; I.T.S. Yu et al., "Temporal-spatial analysis of severe acute respiratory syndrome among hospital inpatients," *Clinical Infectious Disease* 40 (2005): 1237-1243; Booth et al., "Detection of airborne severe acute respiratory syndrome (SARS) coronavirus and environmental contamination in SARS outbreak units," *Journal of Infectious Diseases* 191 (2005): 1472-1477; Tommy R. Tong, "Airborne severe acute respiratory syndrome coronavirus and its implications," *Journal of Infectious Diseases* 191 (2005); National Academy of Sciences, *Reusability of Face Masks During an Influenza Pandemic* (Washington, D.C.: National Academy of Sciences, April 2006); R. Tellier, "Review of aerosol transmission of influenza A virus," *Emerging Infectious Disease* (November 2006), www.cdc.gov/ncidod/EID/vol12noll/06-0426.htm.

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suggests the wisdom and prudence of taking a precautionary approach in the absence of scientific certainty.

The point is not who is right and who is wrong about airborne transmission. The point is not science, but safety. Scientific knowledge changes constantly. Yesterday's scientific dogma is today's discarded fable. When it comes to worker safety in hospitals, we should not be driven by the scientific dogma of yesterday or even the scientific dogma of today. We should be driven by the precautionary principle that reasonable steps to reduce risk should not await scientific certainty.

Until this precautionary principle is fully recognized, mandated and enforced in Ontario's hospitals, workers will continue to be at risk.

Of the almost 375 people who contracted SARS in Ontario, 72 per cent were infected in a health care setting. Of this group, 45 per cent were health workers. Most of these workers were nurses whose jobs brought them into the closest contact with sick patients. And this does not show the full burden of SARS on nurses and paramedics and other health workers. In many cases nurses sick with undetected SARS brought illness, and in some cases death, home to their families.

One nurse answering the Ontario Nurses' Association questionnaire wrote:

Fear ... job not worth risk of dying. Lack of trust that nursing was being protected.

The Commission is not surprised that in Vancouver, with its greater systemic awareness of and commitment to worker safety, only one health worker contracted SARS.

Again and again, health workers in Ontario were told they were safe if they would only do what they were directed to by the hospitals and the government. Again and again, these confident scientific assurances turned out to be tragically wrong. The March 17 Scarborough Grace Hospital incident, the March 24 Mount Sinai Hospital incident, the April 13 Sunnybrook Hospital incident and the May 28 North York General Hospital incident show dramatically that the system, despite its scientific self-confidence, was incapable of protecting workers from SARS.

It is no wonder that health workers became alarmed when they saw their colleagues sicken and die. It is no wonder that they became angry when they saw such incidents recur again and again with no apparent improvement in their safety. Nurses protested that hospitals did not comply with the safety law that required that N95 respirators

had to be fitted to ensure proper protection.

It is easy to forget that everyone makes mistakes and that hospitals acted and continue to act in good faith. Ontario was not alone in its failure to protect health workers during SARS. The challenge of this new disease overcame the extent of their current scientific understanding. That is why it is better to forget dogmatic arguments based on current scientific understanding. That is why it is better to follow the precautionary principle that reasonable action to reduce risk should not await scientific certainty. And that is why it is important to recognize that Vancouver, which was spared the devastation that SARS inflicted on Ontario, had a far greater systemic commitment to the precautionary principle.

Hospitals did their best within the limits of their lack of preparation, their generally inadequate infection control systems and their inadequate worker safety systems. Inevitably they made mistakes in the fog of war against an invisible enemy. There was no lack of good faith in the administration of the existing systems, flawed though they were. Hospitals learned a lot from SARS, and a lot is better now. Hospitals are more conscious of infection control and worker safety. North York General Hospital, for instance, now has infection control and worker safety systems that have earned the praise of its nurses.

The Ministry of Labour learned a lot too. It now has staff with health care-specific expertise, and it has conducted stringent proactive inspections of all acute care facilities.

Our hospitals still have a long way to go, especially in worker safety and with the pushback from some against outside advice and help from the safety standards community and the Ministry of Labour. Hospitals are dangerous workplaces, like mines and factories, yet they lack the basic safety culture and workplace safety systems that have become expected and accepted for many years in Ontario mines and factories and in British Columbia's hospital.

Some of the same Ontario hospital leaders who argued against the N95 respirator required to protect nurses and who actually denied there was a safety law that required the N95 to be fit tested¹³ still insist that science, as it evolves from day to day, comes before safety. If the Commission has one single take-home message it is the precautionary principle that safety comes first, that reasonable efforts to reduce risk need not

13. See "It's Not About the Mask."

await scientific proof. Ontario needs to enshrine this principle and to enforce it throughout our entire health system.

The Commission has not heard of any country or any health system that foresaw SARS. No one foresaw the sudden emergence of an invisible unknown disease with no diagnostic test, no diagnostic criteria, uncertain symptoms, an unknown clinical course, an unknown incubation period, an unknown duration of infectivity, an unknown virulence of infectivity, an unknown method of transmission, an unknown attack rate, an unknown death rate, an unknown infectious agent and origin, no known treatment and no known vaccine.

SARS taught us that we must be ready for the unseen. That is one of the most important lessons of SARS. Although no one did foresee and perhaps no one could foresee the unique convergence of factors¹⁴ that made SARS a perfect storm, we know now that new microbial threats like SARS have happened and can happen again. However, there is no longer any excuse for governments and hospitals to be caught off guard and no longer any excuse for health workers not to have available the maximum level of protection through appropriate equipment and training.

14. See Institute of Medicine, *Microbial threats to health: emergence, detection, and response*, (March 2003). This paper noted, ironically just as SARS hit us, earlier warnings, and said, “We must do more to improve our ability to prevent, detect, and control emerging – as well as resurging – microbial threats to health.” It warned presciently against a potentially “catastrophic storm of microbial threats.”