

CHAPTER EIGHT: It's Not About the Mask

Introduction

One of the biggest bones of contention during SARS was the N95,⁸⁸⁷ a respirator that protects much more than a surgical mask⁸⁸⁸ and that was mandated for health workers caring for SARS patients.⁸⁸⁹

Although Ontario law since 1993 required that anyone using an N95 had to be properly trained and fit tested⁸⁹⁰ to ensure proper protection, few hospitals complied with this law. Some medical experts even denied the very existence of this legal requirement.

Fit testing was the subject of official confusion and heated debate.

887. Using highly efficient filtering materials, N95 respirators are one of the nine types of disposable particulate respirators that are independently tested and certified by the National Institute for Occupational Safety and Health in the United States, which is part of the Centers for Disease Control. "The N indicates that the respirator provides no protection against oils and the 95 indicates that it removes at least 95% of airborne particles during 'worst case' testing using a 'most-penetrating'-sized particle." (Yassi, Annalee MD, MSc, FRCPC et al., "Research Gaps in Protecting Health Workers from SARS," *Journal of Occupational and Environmental Medicine* DOI: 10.1097/01.jom.0000150207.18085.41) (Yassi et al, "Research Gaps in Protecting Health Workers from SARS").

888. In this chapter, *respirator* will refer to a respiratory protective device like the N95 that has been independently tested and certified. *Masks* will refer to any respiratory device like a surgical mask or the PCM 2000 that has not been independently tested and certified.

889. The N95 was sometimes required in other areas of hospital even when not caring for SARS patients. As noted below, the provincial directives for the use of the N95 changed throughout SARS and were not always clear or consistent.

890. Fit testing helps users select a respirator that best fits their faces and teaches them how to get a proper seal each time they use respirator, a procedure known as a *seal check*, and how to safely don and doff a respirator. A test verifies that the chosen respirator works properly. There are two types of tests. One is called a *qualitative fit test* and "relies on the user's subjective response to taste odour or irritation." The other is a *quantitative fit test* and "relies on an instrument to quantify the fit of a respirator." (Healthcare Health and Safety Association, *Respiratory Protection Programs* (2nd edition [Toronto: Healthcare Health and Safety Association, 2000]).

This chapter outlines how fit testing and the N95 became lightning rods for all the underlying problems of worker safety in health care.

Respiratory Protection: A Fundamental Worker Safety Issue

The real problem during SARS was not the N95 respirator or fit testing but deep structural contradictions in worker safety in the health care system. This included both embedded resistance within the health care system to worker safety experts and to the Ministry of Labour and Ontario's failure to recognize, as an aspect of health worker safety, the precautionary principle that reasonable action to reduce risk, such as the use of a fitted N95 respirator, need not await scientific certainty.

There were two solitudes during SARS: infection control⁸⁹¹ and worker safety.

Infection control insisted that SARS was mostly spread by large droplets which do not travel far from an infectious person. Given that case, in their view, a surgical mask was sufficient to protect health workers in most situations. Worker safety experts said workers at risk should have the higher level of protection of an N95. They said not enough is known about how SARS is spread to rule out airborne transmission by much smaller particles, and besides, hospitals are dynamic places where unforeseen events and accidents can always happen. Infection control relied on its understanding of scientific research as it stood at the time. Worker safety experts relied on the precautionary principle that reasonable action to reduce risk should not await scientific certainty.⁸⁹²

891. "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: An Infection Control Guideline*. [Ottawa: Health Canada, 2002], p.2).

892. This is a good place to note that Dr. Sheela Basrur, Chief Medical Officer of Health, has taken steps to improve this situation. Only time will tell if these steps are effective. She notes in her letter of March 9, 2006, to Ms. 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.

PIDAC refers to the Provincial Infections Diseases Advisory Committee.

A good illustration of their differences is the controversy over how far large droplets travel from an infectious person. Many infection control experts believe large droplets travel no more than one metre from the infectious person,⁸⁹³ and they use this one-metre rule as a guide for what respiratory protection to wear. Worker safety experts are critical of this rule both on a scientific basis⁸⁹⁴ and as a practical matter. They suggest that even if the one-metre rule could be proven scientifically, it is not realistic or safe in a workplace.

Dr. Diane Roscoe of Vancouver General said:

It is not an easy thing for health care workers to remember. This is a three-metre or this is a one-metre thing, and this is not. And what am I supposed to do.

As a result, said another expert at Vancouver General,

893. To take one of many references, one respiratory protection manual says: "It has been a generally accepted infection control notion, based on epidemiological observations, that diseases spread by large droplets typically are not spread to others via the respiratory tract when more than 1 meter from the source" (Healthcare Health and Safety Association of Ontario, *Respiratory Protection Programs*, 2nd edition, p. 1).

894. See Bob Janssen, MSc, ROH, Senior Policy Analyst, "A Scientific Review – The Influenza Pandemic: Airborne vs. Non-Airborne Transmission and Considerations for Respiratory Protection" Vancouver: Policy & Research Division, WorkSafeBC, December 2005:

One should be aware of the effects of droplet evaporation and the resultant diminution in size of ejected droplets. A 30 μm droplet dries to a 5 μm droplet within seconds under normal indoor air conditions. This means that a large droplet, as it evaporates, will not settle to the ground but become a free-floating entity. This has implications for the 3 foot rule, the basis for infection control precautionary measures, since it is commonly believed that large droplets ejected upon sneezing or coughing will follow Stoke's Law and fall to ground within a 3 foot distance from the person's face. It is evident that it is commonly believed that the 3 foot rule is a division between an unsafe and safe distance.

There is no indication that the 3 foot rule takes into consideration the evaporation factor and the drift factor of airborne droplets, as discussed above. No scientific evidence is offered by WHO, DHHS-CDC, PCAH, or other medical authorities in explaining the rule. If large droplets quickly evaporate to free-floating small droplets, then the 3 foot rule applies only to droplets greater than about 50 – 100 μm in diameter for which there is insufficient time chance for evaporation to take effect before they fall to the ground from a height of 5–6 feet. Free floating small droplets readily go beyond the 3 foot radius. Therefore, if the majority of ejected droplets following a sneeze are evaporated to a size that is free-floating after only seconds in air, the 3 foot rule becomes illogical and not particularly helpful from a disease transmission perspective.

We always start with the highest level of precaution ... We don't use droplet precautions in our hospital, never have, because we've always believed that droplets have been aerosolized so we only have one category, that's airborne, and you always start with the highest level of precaution and then as the clinical situation becomes clearer, you step back on your precautions – and we have found that the easiest for workers to understand rather to try to figure out when to wear a surgical, when to wear an N95, you know, how close am I to the patient, do I need to put on a mask – it's just simpler for them to remember that this patient's got respiratory symptoms, yes, put on an N95, do the appropriate precautions.

Dr. Elizabeth Bryce of Vancouver General said:

Even if you did determine [the distance from the patient] ... like poof, you know you are this distance, you put on a mask and presto, and you step back a foot and you no longer need a mask ... [health workers] are moving in and out of the “danger zone” for sure for droplets. They are in and out when they are in a room. And it is just simply easier for everyone and safer for them to put on some sort of respiratory protection when they step into the room ... You've got the patients moving around and the staff moving around. It is very hard to keep the spatial separation and just – we just feel it is safer too.

The point is not who is right and who is wrong about airborne transmission, nor is it how far large droplets travel. 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 by the scientific dogma of today. We should be driven by the precautionary principle that reasonable steps to reduce risk should not await scientific certainty.

The debate about 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 of those who contracted SARS in the health system were people who got the disease on the job.

Table 1 – Probable and Suspect SARS Cases Contracted in Health Care Settings⁸⁹⁵

	Phase 1	Phase 2	Total Number of Suspect and Probable Cases	Percentage of Total Number of Cases (375)
Health workers	118	51	169	45%
Patients	23	35	58	15%
Visitors	20	23	43	11%
Total	161	109	270	72%

Most of these workers were nurses whose jobs brought them into the closest and lengthiest contact with sick patients. And this does not show the full burden of SARS on nurses, paramedics and other health workers. Nurses sick with undetected SARS inadvertently brought illness, and in some cases death, home to their families.

Again and again nurses were told they were safe if they would only do what they were told by the health system. Again and again these scientific assurances, though well intentioned and issued in the best of good faith, turned out to be tragically wrong.

It is no wonder that nurses 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.

As SARS continued and more health workers fell ill, the resulting justified lack of confidence in health care safety systems fuelled a heated debate about the need for the N95 respirator and for the safety requirement that workers be fit tested and trained in its use.

Some infection control experts argued in good faith that the fit testing law was ill advised; that N95 respirators were not needed because SARS was droplet spread, not airborne; that the Provincial Operations Centre was wrong to require fitted N95s; and that nurses would be safe if they followed the advice of their employers instead of the safety procedures required by law.

Nurses pushed back with understandable heat, saying that hospitals should follow safety laws. Nurses took the reasonable position that if hospitals did not obey the law,

895. Dr. Colin D’Cunha, presentations, SARS Commission Public Hearings, September 29, 2003.

then the Ontario Department of Labour should fulfill its enforcement mandate and make them do so.

This is not the place to enter into that acrimonious debate. Nurses are angry, with good reason, that so many got sick and that safety laws were not respected or enforced. It must be noted that the experts who campaigned against the N95 and fit testing undoubtedly acted in good faith, doing what they believed was in the best interests of health workers and the health system. It would be too easy to personalize this debate and point out that some of those who most vociferously oppose the N95 and fit testing, and who were most disdainful of nurses and independent safety experts who prefer precaution, were the very people on whose watch nurses became sick despite the assurances that they were safe. Whenever someone presides over a system that fails and then leads a campaign against greater precaution, it is easy to forget that there are bigger issues at stake, more important things than arguing over who is right and who is wrong.

Scientific uncertainty and scientific debate can go on forever. We do not need a personalized debate or further recriminations. What we do need is a common-sense approach to worker safety in hospitals coupled with a measure of scientific humility in light of the terrible and sometime fatal failures in scientific advice and hospital safety systems during the SARS outbreak. What we need to do is to follow the precautionary approach that reasonable steps to reduce risk need not await scientific certainty. It is better to be safe than sorry.

The only way to make nurses and other health workers safe is to transcend the turf wars that hampered the fight against SARS. These turf wars continue even after SARS proved that hospital safety systems failed to protect workers.

On the one hand, some experts believe that in the face of a still relatively unknown disease like SARS, you can avoid a precautionary approach, start with the lesser protection of a surgical mask and ramp up to an N95 if and when it's needed.

On the other hand are independent safety experts like those in British Columbia, which stopped SARS in its tracks, like those from the Centers for Disease Control and NIOSH and like those from the Ontario Department of Labour say, who that experience dictates a common-sense precautionary approach, starting with a higher level of protection that is reduced as the clinical situation is clarified.

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

Airborne and Droplet Transmission

At the heart of the mask debate is the question of airborne transmission. Is SARS spread mostly by large droplets? What is the risk of airborne transmission?

It is instructive to set the stage for the story of the N95 with a nutshell description of how SARS is transmitted from person to person.

Droplets from the breath of an infected person can contaminate surfaces and articles on which they land:

Viable organisms may survive long enough in droplets deposited on environmental surfaces to contaminate the hands of caregivers and then be further transmitted.⁸⁹⁶

Objects thus contaminated are called *fomites*. Fomite transmission occurs when an infectious droplet contaminates a fomite (the surface on which it lands) and is then spread by the hand of someone who touches it.⁸⁹⁷

A study of the Toronto outbreak looking at environmental contamination in SARS outbreak units detected SARS on frequently touched surfaces in rooms occupied by patients with SARS (including a bed table and television remote control) and in a nurses' station used by staff (on a medication refrigerator door).⁸⁹⁸ SARS has been found to remain stable for 24 to 48 hours in urine, 36 hours on plastic surfaces, 72 hours on stainless steel and 96 hours on glass surfaces.⁸⁹⁹

Droplet transmission, the primary mechanism for the spread of SARS, occurs when

896. Healthcare Health and Safety Association of Ontario, *Respiratory Protection Programs*, 2nd edition, p. 1.

897. Fomites have been defined as "objects, such as clothing, towels, and utensils that possibly harbor a disease agent and are capable of transmitting it" (U.S. Army Medical Research Institute of Infectious Diseases, *Medical Management of Biological Casualties Handbook*, 4th edition: U.S. Army Medical Research Institute of Infectious Diseases, 2001], p. A-5; and as "articles that convey infection to others because they have been contaminated by pathogenic organisms. Examples include handkerchief, drinking glass, door handle, clothing and toys." Last, John M. Last, *A Dictionary of Epidemiology*, p. 72.

898. T.F. Booth, B. Kournikakis, N. Bastien, et al., "Detection of airborne severe acute respiratory syndrome (SARS) coronavirus and environmental contamination in SARS outbreak units," *Journal of Infectious Diseases* 191 (2005):1472-77 (Booth et al, "Detection of airborne severe acute respiratory syndrome (SARS)).

899. World Health Organization, *Consensus Document on the Epidemiology of Severe Acute Respiratory Distress Syndrome* (Geneva: WHO, 2003), p.29.

large droplets are transmitted to a paramedic, nurse, doctor, visitor or family member from an infected person's respiratory tract by coughing, sneezing or even normal breathing.⁹⁰⁰ They are too small to see but are heavy enough to fall quickly to the ground and can be breathed in by someone in close proximity to the infectious person. Close personal contact is thus required for droplet transmission.

At the smallest end of the scale are droplet nuclei, so tiny and light that, depending on the conditions, it is thought that they can remain suspended in the air for several hours,⁹⁰¹ and can also:

travel considerable distances in the air and may be readily inhaled into the lung.⁹⁰²

In some cases, it is believed that large droplets can themselves become droplet nuclei:

Larger droplets that are dispersed into fairly dry air can actually begin to "dry out" and become droplet nuclei.⁹⁰³

Diseases spread by droplet nuclei or evaporated droplets are generally considered to infect others through airborne transmission.

Airborne transmission, associated with diseases like measles, chickenpox and smallpox, occurs when droplet nuclei or evaporated droplets from an infected person remain suspended in the air. These nuclei or droplets may remain in the air for a long time and may also travel through the air to be inhaled a distance away by someone who had no contact with the infected person.⁹⁰⁴

900. "Droplets are ejected from the respiratory tract during coughing, shouting, sneezing, talking, and normal breathing. The size and number of droplets produced is dependant on which of these methods generated the particles" (Dr. Annalee Yassi and Dr. Elizabeth Bryce, *Protecting the Faces of Health Workers: Knowledge Gaps and Research Priorities for Effective Protection Against Occupationally-Acquired Respiratory Infectious Diseases* [Occupational Health and Safety Agency for Healthcare in BC, April 30, 2004], p. 5.

901. Yassi et al, "Research Gaps in Protecting Health Workers from SARS".

902. Yassi et al, "Research Gaps in Protecting Health Workers from SARS".

903. Healthcare Health and Safety Association of Ontario, *Respiratory Protection Programs*, 2nd edition, 2005), p. 2.

904. "Airborne transmission: occurs by dissemination of either airborne droplet nuclei or evaporated droplets (sub micron particles) containing microorganisms that remain suspended in the air for long periods of time. These microorganisms can be widely dispersed by air currents and may be inhaled by persons even when standing a distance away from the source patient" Infection Control Standards Task Force, *Final Report* [Toronto: Infection Control Standards Task Force, December 2003], p. 5.

Research has shown that most viruses are spread through large droplets, only a few through airborne transmission:

... most viruses which cause respiratory and gastrointestinal disease in humans, must be contained in large droplets ... in order to survive outside the body and transmit disease from person-to-person. This includes such common respiratory pathogens as influenza, respiratory syncytial virus (RSV) parainfluenza viruses, the common coronaviruses and others. The notable exceptions are measles, varicella zoster virus (chickenpox) and smallpox[,] which apparently can survive in small diameter droplets or droplet nuclei and can be transmitted by air over long distances.⁹⁰⁵

Although believed to be spread mostly by large droplets, SARS is also transmitted when the droplets become aerosolized through medical procedures like intubation, bronchoscopy⁹⁰⁶ or a type of assisted ventilation known as a BiPap, or bilevel positive airway pressure device.⁹⁰⁷

All these procedures and treatments were used during the SARS outbreak. Almost a quarter of SARS patients were intubated, a procedure that places a tube into the windpipe or trachea to open the airway for oxygen, medication or anesthesia. Because these aerosolizing events were so common in the treatment of SARS, it defies the evidence to dismiss it as simply a droplet-spread disease.

Some scientists say that a mere cough or sneeze can produce airborne viral particles. Dr. Annalee Yassi, one of the country's foremost occupational medical experts, said researchers now know that there is always an airborne component of a cough or a sneeze. A cough or a sneeze never produces just large droplets. She told the Commission:

There is unquestionably some airborne spread even if it's only when people are coughing or sneezing, never mind nebulized and ventilated

905. Protecting the Faces of Health Workers, p. 16.

906. "Bronchoscopy is a test to view the airways and diagnose lung disease. It may also be used during the treatment of some lung conditions" (*MedLine Plus Medical Encyclopedia*, <http://www.nlm.nih.gov/medlineplus/ency/article/003857.htm>).

907. "Bilevel positive airway pressure (BiPAP) delivers a higher pressure on inspiration, helping the patient obtain a full breath, and a low pressure on expiration, allowing the patient to exhale easily. BiPAP is a common choice for neuromuscular disease" *Gale Encyclopedia of Surgery*, <http://www.answers.com/topic/mechanical-ventilation>.

and so on. It's always never purely droplet spread. It's droplet spread that's at least aerosolized in certain circumstances.

The jury is still out on the extent of airborne SARS. A strong current of scientific opinion suggests that the distinction between airborne and droplet transmission is not as clear-cut as some insisted during SARS. A recent study co-written by Dr. Allison McGeer of Mount Sinai concluded:

Accumulating evidence suggests that the distinction between droplet and airborne transmission may not be as clear-cut as previously thought.⁹⁰⁸

The Centers for Disease Control (CDC) agrees that airborne transmission of SARS cannot be ruled out and that N95 respirators should be used:

The transmission of SARS appears to occur predominantly by direct contact with infectious material, including dispersal of large respiratory droplets. However, it is also possible that SARS can be spread through the airborne route. Accordingly, CDC has recommended the use of N95 respirators, consistent with respiratory protection for airborne diseases, such as tuberculosis.⁹⁰⁹

The WHO takes the same position, that the risk of airborne transmission requires the use of the N95:

In view of the possibility of airborne transmission, current guidelines issued by the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) state that health workers should wear N95 masks or higher-level protection during all contact with suspected SARS patients.⁹¹⁰

A Health Canada December 2003 draft agreed with the CDC and WHO, although reluctantly, because it resisted the evidence of airborne transmission:

908. Matthew P. Muller and Allison McGeer, "Febrile respiratory illness in the intensive care unit setting: an infection control perspective," *Current Opinion on Critical Care* 12 (2006):37-42.

909. Centes for Disease Control, *Interim Domestic Guidance on the Use of Respirators to Prevent Transmission of SARS* (Atlanta: CDC, May 3, 2005).

910. Derrick et al., "Protecting healthcare staff from severe acute respiratory syndrome: filtration capacity of multiple surgical masks," *Journal of Hospital Infection* 59 (2005): 365-68.

Currently, N95 respirators or equivalent are recommended by Health Canada, WHO and the CDC for the care of SARS patients even though the evidence shows that SARS is spread by droplet transmission.⁹¹¹

Since SARS, a considerable body of research and scientific opinion suggests it was wise to take a cautious approach and require the N95 respirator.

As one CDC expert told the Commission, in a hospital you never know when one of those aerosol-generated events will happen. That is one of the reasons why the CDC recommends routine airborne protection for SARS:

But in health care facilities, when you have people in, you just don't know sometimes when you're going to have an aerosol-generating procedure happen, and it could happen precipitously. And because of those issues and because of issues like this, we're going to continue to recommend airborne precautions.

Experts who opposed the use of the N95 and fit testing argued that because SARS is largely droplet-spread, the level of respiratory protection didn't matter, as long as health workers wore some kind of respiratory device. Even a surgical mask would do.⁹¹²

It is not contested that a great deal of evidence points to the fact that SARS is usually spread by large respiratory droplets. The important word here is "usually." Highly contagious viruses spread by smaller aerosols have high reproduction numbers, or R0.⁹¹³ Measles has an R0 of 15. Experts expect that a person with measles could pass the disease to roughly 15 others at the start of an outbreak in the absence of prevention measures. SARS's R0 was about 3. A person with SARS could on average pass the disease to roughly three others at the start of an outbreak in the absence of prevention measures. There were, however, enough super-spreaders, people with a very high viral load who could spread SARS to more than 20 people in some cases,

911. Health Canada, "Infection Control Precautions for Respiratory Infections Transmitted by Large Droplet and Contact Infection Control Guidance If There Is a SARS Outbreak Anywhere in the World, When an Individual Presents to a Healthcare Institution with a Respiratory Infection" (Ottawa: Health Canada, December 17, 2003).

912. SARS Commission Public Hearings, September 29, 2003.

913. The average number of people an infected person can be expected to pass the disease to at the start of an outbreak in the absence of prevention measures.

and super-spreading events like intubations, to prove that every case was not average and many were not.

The WHO consensus document on SARS said:

A basic reproduction number (R0) of approximately 3 is consistent with a disease spread by direct contact or larger virus-laden droplets that travel only a few meters rather than by lighter airborne particles. By contrast, if a disease is transmitted by aerosols, a single person can infect an entire room by coughing, as can happen with measles and influenza.⁹¹⁴

On the worker safety side of the droplet vs. airborne transmission debate were those who took a more cautious approach. Yes, said experts who took this position, all signs point to the fact that SARS is usually spread by large droplets, but we don't know enough about the disease to rule out airborne transmission. With this uncertainty, they suggested, let's be cautious and use the N95.

The two sides were balanced well in the Naylor Report. First:

Given that SARS was being spread primarily via droplets, some informants questioned whether N95 masks were necessary.⁹¹⁵

But then:

Others stressed that the disease should be treated as airborne until more information was available.⁹¹⁶

A leader in the effort to contain SARS in Ontario told the Commission that, despite evidence that SARS was mostly spread by large droplets, he still supported a precautionary approach and the use of N95 respirators:

914. WHO, *Consensus Document on the Epidemiology of Severe Acute Respiratory Syndrome (SARS)*, p. 12.

915. Naylor Report, p. 30.

916. Naylor Report, p. 30. The full quotation reads as follows:

A controversial directive was the requirement that health care workers wear fit tested N95 masks. Neither the fit testing (a complex operation requiring a subject to try various mask designs while a bitter-tasting gas circulates underneath a hood), nor the appropriateness of the N95 standard itself had been fully discussed by the SAC. Given that SARS was being spread primarily via droplets, some informants questioned whether N95 masks were necessary. Others stressed that the disease should be treated as airborne until more information was available.

There isn't enough data reported yet from the SARS outbreaks to really know. There's been some literature published to suggest that an N95 is no more effective with a SARS patient. Let's for argument's sake say, for a regular SARS patient not requiring a high-risk procedure, then a properly worn surgical mask [would be fine], and intuitively if it's droplet, that should be the case.

I'm not comfortable with that yet and I'm not sure why. Maybe it's because my colleagues got sick. Maybe it's because I know the backlash from the providers and the unions. I'd rather from a strategic point of view say let's just keep doing this until all the evidence is in, that we're able to evaluate it properly and then we can back off. I'd rather ... than say maybe we were wrong this time, let's go back to the N95.

Three years after the outbreak, one physician who caught SARS and strongly supports the use of N95 respirators told the Commission that we still don't know enough about SARS:

I mean there are still people who say they were just droplets and even surgical masks should stop the droplets. I am not sure how they got sick then. So it could be that there are things about SARS we don't know.

It was largely on the basis of Toronto's Sunnybrook disaster on April 13, when nine health workers caught SARS, that the CDC decided in favour of the precautionary approach and opted for airborne precautions.

One CDC expert told the Commission:

And it's largely because of this event here, the Toronto cluster – not only this event though: there's also clusters in Hong Kong and elsewhere where people have been wearing droplet-level precautions and still gotten sick.

Now, it's usually an aerosol-generating infection as far as I'm aware. It's always associated with some aerosol-generating procedure of some type. And in Hong Kong, it was the use of aerosized nebulized bronchodilator therapy medications and a bunch of medical students all got sick who were wearing masks.

When you look at the R0, it suggests it's probably not airborne, it's not airborne in the same sense as measles or anything like that. And when you look at epidemiologic links, people down the hallway, around the corner, they're not getting sick. But, in health care facilities, when you have people in, you just don't know sometimes when you're going to have an aerosol-generating procedure happen, and it could happen precipitously. And because of those issues and because of issues like this, we're going to continue to recommend airborne precautions.

Nothing brings home the point of airborne SARS risk better than the May 28 disaster at North York General, when workers caught SARS despite their use of the personal protective precautions they were told would keep them safe. As late as May 28, the lesson of airborne risk had not been learned. A scientific study of the incident said:

In this case, just as in previous cases, either contact, droplet, or airborne transmission might have occurred.⁹¹⁷

The CDC reported this incident in its journal *Emerging Infectious Diseases*. The authors,⁹¹⁸ some of them well-known figures in the SARS outbreak, concluded that the mechanism of transmission of the virus from patient to worker could have been airborne rather than droplet:

Two explanations may account for the transmission observed in this case: 1) an unrecognized breach in contact and droplet precautions occurred, or 2) an airborne viral load was great enough to overwhelm the protection offered by droplet precautions, including non-fit tested N95 disposable respirators. If the last form of transmission was responsible, airborne virus may have been generated by the coughing patient before her cardiopulmonary arrest or due to a "cough-like" force produced by the airway pressures created during asynchronous chest compressions and ventilations using the bag-valve-mask ...

917. M.D. Christian et al., "Possible SARS coronavirus transmission during cardiopulmonary resuscitation," *Emerging Infectious Diseases*, Vol. 10, No. 2, February 2004 (Christian et al, "Possible SARS Coronavirus Transmission").

918. Michael D. Christian, Mona Loutfy, Clifford McDonald, Kenneth F. Martinez, Mariana Ofner, Tom Wong, Tamara Wallington, Wayne L. Gold, Barbara Mederski, Karen Green, and Donald E. Low.

The final line of protection against occupational exposure is protection equipment. The use of N95 respirators offers a level of protection against airborne transmission of SARS. However, for any form of respiratory protection to perform at the level of its full potential, it must be properly fitted to provide an adequate seal. The N95 disposable respirators used by health workers in this instance were not fit tested to ensure an adequate seal. Thus the exact level of protection afforded by the N95 respirators for each person in this case is unknown. Nonetheless, a higher level of respiratory protection should be considered in environments with a potentially very high SARS-CoV load, *such as* that associated with aerosol-generating procedures. [emphasis added]⁹¹⁹

Nothing could show better the scientific reasons for the N95 and for fit testing.

The body of evidence and scientific opinion about airborne SARS is too extensive to discuss in detail here. Reference is made below to evidence that the original transmission of SARS in the Metropole Hotel on February 21, 2003, to Toronto's index case and at least 15 others that may have been airborne,⁹²⁰ to disasters in other countries (like Amoy Gardens in Hong Kong) and to evidence of airborne SARS in a Toronto hospital.

Because of this risk of airborne transmission, Ontario during SARS required workers with close patient contact and sometimes those in other areas of hospital to wear fitted N95 respirators to protect against the risk.

In the context of this risk, the following issues arise:

- N95 respirators and surgical masks
- Ministry of Labour approval
- SARS decision to require N95s
- Confusing directives during SARS
- Failure to train
- Ministry of Labour sidelined
- Confusion: N95 "equivalent"

919. Christian et al, "Possible SARS Coronavirus Transmission".

920. WHO, *SARS: How a Global Epidemic Was Stopped* (Geneva: WHO, 2006), p. 8.

- Was the N95 necessary?
- Was fit testing necessary?

The Difference Between an N95 Respirator and a Surgical Mask

While surgical masks⁹²¹ and their lower-standard cousins, procedure masks,⁹²² have long been used to safeguard health workers, they were originally intended primarily to protect patients.

One study said:

Surgical masks were developed to prevent the wearer's exhaled secretions from contaminating the operative field.⁹²³

Surgical masks, which must meet far less stringent regulatory standards than respirators,⁹²⁴ are believed to offer the wearer some protection.⁹²⁵ But this protection is

921. "Surgical masks ... are of two main types: (1) flat-pleated or duck-billed in shape, conforming to the bridge of the nose with a flexible piece, affixed to the head with two ties and (2) pre-molded conforming to the bridge of the nose with a flexible piece, adhering to the head with a single elastic" National Academy of Sciences, *Reusability of Face Masks During an Influenza Pandemic* [Washington, DC: National Academy of Sciences, April 2006], p. 16).

922. "Procedure masks are flat/pleated or duck-billed in shape and fasten to the head with ear loops. All procedure masks have some degree of fluid resistance, but they are not required to meet the same standards as surgical masks" (National Academy of Sciences, *Reusability of Face Masks During an Influenza Pandemic*, p. 16).

923. Yassi et al, "Research Gaps in Protecting Health Workers from SARS".

924. The regulatory approval for surgical masks is far less stringent than that of independently certified N95 respirators There are no minimum standards or standardized testing methods for surgical mask filter efficiency. (WHO, *Avian Influenza, including Influenza A (H5N1), in Humans: WHO Interim Infection Control Guideline for Healthcare Facilities* [Geneva: WHO, February 9, 2006], p. 41).

The U.S. Food and Drug Administration, in approving surgical masks for sale, does not address the fit of the mask, or its effectiveness:

Food and Drug Administration's regulatory requirements do not address the fit of medical masks, which can make the total filtration efficiency of questionable value. Masks approved by the FDA for medical use are designed to be worn by an infected person, health worker or member of the public to reduce transfer of body fluids that may spread infection. (National Academy of Sciences, *Reusability of Face Masks During an Influenza Pandemic*, p. 32).

limited because a surgical mask doesn't create a tight seal around the mouth and nose of the wearer and always leaves gaps. As one study of respiratory protection explained:

The device is placed over the nose and mouth and held in place by straps placed behind the ears or around the head but more usually around the back of the head and neck. The device fits fairly loosely and a tight seal is not feasible where the outside edge of the mask meets the skin of the face. Most users in the healthcare industry tend to wear surgical masks rather loosely; considerable gaps are usually observed at the peripheral edges of the surgical mask along the cheeks, around the bridge of the nose and along the bottom edge of the mask below the chin.⁹²⁶

The problem with a surgical mask is that not all the air breathed in by a health worker passes through a surgical mask's filtering materials, regardless of the filtering quality of those materials. A recent study by the Institute of Medicine of the National Academies, whose authors included Dr. Allison McGeer of Toronto's Mount Sinai Hospital, said:

The loose fit of most medical masks [i.e., surgical and procedure masks] leaves gaps that could allow substantial contaminant leakage into and from the mask ... Medical masks may be used as barriers against disease transmission by fluids, especially blood, and some large droplets, and they are designed to prevent release to the environment of large droplets generated by the wearer. They are not designed or approved for the

Standard surgical masks are considered a Class II device by the US federal Food and Drug Administration (FDA) which require pre-market sales approval. This means that to obtain approval as an item for sale, the manufacturer must demonstrate to the satisfaction of the FDA that the new device is substantially equivalent to similar masks currently on the market. There is no specific requirement to prove that the existing masks are effective and there is no standard test or set of data required supporting the assertion of equivalence. Nor does the FDA conduct or sponsor testing of surgical masks. Yassi and Bryce, *Protecting the Faces of Health Workers*, p. 17).

925. Health Canada's *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Healthcare* says: "Masks are also worn to protect the HCW from acquisition of infections transmitted by large droplets. Surgical masks are considered adequate for this purpose. It appears logical to use a mask when within 1 metre of a coughing patient" (Vol. 25S4, July 1999, p. 27).

926. Yassi et al, "Research Gaps in Protecting Health Workers from SARS".

purpose of protecting the wearer against entry of infectious aerosolized particles potentially surrounding the wearer and his mask.⁹²⁷

A Toronto physician who was involved in treating SARS patients said:

The trouble with ordinary surgical masks are you lick them and you stick your nose in them and they have big holes in the outside part and so forth. Let's face it, they're a joke. But surgeons use them to this very day. They're cheap and they're comfortable. We still use them. Surgical masks protect mainly the patient.

Studies have shown that surgical masks, because of their inability to create a tight seal, are less effective against smaller droplets and droplet nuclei than N95 respirators. Even wearing as many as five surgical masks does not raise their ability to filter out smaller airborne particles to the level of an N95 respirator.⁹²⁸

Designed to create a tight seal around the mouth and nose of the wearer, an N95 respirator provides a far higher level of protection to the wearer than surgical masks. Respirators rely:

on the breathing action of the user to draw air through the filtering medium. On inhalation a negative pressure is created as the air is drawn through the medium. Respirators of this type are considered tight fitting because they rely on a good seal between the user's face and the respirator itself in order to work properly.⁹²⁹

As one U.S. expert explained to the Commission, masks and respirators are designed for different purposes:

927. National Academy of Sciences, *Reusability of Face Masks During an Influenza Pandemic*, p. 32.

928. A recent study that examined whether wearing as many as five surgical masks was sufficient protection from the SARS virus concluded: "Our data confirm previous findings that the filtration of submicron-sized airborne particles by a single surgical mask is minimal ... Although greater filtration was afforded by multiple masks, with an approximate doubling in the filtration factor when five masks were worn compared with a single mask, the absolute filtration factor remained low and well below the minimum fit factor of 100 required for a respirator" Derrick et al., "Protecting healthcare staff from severe acute respiratory syndrome," 365–68).

929. Healthcare Health and Safety Association of Ontario, *Respiratory Protection Programs*, 2nd Edition, p. 11.

Masks are meant to protect something else, e.g., a surgical field, or someone else from getting whatever the wearer of the mask may have. They are not designed to protect the wearer of the mask from whatever is floating around in the air. Respirators, on the other hand, are designed to protect the wearer and that's one of the reasons why they need to be form-fitted.

Ministry of Labour Approval

The N95 is part of a family of nine respirators introduced in July 1995 under a new NIOSH standard known as 42 CFR Part 84.⁹³⁰

NIOSH, the National Institute for Occupational Safety and Health, is part of the Centers for Disease Control and Prevention, the U.S. agency responsible for worker safety research, standards, evaluation and education.

Because there is no Canadian agency that tests and certifies respirators, the Ministry of Labour, in regulating workplace safety, often relies on NIOSH. A ministry official said this was the case with NIOSH's new respirator standards:

And we essentially accepted these new [NIOSH respirator] approvals and – and we basically said these are the respirators that we want to see used.

The ministry began to phase in the new standards in 1995. The phase-in period expired in May 1999, after which only new NIOSH-tested respirators would be approved for use. As the phase-in period was expiring, the Ministry of Labour advised:

It is Ministry of Labour policy to continue to accept both the new approved respirators under Part 84 and the old respirators for dusts, mists and fumes, approved under the old Part 11, up until May 10, 1999, as long as the old respirators are in good physical condition and are appropriate for the type and concentration of an airborne contaminant.

930. National Institute for Occupational Health and Safety, "NIOSH change will save healthcare industry millions," news release, August 25, 1995.

After May 10, 1999, Inspectors will issue orders under clause 25(2)(h) of the *Occupational Health and Safety Act* to require the new respirators or filters.⁹³¹

Clause 25(2)(h) of the Act requires that an employer:

take every precaution reasonable in the circumstances for the protection of a worker.

This change in the ministry's respirator standards was also reflected in the Policy and Procedures Manual of the ministry's Operations Division. Section 10.17 of the manual, dated April 1, 2000, said:

In issuing orders for new non-powered air purifying filter/respirators the following wording is suggested:

“Pursuant to section 25(2)(h) of the OSHA, the employer shall ensure that respirators used in the workplace meet the current standards to ensure the workers wearing air purifying particulate respirators for exposure (i.e. state hazard i.e., asbestos, welding fume, lead, silica, etc.) in the (state area or location) are adequately protected.”

The narrative of the report can provide explanatory material such as:

“It is a reasonable precaution to provide respirators approved to the new NIOSH standard referred to as 42 CFR 84 since these new filters are tested to new and more demanding testing requirements than those tested under the old NIOSH approval system. The new testing provides better evidence of the filters' ability to remove airborne particulates and thus the workers will receive better protection from the particulates.”

Before SARS, N95 respirators were not widely used in most Toronto hospitals. Some did stock N95 respirators for use in treating tuberculosis patients. At some other hospitals, however, health workers treating TB cases used respirators that the hospitals felt were equivalent to an N95 even though they were not independently tested and certified. (The issue of equivalency is discussed below.)

931. Ontario Ministry of Labour, “Ministry updates respirator policy for NIOSH approved particulate respirators,” January 18, 1999.

Regardless of what type of respirator their hospitals stocked, most health workers interviewed by the Commission said that before SARS they had never seen an N95 respirator, had never used one and had not been trained in its use either at school or on the job.

The Decision to Require N95s

On the evening of March 26, just hours after the provincial emergency was declared, a critical meeting was held at the Provincial Operations Centre (POC). With the outbreak gathering momentum, the men and women who led the fight against SARS decided what measures, including respiratory protection, were needed to contain the new disease.

The atmosphere among the attendees, who included Drs. Jim Young, Colin D'Cunha and Sheela Basrur, was understandably tense. One participant recalled the mounting concern over the worsening situation:

I got paged late Wednesday night and asked if I would come down to the emergency centre because they were going to, now the province was involved. People were very upset that things, we were hearing stories now not only about people coming back to Scarborough Grace Hospital unwell but people were arriving in other emergency departments around the city sick, so it was no longer confined to Scarborough Grace Hospital but now patients were showing up at Scarborough General, at North York, at Centenary, and so things were kind of ... we did not have a handle on what was going on.

SARS was spreading so fast that it overwhelmed efforts to trace the contacts of SARS patients and find out where the infection was coming from and where it was going. No one knew how far it had spread in Toronto. No one knew where it was spreading. Dr. Don Low said:

We recognized that we had lost control, that we were not able to identify patients.⁹³²

932. Interview with Dr. Donald Low in *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science 2* (2004) (Dr. Low – Biosecurity and Bioterrorism Interview).

Amid this uncertainty, it was clearly evident from the devastating outbreak at Scarborough Grace that health workers were terribly vulnerable to the new disease and that the health care system had failed thus far to protect them.

As Table 2 below indicates, of the initial 128 SARS cases at Scarborough Grace, 47, or 37 per cent, were staff at the hospital, and seven, or 6 per cent, were non-hospital health workers, including EMS personnel. At least eight members of health workers' households were also infected. The disturbing bottom line: of the 128 cases, 62, or 48 per cent, were either staff at the hospital, other health care workers or members of health workers' households.⁹³³

Table 2 – SARS Cases at Scarborough Grace Hospital⁹³⁴

Contact Setting	Number	Percentage of Total Cases (128)
Hospital – Staff	47	18%
Patients	18	37%
Visitors	14	14%
Other health workers	7	6%
Close contacts	38	30%
Total number of health workers and members of their households	62	48%

If health workers were this vulnerable, no one appeared to be safe.

The fact that SARS had infected so many health workers led those trying to contain the Scarborough Grace outbreak to conclude that more protection was needed. Heightened precautions implemented at Scarborough Grace in late March included the requirement that all health workers use N95 respirators:

Following the initial investigation, contact and droplet precautions were implemented for all patients in ICU on March 22, and the ICU and

933. Varia et al., "Investigation of a nosocomial outbreak of (SARS)"

934. Varia et al., "Investigation of a nosocomial outbreak of (SARS)"

emergency department were closed on March 23. On March 24, following the identification of staff and patient cases not linked to the ICU or emergency department, the hospital was closed to admissions, outpatient clinics were closed, and discharged patients were placed into quarantine at home for 10 days. Along with an increased emphasis on hand-washing, additional precautions, including the use of gowns, gloves, N95 or equivalent masks, and eye protection, were implemented for all patient care, and single or negative-pressure rooms were used for all febrile patients. Dedicated equipment was used for all patients, and patients were restricted to their rooms except for medically necessary tests. Staff wore N95 masks at all times in the hospital.⁹³⁵

In the face of a new, unknown disease, and mindful of the experience of Scarborough Grace, provincial officials decided on March 26 that affected health workers outside of Scarborough Grace also needed the higher protection of N95 respirators.

Dr. James Young told the SARS Commission public hearings that the decision was taken from a precautionary approach:

We chose, for means of protection, to use the N95 mask. We believed from the beginning that it was droplet-spread, but we believed, until we were more certain, that we should use the more protective N95 mask.⁹³⁶

One expert told the Commission that officials decided to err on the side of caution:

Even then we started talking N95. If I remember correctly that Wednesday night, we started because we did not know how this thing was transmitted and we assumed the worst, which is the right thing to do, and that's why N95s. Either that night or the next, the decision was made to buy every N95 in North America. We bought out the market by the weekend.

Dr. Low said:

In the early days, that's what kept me awake at night: the thought that we would always be remembered as the epicentre for a new endemic disease

935. Varia et al., "Investigation of a nosocomial outbreak of SARS"

936. SARS Commission Public Hearings, September 3, 2003.

which eventually would find its way across North America. But early on, we didn't know how it was transmitted. We couldn't say that it wasn't airborne-transmitted. And therefore we assumed the worst and made the decision. We were going to require that everybody in the city wear an N95 mask in a health care facility.⁹³⁷

N95s Were Hard to Wear

It quickly became evident that health workers would have a difficult time doing their jobs while using an N95.

Respirators were uncomfortable to wear, restricted human interaction (an important part of patient care) and added significantly to health workers' workloads. One study of the experience of health workers during SARS said:

Wearing a mask was the precaution most frequently cited as most bothersome ... The most commonly cited difficulty with the mask was physical discomfort (92.9% [1588/1710] of respondents).⁹³⁸

The ONA survey found:

Over 70% of respondents experienced some side effects from the use of PPE [personal protective equipment], including: headaches, shortness of breath, facial rash, fatigue, dizziness, and others.⁹³⁹

The ONA and OPSEU told the Commission public hearings that wearing N95 respirators for a long time caused fatigue, probably because of reduced oxygen intake.

One health worker told the Commission:

We had it on for our whole 12-hour shift, right? We changed our masks, our gloves, our gowns, everything, but you were donned, except on break time, in this, and the thirst and the fatigue was phenomenal that we went

937. Dr. Low Biosecurity and Bioterrorism Interview.

938. L. Nickell et al., "Psychosocial effect of SARS on hospital staff: survey of a large tertiary institution," *CMAJ* 170 (2004): 793-98.

939. Hay Group, "Nurses' Perspective on the Outbreak of SARS in Toronto" (March 2006), p. 10.

through. We were so tired and so listless.

Another health worker said:

Question: So it was very hot?

Answer: It was very uncomfortable and I remember we had a cardiac arrest and I ended up being the one that was doing the chest compressions and I had never been so hot in my entire life, thinking, how did I manage to get this job?

A third health worker simply said:

I was very uncomfortable in it – you can't breathe through these fibre-glass things.

The ONA and OPSEU told the Commission public hearings that pregnant workers especially noted fatigue because their breathing was already restricted by the pressure from the growing fetus:

The mask restricts breathing and increased carbon dioxide levels. The mask restricts successful exhalation because, as you exhale, the air containing carbon dioxide is trapped in the mask and then you breathe it in again.⁹⁴⁰

The Registered Nurses Association of Ontario told the Commission:

Nurses complained about a constant burning irritation of the throat, tightness in the upper chest, headaches, allergic skin reactions, swollen lips and tongue, dizziness, lethargy, sleep disorders and the exacerbation of other health problems such as asthma. Some nurses reported that they could taste and feel the fibres from the mask and were concerned about long-term implications of prolonged mask use.⁹⁴¹

During and after SARS, some experts in and out of government used the discomfort of wearing an N95 as an argument against a precautionary approach.

940. SARS Commission Public Hearings, November 17, 2003.

941. SARS Commission Public Hearings, November 17, 2003.

In the words of one health workers' union, these experts argued that "personal protective equipment is uncomfortable and difficult to put on" and that this was a reason not to use respirators. Representatives of health workers say their members accept the discomforts of wearing N95 respirators if it means they are protected. As one union stated:

A day in the life of a health care worker is replete with all varieties of discomfort. While health care workers (like all workers) would prefer not to wear respirators, they are prepared to adjust to discomfort when necessary to make the very air they breathe safe for themselves and safe to pass on to patients and family. Firefighters, steelworkers, chemical workers and others have for decades routinely crouched in cramped, confined spaces for hours at a time, dragged down by much heavier respiratory protection than the N95 respirators ... Given information and training about hazards and the need for respiratory protection, all workers tolerate the discomfort.⁹⁴²

It is hard to argue with the union's point of view.

N95 Respirators and POC Directives

Comfortable to wear or not, the N95 respirator, with its recognizable, face-hugging shape and its frequent media use to illustrate the outbreak, came to symbolize the battle to contain SARS.

For health workers, along with being the source of much discomfort, the N95 respirator was also the subject of a great deal of confusion over who should wear an N95, where it should be worn and how it should be properly used.

Unclear directives were a significant cause of this uncertainty.

Issued by the POC, directives were meant to ensure that measures to contain the outbreak were based on the best expert advice and were consistently applied. While there is no doubt that directives on N95 respirators were at times confusing, those who prepared the directives made a remarkable effort under pressure. From a standing

942. ONA letter to Premier McGuinty, December 15, 2005.

start they helped to create a system that in the end stopped SARS. The wonder is not that there were problems with the directives. The wonder is that these dedicated men and women were able to produce from nothing a system that did the job.

When the March 26 decision was made to mandate the use of N95 respirators, for example, experts like Dr. Low stayed up late into the night to craft appropriate directives. Dr. Low recalled:

That night we sat down and came up with policies and procedures that we sent to all the hospitals the next morning.⁹⁴³

Directives on N95 respirators were at times confusing because of the massive systemic weaknesses that hampered efforts and capabilities. Those preparing the directives did the best they could under difficult circumstances with insufficient resources, infrastructure and planning. One expert involved in preparing directives recalled:

Whatever information we had, we then issued new orders and directives as to how we thought hospitals should react. And the kinds of questions that were thrown at us, when the volume I likened to taking a shower in Niagara Falls. It was colossal, and we had to set rules as to how many people were allowed in to interrupt us ... We were so short of infectious disease human intellectual resources, that the people who were in Toronto were either quarantined or were themselves struggling with maintaining their own hospitals.

Regardless of the reasons for the directives' failings, reality is that on many occasions the directives did not provide sufficient advice to health workers, their supervisors or their employers.

Consider the first hospital directive issued by the POC on March 27. It required only staff in emergency departments and clinics to wear N95 respirators:

All staff in GTA [Greater Toronto Area] and Simcoe County hospital emergency departments and clinics to wear protective clothing (gloves, gown, eye protection and mask – N95 or equivalent).

943. Dr. Low Biosecurity and Bioterrorism Interview.

Yet, as ONA and OPSEU noted in their joint submission to the SARS Commission, workers in the rest of the hospital were not required to take any special precautions:

This distinction between what protection was recommended for which groups of workers in the same facilities arose again and again throughout the crisis. Both unions were constantly trying to establish which areas were required to wear what personal protective equipment (PPE) and why.⁹⁴⁴

Problems with the March 27 directives appeared to have been addressed in the next few days, when two new directives extended the use of respirators to all health workers in affected facilities. On March 29, 2003, a POC directive to acute care hospitals in the GTA and Simcoe County required the wearing of an N95 respirator or equivalent by “all staff when in any part of the hospital,” “for hospital staff who are required to visit a patient care unit” and “for direct patient contact.” And on March 31, 2003, the requirement was extended to long-term care facilities in a directive that said:

All GTA/Simcoe County staff must invoke gown, glove, N95 mask (or equivalent), and eye protection precautions and cohort nursing protocols, whether or not they have identified possible SARS patients.

In a matter of days, new directives had a different message.

Directives on April 1, 2003, and April 3, 2003, appeared to require health workers to wear N95 respirators only in SARS patients’ rooms and for direct contact with any patient in intensive/critical care units or emergency departments.

ONA and OPSEU noted in their joint submission to the SARS Commission:

One example of such a change is found in two consecutive Directives for Acute Hospitals. The March 29 Directive for All Acute Hospitals in the GTA/Simcoe County required that “All staff when in any part of the hospital ... Use an N95 (or equivalent) mask (ensure mask is fit tested).” The April 1 and 3, 2003 Directives to All Ontario Acute Care Hospitals (which replaced the March 29 Directive above, and others) required staff to wear an N95 mask in SARS patients’ rooms, and for direct

944. OPSEU/ONA Joint Report on Health & Safety Matters Arising from SARS, November 2003, pp. 4-5 (ONA/OPSEU Joint Report).

contact with any patient in Intensive/Critical Care Units or Emergency Departments.⁹⁴⁵

The April 1, 2003, POC directive to all Ontario acute care hospitals said:

All HCWs and staff entering the room of a SARS patient in ANY location ...

Use an N95 mask

—

For direct contact with any patient in Intensive/Critical Care Units or Emergency Departments HCWs must ...

Use an N95 mask

—

Patients with suspected or probable SARS must be placed in single isolation rooms, or cohorted with other SARS patients and treated using contact, and respiratory precautions. N95 masks, or equivalent, must be worn by anyone entering the room.

The April 3, 2003, POC directive to all Ontario acute care hospitals said:

All HCWs and staff entering the room of a SARS patient in ANY location ...

Use an N95 mask

—

For direct contact with any patient in Intensive/Critical Care Units or Emergency Departments HCWs must ...

945. OPSEU/ONA Joint Report, p. 8.

Use an N95 mask

Patients with suspected or probable SARS must be placed in single isolation rooms, or cohorted with other SARS patients and treated using contact, and respiratory precautions. N95 masks, or equivalent, must be worn by anyone entering the room.

Health workers undoubtedly felt like yo-yos, told one thing one day, another the next, by the people who, acting in good faith, were supposed to keep them safe in a dangerous workplace.

The ONA and OPSEU noted in their joint submission that the confusion caused by the directives helped to undermine the confidence of health workers in the system that was supposed to protect them:

If workers throughout a facility are required to wear certain personal protective equipment (PPE) one day, and the next day only workers in the Emergency department are required to wear this PPE, and there is no explanation or rationale offered, it is difficult to be confident that every precaution is being taken to protect the health of our members.⁹⁴⁶

The uncertainty over who should wear an N95 and where they should wear them was exacerbated by the fact that the N95 was a completely new piece of protective equipment for most health workers.

An Ontario Nurses' Association (ONA) survey of its members⁹⁴⁷ found:

Only 5% of respondents had been fit tested and/or trained and instructed in the care, use and limitations of PPE (personal protective equipment) before SARS.⁹⁴⁸

946. OPSEU/ONA Joint Report, pp. 7-8.

947. The independent Hay Group summarized the survey's results for the Commission. The complete Hay Group report is available in Volume 2 of the Commission's final report.

948. Hay Group, "Nurses' Perspective on the Outbreak of SARS in Toronto" (March 2006), p. 8.

Since so few health workers had been taught how to properly use this new piece of protective equipment before SARS, health workers and their employers and supervisors were particularly reliant on the guidance of POC directives.

The directives were not only confusing, but during the early part of the outbreak they also lacked sufficient detail. For the first month and a half of the outbreak, the POC directives failed to explain in sufficient detail how to properly apply and remove an N95 respirator.

As the ONA and OPSEU said in their joint submission:

On April 20, for the first time detailed direction was given on matters such as ... procedures such as applying personal protective equipment, removing personal protective equipment ...

These directives offer the first concrete evidence that the POC had begun to recognize that employers, supervisors and workers did not understand how to implement the previous Directives. It is surprising that in an acute hospital setting accustomed to caring for patients with infectious diseases, that such detail was necessary.⁹⁴⁹

Directives issued on April 20, 2003, detailed procedures for applying and removing personal protective equipment.⁹⁵⁰ Directives issued a few days later, on April 24, 2006, provided more detailed instructions.⁹⁵¹

949. OPSEU/ONA Joint Report, pp. 10-11.

950. Procedure for removing protective equipment on exit from the room:

While still inside the room:

- Remove gloves
- Remove gown (discard in linen hamper in a manner that minimizes air disturbance)
- Decontaminate hands with alcohol hand wash; do NOT use patient bathroom to wash hands
- Leave room, bag specimens, etc.

After leaving the room:

- Use alcohol hand wash again
- Remove face shield/fluid shield and discard
- Remove N95 mask. Remove hair cover
- Use alcohol hand wash again
- Put on new hair cover, N95 mask and gown
- At least once per hour, wash hands at nearest hand washing sink to remove residue from alcohol hand wash and reduce skin irritation

But by then, more than six weeks into the outbreak, dozens and dozens of health workers and members of their households had already contracted SARS, including two who were to die from it.

Confusing directives hindered the ability of health workers to protect themselves. Confusing directives hindered the ability of their employers and supervisors to know exactly what respiratory protections were needed to protect their employees. And confusing directives undermined the faith of health workers, their employers and their supervisors in the recommendations of those in charge of the fight to contain SARS.

An important lesson from SARS is that during a public health emergency, directives on respirator protective equipment need to be clear and complete. They need to be

951. Routine procedure for applying personal protective equipment prior to entering patient room:

- Wash hands (do NOT use patient washroom to wash hands)
- Put on a disposable hair cover
- Put on a face shield. Use either a surgical mask with attached face shield (“fluid shield”) over the N95 mask or a full-face plastic shield.
- Put on 2 pairs of gloves

While in the patient room:

- Remove first pair of gloves after providing direct patient care
- Keep second pair of gloves on for remainder of stay in the room

Routine Procedure for removing protective equipment on exit from the room:

While still inside the room:

- Specimens to be placed in a clean specimen bag using a two person transfer method
- Remove second pair of gloves
- Remove gown (discard in linen hamper in a manner that minimizes air disturbance)
- Use alcohol hand rinse; do NOT use patient bathroom to wash hands

Just prior to leaving or immediately after leaving the room:

- Use alcohol hand rinse again
- Remove face shield/fluid shield and discard
- Remove N95 mask and discard
- Remove hair cover and discard
- Use alcohol hand rinse again
- Put on new N95 mask or equivalent and gown
- At least once per hour, wash hands at nearest hand washing sink (but NOT in a patient washroom) to remove residue from alcohol hand wash and reduce skin irritation

developed before the emergency strikes and not made up from scratch after it begins. They need to be developed in concert with all workplace parties to ensure that they are accurate, are consistent with worker safety laws and best practices, can be understood and will work.

Lack of Training

It was bad enough that directives, at least during the first part of the outbreak, often lacked sufficiently detailed information. What made things worse was the lack of training.

The ONA members' survey found that 44 per cent of respondents felt that during the SARS outbreak there either was not enough training on the proper use of personal protective equipment or they didn't know.⁹⁵²

Many health workers interviewed by the Commission were not taught how to use N95 respirators when first required to use them. Often they were not properly taught until they were fit tested, which typically happened only long after the outbreak.

The following are representative of health workers' comments to the Commission:

Question: And did anybody ever show you how to use it properly? Was there any training?

Answer: No. I just looked at the box and put it on the way the box said to put it on.

—

I really did not receive any formal training on the use of the equipment. You were pretty well [told] there's equipment there, you figure out yourself how to put it on. And certainly the missing piece with me was that I didn't have any formal training in how to remove it properly.

952. Hay Group, "Nurses' Perspective on the Outbreak of SARS in Toronto" (March 2006), p. 9.

—

Answer: There were no instructions on the memo [provided by the employer] for how to put on an N95 mask. Actually, I didn't know there was a way to put it on until after.

Question: And I guess you didn't know that there was a way to take it off?

Answer: Right. The memos did say in what order to take your gear off, like one set of gloves and then the next, but it didn't say specifically how.

—

Question: Were you – at some point were you fitted for your mask?

Answer: Yes, I was.

Question: When was that, in the fall ... Was it after the second outbreak, or after the hospital shut down?

Answer: After the hospital shut down.

Question: And prior to your fitting, when you started wearing the N95 mask, did anyone give you training and education on how to properly apply the mask and how to make sure you get a proper seal?

Answer: No

—

But what we didn't have was – the first day [was] anybody [who] taught us how to really put those masks on. So we didn't know whether we were putting them on properly or not.

—

Question: Did you get training on how to properly don the equipment, how to properly remove the equipment, how to properly put your masks on. Did you get any of that in the first part of SARS?

Answer: No.

—

Question: So, you just go in and get a mask and you're expected to figure out how to use it properly and that's the complete extent of the training of the personal protection equipment, really?

Answer: Until, yes.

Question: Until the fit test?

Answer: Well, no. Because I guess somebody shows you once, you start talking to people and they tell you, fit it here and somebody else you work with has been already been shown.

Question: Right. But was there a formal [training] – like someone come around that [provided formal instruction]?

Answer: No, there's a little pamphlet that came in the box of them when you got the first ones that basically told you what to do.

—

Question: And had you at that point [i.e., during the SARS outbreak] been given any instructions on how to properly wear a mask?

Answer: No.

—
Question: And were you given any in-service training on how to properly put the equipment on and take it off?

Answer: Oh, not till far, far later. Months after.

—
Question: You had said that you were not fit tested prior to that.

Answer: No.

Question: But you have been since?

Answer: Yes.

Question: And did someone show you [during the fit testing process] the proper way to put on that respirator, that mask?

Answer: Yes.

Question: During SARS, prior to you being fit tested, were you shown how to put it on?

Answer: No.

—
Question: How did you know how to put that N95 on initially?

Answer: It's from colleagues.

Question: Prior to the fit testing taking place, did anybody ever give you training on how to properly apply your mask, how to get a proper seal.

Answer: Training? I don't remember any training.

—
Answer: We weren't given an official in-service until the middle of the second SARS.

Question: And who did that for you?

Answer: You know what, I'm not really sure. Someone in regards to the education, like the nurse educator and stuff. We thought it was kind of ridiculous because, you know, at this point, we'd been through the first SARS and halfway through the second.

In cases where health workers were taught to use N95 respirators during SARS, health workers on day shifts in some cases appeared to have a greater chance of getting trained than their colleagues on nights.

One nurse said:

Professional practice leader came – it was the second day – came up to the unit, and they had signs, and it showed you the appropriate way to don and take off your garb, which we put outside the rooms. I said to her, this is great that we have this, but the staff's coming on at 7:30 [in the evening], are you going to be able to come back and explain all this to them? And she said to me, oh no, can't you do that?

Another nurse had a similar experience:

Question: So, there wasn't an educator that came on the unit and [provided formal training]?

Answer: That's my big issue. There is no education except for Monday to Friday. Basically 9:00 to 5:00, sometimes in the evening. So, if you do permanent night shift you have absolutely no education for off-hours.

Question: Mostly occurred Monday to Friday during the day shifts?

Answer: Yes. And I brought it up over and over. Nursing is

24/7. They need to be accommodating, especially when most of the staff are nurses, for night shifts, somebody needs to be coming in at nights for in-services and education, and it just doesn't happen.

Less attention also appeared to have been paid to training medical residents and fellows. One physician told the Commission:

There were no training sessions for the residents or the fellows. I think there were training sessions for the nurses and I think there were for the staff physicians, but there weren't for the residents and the fellows, which is – the reason for that is because resident and fellows rotate between hospitals and it is harder for the infection control service to capture them, but at the same time, it is a bit of a deficiency because residents and fellows have a lot of hands-on with patients.

As an indication of the consequences of poor training, some health workers told the Commission they were not told a good seal could be jeopardized by facial hair or by inserting something between the skin and the respirator.

An occupational safety consultant told the Commission that respirators work properly only if there is direct contact between the face and the respirator:

What the intent is, you need to have a proper seal. And what is a proper seal? A proper seal is there can be nothing such as beard growth, or beard or, you know, even face deformities fall into this. You've got to be able to have skin-surface-to-respirator contact. So as long as you've got that contact and it allows you to feel the negative pressure within your respirator, then there's absolutely no reason why it wouldn't be safe.

One health worker with a beard who caught SARS despite his unfitted N95 had never been told that the N95 required a tight fit around the face. When asked if he had been given any instructions, he said no:

Answer: No, I was never given any instructions.

Question: Did you get that when you were fit tested?

Answer: Yes.

Question: And was there anything that you learned that you weren't doing at the time or ...?

Answer: Yes. In regards to ensuring a seal between the mask and the face. I was not doing that at the time in 2003.

A respiratory protection manual said:

Facial hair can prevent a good seal between the skin and the respirator. Therefore, employees required to wear tight fitting respirators should be required to be clean-shaven where the respirator seals to the face unless there is a specific medical or religious reason for facial hair. In these cases, the employee can be reassigned to a position that does not require the use of a tight fitting respirator.⁹⁵³

Another health worker who caught SARS more than two months into the outbreak placed facial tissue between her skin and her N95 because of an allergic reaction to the respirator. She told the Commission:

Question: Do you know who you contracted SARS from?

Answer: I'm assuming it was [names patient].

Question: And you recall wearing a mask with her.

Answer: I had to shove Kleenex in it so it wouldn't touch my skin because I had an allergy to it. So I was wearing a mask, but I doubt it was in any way effective.

A hospital assistant who caught SARS in late May 2003 wore a surgical mask under his N95 respirator, unaware that inserting something between the respirator and the face can prevent a tight seal.

Question: But with this particular patient, you said you had on two masks.

953. Healthcare Health and Safety Association of Ontario, *Respiratory Protection Programs*, 2nd edition, p. 31.

- Answer: Two masks.
- Question: Which one did you put on first?
- Answer: First I put that one [surgical mask] and the second one I put that [N95].
- Question: Indicating the surgical mask first and then the one that sticks out [N95]. Do you know what the second one was? Do you know what kind of mask that was?
- Answer: They are two colours, one was white [surgical mask], one was grey like this [N95] ... but I was using only white because it's a little bit bigger and it would fit over my nose.
- Question: Now, have you ever been fit tested for an N95 respirator?
- Answer: No, I don't remember that ...
- Question: And did anyone show you how to put on that top mask [N95]?
- Answer: Yeah, the nurse told me that you have to put like this first [surgical mask] and then comes this [N95] and put it on. Or she will put it on for me because I was very attached with that nurse up to now.
- Question: Prior to SARS, were there occasions where you would wear two masks?
- Answer: If it is very serious, the patient. Otherwise it is usual we put the mask on like that.
- Question: And would you always wear the surgical mask and then the other mask [N95] over the top?
- Answer: Not always. When the patient is very serious and if they were ... the patient was, then we wear two. Otherwise my one mask is fine.

To send a man like this into SARS without training does not reflect well on the way the health care system protected its workers.

Another health worker also told the Commission that she wore a surgical mask underneath her N95 until she found out that that ruined the seal. Luckily, she did not contract SARS.

Lack of training underlay most problems. Very few hospitals had a respiratory training program to ensure that workers when called upon to use the N95 were properly trained and fitted as required by law. Respirators can become hazards if not worn properly and can spread infection if not removed properly after contact with a sick patient.

Once SARS struck there was little time to correct years of neglect and bring training up to speed. But even then more could have been done to ensure that hospitals knew about the training and fit-testing requirements and did their best to train up quickly and efficiently.

An important lesson from SARS is that safety training needs to be in place before emergency strikes. Once an emergency strikes, the emergency response and directives should include a requirement for whatever training is urgently needed to protect responders.

Ministry of Labour and Respiratory Protection

No safety device will protect a worker if he or she does not know how to use it properly. A medical study has noted:

Previous efforts to improve infection control in the hospital and elsewhere have demonstrated that the efficacy of an intervention does not guarantee its success. The best respirator or medical mask will do little to protect the individual who refuses to wear it or who does not use it correctly.⁹⁵⁴

To ensure protection, Ontario law requires employers to train and supervise workers in the proper use of safety equipment.

954. National Academy of Sciences, *Reusability of Face Masks During an Influenza Pandemic*, pp. 39-40.

Section 10 of Ontario Regulation 67/93 requires:

10. (1) A worker who is required by his or her employer or by this Regulation to wear or use any protective clothing, equipment or device shall be instructed and trained in its care, use and limitations before wearing or using it for the first time and at regular intervals thereafter and the worker shall participate in such instruction and training.
- (2) Personal protective equipment that is to be provided, worn or used shall,
 - (a) be properly used and maintained;
 - (b) be a proper fit;
 - (c) be inspected for damage or deterioration; and
 - (d) be stored in a convenient, clean and sanitary location when not in use. O. Reg. 67/93, s. 10.

Section 27 (1) of the Occupational Health and Safety Act requires:

27. (1) A supervisor shall ensure that a worker,
 - (a) works in the manner and with the protective devices, measures and procedures required by this Act and the regulations; and
 - (b) uses or wears the equipment, protective devices or clothing that the worker's employer requires to be used or worn.

During SARS, the health workers who wore a surgical mask underneath their respirator, stuffed facial tissue underneath their respirator or wore the respirator over a beard cannot be faulted. They had not been trained, as required by law, on the proper use of respirators. None of their supervisors, as required by law, appeared to notice that respirators were not worn properly. That so many health workers were not properly trained, supervised or equipped reflects a deep systemic problem in the health care sector. Before and during SARS, much of the health care sector were unaware of the personal protective equipment requirements of Ontario work safety laws.

As a senior health administrator with significant experience in other sectors told the Commission:

I can draw the conclusion from my 30-odd years of working in various industries, and I think that hospitals would be less aware of occupational health and safety at that time [i.e., during SARS] than what I found in other industries.

If there was a general lack of awareness of worker safety regulations among hospitals, provincial officials did little to remind them of hospitals' legal obligations during much of the outbreak.

The March 29, 2003,⁹⁵⁵ and March 31, 2003,⁹⁵⁶ directives contained nonspecific references to fit testing (i.e., "ensure mask is fit tested," and "masks must be fitted appropriately"), but these were insufficient for a health care system that was largely unaware of both fit testing and the fact that it was a legal requirement. It was not until May 13,

955. The March 29, 2003, POC directive to GTA and Simcoe County hospitals said:

For all staff when in any part of the hospital ...

Use an N95 (or equivalent) mask (ensure mask is fit tested)

For hospital staff who are required to visit a patient care unit ...

Use an N95 mask (ensure mask is fit tested)

For direct patient contact ...

Use an N95 mask (ensure mask is fit tested)

956. The March 31, 2003, POC directive to GTA and Simcoe County long-term care facilities said:

All GTA/Simcoe County staff must invoke gown, glove, N95 mask (or equivalent), and eye protection precautions and cohort nursing protocols, whether or not they have identified possible SARS patients ...

Note: N95 masks must be fitted appropriately

POC directives to GTA and Simcoe County community care access centres:

Full protocol precautions for staff

Invoke gown, glove, N95 mask (or equivalent), and eye protection precautions and cohort nursing protocols, whether or not they have identified possible SARS patients.

Masks and gowns may be reused but must be changed:

- Following contact with a SARS patient
- When wet or soiled

N95 masks must be fitted appropriately

2003, that the POC first issued directives⁹⁵⁷ explicitly reminded health care institutions of their legal duties regarding N95 respirators and other personal protective equipment. All six directives issued that day contained the following language:

Personal protective equipment must be properly used and maintained consistent with the Occupational Health and Safety Act Reg. 67/93 s.10. N95 or equivalent masks must be qualitatively fit tested to ensure maximum effectiveness. (See NIOSH website at www.cdc.gov/niosh - Publication No.99-143).

These requirements had been in place as a feature of Ontario safety law since 1993, but many hospitals officials told the Commission they become aware of this only on May 13, 2003.

Provincial labour officials also did too little to ensure that worker safety regulations were enforced.

As noted elsewhere in this report, despite the large number of health workers who got SARS, the Ministry of Labour was largely on the sidelines. Reminders to employers of their worker safety obligations were not issued until late in the outbreak, and the Ministry of Labour, unlike its counterpart in B.C., did little during most of the SARS outbreak to ensure that employers were aware of and were meeting their statutory duties.

The Ministry of Labour conducted no proactive inspections of SARS hospitals in March 2003. During that month, nearly half of the SARS cases in the initial outbreak at Scarborough Grace were either health workers or members of their households, and six health workers at Mount Sinai also caught SARS.

Despite the events at Scarborough Grace and Mount Sinai in March 2003, the Ministry of Labour conducted no proactive inspections of health care settings with SARS patients in April 2003. Yet, during that month, the list of health workers contracting SARS grew. Affected hospitals included Mount Sinai, York Central, Sunnybrook and North York General.

957. On May 13, 2003, the POC issued six directives: Directive to Ontario Healthcare Providers in Community Settings and Community Healthcare Agencies (Excluding Community Care Access Centres); Directive to all Community Care Access Centres; Directive to all Ontario Non-Acute Care Facilities; Directives to all Ontario Acute Care Facilities; Directives to all Ontario Acute Care Hospitals for High-Risk Procedures Involving SARS Patients Critical Care Areas; Directives to all Ontario Prehospital Care Providers and Ambulance Communications Services.

Nor did the Ministry of Labour conduct proactive inspections in May 2003, when the second phase of the outbreak began. None was undertaken until June 12, 2003, in the face of a growing number of health worker complaints and work refusals. By that time virtually all 51 health workers⁹⁵⁸ who caught SARS during the second phase of the outbreak had become infected.

It cannot be proven that health workers caught SARS because of unclear and confusing directives, because they were not trained or because the Ministry of Labour did not enforce worker safety regulations.

But SARS did demonstrate the importance of meticulous attention to worker safety measures. As one study found:

Experience from Hong Kong suggested that infection among “protected” health workers was related to how well the precautionary measures were used. In a case control survey, they found no infection in staff using complete precautionary measures, whereas infected staff had omitted at least one of the precautionary measures.⁹⁵⁹

A key lesson from SARS is that while health workers needed to pay meticulous attention to their respiratory protection, the lack of clear directives, the lack of training and the lack of enforcement found during SARS made that task difficult and sometimes impossible.

No hospital or nursing home can be totally safe. They cannot even begin to be safe if workers are not properly trained and supervised in their use of safety equipment and if the government does not enforce its own safety laws.

Confusion over N95 Equivalent Respirators

It should have been crystal clear to health workers what type of respirator would protect them against SARS. Instead, as the ONA nurses' survey found, this was often not the case:

53% of respondents experienced confusion about which masks would provide the necessary protection.⁹⁶⁰

958. Dr. Colin D'Cunha, presentation to the SARS Commission Public Hearings, September 29, 2003.

959. Philip W. H. Peng et al., “Infection control and anesthesia: lessons learned from the Toronto SARS outbreak,” *Canadian Journal of Anesthesia* 10 (2003) 984-97.

960. Hay Group, “Nurses' Perspective on the Outbreak of SARS in Toronto” (March 2006), p. 6.

Part of this uncertainty was because instead of specifying that only N95 respirators were to be used, the directives required N95 or equivalent respirators. The term “equivalent” was open to interpretation.

To worker safety experts like Dr. Gabor Lantos, the term “equivalent” was puzzling. Dr. Lantos told the SARS Commission:

They are still talking about N95 masks or equivalent. As an engineer, I don't know what an equivalent is. It's either an N95 or it's better.⁹⁶¹

Many in the health system interpreted “equivalent” to mean masks with the same manufacturer's specifications as an N95 but which had not been independently tested and certified. One such device was the PCM 2000 mask. (As noted above, we will use the term *respirator* to describe only respiratory protective devices that have been independently tested and certified.)

A health worker who got SARS told the Commission that his hospital haphazardly provided a variety of respiratory protective devices, including N95s and PCM 2000s, without differentiating between them:

Question: ... do you have a sense of what different kinds of respirators and masks were potentially used?

Answer: There were for sure many N95 masks but also duckbill masks [i.e., PCM 2000] as well and, unfortunately, it seems very haphazard what in fact is put outside each individual patient's room. The little trolleys and dollies outside every room, and it's really, as I say, an assortment of equipment but not always standardized ...

This doctor noted the problem:

Question: What do you understand to be the difference between an N95 respirator and other forms, such as duckbilled or surgical mask?

Answer: Okay, so my understanding was that the N95 mask had been certified to filter out 95 per cent of the aerosol

961. SARS Commission Public Hearings, November 18, 2003.

particles. The duckbill mask [i.e., the PCM 2000] is one step below that but better than the ordinary surgical mask and in, with tuberculosis for instance, if the patient wears a duckbill mask and the health practitioner wears a duckbill mask, the risk of transmission is almost zero. What is not known is with a viral infection whether the duckbill mask offers any protection or not. I must say at the time, my recollection is that [his health care institution] said, yeah, use the N95, but it wasn't like no, but the fact that there were duckbill masks available suggests that, you know, that may be good enough. You don't have to have an N95.

During SARS, there was a wide divergence of opinion over what constituted an N95-equivalent respirator.

On one side were Health Canada, the Ministry of Health and Long-Term Care and experts at some major Toronto teaching hospitals who believed that an N95-equivalent respirator did not need to be independently tested and certified.

This was Health Canada's position:

4. Health Canada recommends wearing an N95 mask or equivalent. What does "equivalent" mean?

It should be noted that NIOSH is an American agency, and there is no equivalent agency in Canada which certifies masks for industrial use. N95 masks have been tested and certified by NIOSH. For more information on NIOSH, testing and certification, visit <http://www.cdc.gov/niosh/homepage.html>

Health Canada recognizes that many institutions and other health settings may not use N95 masks that are NIOSH approved, and considers masks fulfilling the following requirements as the "equivalent" to NIOSH certified N95 masks:

- Filter particles one micron in size or smaller
- Have a 95% filter efficiency
- Provide a tight facial seal (less than 10% leak).

5. Are N95 masks considered an "equivalent" to the TB masks?

Yes, NIOSH approved N95 respirators/masks or equivalent meet and exceed the TB mask criteria.

If your health care facility masks meet the filter and fit criteria of #4 (above), they can be considered equivalent to TB masks.⁹⁶²

An April 11, 2003, document prepared by the Ministry of Health and Long-Term Care and entitled “Questions and Answers” took a similar position:

Q3. Are the PCM 2000, P-95 and R-95 masks equivalent to the N95 mask?

A3. Yes.⁹⁶³

An article by Toronto experts in the *Canadian Journal of Anesthesia* contained in a footnote the following description for a PCM 2000 mask:

N95-equivalent mask ...⁹⁶⁴

An article published in a British medical journal in June 2003 and written by three experts at a major Toronto teaching hospital also appears to suggest that the PCM 2000 is equivalent to an N95:

As a result of the transmission of SARS to health workers, N95 (or equivalent) masks are currently mandatory in Toronto for all medical personnel. They fulfill the filtering efficiency criteria of the National Institute for Occupational Safety and Health (NIOSH) N95 standard by protecting against droplet and airborne transmission of 95% of particles greater than 0.3 microns in size. These masks will offer a high degree of protection against the contact and droplet spread of the coronavirus. The N95 masks should be fit tested using an appropriate “fit test kit” according to the manufacturer’s instructions. The PCM 2000 Tuberculosis masks meet the N95 filtration criteria and fit the majority of wearers adequately. They do not require routine fit testing. N95 masks can be worn continuously for 8 h whereas PCM 2000 masks can only be worn continuously for 4 h.⁹⁶⁵

962. Health Canada, “Infection Control Guidance for Respirators (Masks) Worn by Health Workers – Frequently Asked Questions – Severe Acute Respiratory Syndrome (SARS),” revised 2003-06-05.

963. http://www.health.gov.on.ca/english/providers/program/pubhealth/sars/docs/qa_041103.pdf

964. “Intubation of SARS patients: infection and perspectives of health workers,” *Canadian Journal of Anesthesia* 53 (2006).

965. “Anaesthesia and SARS,” *British Journal of Anaesthesia*, 90 (2003).

Experts at another major teaching Toronto hospital took a similar position, suggesting that PCM 2000 masks, even though they were not NIOSH approved, were the equivalent of N95s because they had the same technical specifications. One expert at this hospital told the SARS Commission:

... because we didn't know what we were dealing with, so we went with an N95-equivalent mask, which had been our mask for TB ... for decades. The brand is PCM 2000 masks, and they're N95-equivalent. They're not NIOSH-approved masks, but they have the same filtration ... The manufacturer would tell us what filtration the mask has ...

This infection control expert noted that PCM 2000 masks met Health Canada's guidance:

We were confident in them, and they were widely used across Canada, and Health Canada had no problems with those masks.

The Ministry of Labour took a very different position on what was equivalent to an N95. It told the Commission that it accepted the term "equivalent" in directives because this allowed health workers to also use the protection of higher-rated NIOSH-approved respirators like the N99 or N100.⁹⁶⁶

One ministry official told the Commission:

Now, if somebody uses an N99 or an N100, they are equivalent and would provide even higher protection.

This approach was reflected in a document that the Ministry of Labour prepared for its staff, which appears to have been issued in early April:

Problem: Refusal to work with or serve a patient, client or inmate with possible SARS and symptoms e.g. fever, cough, history of travel or contact with confirmed SARS case, in healthcare setting or in corrections facilities.

Solution: Health care facilities and corrections facilities must implement the infection control measures required by MOHLTC and public health units. These include gloves, gowns, **N95 or better respirators**, eye protection, hand-washing facilities, plus the appropriate training and respirator fit testing.⁹⁶⁷
[emphasis added]

966. The minimum efficiency of each tested filter is to be greater than or equal to 99.97% for N100 filters and 99% for N99 filters.

967. Document entitled "SARS Scenarios" which was attached to a copy of the Ministry of Labour's SARS protocol which it provided to the SARS Commission in the course of its submission at the public hearings.

Ministry of Labour officials told the Commission that they would have preferred to have seen the phrase “N95 or better” in the directives. But the directives continued to refer to “N95 or equivalent.”

The Ministry of Labour said it would not, without appropriate independent testing, accept the manufacturer’s specifications as being sufficient proof that a respirator was equivalent to one certified by NIOSH.

During SARS, the Ministry of Labour was asked whether a European-approved respirator was an N95 equivalent. At the time, there was concern about supplies of N95 respirators and officials wondered if there might be appropriate substitutes in Europe. A Ministry of Labour official consulted with NIOSH, learned that the European test was less rigorous than NIOSH’s and was told NIOSH would accept the European respirator only if it passed its own tests.

This official told the SARS Commission:

So the question is: Is that equivalent?

Now, certainly at the Ministry of Labour, we don’t have a laboratory that’s testing respirators, approving respirators. We don’t have people that are doing the research and so we’re going to rely on NIOSH.

And if NIOSH had said to us their professional opinion is it is equivalent, then we would have considered making a statement to say we’ve done some research, we consulted with an expert in the field and we have concluded that, you know, it is equivalent or it is adequate.

And NIOSH was being very, very careful. And the position that NIOSH was taking is that the efficiency is not the same and certainly the European respirator was less efficient.

Now the only way NIOSH would be willing to make a comment would be if [the manufacturer] would submit their respirator to NIOSH, have it go through the N95 approval testing and if it met the criteria then they would be issued, I guess, approval as an N95.

The debate over what was an equivalent respirator continued after SARS.

On March 3, 2004, one Toronto hospital wrote to the Ministry of Labour after it had issued an order requiring the hospital to provide health workers with NIOSH-approved respirators, and not the PCM 2000:

Further to our discussion, our Infection Prevention and Control department wanted to get clarification on the MOL order regarding change to “N95 or better” in our policies.

- Can you indicate the specific regulation or standard that is the basis for the MOL requirement that N95 is the minimum protection and other masks without the N95 under the NIOSH criteria are not acceptable e.g. PCM 2000
- Can you provide the evidence that supports the MOL's requirement

On March 23, 2004, the Ministry responded:

The inspector's order gives the regulatory requirement. The contravention is of the compliance order issued.

The CSA Standard Z94.4-02 Selection, Use and Care of Respirators G4.3.1, page 67, indicates there are three filter efficiencies for non-powered particulate removing respirators (95%, 99% and 99.97%) and one efficiency for powered air-purifying respirators (99.97%). A P100 respirator has better filter efficiency than an N95 and is acceptable for use. A powered air-purifying respirator with a 99.97% efficient filter also has better filter efficiency than a N95.

The CSA Standard Z94.4-02 Selection, Use and Care of Respirators 2.1, page 1, indicates an accepted respirator to be a respirator tested and certified by procedures established at testing and certification agencies recognized by the authority having jurisdiction. The Ministry of Labour, as that authority, recognizes NIOSH testing and certification. The N95 respirator or respirator with better filter efficiency must be tested and certified by NIOSH.

There are several reasons the Ministry of Labour recognizes NIOSH testing and certification:

1. Assurance that the respirator/filter has met a recognized standard of efficiency.
2. Assurance of consistent quality since manufacturers of NIOSH approved respirators must submit to NIOSH a quality assurance plan.
3. Assurance that in the event of a serious problem being identified NIOSH has the power to issue a stop sale order to the manufacturer.
4. For respirators that are not approved by a recognized testing and certification agency such as NIOSH, the Ministry does not have the same assurance of quality and performance.

While undoubtedly acting in the best of good faith and with the best of intentions, it is surprising that so many experts took the position during and after SARS that a PCM 2000 is equivalent to an N95. In an age when independent testing is the norm in so many product areas, from the crash worthiness of automobiles to the safety of household appliances, it seems remarkable that anyone in charge of health worker safety would be content to rely solely on the manufacturer's specifications without independent certification.

By not providing NIOSH-certified and -tested respirators, employers accepted a lower standard of protection. Regrettably, they also appeared to place greater reliance on advice from Health Canada, a federal agency with no jurisdiction over Ontario workplaces, than on the higher standards of protection required by the provincial ministry in charge of worker safety in Ontario.

An important lesson from SARS is that in any health emergency, the Ministry of Labour must be actively engaged from the start to ensure adherence to safety standards and to ensure that there is no confusion in the workplaces over what equipment is required to protect workers.

Evidence of Airborne Transmission

During SARS, there were multiple episodes of transmission that could not be readily explained by droplet spread alone, and there were episodes and situations where airborne transmission appears to have been involved in transmission.

In the Amoy Gardens housing complex in Hong Kong, cases appeared rapidly in several different apartment buildings in manner atypical of contact or droplet transmission.⁹⁶⁸

Spread to health workers in Toronto during aerosol-generating procedures, including endotracheal tube intubation or bronchoscopy,⁹⁶⁹ is another example where airborne transmission has been invoked during nosocomial spread.

The pattern of spread of SARS associated with sick patients travelling on aircraft suggests that airborne transmission could have occurred during the flights.⁹⁷⁰

Another example is the super-spreader event at the Hotel Metropole, when at least 16 people, including the index cases in Toronto, Vancouver, Singapore, Hanoi and Hong Kong, were infected in February 2003.

According to the World Health Organization:

Professor LJJ's infected body fluids must have been aerosolized, as indicated by the traces on the inlet of the elevator lobby fan. Anyone who stepped out of the 9th floor lift [i.e. elevator] shortly after the event would have been exposed, while those who walked past room 911 [i.e.,

968. 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): 1731-390 (Evidence of airborne transmission of SARS Article).

969. M. Ofner, M. Lem, S. Sarwal, M. Vearncombe, A. Simor, "Cluster of severe acute respiratory syndrome cases among protected health-care workers" – Toronto, Canada, April 2003," *MMWR* 52 (2003): 433-436; D.C. Scales, k. Green, A.K. Chan, S.M. Poutanen, D. Foster, et. al., "Illness in intensive care staff after brief exposure to severe acute respiratory distress syndrome," *Emerging Infectious Diseases* 9 (2003): 1205-10.

970. W.H. Seto, D. Tsang, R.W. Yung, et. al., "Effectiveness of precautions against droplets and contact in prevention of nosocomial transmission of SARS," *Lancet* 361 (2003): 1519-20 (Seto et al, "Effectiveness of precautions against droplets and contact in prevention of nosocomial transmission of SARS")

the index patient's room] may have been at risk for a longer period. Presumably, by morning there was no longer any viable virus, or else staff had quickly disinfected the area without becoming exposed. It certainly appears that only those who were on the 9th floor that night were at risk. Thus, the "miracle" of none of the hotel staff getting SARS could simply have been due to their not having been exposed to the virus.

The rooms in the hotel, atypically, were pressurized; so infected aerosols could not have entered from the corridor. The WHO team dismissed theories that the virus was transmitted through elevators, door handles, or handrails. "In this hotel, these are unlikely scenarios," the report [by the WHO team of Health Canada experts] said, "because other guests would have made similar contacts, and indeed, staff would have had intense exposure risk. Staff who served the subject floor did not get infected."

The contamination occurred in the corridor of one wing of one floor, and never moved up or down the building or endangered people inside their rooms.⁹⁷¹

The single most dramatic spread of SARS was the Amoy Gardens outbreak. More than 300 people in four separate Hong Kong buildings caught SARS. Airborne spread was at first dismissed as the likely transmission mechanism as opposed to:

person-to-person spread, contamination of communal facilities (such as elevators) and thus indirect contact transmission, and problems with sewage disposal resulting in fecal-oral transmission.

A later study⁹⁷² suggests airborne transmission as the likeliest explanation. This research says it is likely that the exhaust fan in bathroom of the index cases drew aerosols (generated by coughing or flushing virus-laden stool in toilets) from the bathroom into common building airshafts. These aerosols would rise with the warm humidified air currents and be transmitted to the residents in upper levels of the apartment complex. Natural wind currents likely then permitted the spread to other buildings as the contaminated air plume left the building of the index case. This

971. WHO, *SARS: How a Global Epidemic Was Stopped* (Geneva: WHO, 2006), pp. 147-48.

972. Evidence of Airborne Transmission of SARS Article.

theory is supported in a mathematical model. On this basis, airborne transmission appears to provide the single best mechanism explaining the varied attack rates in the different floors and buildings within the Amoy Gardens complex.

Some experts regard this as a landmark study because it provides a fresh perspective on the droplet-versus-airborne debate. They suggest the initial Amoy Gardens investigation did not seriously consider airborne transmission because of the current bias in favour of the large-droplet theory.⁹⁷³

Noting that research into airborne transmission has been neglected, some researchers suggest SARS provides an opportunity to critically re-evaluate how respiratory diseases are spread:⁹⁷⁴

The SARS epidemic provides an opportunity for the critical reevaluation of the aerosol transmission of communicable respiratory diseases. Prevailing thought has focused on determining whether an infectious agent has “true” airborne transmission. We find it more useful to classify the aerosol transmission of diseases as obligate, preferential, or opportunistic, on the basis of the agent’s capacity to be transmitted and to induce disease through fine-particle aerosols and other routes ...

There are probably many diseases with opportunistically airborne transmission – infections that naturally cause disease through other routes

973. “In the official investigation, airborne transmission was not seriously considered, because the current paradigm, as initially described by Charles Chapin in 1910, supports the belief that most communicable respiratory infections are transmitted by means of large droplets over short distances or through contact with contaminated surfaces” (Chad J. Roy and Donald K. Milton, “Airborne transmission of communicable infection – the elusive pathway,” *New England Journal of Medicine* 350 [April 22, 2004], www.nejm.org) (Roy, and Milton, “Airborne transmission of communicable infection – the elusive pathway”)

974. Roy, and Milton, “Airborne transmission of communicable infection — the elusive pathway”:

What underlies the low repute of airborne transmission today? First, the two diseases whose aerosol transmission is most widely acknowledged, measles and tuberculosis, have been largely controlled through vaccination or drug therapy. As a result, the impetus to understand the aerobiology of infectious diseases has faded. Second, contamination of water, surfaces, and large-droplet sprays can be easily detected. It is difficult, however, to detect contaminated air, because infectious aerosols are usually extremely dilute, and it is hard to collect and culture fine particles. The only clear proof that any communicable disease is naturally transmitted by aerosol came from the famous experiment by William Wells, Richard Riley, and Cretyl Mills in the 1950s, which required years of continual exposure of a large colony of guinea pigs to a clinical ward filled with patients who had active tuberculosis.

(e.g., the gastrointestinal tract) but that can also initiate infection through the distal lung and may use fine-particle aerosols as an efficient means of propagating in favorable environments. For all three classes of diseases that are communicable through aerosols, the agent must be capable of initiating infection, with some reasonable probability, by means of a small dose delivered to the lung in a single airborne particle.

The current analysis of the outbreak at Amoy Gardens suggests that SARS has at least opportunistically airborne transmission.⁹⁷⁵

Two more recent studies also suggest the possibility of airborne spread in hospital wards. One examined a nosocomial outbreak in a Hong Kong hospital.⁹⁷⁶ The other detected the presence of the SARS virus in the air in the room of a SARS patient in Toronto:

Severe acute respiratory syndrome (SARS) is characterized by a risk of nosocomial transmission; however, the risk of airborne transmission of SARS is unknown. During the Toronto outbreaks of SARS, we investigated environmental contamination in SARS units, by employing novel air sampling and conventional surface swabbing. Two polymerase chain reaction (PCR)-positive air samples were obtained from a room occupied by a patient with SARS, indicating the presence of the virus in the air of the room. In addition, several PCR-positive swab samples were recovered from frequently touched surfaces in rooms occupied by patients with SARS (a bed table and a television remote control) and in a nurses' station used by staff (a medication refrigerator door). These data provide the first experimental confirmation of viral aerosol generation by a patient with SARS, indicating the possibility of airborne droplet transmission, which emphasizes the need for adequate respiratory protection, as well as for strict surface hygiene practices.⁹⁷⁷

975. Roy, and Milton, "Airborne transmission of communicable infection — the elusive pathway."

976. "The analysis of the temporal-spatial spread of SARS from the index case patient to other inpatients in the ward suggested that airborne spread through virus-laden aerosols possibly played an important role. Unlike other reports of airborne outbreaks, we were unable to document the existence of the infective agent in aerosols. Such documentation was simply impossible in early March 2003, when the infective agent was yet to be identified. SARS was unlikely a communicable disease with obligate airborne transmission, such as tuberculosis, but there was evidence to suggest that SARS could have at least opportunistic airborne transmission under special circumstances when virus-laden aerosols could be generated" (I.T.S. Yu et al., "Temporal-spatial analysis of severe acute respiratory syndrome among hospital inpatients," *Clinical Infectious Diseases* 191 (2005):1472-77.

977. Booth et al., "Detection of airborne severe acute respiratory syndrome (SARS), 1472-77.

An editorial that accompanied the article noted:

Airborne transmission of the severe acute respiratory syndrome (SARS) coronavirus (CoV) has been the favored explanation for its transmission on an aircraft and appeared to explain a large community outbreak of SARS in the Amoy Gardens in Hong Kong. The article by Booth et al. in this issue of the *Journal of Infectious Diseases* suggests that airborne dissemination of SARS-CoV may also occur in the health-care setting. A patient with SARS who was breathing quietly but coughing occasionally in a hospital room contaminated the surrounding air with SARS-CoV, as shown by experiments conducted during the SARS outbreak in Canada in early 2003.

Several viruses and other pathogens, such as *Mycobacterium tuberculosis*, have been shown to be transmitted by airborne dissemination. However, the possibility of airborne dissemination of SARS-CoV has been controversial. The important work by Booth et al. has shown beyond doubt that SARS-CoV aerosol generation can occur from a patient with SARS ...

Because none of the SARS-CoV cultures were found to be positive and host infection was not involved, the authors rightly avoided drawing a conclusion of airborne *transmission* of SARS-CoV. Definitive proof of transmission will need to come from experiments similar to those performed by Riley et al. in the 1950s, which involved exposure of guinea pigs to air shared by patients with active pulmonary tuberculosis. In vitro viral culture tests may not be sensitive enough for this purpose. However, if SARS-CoV is naturally airborne (produced by breathing and coughing), as was shown by Booth et al., then there is sufficient concern that it can be transmitted successfully by air ...⁹⁷⁸

Were N95 Respirators More Protective than Surgical Masks?

Despite the evidence of airborne SARS, and despite the fact the N95 was specified by Ontario and the CDC and the WHO for protection against SARS, doubts remained that these safety precautions had been proved necessary beyond a scientific doubt.

978. Tommy R. Tong, "Airborne severe acute respiratory syndrome coronavirus and its implications," *Journal of Infectious Diseases* 191 (2005).

Health Canada said:

International SARS studies have not shown a difference in efficacy between surgical masks and N95 respirators in preventing transmission of the SARS coronavirus. Recommendations will be reviewed as further evidence emerges.⁹⁷⁹

Two studies of how health workers got SARS, one by a Hong Kong team led by Dr. W. Seto⁹⁸⁰ and another in Toronto led by Dr. Mark Loeb,⁹⁸¹ suggest no substantial benefit to wearing a surgical mask over an N95 respirator.

Citing those studies, one expert told the SARS Commission:

You have to go back to the early days. So there's some stuff from Hong Kong that were published in *The Lancet* in May. And there is some data out of the Scarborough Grace hospital from, particularly, in their intensive care unit from very early in the outbreak before they realized what they were dealing with. And it looks at nurses in the ICU there and what personal protective equipment they used and whether they were protected or infected. The things that fall out of that as being statistically significant are if you put on a mask consistently, and it did not matter much if it was an N95 mask or surgical mask, and did some hand hygiene consistently, and there is similar kind of data from Hong Kong.

Despite the opinion of this expert and others, there is no consensus on the conclusions that can be drawn from these two studies.

A Vancouver team of researchers who conducted a major study on respiratory protection commissioned by the Ontario Hospital Association's Change Foundation acknowledged the importance of these two studies, but also pointed to their shortcomings:

979. Health Canada, "Infection Control Precautions for Respiratory Infections Transmitted by Large Droplet and Contact Infection Control Guidance If There Is a SARS Outbreak Anywhere in the World, When an Individual Presents to a Healthcare Institution with a Respiratory Infection," December 17, 2003.

980. Seto et. al., "Effectiveness of precautions against droplets and contact in prevention of nosocomial transmission of SARS".

981. M. Loeb, A. McGeer, B. Henry, et. al., "SARS among critical care nurses, Toronto," *Emerging Infectious Disease* 10 (2004): 251-55.

Seto and colleagues showed that wearing any mask was protective against SARS in a case-control study of 13 HCWs [health care workers] who developed SARS and 241 controls who did not. Regularly wearing gowns was protective in univariate analyses, but only mask (surgical or N95) use was significant in the multivariate analysis.

The conclusions from this study must be viewed with caution because of the small number of cases and because the study excluded HCWs from one hospital with a large outbreak where exposure to aerosolizing procedures was likely.

In another study, Loeb et al. constructed a retrospective cohort of 43 intensive-care unit nurses from Toronto. Eight of the 32 nurses who had direct contact with a patient with SARS later developed SARS themselves. Regular use of N95 respirators and surgical masks was associated with protection from SARS when compared with irregular or no mask or respirator use ... There was a trend toward increased protection from the N95 respirators in comparison with surgical masks, but this was not statistically significant. Again, the number of cases limited the power of this study.⁹⁸²

Experts who questioned the value of N95 respirators over surgical masks also pointed to the fact that SARS was controlled in Vietnam without their use:

Although a great deal of attention was focused on the need for N95 respirators or even respiratory protection with higher protection factors, it is also worth noting that in Vietnam, N95 respirators were not available until the third week of the outbreak. However, this did not prevent Hanoi from becoming the first affected jurisdiction to effectively control SARS; masks and barriers with spatial separation were thought to be the key control factors.⁹⁸³

Vietnam did indeed control SARS despite an initial lack of N95 respirators. But as Table 3 indicates, Vietnam also had the highest percentage of health workers among its SARS cases.

982. Yassi et al., "Research gaps in protecting health workers from SARS."

983. Yassi et al., "Research gaps in protecting health workers from SARS."

Table 3 – Comparison of Percentage of Health Workers Who Got SARS in Ontario and in Other Jurisdictions⁹⁸⁴

Jurisdiction	Number of HCWs Who Caught SARS	HCW Cases as Percentage of Total Cases
Vietnam	36	57%
Ontario	169	45%
Singapore	97	41%
Hong Kong	386	22%
Taiwan	68	20%
China	1,002	19%

The fact that N95s were not used at first in Vietnam, where 57 per cent of those who got SARS were health workers, hardly supports those who campaign against the N95.

The debate over whether N95 respirators were really necessary for routine patient care is actually two separate debates. The first is whether it was the right decision to require the N95 in late March 2003, during the difficult early days of the outbreak. The second is whether, in hindsight and with the benefit of all the scientific research to date, the decision can be seen in a different light.

It is difficult to fault the early decision to require the use of N95 respirators. The officials who led the response to SARS were taking a prudent approach in the face of a mysterious new disease. As Dr. James Young told the SARS Commission public hearings:

... we were dealing with an outbreak where we did not know for sure that it was a virus, we did not know for certainty what virus it was, we did not know what symptoms and what order of symptoms SARS presented with.

We had a vague idea that some of the symptoms might include fever and cough. We did not, for example, for some period of time, realize that

984. WHO SARS Summary, July 31, 2003; Ontario data is from the Presentation of Dr. Colin D’Cunha, SARS Commission Public Hearings, Sept. 29, 2003.

about 30 per cent of patients also could produce – present with diarrhea. We did not know how long it incubated for. We did not know with certainty whether it was droplet-spread or whether it was airborne. We did not know when it was infectious. We did not have a diagnostic test for it and still do not have an accurate diagnostic test. We had no way of preventing it, we had no vaccine and we had no treatment.

What we had was an illness with many unknowns and virtually no knowns.⁹⁸⁵

Knowledge about SARS was slow in coming, whether it was about how it spread or how far it had in fact spread.

Dr. Young told the SARS Commission's public hearings:

... it's not like a forest fire which, in and by itself, can be difficult enough to control, but if I want to know the size of a forest fire, I can get above the forest fire, see where it is and build a barrier so that the forest fire does not jump over that barrier, and even if it does, I may be able to have a series of smaller fires I can put out.

The theory in controlling something like SARS is the same, but the difficulty and the problem is, I have no idea where it is. I only know where it was 10 days ago and I have to not only catch up that 10 days, I must get further ahead.⁹⁸⁶

To take Dr. Young's analogy further, if you don't know where an outbreak currently is, you don't know in real time if it's expanding or contracting. You also don't know in real time whether your current containment efforts, including levels of respiratory protection, are working.

Under these circumstances, and in view of the initial scientific uncertainty over SARS, provincial officials cannot be faulted for taking a better-safe-than-sorry approach to worker safety and respiratory protections by mandating the use of N95 respirators.

Now, with the benefit of post-SARS scientific research and the arguments of those

985. SARS Commission Public Hearings, September 30, 2003.

986. SARS Commission Public Hearings, September 30, 2003.

who opposed in good faith the use of the N95, can this decision still be questioned in hindsight?

Much remains unknown about SARS and about our understanding of how respiratory infections are spread. Research since the outbreak has shed some light on SARS and its mechanisms of transmission. The research shows how little was known during the outbreak and how much remains unknown even now about this new disease.

As noted above, knowledge about how SARS is transmitted has evolved significantly since the outbreak. Some recent studies suggest that it may be spread by airborne transmission. These studies lend further weight to taking a prudent precautionary approach to the protection of health workers against a new disease whose method of transmission is not fully understood.

In addition to all the research that suggests a risk from airborne transmission, there is another important reason to remain cautious about how SARS is transmitted and thus to require a higher level of protection than just a surgical mask.

One senior occupational medical expert suggested that the high number of health workers who got SARS is itself reason enough to use higher levels of respiratory protection:

Clearly the high morbidity and mortality associated with SARS – that's another reason to utilize the N95. A lot of literature dealing with SARS tends to talk about contact and droplet transmission. There are some reports about Vietnam and about how they only wore surgical masks. So it's still controversial in the literature about what would be appropriate from a transmission basis. However, there is reason to recommend airborne precautions and N95 due to the high morbidity and mortality associated with this disease.

Dr. Annalee Yassi told the Commission there was very little downside to using a higher level of protection:

Even if we don't have strong evidence that the transmission of infection would have been different had there not been N95s, we do know that N95s do protect better than surgical masks. There was really no downside, other than some trivial cost factor. It is trivial in the bigger picture when you look at the billions and billions of dollars spent on the outbreak. The extra little cost of an N95 versus a surgical mask is more than made up for by the

better degree of protection that it provides ... If health workers felt more protected wearing an N95 when someone is coughing and sneezing, then why not. It was the right decision then and it still is the right decision.

Although scientific research into SARS transmission continues, it appears that the initial dogmatic statements dismissing the possibility of airborne transmission were premature. SARS demonstrated the importance of taking precautionary approach to transmission of a new respiratory disease and to requiring the best system of respiratory protection for hospital workers.

Setting aside the ongoing droplet-versus-airborne debate, the Commission heard other compelling arguments favouring a precautionary approach requiring higher levels of respiratory protection.

A number of witnesses remarked that unforeseen events and accidents happen in hospitals that might inadvertently generate aerosolized particles. Experts note that even if SARS is primarily droplet-spread, no one knows when an incident might happen in a hospital to cause the inadvertent generation of aerosols.

One CDC expert said:

... when you look at the R0 it suggests it's probably not airborne in the same sense of measles or anything like that. When you look at epidemiologic links, people down the hallway, around the corner, they're not getting sick. But in health care facilities, when you have people in, you just don't know sometimes when you're going to have an aerosol-generating procedure happen and it could happen precipitously, and because of those issues and because of issues like this, we're going to continue to recommend airborne precautions.

Nora Maher, an occupational hygienist with the Occupational Health Clinics for Ontario Workers, told the SARS Commission's public hearings:

In determining how to control a hazardous exposure, it is important to take into account the chance of human error. No worker wants to make a mistake; no one sets out to undertake a task with more risks than necessary. The best controls will be those that have a failsafe or backup mechanism built in and to evaluate.⁹⁸⁷

987. SARS Commission Public Hearings, November 17, 2003.

Opposition to Fit Testing

Fit testing⁹⁸⁸ was the most contentious safety issue during SARS.

Nurses and their unions were quite properly angry that hospitals were ignorant of the long-standing 1993 legal requirement for fit testing:⁹⁸⁹

- One prominent hospital infection control director insisted in a June 2003 memo to health workers that “Canadian regulations have never required fit testing in the healthcare setting.” Nothing could have been more untrue. While no one questions the good faith of this person, there is something profoundly wrong with a system in which a person in this position can be so utterly wrong about worker safety in hospitals.
- An article by some Canadian experts in the *British Medical Journal* made the same point: “Fit testing had never been required in the Canadian health care setting.”⁹⁹⁰

988. Fit testing helps users select a respirator that best fits their faces and teaches them how to get a proper seal each time they use respirator, a procedure known as a *seal check*, and how to safely don and doff a respirator. A test verifies that the chosen respirator works properly. There are two types of tests. One is called a *qualitative fit test* and “relies on the user’s subjective response to taste odour or irritation.” The other is a *quantitative fit test* and “relies on an instrument to quantify the fit of a respirator” (Healthcare Health and Safety Association, *Respiratory Protection Programs*).

989. Section 10 of the Ontario Regulation 67/93 requires:

10. (1) A worker who is required by his or her employer or by this Regulation to wear or use any protective clothing, equipment or device shall be instructed and trained in its care, use and limitations before wearing or using it for the first time and at regular intervals thereafter and the worker shall participate in such instruction and training.

(2) Personal protective equipment that is to be provided, worn or used shall,

(a) be properly used and maintained;

(b) be a proper fit;

(c) be inspected for damage or deterioration; and

(d) be stored in a convenient, clean and sanitary location when not in use. O. Reg. 67/93, s. 10.

990. Sue Lim, Tom Closson, Gillian Howard, and Michael Gardam, “Effects of outbreak policies: collateral damage: the unforeseen effects of emergency outbreak policies,” *Lancet Infect Dis* 4 (2004): 697-703.

- Health Canada also seemed unaware of this Ontario requirement. A Canada Communicable Diseases Report on the April 13, 2003, intubation at Sunnybrook said: “In addition, at the time these exposures occurred, fit testing was not recommended by Canadian public health authorities; such testing has been mandated in the United States since 1972.”⁹⁹¹

Officials at a number of hospitals told the Commission that they only become aware of the legal requirement of fit testing when the May 13, 2003, directives⁹⁹² were issued.

As a result, fit testing did not begin in most hospitals until May 2003. Most health workers who used N95 respirators were not fit tested until June 2003. Not surprisingly, the proper fit of a respirator was a problem for many health workers. The ONA survey found:

50% of respondents experienced problems with the masks not fitting properly, and 8% were told to return to work without a properly fitting mask.⁹⁹³

Unions were angry that so many health workers had to go through SARS without being fit tested as required by law.

ONA and OPSEU said in their joint presentation at the public hearings:

Finally, fit testing began, sporadically due to union complaints and a nurse's June 6th work refusal. The Ministry of Labour ordered that the

991. Health Canada, “Cluster of severe acute respiratory syndrome cases among protected health care workers – Toronto, April 2003,” Canada Communicable Diseases Report volume 29-11, June 1, 2003.

992. All six directives issued that day contained the following language:

Personal protective equipment must be properly used and maintained

consistent with the *Occupational Health and Safety Act* Reg. 67/93 s.10. N95

or equivalent masks must be qualitatively fit tested to ensure maximum effectiveness. (See NIOSH website at www.cdc.gov/niosh -Publication No.99-143.)

993. Hay Group, “Nurses’ Perspective on the Outbreak of SARS in Toronto” (March 2006), p. 10.

nurse be fit tested before being required to work in a workplace that required respiratory protection.⁹⁹⁴

Fit testing was a hot-button issue for the health system, but for different reasons. Many in the health care system questioned the scientific basis for fit testing and were angry at the logistical challenge of a procedure that, in their view, had limited value.

One prominent infection control practitioner said:

We want to point out that fit testing of masks, or the lack of fit testing of masks in Canada, we believe to be a red herring and was not part of the reason for transmission of the SARS virus.

The Ontario Medical Association told the SARS Commission public hearings:

At the time when mask fit testing was first proposed, we followed the directive but we did ask for the scientific evidence that this fit testing would make a difference.

In our own comprehensive literature search, we have not found any evidence to support mask fit testing as it is being proposed in Ontario. In fact, we have been instructed during the current planning of this massive project not to ask for the evidence.⁹⁹⁵

An infection control practitioner told the Commission in a confidential interview:

I think people in Canada did not see that this was a really big issue, the fit testing of the N95 masks, and I think a lot of experts in Canada still do not believe that it is a big issue. It may be a big issue in industry, where you are wearing N95 or N99, N100 masks for chemicals, where you are dealing with vaporized chemicals; that is probably or certainly is a whole different level of protection you require. But a lot of experts still believe that for biologic agents, there is not good evidence that you need to go through all of this; extra protection that is offered through the fit testing is not necessary for biologic agents.

994. SARS Commission Public Hearings, November 17, 2003, p. 13.

995. SARS Commission Public Hearings, September 29, 2003, pp. 47-48.

Part of employers' frustration over fit testing was that it meant they would have to carry many different types of respirators, at a time when there was much concern over respirator shortages. As was noted in the second interim report, getting enough supplies of N95 respirators was a widespread problem during SARS.

The Ministry of Health and Long-Term Care noted the problem of masks during its presentation to the Commission at public hearings:

The lack of a domestic mask supplier and an insufficient inventory of masks to deal with the infection protocols as the emergency progressed was also problematic.⁹⁹⁶

An article in *The Lancet* by some Toronto experts describes the particular challenge of getting enough masks:

... submicronfiltering masks (e.g., N95 masks) were in variable supply, because before SARS such masks were used only for patients with airborne infections and hence most facilities would have only kept a limited supply. With 211 hospitals in Ontario alone requiring these supplies, Canadian suppliers rapidly ran out of stock. There was no pre-existing supply stock-pile, and our mask supplies were obtained from foreign manufacturers. Because SARS was a worldwide threat, there was great difficulty in acquiring masks from other countries, since foreign governments understandably wanted to keep such supplies for their own citizens.⁹⁹⁷

St. Michael's Hospital said at the public hearings:

Supplies were particularly problematic as there is not enough masks available in the system for optimal safety. After fit testing having supplied the right type of mask for the right staff member complicated the issue. The requirement for mask fit testing was a significant challenge. St. Michael's Hospital went to great lengths to comply with provincial directives with respect to fit testing.⁹⁹⁸

996. SARS Commission Public Hearings September 30.

997. Sue Lim, Tom Closson, Gillian Howard, and Michael Gardam. "Collateral damage: the unforeseen effects of emergency outbreak policies. *Lancet Infectious Dis.* 2004;4(11): 697-703"

998. SARS Commission Public Hearings, September 30 2003.

Some experts argued during SARS that fit testing was not necessary because it was sufficient to teach users to perform a seal check.

An infection control expert who argues against the N95 and against fit testing told the SARS Commission in a confidential interview that a seal check is a good substitute for a fit test:

An N95 mask, the more important thing is the design of the mask rather than the fit testing. A well-designed N95 mask applied properly so the person knows to fit it around his face and does the test for the seal has a 93 per cent effective seal in terms of protection.

... if you fit test it, you could get that up to 95 per cent and that is a marginal difference, so the issue around fit testing these masks, to say that was a large issue in the middle of this outbreak I think was a huge mistake, and a huge disservice to those people taking care of the patients.

On the particular issue of whether a seal check is a substitute for a fit test, recent research indicates that “a seal check should not be used as a surrogate fit test.”⁹⁹⁹

On the overall value of fit testing, a study by the Institute of Medicine concluded:

By contrast, the ability of an individual wearer to obtain good face piece fits is far more varied and is a function of the facial dimensions of the wearer, the training received by users to ensure that the device is properly placed on the face each time the respirator is donned, and how closely the

999. “Guidelines issued by the Centers for Disease Control and Prevention and the World Health Organization state that health workers should wear N95 masks or higher-level protection during all contact with suspected cases of severe acute respiratory syndrome. Before use, the manufacturer recommends performing a user seal check to ensure that the mask is fitted correctly. This study aimed to test the ability of the user seal check to detect poorly fitting masks. This study is a retrospective review of a mask-fitting programme carried out in the intensive care unit of the Prince of Wales Hospital in Hong Kong. In this programme, all staff were tested with two types of N95 mask and one type of N100 mask. The results of the documented user seal check were then compared with the formal fit-test results from a PortaCount. Using a PortaCount reading of 100 as the criterion for a correctly fitted mask, the user seal check wrongly indicated that the mask fitted on 18-31% of occasions, and wrongly indicated that it did not fit on 21-40% of occasions. These data indicate that the user seal check should not be used as a surrogate fit test. Its usefulness as a pre-use test must also be questioned.” J.L. Derrick, Y.F. Chan, C.D. Gomersall, S.F. Lui “Predictive value of the user seal check in determining half-face respirator fit,” *J Hosp Infect.* 59 (2005): 152-55.

device matches the size and shape of the wearer's face. Coffey et al. (2004) have demonstrated that subjects who wear most N95 filtering face pieces without prior fit testing fail to achieve the expected levels of protection, and that persons passing a qualitative or quantitative fit test will achieve the expected level of protection (Coffey et al., 2004).¹⁰⁰⁰

One expert who campaigned heavily against the N95 and fit testing went so far as to say that because we got through SARS without fit testing, we therefore did not need fit testing:

We got through SARS I and managed it, controlled it, without fit testing for the N95 masks.

The logic of this confident assertion is not immediately apparent. Ontario certainly managed to get through SARS I without fit testing, but almost half of those who got SARS were health workers. The fact that we got through SARS without fit testing in an outbreak where 169 health workers caught it on the job is no argument against the evidence that fit testing provides a better level of protection.

Some who campaigned against the N95 and fit testing distorted the debate by setting up a straw man to knock down. They suggested inaccurately that the N95 and fit testing had been held up as the magic bullet against SARS. No one ever said the N95 and fit testing were magic bullets.

No one ever said that fit testing "is the answer." Yet those who campaigned against fit testing did so on the inaccurate basis that those in favour of fit testing said it was the answer. One hospital expert who wrongly insisted that no Ontario law required fit testing put it like this:

In SARS, both myself and many of my colleagues believe that fit testing is not the answer to protecting health workers.¹⁰⁰¹

To the Commission's knowledge, no expert in worker safety suggested that the N95 respirator or fit testing were the be-all and end-all to containing SARS. No expert in worker safety believed the N95 respirator or fit testing could, or should, be singled out as ends in themselves.

1000. Institute of Medicine of the National Academies, "Reusability of facemasks during an influenza pandemic: facing the flu: report brief" (April 2006), <http://222.nap.edu>.

1001. Michael Gardam, Fit testing memo, June 2003.

These attacks on the N95 and fit testing, this focus on one component only of the hierarchy of safety controls so absent from Ontario hospitals during SARS, is just one more piece of evidence that the health system during SARS lacked a basic understanding of worker safety principles.

Safety experts regarded N95 respirators and fit testing not as magic bullets but as simply one part of a respiratory protection system that should include:

- A hazard assessment of the workplace
- The selection of appropriate respiratory protection based on the hazard assessment
- Health assessment and ongoing surveillance of respirator users
- Fit testing
- Initial and ongoing training and education¹⁰⁰²

Perhaps the most important respiratory protective lesson from SARS is the importance of focusing not just on one protective component, whether it's the N95 respirator or fit testing. To return to the title of this chapter, it's not about the mask; and it's not about fit testing. It's about a whole system of safety controls in which the respirator and other personal protective equipment are simply the last component, the final line of defence.

That bigger safety system, of which the respirator is just one small part, is known as the hierarchy of controls. It is a fundamental principle of the worker safety discipline of occupational hygiene.¹⁰⁰³ Among these controls, personal protective equipment is the last line of defence, not the first:

... all available options for controlling the hazard should be put into place and that when these controls are not possible or not sufficient to control the risk, personal protective equipment such as respirators should be implemented. The hierarchy of controls is as follows:

1002. Healthcare Health and Safety Association, *Respiratory Protection Programs*, pp. 15-16.

1003. Occupational hygiene, which is often called industrial hygiene in the U.S., is defined as follows: "The science and art of anticipating, recognizing, evaluating, and controlling chemical, physical, biological, ergonomic hazards that are in or originate from the workplace" (Salvatore R. DiNardi and William E. Luttrell, *Glossary of Occupational Hygiene Terms*, [Fairfax, VA: American Industrial Hygiene Association, 2000], p. 106).

1. Engineering controls
2. Administrative controls
3. Work practices
4. Personal protective equipment.

These controls are meant to address hazards through control at the source of a hazard, along the path between the worker and the hazard and lastly, at the worker.

Controls that are implemented at the source should be put into place first. These include using engineering controls such as enclosing the hazard or using local exhaust ventilation. An isolation room with negative pressure ventilation is an example of an engineering control aimed at the source of the hazard.

Controls that are implemented along the path should be put in place next. These include general exhaust ventilation or the use of shielding or barriers.

Administrative control and workplace practice controls are also critical. These controls include such program components as processes to ensure early recognition and appropriate placement of patients who are infectious, surveillance for detection of outbreaks, adequate cleaning and disinfection of patient care equipment and the environment and education programs for health care workers about identifying and managing risk.

If, after implementing controls at the source and along the path does not eliminate the worker's risk of exposure, then controls at the worker can be put in place. These include the use of personal protective equipment such as respirators and eye protection.

The essential point from the hierarchy of controls is that employers should not rely exclusively on personal protective equipment (PPE) to protect workers. All other means of control should be used to protect workers and PPE used only when other controls have not eliminated or reduced the hazard significantly.¹⁰⁰⁴

1004. Healthcare Health and Safety Association of Ontario, *A Guideline for the Development and Implementation of a Respiratory Protection Program for the Prevention of Occupational Infections in Health and Community Care Workplaces – Final Draft*, (Toronto July 23, 2003), p. 11.

Worker safety principles like the hierarchy of controls are not new. They had been developed long before SARS. Worker safety experts knew how to use these systems, these processes, these procedures and this equipment to protect nurses and other health workers.

As Health Canada noted in a worker safety manual issued in 2002, close cooperation between worker safety and infection control is essential for the safe operation of a health care facility. Health Canada's *Prevention and Control of Occupational Infections in Health Care* says:

A component of the [worker safety] program relates specifically to infection control and must be planned and delivered in collaboration with the Infection Control (IC) program of the workplace ... This document supports the close collaboration of OH personnel with those responsible for the IC program ... It notes the essential collaboration of both groups working together where responsibilities overlap, especially in the management of outbreaks.¹⁰⁰⁵

Tragically, this knowledge was not used during SARS. This expertise was ignored.

As one hospital said in its submission to the Commission:

It was interesting to note that an occupational hygienist was part of the CDC team called in to help review how SARS was being spread; earlier recognition and utilization of local professional resources (e.g. through the Canadian Registration Board of Occupational Hygienists, the University of Toronto graduate program in occupational hygiene, etc.), may have helped contain the problem much sooner.

It is time for Ontario to stop the turf wars and remove the barriers that prevented the use of this expertise during SARS to protect health workers.

1005. Health Canada. *Prevention and Control of Occupational Infections in Health Care: An Infection Control Guideline* (Ottawa: Health Canada, 2002), p. 1.

Progress Since SARS

Some experts who campaigned during SARS against fit testing have come to accept that any worker required to wear an N95 respirator should be fit tested as required by law.

One infection control expert who opposed fit testing said after SARS:

... if you need an N95 mask, it should be fit tested and that's one issue, and I don't think anybody's going to argue with that anymore.

A senior Ministry of Labour official who bore the brunt of the hospital establishment's opposition to fit testing told the Commission that the climate has changed:

I think they have moved on. Now the question you get nowadays is when should you use the N95? One doesn't have the same resistance to fit testing. The big question is when do we need N95s.

Part of the change of heart may be due to the large number of post-SARS studies in support of fit testing.

Representatives of health workers, however, have detected continuing resistance to fit testing. They have:

... participated in many government round tables that have discussed personal protective equipment during a response to an outbreak. We have been told the science of respirator fit testing is not perfect, and thus fit testing does not guarantee that a respirator will be completely effective in protecting against airborne hazards. While this seems to be news to the MOHLTC, the occupational health and safety community has long been well aware of this. The response of safety professionals and researchers is to strive to improve fit testing, not abandon it.¹⁰⁰⁶

1006. Letter from ONA to Premier McGuinty, December 15, 2005.

As noted earlier, the current Chief Medical Officer of Health has taken steps to try to bridge the wide gulf separating infection control and worker safety. However, only time will tell whether her efforts will bear fruit.¹⁰⁰⁷

Conclusion

Those in charge of the system that failed to protect health workers during SARS undoubtedly acted in good faith. But during most of the outbreak they were regrettably unaware of their occupational safety obligations under Ontario law. They were unaware until reminded late in the outbreak that when health workers have to use N95 respirators, employers must ensure that the respirators fit properly and that health workers are trained in their limitations and safe use. This has been Ontario law since 1993.

The Ministry of Labour may have acted in good faith, but it did little until late in the SARS outbreak to proactively inspect health care workplaces to ensure that health workers were using the appropriate respiratory protection and were properly trained in its use. The absence of the Ministry of Labour was especially significant because the health care system had little experience or expertise in N95 respirators or the respiratory protection programs necessary to ensure that N95s safely provide their intended level of protection.

The fact that about 45 per cent of all SARS cases were health workers demonstrates how badly respiratory protection and other worker safety issues were handled.

The primary role of occupational health and safety laws, regulations and systems is solely to protect workers in many workplaces.

1007. Dr. Sheela Basrur notes in her letter of March 9, 2006, to Ms. 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.

In health care settings, occupational health and safety protections perform a double duty, safeguarding workers while also shielding patients and visitors.

As the Ontario Nurses' Association and the Ontario Public Service Employees Union told the Commission in their joint submission:

Workplace health and safety is important in any workplace, but in a healthcare environment it's doubly important. If workers are not protected from health and safety hazards, patients and the public are not protected either. It's that simple.¹⁰⁰⁸

Scientific knowledge changes constantly. Yesterday's scientific dogma is today's discarded fable. When it comes to worker safety in health care, we should not be driven by scientific dogma. 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 our health care system, nurses and doctors and other health workers will continue to be at risk from new infections like SARS.

1008. SARS Commission Public Hearings, November 17, 2003.

Did Politics Intrude?

There is widespread suspicion that political and economic pressure affected Ontario's response to SARS. Union officials, nurses, doctors, people who fell ill, families of those who died asserted again and again their feeling that someone, somewhere, somehow, exerted pressure to minimize or hide SARS, or not call a SARS case SARS, or declare SARS over because of its devastating effect on the economy.

Those who assert these suspicions point to the timing of the World Health Organization travel advisory imposed against Toronto on April 23, 2003. The advisory was lifted on April 30 only after high-level political intervention by the Minister of Health, who flew to Geneva with public health officials. That was followed in mid-May by the relaxation of precautions, the new normal, announcements that SARS appeared to be over and that the health system and the economy could return to business as usual. Those who assert this view point to the disastrous May 23 news conference where news of the second outbreak was pried out of officials only in the face of skilful cross-examination by the media. They also point to the patients at North York General who had SARS in April and May, although the hospital and public health officials failed to diagnose and disclose these cases as SARS.

The suspicions, with one exception, are unfocused and unspecific and they name no names or events or alleged events or conversations or documents. Some who hold these suspicions point to politicians or government in general terms; others point to hospitals or public health or physicians.

In all the interviews and documents and investigations, only one specific allegation of pressure emerged, not that there was pressure to hide SARS, but that there was pressure to back off an investigation into health worker safety. The allegation surfaced during the followup interview of a confidential source that the Ontario Cabinet Secretary, as the result of a phone call from the CEO of Mount Sinai Hospital, directed the Ministry of Labour to cancel a worker safety investigation scheduled for Mount Sinai on June 13, 2003. Immediately upon receipt of this late-breaking allegation, the Commission interviewed 13 witnesses, some more than once, and examined documents that included contemporary emails, memoranda and various government

and hospital paper trails obtained by way of subpoena. The results of this investigation are found in Chapter Three, under the heading “June 13 Cancellation at Mount Sinai,” and do not form part of this chapter.

As for the persistent yet vague suspicions of improper political and economic pressure, the Commission noted in its first, 2004, interim report that it had at the time of writing found no evidence of political influence on public health decisions:

The Commission on the evidence examined thus far has found no evidence of political interference with public health decisions during the SARS crisis. There is however a perception among many who worked in the crisis that politics were at work in some of the public health decisions. This perception is shared by many who worked throughout the system during the crisis. Whatever the ultimate finding may be once the investigation is completed, the perception of political independence is equally important. A public health system must ensure public confidence that public health decisions during an outbreak are free from political motivation. The public must be assured that if there is a public health hazard the Chief Medical Officer of Health will be able to tell the public about it without going through a political filter. Visible safeguards to ensure the independence of the Chief Medical Officer of Health were absent during SARS. Machinery must be put in place to ensure the actual and apparent independence of the Chief Medical Officer of Health in decisions around outbreak management and his or her ability, when necessary, to communicate directly with the public.¹⁰⁰⁹

The first interim report also said:

... the Commission has not at this stage of its investigation found any evidence of political interference with public health decisions during the SARS crisis. There is however a perception among many who worked in the crisis that politics somehow played a part in some of the public health decisions. Whatever the ultimate finding may be on this issue, Dr. D’Cunha’s approach left too many colleagues with the perception that he was too much a political animal and too little an independent public health professional.

1009. SARS Commission first interim report, p. 56.

It is impossible to say, in the end result, that Dr. D’Cunha’s difficulties made any ultimate difference in the handling of the crisis. Although his colleagues were frustrated by his approach to things, the crisis was to a large extent managed around him. It is hard to say that the overall result of the SARS crisis would have been different with someone else at the helm.¹⁰¹⁰

The Commission noted similarly in its second, 2005, interim report:

While the Commission has not, to date, found any evidence of political interference during SARS, the problem is that many people suspected political interference and many were convinced that politics were at work behind public health decisions. The mere perception of political interference, whether true or not, will sap public confidence and diminish public cooperation.¹⁰¹¹

This section will deal with:

- The nature and content of the suspicions;
- the evidence of key witnesses, such as the Premier and the Minister of Health, who would have been in a position to exert influence; and
- the evidence of key witnesses such as public health, hospital officials and physicians who would have been in a position to observe any influence.

The conditions that fostered such suspicions include:

- the timing of the travel advisory and its lifting, followed shortly by the relaxation of precautions and the “new normal”;
- the intense desire of everyone in the health system and the community, exhausted and weary of SARS and at the end of their tether, that SARS should be gone, and their fervent hope that it was in fact gone;

1010. SARS Commission first interim report, p. 55.

1011. SARS Commission second interim report, p. 17.

- The regrettable perceptions created by Mayor Mel Lastman's outburst against the World Health Organization and the invocation by some officials in the office of the minister of health and the Chief Medical Officer of Health of the minister's name and authority when requesting information from front-line public health and hospital workers;
- The Commission's steps to investigate the suspicions of political and economic pressure; and
- The Commission's analysis and findings.

These suspicions of political and economic pressure on public health and hospital decisions in order to protect the economy and hospital finances have two common elements. First, they are strongly held by those who hold them. Second, those who hold them are unable to point to any evidence to support their suspicions.

The suspicions were voiced by a health union leader in the context of the WHO travel advisory, its effect on the economy and the political effort to reverse it:

Answer: Quite clearly economic interests took over at an early stage. Quite clearly doctors put pressure on authorities to get back to normal ... The business community started to get on board and economic interests took priority here and the whole health and safety of members took a back seat with the WHO advisory in April. The whole thrust of trying to get it reversed centred around economic factors.

The ball was dropped in the middle of May. [Minster Tony] Clement sent out the signal that the crisis was over and then we have the second outbreak. North York General, St. John's and the Whitby wing of Lakeridge Hospital.

My concern is that the economic interests predominated at expense of health and safety of members.

Question: How does one prove it? ... How can you prove it was linked to economic reasons?

Answer: Why was the whole thrust of the provincial government centred around getting that advisory lifted? That was the sole preoccupation of the Minister of Health. His job should have been to protect the health and safety of the people in the province and they didn't do that.

The suspicions in the context of hospital's finance were expressed by two nurses at North York General:

There was a lot of pressure from the media, from the politicians, from the business community, that the city was going to lose so much money and all I kept thinking was how much money will they lose if this gets out of control ...

The whole thing was being kept hidden because they were afraid of a panic, afraid of the impact on the economy ...

As noted elsewhere in the report, one North York General emergency room nurse said she thought there was tremendous pressure to downplay SARS:

... There was a tremendous pressure on the politicians from the business community, or perceived pressure, to downplay the danger of SARS. That the danger was to downplay it to the staff who were looking after the patients. And to put the staff at risk. And to put all of the community at risk because you're not containing it strictly.

These suspicions were voiced at the public hearings by Dr. Jan Kasperski, Executive Director and CEO of the Ontario College of Family Physicians:

Bowing to political pressure, the new normal was put into place, mostly to reassure tourists that Toronto was open for business.¹⁰¹²

Dr. Kasperski continued with a thoughtful analysis of the lack of support given to front-line family physicians by the health system, but he pointed to no evidence to support a suspicion that the "new normal" resulted from political pressure to reassure tourists.

Although these witnesses were convinced that economic and political pressures were somehow at work, they were unaware of any actual evidence of such pressure. Also unaware of

1012. SARS Commission Public Hearings, September 29, 2003.

such evidence was a doctor at North York General who held similar suspicions:

Question: Did you sense that SARS had gone away and wasn't a problem?

Answer: I didn't think it had gone away. There was, well, significant if you would political pressure to relax the protocols and restrictions, my personal opinion obviously, but with trying to get Toronto off the WHO travel advisory.

Question: What do you mean by political pressure?

Answer: If you were aware of the media, there was pressure because of the way it affected Toronto coming into the summer, to get Toronto off the WHO travel advisory because of the, if you will, the political, economic effect it was going to have. There was this will to have SARS go away and be declared resolved. And the impression that it started at a public health, governmental level rather than within a particular hospital ...

Question: On the question of political pressure, which means different things to different people, we're obliged to see if there was any actual evidence of political pressure. Do you know of any actual evidence of political pressure?

Answer: Exerted by politicians? No, I'm not aware of that. I know that there was a will, if you will, a general will in the community to have Toronto declared SARS-free, you know?

The doctor's observations are significant for two reasons. First is the assumption that underlies most suspicion of pressure, the assumption that the relaxation of precautions and the new normal and the announcements that Toronto was open for business, because they followed so closely the economic disaster of the travel advisory and the political effort to have it lifted, must have been connected to them.

The second reason the doctor's observations are significant is that as soon as he thought about what he meant by "political pressure," he crystallized his suspicion into the proposition that there was a general will in the community to have SARS over

and to be SARS-free.

This doctor's insight goes a long way to explain the widespread suspicion that there was political and economic pressure to say that SARS was over. The doctor is correct that there was a general will in the community to be SARS-free. Everyone wanted SARS to be over. Politicians, health officials, emergency officials, nurses, business people, doctors, hospital officials, paramedics, patients and everyone touched in any way by SARS wanted it to be over and gone.

Front-line workers were exhausted. The restrictions of masks, the constant changing of gowns and gloves, the inability to breathe easily through the N95 respirator, the total disruption of hospitals – indeed, the terrible disruption of every health system workplace and every health worker's daily tasks – their inability to fulfill their professional calling and give patients the kind of personal care so disrupted by SARS, the inability to treat cancer and cardiac patients who needed medical care: All this and more created a profound sense of frustration and a strong desire for a SARS-free return to the normal work of caring for the sick.

There may for this reason be a sense in which the wish is fodder to the thought, a sense in which people throughout the system created in themselves their own pressure to believe that SARS was gone.

Reasons for Suspicion

The perception that SARS was politically driven arose principally from two circumstances:

- The trip by the Minister of Health and senior officials to Geneva to secure the reversal of the WHO travel advisory.
- The coincidence in time between the lifting of the WHO travel advisory on April 30 and the lifting of the emergency and the proclamation of the new normal in mid-May, based on the belief that SARS was gone.

The evidence that the Geneva trip and the lifting of the emergency and the proclamation of the new normal were not politically motivated is noted in this section. This evidence is uncontradicted and the reasons for considering it plausible are reviewed below.

There were also less prominent reasons for the perception, including:

- The perception that the office of the Chief Medical Officer of Health was within the political sphere of the Minister of Health, a perception fostered by the invocation of the Minister's name by some officials when asking for operational information of a medical nature.
- The bizarre attack by the Mayor of Toronto on the World Health Organization, combined with the economic boosterism of some public announcements that SARS was over.
- The intergovernmental bickering, particularly the partisan-sounding attacks by the Ontario government on the federal government.

This is a convenient place, before turning to the major reasons for the perception, to deal with these issues.

The Minister's trip to Geneva and his reasons for it were fully in accord with the thinking of the public health and public service professionals whose advice he accepted throughout the crisis. They were convinced that the WHO decision was wrong and was based on inadequate medical and scientific information. Because of the structure of the WHO, in one sense an international political organization, the only way to bring these scientific and professional concerns to its attention at the highest level was an intervention at the political level by the Minister of Health. There was nothing inappropriate in the Minister taking this step in accordance with the views of the public health and scientific leaders.

As for Mayor Lastman's outburst against the WHO,¹⁰¹³ little need be said except to emphasize that public communication during a public health crisis should be thoughtful, measured and nonpolitical.

As for the economic boosterism of some public announcements that SARS was over, it must be remembered that every level of government was properly concerned not only with the health problems posed by SARS but with its economic devastation. There is nothing wrong with economic recovery measures so long as they do not

1013. "Where did [the WHO] come from? ... They sit somewhere, I understand Geneva, I don't even know where the hell they came from, but Geneva or someplace and they make decisions..." – Mayor Mel Lastman, at a press conference, April 23, 2003.

influence public health decisions or public disclosure of an infectious risk. The remedy against any political interference that might flow from economic recovery measures is not to discourage such measures. The remedy is to ensure, as recommended, the scrupulous structural separation of politics and infectious outbreak management.

As for intergovernmental bickering, the Commission in its first interim report noted the bad provincial-federal communication that impaired our response to SARS and the need to avoid it the next time we are faced with such a crisis. The Ontario government never lost any opportunity to criticize the federal government on any issue, from airport screening to financial compensation. The provincial attacks seldom appeared constructive and smacked at times of gratuitous “fed-bashing.” Nothing displays this anti-federal bias more than a curious document received by the Commission at the beginning of October 2003, in the last days in office of the Eves government, purporting to be a brief submitted on behalf of the government of Ontario.¹⁰¹⁴ It consists of a lengthy partisan attack on the federal government’s SARS activity. Although disavowed by the Premier and the Minister of Health as any reflection of the position of their government, it does reflect within the ranks of senior government advisors a deep hostility to the federal government and a reluctance to miss any opportunity to blame things on it.

Although an element of healthy tension is inevitable in Ontario’s relations with the federal government, there is no room during a health crisis to indulge in this ritualistic intergovernmental bickering. As noted in the Commission’s first interim report, it is essential for governments during a public health crisis to resist their natural temptation to criticize each other. It is imperative for governments in a crisis like SARS to rise above their traditional bickering and work together in the wider public interest.

The unnecessary invocation of the Minister’s name by some within the office of the Chief Medical Officer of Health, when asking for operational information or giving operational directions, created in some quarters a perception that the operational response to SARS was politically driven. While there is no evidence that this was the case, it does emphasize the importance of a clear line between what is public health and what is politics. The government has started to clarify this line in legislation according a measure of political independence to the Chief Medical Officer of Health. This important process will remain incomplete until the government imple-

1014. Although the document is marked “Confidential,” the Commission did not solicit the document in any way, did not receive it under any promise of confidentiality and acknowledges no basis on which this government submission should be considered confidential. It will form part of the Commission’s record of public documents transmitted to the Ontario Archives.

ments the balance of the Commission's earlier recommendations in this respect and in respect of the independence of local medical officers of health.

One similar factor that may have contributed to a blurring of the lines between politics and public health was the special role of Michael McCarthy, a senior political aide to Health Minister Tony Clement. He was perceived to be very close to Dr. Colin D'Cunha, the Chief Medical Officer of Health, and to involve himself from time to time in operational matters. There is no suggestion of wrongdoing on his part and the Commission makes no criticism of Mr. McCarthy.

The problem was not so much the role of any particular person but that the dividing line between what is political and what is public health was not made as clear during SARS as it should have been. It would be wrong to treat any public health crisis as just one more "hot potato file" to be carried and managed politically by those in the Minister's office in the same way as physicians' fees or hospital funding. Public health crises, for all the reasons given above and in the Commission's interim reports, require the utmost public confidence that no political consideration can or will interfere with medical public health considerations by the Chief Medical Officer of Health.

One way to ensure a bright line between politics and public health, so essential to public confidence, is to ensure that ministerial aides stay clearly on the Minister's side of the line without appearing to become players in their own right in the operational response to a public health crisis. The government has taken steps in the right direction by giving the Chief Medical Officer of Health a large measure of independence. Further steps need to be taken in this direction, as recommended in the Commission's interim reports in respect of the role of the Chief Medical Officer of Health and the local medical officers of health.

Evidence of Premier and Minister of Health

The question of economic motivation and political pressure were put to Premier Ernie Eves and Minister of Health Tony Clement.

Mr. Eves said that the government's approach to SARS was to avoid politics and act on the advice of public health and public service professionals like Dr. James Young and Dr. D'Cunha and to back them up:

I made a decision rightly or wrongly at the outset that this was not, that people should not be playing politics with this issue. I felt that it was far

too important an issue. It went right to the safety and health of Ontarians. So I purposely took a role that was not in the limelight; I did not go to appear before TV cameras every day. I thought the best thing we could do is hire the best medical and scientific brains we had or obtain them from other jurisdictions if we did not have them and empower Dr. D’Cunha, Dr. Young and others to I regarded this as a medical and scientific problem and I would like to think that is the way that it was handled. I am sure in hindsight there are always things that we think of that human beings could have done better, but I really think that we approached this on that basis ...

The Premier’s Chief of Staff said:

From day one, the first day was a Wednesday, I think, of SARS I, the message back to Drs. D’Cunha and Young was, whatever you need, you got.

And the Premier added that his message to take away was:

And the cost, we will sort out how we pay for it later.

Mr. Eves said that on May 17 he accepted with some reluctance the advice of public health officials to lift the emergency, and only after he asked repeatedly:

Are you absolutely positive that this is the right thing to do, that we are getting the right information, are you sure this is all right?

And only after he received repeated assurances from Dr. D’Cunha and Dr. Young that the absence of new cases and the advice of medical and science advisors warranted the lifting of the emergency:

I think that they really, from their best judgment, and from what they knew at the time, felt that it was the right thing to do. I have tremendous amount of respect for the abilities of both Dr. D’Cunha and Dr. Young. I cannot perceive either one of them ever doing something that was expeditious as opposed to appropriate or correct and I think that they acted in their best judgment.

In respect of his overall role as Minister of Health in the SARS crisis and his approach to it, Mr. Clement said:

Mr. Clement: Basically I was the point guy from the government of Ontario's perspective and then had to create a management structure for Drs. Young and D'Cunha that would allow each of them to do what they had to do under their respective acts, and get the job done ...

I believe that the Minister has to be very much involved with the organization of dealing with the medical emergency. Very much has to be involved in all major decisions, has to vet all major decisions, very much has to be involved with the communication to the public on a regular ongoing basis and has to be involved with ensuring that whatever is done, whatever is decided upon is implemented, that there is avenues by the stakeholders, the nurses, the doctors, the public health officials, all these avenues to, if there is something going wrong, they have to be able to talk to the Minister about it. It cannot just be the hierarchy. So that's how I conceived my role and I believe that it was the appropriate definition of my role ...

I was involved at all levels. I would be a frequent participant in the POC [Provincial Operations Centre] meetings. I would be an occasional participant with Dr. D'Cunha at his initial meetings and I was a frequent participant with the conference calls with the Premier's office and the Cabinet office and that was just the formal meetings. Then there were informal meetings that took place throughout the day and night on an as-necessary basis where I was more often involved than not. I was up to my eyeballs in it. I believe that that is the appropriate role. In terms of the communications, I believe we had something like 47 press conferences, and I was involved in over a dozen of those, so I was not an intrusion but where and when necessary to put an elected, empathetic face that was not a doctor but was suffering with the rest of us, I was there. I was there to communicate major messages such as over the Easter weekend, when we were afraid of community spread, as well as interact frequently

with my federal counterpart, which fortunately was a very strong relationship, a very positive relationship. So, that's the role that I played ...

Question: Is there a risk here that the whole issue becomes too much of a political issue?

Mr. Clement: No I think we were quite at pains to make sure that did not happen, actually. I was conscious of that issue. There is an ingrained check and balance on that, which is if you are seen as exploiting this issue for political purposes, you are absolutely crucified and rightly so. That is an ingrained check and balance on that, and I was quite at pains to make this as nonpolitical as possible. I insisted that the Opposition health critics be briefed ...

As for the decision to travel to Geneva to seek withdrawal of the WHO travel advisory, Mr. Clement said:

Can I just say one thing about the WHO on the politics front? The reason that I went along was because I wanted Dr. Brundtland, head of the WHO, Director General, a former Prime Minister, a former politician, I wanted her to see the whites of my eyes. It's one thing for public health officials to go over there and say don't worry, everyone is on side, we've got everything under control, we'll do whatever you ask us to do. The public health officials can say that, but she would want to know that there is political will, that the politicians understand how serious this is, and that the politicians are willing to do what's necessary to meet the concerns of the WHO, which as it turned out hinged on the borders. That was the only outstanding issue. We've convinced them that the disease was not being communicated in the community and we've convinced them that our infection control was working in the hospital setting such that our rate of new infections was radically down.

So the only issue we faced in Geneva really was in federal responsibility and we were able to give them the assurance because I had worked with Anne McLellan on the ground in Geneva to give them the best of assurances. I wanted her to see the whites of my eyes. I thought that it was important for her to know that the politicians were engaged and that we

knew that if we failed that, it was not only a failure in our own community, if this thing got exported to the Third World, this could be a potential catastrophe of unimaginable proportions, and I wanted her to know that I knew that. Because she had a responsibility to the world. She had the responsibility of making sure that this didn't come to South Africa, or didn't come to India, or didn't come to some place that didn't have the public health infrastructure that we have.

So that's why that was important, but I did not make the argument based on politics. I made the argument based on facts. I said, here is our rate of infection, here is our rate of community spread, here is what we are going to do with the federal government when it comes to border crossings. Please make the decision based on the facts, Director General, don't make the decision based on other extraneous factors, including politics. The facts were on our side, so this was not a political appeal, it was a factual appeal to the facts on the grounds on that day on April 30th rather than where they were on April 18th. Sorry, I wanted to get that point out because it was most definitely not a political gesture, it was a strategic gesture to convince her in the language that she would understand, factual language, and also as a former prime minister respecting that politicians have to be accountable and have to be part of the solution, and not just public health officials.

As for the government's approach to public disclosure of SARS risk, Mr. Clement said:

Very early on, I decided, you have to make a decision, you have to make a decision how you're going to treat this with the public, and there is always advice, and I did receive advice to play it down, there is no issue, there is no problem, we got a little problem at Scarborough Hospital, let's not create a sense of panic in the public. I rejected that advice to this extent, I believed that what would create a greater sense of panic in the public is a lack of information given the fact that death was occurring.

And so very early on, even before the state of emergency was issued, I made a deliberate conclusion that we were going to give the public as much information as we had on a real-time basis, even on a daily basis, in order that they knew exactly what we knew, and Dr. [Richard] Schabas has been critical of that, but I think that it was the right thing to do.

And I would do it again, because the alternative is to hide information from the public, and I think that would actually create more of a problem. It would create a problem of credibility with the government and the public health officials, and it would create a problem of assuming far worse than potentially was the case, which would actually fan panic rather than actually contain the panic. So yes, guilty as charged, we communicated with the public at every available opportunity and I think that was the right thing to do.

The Commission asked Mr. Clement about his state of knowledge before the disastrous May 23 press conference where the facts of the North York General outbreak emerged only under media cross-examination of Dr. [Donald] Low. Mr. Clement said that going into the press conference, he was aware of a few cases but not of the magnitude disclosed by Dr. Low, who had arrived directly from the field a few minutes before the press conference without telling the Minister or the other government officials what he later told the media:

Question: So going in to the press conference, had you had any kind of a briefing from any of the officials as to what might be happening?

Mr. Clement: Well, we usually have a briefing before every press conference, and we did so in this case, but it was literally a couple of minutes of briefing, because he had just arrived in time, as I recall, this is my recollection now. And so he didn't, he didn't tell us any of this during the time before we were working on our speaking notes for the press conference. So it was news to us.

Question: And so do you recall what your understanding of the situation was prior to hearing him respond to the media question?

Mr. Clement: Well, we had a few cases, but not in the magnitude that he was expressing.

As for the existence of any pressure to declare SARS over prematurely, Mr. Clement said:

Question: Was there a pressure that you could feel that grew during April as far as the WHO travel advisory and the issues that arose out of that, to be able to declare this victory?

Mr. Clement: I am glad that you mentioned that. I never felt any pressure from inside the government. There was certainly pressure from the media, and I thought to myself as the cases declined, I thought, you know, they are going to start to ask me whether this is over, and I would be the craziest health minister alive to declare this as over. You could go through every single tape and interview I did of where I was asked probably a dozen times on TV, is this over? My response was exactly the same. In early May, which is after the travel advisory, I said no, this is not over; we have to continue to be vigilant.

There could be a recurrence, so our jobs continue to ensure that we have the right procedures in place in case there is another outbreak of this or any other communicable disease. I said that ad nauseam because I knew that if I ever declared it over and it wasn't over, I would be strung up from the nearest lamp post, I knew that as a politician, as well as a human being, I knew that. So, I never declared it over. Never, ever, ever, in my discussions with stakeholders, with the media, with the POC, with the Premier, I always said we have to be continually vigilant because this may not be over.

Question: Why do you think you were getting the sense that the media was putting pressure on you? Was it a new turn in the series of stories for them?

Mr. Clement: I think there is a notion to want to declare something, they wanted to get on to other things institutionally, so yes, they were waiting for somebody to declare it over, sure. But it wasn't me.

Question: Did you get a sense that those who were working on the issue had the same view as you did? Were there people in there in that group that were also feeling pressure or creating pressure?

Mr. Clement: No, not at a senior management. No. Evidently, this is human nature, people on the ground wanted this, there is a normal human reaction to think that this is over and now we could get back to normal. My point to them always was we will never get back to normal, that is why I'm the one who coined the phrase "the new normal." At a Science Committee meeting, I said we had to get a new normal because we were never going back to normal but we were in the midst of creating the new normal when the second outbreak obviously occurred, but I got a sense after the fact, after the second outbreak, that human nature did its thing again and there were some people potentially who may have let their guard down because they thought that it was over. But they never got that signal from me, or I never got that feeling from anyone in the senior management group.

Question: Now the senior management group is?

Mr. Clement: I mean the POC, Dr. Young, Dr. D'Cunha, Phil Hassen ...

...

Question: Did you sense pressure? You mentioned the media. What about the hospitals themselves, the doctors?

Mr. Clement: They were desperate to get back on track. Their queues were lengthening and that is how doctors get paid. The hospitals obviously wanted to get out of the situation where every hospital in the GTA [Greater Toronto Area] was in restricted access. Obviously we handled the second outbreak in a different way. Having learned a little bit, we learned that it is easy to

shut down a hospital but not so easy to boot them back up again. It is a very complicated task, actually. So I would say the hospitals and doctors wanted to get back to normal, as quickly as possible at which point I would say to them, remember, we are never going back to normal we're going to a new normal of infection control, the likes of which we have never seen before but yes, sure we want to normalize the new normal as soon as possible.

Question: Was there a sense of pressure from the federal government?

Mr. Clement: No, to be fair, no I wouldn't say that. They were not that close to the ground to even make that suggestion, I wouldn't think.

Question: What about the city? Business community? Were you sensing anything coming?

Mr. Clement: I was sensing that everybody wanted this to be over as soon as possible but again, it is not as if I had a conversation or a meeting X on day Y where the mayor said to me, get on with it, nothing like that that you could, I guess it was through the media that you got a sense that people wanted to be over this, and we all did, but we knew that there had been recurrences in other, a recurrence in Singapore, a recurrence in Taiwan, the situation in China wasn't under control yet, so I made it pretty clear that we will not do anything in haste that we would regret later. I felt pretty clear about that.

Question: There is certainly concern expressed to us, and it often does not have specific genesis, but that it was economics that drove this from about the WHO travel advisory on.

Mr. Clement: Yes, that is not true.

Question: They will say that you sent the signal. You obviously

didn't send a direct signal. I think that they are taking your participation in response to the WHO has been a signal, that it was the economics of it that drove you to take a higher public profile at that point in time?

Mr. Clement: No. I went there I went to Geneva because they had to hear the facts from a combination of public health officials and elected officials and I wanted them to make a decision based on the facts, so no, that is not true.

When I say pressure, I was aware that people wanted this to be over, but it is like being aware of the weather. Just because they wanted it to be over does not mean that it is going to be over. I want to make that absolutely clear. It is not as if it had any influence in my decision making whatsoever. In fact, quite the opposite, because I saw the danger of declaring prematurely that it was over and I was absolutely committed to not declaring premature victory, so I want to make pretty clear that fact outlined and highlighted to me why we could not declare prematurely that the war against SARS was over.

This evidence from the Premier and the Minister of Health, as noted below, is uncontradicted. There is no evidence in any document or from any witness or confidential informant interviewed by the Commission to suggest the contrary of what they assert in respect of the lack of any political pressure to hide or downplay SARS or to say prematurely that it was over.

Their evidence is plausible because, for reasons expanded on below, it would be political suicide for anyone in their position to attempt to hide SARS or to exert influence to secure a premature declaration that SARS was over.

Evidence from Senior Officials

The Commission interviewed many senior officials with the Provincial Operations Centre, the Ministry of Health, the Science Committee, hospitals and Public Health who were in a position to see the exertion of political influence if it existed. Some of

them were quite properly irritated by the invocation of the Minister's name by some of those associated with the Chief Medical Officer of Health when requesting information from the field. But not one of them recalled any form of political pressure to hide SARS or to say it was over when it was not. All of them said that their message from the Minister of Health and the Premier was that the government stood ready to do whatever was necessary and to commit whatever resources were necessary to assist the professional public health management of the SARS crisis. All say that there was no political pressure to minimize or hide SARS, to say that cases were not SARS, to say prematurely that SARS was over or to hide the second outbreak.

Their evidence is typified by this comment by one of the most senior government officials involved in SARS:

The politicians were amazing. They had not a minute of doubt or criticism of our work. When SARS II broke out they said it was "too bad" and "do what you have to do to get it under control." The politicians led. The premier said, "Fix it. Do what you have to do. You have the resources." They never second-guessed or made political decisions. The politicians got out of the way. They made exactly the right decision to let the professionals run it. We received nothing but encouragement and pats on the back.

This observation is typical of all responses by those who dealt with the political reaches of government, and these responses support the evidence of the Minister of Health and the Premier.

Evidence from the Health System

Typical of the evidence from hospitals is this account from one of the most senior administrative physicians at North York General in charge of the SARS response:

Question: Some have said that there may have been a combination at play provincially, that there was a disincentive to declare cases to be SARS because of economic impact, political impact. You recall the WHO travel advisory and a contingent of politicians and others off to Geneva to try to persuade them otherwise, and WHO in late April dissolved it. After that point in time, was there a disinclination at all levels to call

something SARS because of the potential consequences? Did you ever sense that was becoming a factor in decisions?

Answer: I never felt any pressures about that. I never felt indirectly any pressures on the part of anybody I interacted with about that. You know, the calls were being made and I didn't get a sense that Toronto Public Health was saying, look, it's bad for the economy. They just didn't have an epilink and they didn't meet the criteria and they actually didn't meet the criteria, as identified at the time. So it wasn't like they met the criteria but let's not call it SARS. They didn't meet the criteria and it turned out not to be as black and white as that in hindsight, but at the time, the knowledge said you need an epilink. And you needed all three and they didn't have all three so they weren't SARS.

Question: Did you ever sense that, at any level, your level included or above, that there was political pressure being brought to bear on anybody?

Answer: I wasn't aware of any political pressure being brought to bear in our institution. I wasn't aware of any.

Question: Nothing caused you to wonder about it?

Answer: I read the news and listened to the news like everybody else. You know, we were hoping that SARS was over, and it would have been nice if it was, but if it wasn't, then we needed to deal with it. So it wasn't about trying to call it quicker than it should be. The question more pertained when people were discussing it about whether or not WHO was calling it right in terms of the travel advisory given that it seemed to be a hospital-based phenomenon. But I don't even remember when that discussion occurred. That might have been in SARS II when it became more clear. So I might be merging thought processes from three years ago together too close in time in retrospect. So I just,

there wasn't a sense, as I look back at it, I don't have a sense that that really played into our interactions with the health care system, the ones that I'm aware of. I don't have any sense. After the fact, in SARS II, I didn't have a sense that that was the case either.

This evidence that there was no pressure to hide SARS or to say that SARS cases were not SARS or to declare SARS over prematurely is consistent with everything said by Ministry of Health and public health officials.

It is implausible to think that officials in the Ministry of Health would be able, even if they wanted to, to conceal a plan to hide SARS. This huge and complex ministry could not turn on a dime, and it was difficult enough for it to respond to the daily demands placed upon it by SARS, let alone to participate in some form of yet undetected secret pressure. It was all it could do to manage the systems and complex interactions with other levels of government, the federal government, the local public health agencies, the hospitals, and above all its many internal divisions, including the office of the Chief Medical Officer of Health and the hospitals branch. It is implausible to think that an organization so complex and so difficult to coordinate internally could successfully conceive, manage and successfully execute a conspiracy of silence to hide SARS or its return.

It was a frustrating time for many in the Ministry, and some of them expressed their frustration when dealing with front-line hospital people. One middle-level Ministry manager told a hospital official who contemplated closing a Toronto emergency ward in mid-April because of short-staffing due to SARS that "the Ministry has no appetite for more closings." It is clear from the entire conversation, including the fact that the manager backed off immediately when challenged, that he was not reacting to political pressure or expressing Ministry policy but simply venting a personal frustration shared by many in government and on the front line. Although the line between political pressure and personal frustration is objectively clear, expressions of personal frustration can easily be taken by outsiders already suspicious of political pressure as a sign that political pressure is at work.

Another natural response of front-line managers was driven by their desire for clarity and bright lines in the diagnosis of SARS despite the lack of a reliable or timely clinical test. One thing to fall back on was the epilink requirement before a SARS diagnosis could be made. As noted often in this report, the case definition for SARS set by Health Canada in conjunction with the World Health Organization case definition required recent contact with a SARS patient or recent presence in a SARS-affected

area like Hong Kong or China. Recent presence or actual presence at the time of diagnosis in a SARS hospital with SARS patients did not qualify as an epilink. If you had been to China, you had the required epilink, but if you were in North York General Hospital one floor down from the SARS ward, you did not have the required epilink. In hindsight this sounds counterintuitive, but at the time it was not only the standard generally accepted by every expert in the field but indeed the only standard there was.

One senior scientist at the centre of the SARS response, devastating in his criticism of Ontario's lack of preparedness, insisted nonetheless that it was science alone that drove Ontario's response to SARS:

Science drove policy.

As noted in the section on North York General Hospital, the belief that SARS was over was not limited to North York General. The focus on recovery was universal. One Doctor, who held a prominent leadership role during SARS, agreed that although there was no pressure to say SARS was over, after the travel advisory there was a mindset that everyone wanted it over:

Question: When it comes to the question of the relaxation in precautions, in hindsight you get certain people who say that it must have been a political decision, the guard must have been let down for economic reasons, and people say this and I say, well, how can you prove this and they say that it must have happened.

Answer: No, there was no pressure that I ever saw to hurry things.

Question: But was there a mindset that everyone wanted this to be over?

Answer: Everybody wanted it to be over, and Carolyn Abramson in the *Globe* said that once they ... things changed once they lifted the travel advisory, the travel advisory was a sort of a shift in the whole psychology in the city and all of a sudden everybody now was together. When the travel advisory came down, there was the City, the Province, Health Canada, everybody

was outraged and fighting together, and then when they got the travel advisory turned back, everybody celebrated about that and once everybody were getting back to normal and everybody was ... that is part of why the lack of leadership. There should have been somebody who said ... nobody questioned it. [Dr.] Jim Young went off to China to talk about our successes and how we controlled it. [Dr.] Bonnie [Henry] went with him and [Dr.] Tony [Mazzulli] went with him and nobody said, "how do you know it is over?" including myself. None of us said "well, just because," and it is such a simple question to ask and we blew it. It is just amazing everybody blew it.

The desire to see the end of SARS was natural. People had worked beyond the normal limits of endurance, it was a frightening experience, and everyone wanted to see the end of the spread of SARS. The fact that everyone on the front lines and throughout the system wanted it to be over may in hindsight suggest over-optimism, but it provides no evidence of political or economic pressure.

Inherent Problems of Proof and Disproof

How can one ever be satisfied beyond a reasonable doubt or even on a balance of probabilities that a thing like political pressure does not exist? Judicial experience shows that it is inherently difficult to prove a negative. This is particularly so with a thing as subtle and elusive as political or economic pressure. In the first place, those who improperly exert such pressure or improperly succumb to it are unlikely to admit it unless confronted with a document. In the second place, such matters are not typically committed to documents. In the third place, such pressure can be so subtle as to defy proof. In the fourth place, there may in fact be no such pressure but underlings may create self-imposed pressure to do what they think will please their masters.¹⁰¹⁵

How can an investigator be satisfied there was no improper pressure? Improper pressure is a hard thing to find and a harder thing to prove or disprove. Even if one interviewed every single Ontario politician and Ministry and Public Health and hospital employee, and everyone denied such pressure, that would not, because of the four problems of proof mentioned above, prove there was no improper pressure.

The only thing an investigator can do is to interview the key figures and a large

number of those who played a part in Ontario's response to SARS and those affected by SARS, from the highest officials to the front-line workers, and test their evidence against the entire body of interviews with witnesses and confidential informants and documentary evidence and the logic and experience of human behaviour.

The Commission's Investigation

The work of the SARS Commission was highly publicized in the media and by newspaper advertisements and the Commission website and the public hearings. Confidentiality was promised to anyone who wished to come forward. The Commission conducted hundreds of confidential interviews and examined thousands of documents without finding any evidence of such improper pressure.

Analysis

No one at the public hearings, not even those who were highly critical of government and public health and hospitals, was able to recall any evidence of such pressure.

All of the key figures, including the Premier, the Minister of Health, senior officials in the Ministry and in Public Health and hospitals, and doctors, denied and refuted the suspicions that anyone exerted or succumbed to improper pressure to minimize or hide SARS or to declare prematurely that it was over.

This evidence is uncontradicted by any evidence turned up in the Commission's investigation described above. The evidence supports the assertion of the key figures that there was no such pressure.

These uncontradicted denials and refutations are plausible for the following reasons:

- It would be political suicide to try to hide SARS or suppress evidence of its return because it would be so difficult to hide such an explosive fact and the risk of exposure would be too high. As Health Minister

1015. An example of the latter two problems is furnished by the remark by King Henry II: "Will no one rid me of this turbulent priest?" The king's remark resulted in the murder, by four of his knightly hangers-on, of the Archbishop of Canterbury. Did the King order the murder? Did he hope the knights would fulfill his wish? Did the knights follow orders? Did the knights merely want to please their master by bringing about what they thought he wanted?

Clement said in response to questions by Mr. Hunt, Commission counsel:

I knew that if I ever declared it over and it wasn't over, I would be strung up from the nearest lamp post, I knew that as a politician, as well as a human being, I knew that.

...

There is an ingrained check and balance on that, which is if you are seen as exploiting this issue for political purposes, you are absolutely crucified and rightly so. That is an ingrained check and balance...

- It would be political suicide to try to hide SARS or suppress evidence of its return because the conspiracy of silence required to achieve it would require the participation of so many people at so many levels that leaks and exposure and disgrace would be inevitable.
- To exert improper pressure effectively in a complex health system full of feisty independent professionals and potential whistleblowers would require not only the knowledge of a large number of people but also their continuing silence to this day. The fact that no one has come forward with any evidence or even any specific allegation of improper pressure makes it highly implausible that such evidence exists.
- The Commission asked hundreds of people in confidential interviews, many of whom distrust officialdom and those in authority, if they knew any evidence of such improper pressure. No one recalled any such evidence.
- The Commission from confidential informants and by way of subpoena obtained and examined thousands of contemporary emails and documents from government and hospitals and found no evidence of such pressure.

Finding

On the basis of this evidence and this reasoning, the Commission finds that there was no political or economic pressure brought to bear on the health system or Public

Health or hospitals in order to minimize or hide SARS or to say that a SARS case was not SARS or to declare prematurely that SARS was over.

13 Essential Questions

Introduction

SARS raised serious questions. Thirteen of the most important ones are addressed here. Some answers are terribly clear. Were health workers adequately protected? Clearly not. Other answers are less obvious. Could SARS II have been prevented? If so, how? This section will summarize these answers as they emerge from the Commission's evidence and findings.

It is too easy after a public health crisis to assign individual blame. This is not to say in hindsight that mistakes were not made or that systems should not be blamed. But honest mistakes are inevitable in any human system. There is always more than enough blame to go around if good faith mistakes made in the fog of crisis are counted in hindsight as blameworthy.

The approach of this Commission as set out in its mandate and as reflected in its approach is not to apportion blame but to find out what happened, to figure out how to fix the problems revealed by SARS, to learn from these tragedies and to give a legacy of betterment to those who died, those who fell ill, those who suffered so much and those who fought it with such courage.

1. Why Does SARS Matter Today?

It is fair to ask, in respect of this final report, after so many reports and investigations, the Naylor Report and the Walker Report and the Commission's 2004 and 2005 interim reports, so what? What is gained now by telling in detail the story of SARS?

Why does SARS matter today, more than three years after the event, after the government and the media have moved on to other crises, after those who suffered from SARS have moved on as best as they can?

After every disaster like SARS the years recede and memories fade. There is always pain that has been forgotten, and things we choose not to recall. If we forget the suffering and courage seen in the SARS crisis we diminish the sacrifices of Tecla Lin, Nelia Laroza, Dr. Nestor Yanga and all those who died and those who suffered. Their suffering and courage should not be in vain.

We must remember SARS because it holds lessons we must learn to protect ourselves against future outbreaks, including a global influenza pandemic predicted by so many scientists. If we do not learn from SARS and we do not make the government fix the problems that remain, we will pay a terrible price in the next pandemic.

2. How Bad Was SARS?

The numbers, that 375 people contracted SARS and 44 died, do not tell the complete story of how bad SARS was. They do not reflect the unspeakable losses of families affected by SARS. They do not reflect the systemic failures that permitted these deaths and illnesses.

SARS had Ontario's health system on the edge of a complete breakdown. The wonder is not that the health system worked so badly during SARS, but that it worked at all. SARS also badly hurt Ontario's international reputation, setting up an unfortunate link in the minds of many in other countries between Toronto and a mysterious deadly disease.

Worst of all, SARS demonstrated how many earlier wake-up calls had been ignored, and how few of their warnings had been heeded. Many of the fault lines that appeared during SARS were identified by earlier investigations and commissions, notably the Krever Inquiry into tainted blood and the O'Connor Inquiry into tainted water.

SARS may be the last wake-up call we get before the next major outbreak of infection, whether it turns out to be an influenza pandemic or some other health crisis. That is why we cannot forget how bad SARS was, and how much terrible suffering and loss we must avoid the next time around. The tragedy of SARS, these stories of unbearable loss and systemic failure, give the public every reason to keep the government's feet to the fire in order to complete the initiatives already undertaken to make us safer from infectious disease.

3. What Went Right?

Despite its deep flaws, the system was supported by people of extraordinary commitment. What pulled us through was the hard work and the courage of those who stepped up and fought SARS. What went right in a system where so much went wrong is their dedication in the midst of chaos and enormous workload pressures. It was a tireless fight in the fog of battle against a deadly and mysterious disease. We should be humbled by their efforts.

SARS produced so many heroes that it is impossible to identify them all and no attempt has been made to do so. Some happen to be mentioned in this report when their names are essential to the narrative.

One hero was the public, which rose magnificently to meet the challenge. Any fight against infectious disease depends above all on public cooperation. SARS could not have been contained in Toronto without the tremendous public cooperation and without the individual sacrifice of those who were quarantined. It is essential to ensure that the spirit of cooperation shown during SARS is not taken for granted. It must be nurtured and promoted.

4. What Went Wrong?

SARS took hold because of a confluence of systemic weaknesses in worker safety, infection control and public health. The Commission's first interim report identified 21 deep systemic flaws in public health infrastructure. The second interim report identified serious shortcomings in health protection and emergency management laws. This final report identifies further areas of unresolved problems, particularly in the domain of health worker safety. Because of these systemic weaknesses, SARS was a disaster waiting to happen.

The public health system was broken, neglected, inadequate and dysfunctional. It was unprepared, fragmented, uncoordinated. It lacked adequate resources, was professionally impoverished and was generally incapable of fulfilling its mandate.

Ontario was not prepared for a public health crisis like SARS. It didn't even have a pandemic plan.

There was a grave lack of worker safety expertise, resources and awareness in the health system, a lack whose impact was compounded by a similar lack of infection control expertise and resources. Not only that, but infection control and worker safety operated as two solitudes, and public health and hospitals operated as separate silos. And the Ministry of Labour was sidelined.

Also missing were two key components of a safe workplace: Neither internal responsibility systems nor joint health and safety committees were, in general, fulfilling their intended roles and responsibilities.

The trust of health workers in the ability of government, safety laws, and their employers to safeguard them and their colleagues was broken. Health workers learned that those in charge were poorly informed and inadequately advised to make pronouncements on worker safety and personal protective equipment. A prime example was the lack of awareness throughout the health and hospital system of the legal requirement for respirator fit testing.

5. Were Precautions Relaxed Too Soon?

In May 2003, the government implemented a series of measures that led to the relaxation of precautions on May 13 and to the lifting of the provincial emergency four days later. But SARS had not gone away. How could victory over SARS have been declared when it was spreading undetected at North York General Hospital? Were precautions relaxed too soon?

Knowing when to announce the “all clear” is very difficult. There were similar instances during the Spanish flu pandemic of 1918–1919, when victory was declared too early. Decision makers are in a tough spot during a public health emergency. React too early in a preventive mode and they may be accused of having generated another “swine flu” problem. Lift precautions too early and they may be accused of recklessness and bowing to political pressure.

There is no easy answer to the question of whether precautions were lifted too soon. In hindsight it turned out to be a mistake because as soon as precautions were relaxed the SARS cases simmering undetected at North York General flared up into the second outbreak. But the decision was made at the time in good faith on the best medical advice available and after two incubation periods with no new detected cases did it appear appropriate to relax the precautions and institute the “new normal” with precaution levels higher than they were before SARS.

As noted in the report, one of the underlying reasons for the second outbreak was the lack of any system to ensure surveillance of the kind that would have detected the North York General cases before they spread. Although the relaxation of precautions triggered the second outbreak, its more underlying cause has more to do with the lack of systems to ensure adequate surveillance.

6. Who Is There to Blame?

No one. The evidence throws up no scapegoats. This will disappoint those who seek someone to blame.

It is too easy to seek out scapegoats. The blame game begins after every public tragedy. While those who look for blame will always find it, honest mistakes are inevitable in any human system. There is always more than enough blame to go around if good faith mistakes made in the heat of battle are counted in hindsight as blameworthy.

More important than blame is to find out what happened, to figure out how to fix the problems, to learn something from these tragedies, to give a legacy of betterment to those who died and those who fell ill and those who suffered so much.

This was a system failure. We were all part of it because we get the public health system and the hospital system we deserve. We get the emergency management system we deserve and we get the pandemic preparedness we deserve. The lack of preparation against infectious disease, the decline of public health, the failure of systems that should protect nurses and paramedics and doctors and all health workers from infection at work, all these declines and failures went on through three successive governments of different political stripes. We all failed ourselves, and we should all be ashamed because we did not insist that these governments protect us better.

It is also hard to find blame because blame requires accountability. Accountability was so blurred during SARS that it is difficult even now to figure out exactly who was in charge of what. Accountability means that when something goes wrong you know who to look for and you know where to find them. That kind of accountability was missing during SARS and remains blurred even today. What we need is a system with clear lines of authority and accountability to prepare us better for the next infectious outbreak.

7. Was Information Withheld?

There is no evidence that information was deliberately withheld. But there is much evidence of serious communication failure.

Bad communication is a steel thread throughout the story of SARS. Poor communication exacerbated a confusing and terrible time. This happened again and again. In February and early March 2003, health workers in Ontario, unlike their colleagues in B.C., were not alerted to the emergence of a mysterious new disease in China and Hong Kong. Until mid-May 2003, directives failed to remind employers of their worker safety legal obligations. And over and over when new hospital outbreaks were detected, there were inordinate delays before all workers who might have been exposed were contacted.

Bad communication between governments and agencies and hospitals is evidenced in many cases throughout this report. Although a real effort was made by government and public health to give the public timely and accurate information, performance was mixed. In some instances public communication was excellent, as in the work of Dr. Sheela Basur, the Chief Medical Officer of Health for Toronto. In some instances, like the disastrous May 23 press conference, public communication was like a train wreck.

8. Did Politics Intrude?

The Commission finds on the basis of the evidence and analysis set out in this chapter that there was no political or economic pressure brought to bear on the health system or public health or hospitals in order to minimize or hide SARS or to say that a SARS case was not SARS or to declare prematurely that SARS was over.

9. Was SARS I Preventable?

There is an element of speculation in any attempt to say whether a disaster could have been prevented by this measure or that measure. History is full of what-ifs. Like every other historical what-if, there is an element of speculation in any attempt to say whether the SARS disaster could have been prevented, by earlier isolation and investigation, by a differently configured emergency room, by different infection control procedures, worker safety precautions or training or alertness.

The short answer is no, SARS I was not preventable. No country escaped SARS entirely. Vancouver certainly did better than Toronto. Although the presentation of the index cases was much different in each case, there are enough similarities to warrant comparison in terms of preparedness and worker safety systems. There was undoubtedly an element of good fortune that saved Vancouver from the devastation that SARS wrought on Ontario. But it must also be said that Vancouver made its own luck with better preparedness and systemic strengths.

It cannot be proven that SARS I could have been prevented if Ontario's systemic weaknesses in preparedness, surveillance, worker safety, infection control and public health had been adequately addressed before SARS. It is likely that SARS I could have been contained more quickly and with less damage had the right systems been in place in Ontario.

In B.C., even if the province was luckier than Ontario in the presentation of its index case, SARS was, nonetheless, more effectively contained in a jurisdiction with better preparation and more robust and more collaborative worker safety, infection control and public health systems.

British Columbia provides a useful example of how well things can work and how well health workers can be protected when there is a strong safety culture. It provides an example of how things can and should work in Ontario.

10. Was SARS II Preventable?

We will never know if SARS II could have been prevented.

What can be said, for the reasons set out below, is that the opportunity was greater to prevent SARS II than to prevent SARS I, and that SARS II could have been caught earlier and its impact lessened had the right systems been in place.

First, as a mostly nosocomial outbreak, SARS spread primarily within the contained space of health workplaces. Unlike a flu pandemic, it did not spread uncontrollably in the community. Second, it spread precisely in the kind of workplaces that should be optimally prepared to protect patients, visitors and workers from infectious diseases. Third, it occurred more than two months after Mr. T presented at Scarborough Grace Hospital. It is one thing to be caught off guard, as Ontario was, at the start of SARS. It is another to have failed to learn enough over a two-month period to prevent a major recurrence.

The problem was that these factors, which should have made it easier to prevent and control SARS II, were undermined by the many systemic flaws revealed by SARS, including insufficient surveillance, inadequate infection control expertise and resources, a lack of worker safety resources and expertise, blurred accountability, and inadequate communication systems between hospitals and public health.

11. Were Health Workers Adequately Protected?

The answer is no. It is tragically clear that health workers were not adequately protected. This is demonstrated by the heavy burden of disease on hospital workers, paramedics and others who worked in Ontario's health system during SARS. Two nurses and a doctor died from SARS. Other health workers fell ill, including paramedics, medical technicians and cleaners, and many of them unknowingly infected their families. Almost half of those who contracted SARS were health workers who got it on the job. It would have been one thing if all had been infected at the start of the outbreak when little was known about the disease. The full extent of worker safety failings during SARS is revealed by the fact that workers continued to get sick in April and up to the end of May, long after the Scarborough Grace outbreak.

**Table 1 – Probable and Suspect SARS Cases
 Contracted in Health Care Settings¹⁰¹⁶**

Category	Phase 1	Phase 2	Total Number of Suspect and Probable Cases	Percentage of Total Number of Cases (375)
Health Workers	118	51	169	45%
Patients	23	35	58	15%
Visitors	20	23	43	11%
Total	161	109	270	72%

Many factors contributed to this. There was a lack of worker safety resources and expertise in the health system heading into SARS. The health system generally did not understand its obligations under worker safety laws and regulations. There was a lack of understanding of occupational safety as a discipline separate from infection control. Infection control and occupational safety operated as two solitudes. The Ministry of Labour was largely sidelined during SARS; its ability to play a greater

1016. Presentation of Dr. Colin D'Cunha, SARS Commission Public Hearings, Sept. 29, 2003.

enforcement and regulatory role as required by law to protect workers had been seriously undermined by funding and resource cuts in the 1990s.

12. Are We Safer Now?

The short answer is yes, somewhat safer. The long answer that we are not yet as safe as we should be.

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's health protection and emergency response laws and what must be done to correct them.

Although the Ontario government and individual hospitals have taken significant steps to improve our level of protection from infectious outbreaks such as SARS, serious problems persist. Much remains to be done. What has been accomplished thus far, though commendable, marks the beginning of the end of the effort to fix the problems revealed by SARS. The end will not be reached until Ontario has a health system with robust and collaborative infection control, worker safety and public health functions.

As the Commission's second interim report said:

After long periods of neglect, inadequate resources and poor leadership, it will take years of sustained funding and resources to correct the damage.¹⁰¹⁷

13. What Must Be Done?

SARS revealed a broad range of systemic failures: the lack of preparation against infectious disease outbreaks, the decline of public health, the failure of systems that should protect nurses and paramedics and others from infection at work, the inade-

1017. SARS Commission, second interim report, p. 297.

quacy of infection control programs to protect patients and visitors to health facilities, and the blurred lines of authority and accountability.

SARS taught us lessons that can help us redeem our failures. These lessons are reflected in the Commission's recommendations for change.

Perhaps the most important lesson of SARS is the importance of the precautionary principle. SARS demonstrated over and over the importance of the principle that we cannot wait for scientific certainty before we take reasonable steps to reduce risk. This principle should be adopted as a guiding principle throughout Ontario's health, public health and worker safety systems.

If we do not learn this and other lessons of SARS, and if we do not make present governments fix the problems that remain, we will leave a bitter legacy for those who died, those who fell ill and those who suffered so much. And we will pay a terrible price in the face of future outbreaks of virulent disease, whether in the form of foreseen outbreaks like flu pandemics or unforeseen ones, as SARS was.

SARS taught us that we must be ready for the unseen. SARS taught us that new microbial threats like SARS have happened and can happen again. And it gave us a first-hand glimpse of the even greater devastation a flu pandemic could create.

There is no longer any excuse for governments and hospitals to be caught off guard, no longer any excuse for health workers not to have available the maximum reasonable level of protection through appropriate equipment and training, and no longer any excuse for patients and visitors not to be protected by effective infection control practices.

As the Commission warned in its first interim report:

Ontario ... slept through many wake-up calls. Again and again the systemic flaws were pointed out, again and again the very problems that emerged during SARS were predicted, again and again the warnings were ignored.

The Ontario government has a clear choice. If it has the necessary political will, it can make the financial investment and the long-term commitment to reform that is required to bring our public health protection against infectious disease up to a reasonable standard. If it lacks the necessary political will, it can tinker with the system, make a token

investment, and then wait for the death, sickness, suffering and economic disaster that will come with the next outbreak of disease.

The strength of the government's political will can be measured in the months ahead by its actions and its long-term commitments.¹⁰¹⁸

1018. SARS Commission, first interim report, p. 210.