Digital OR (cont.)

5. Determine how the patient enters and exits the room. This will affect the design, since equipment must be able to accommodate a range of circumstances.

6. Catalogue the equipment used in each type of surgical procedure. Is the equipment dedicated to a particular OR, or will it be necessary to move it between a number of ORs? It may be appropriate to place dedicated, frequently used equipment on an equipment boom. Equipment stacked vertically on a boom reduces overall space required, reduces OR set-up and cleaning time, and reduces the clutter that can compromise the sterile field. An articulated service column, providing services to tethered equipment carts, may, however, be more appropriate for equipment which needs to be moved between a number of operating rooms.

7. Locate cameras and microphones for telecommunications to other sites. In the past, cameras have been mounted in surgical lights. However, there is a growing consensus that independent boom-mounted cameras provide the best visualization of the surgical site.

8. Establish the number of flat screen monitors required. This is dependant on the type of procedure performed and the number of surgeons and residents present during the procedure. Typically, two or three flat screen monitors are required to display information, but the following may also need to be viewed on monitors:

   a. Video images from scopes

   b. Digital diagnostic images

   c. Medical records information

   d. Patient physiological signs

9. Determine the types and quantity of cabinets required. These can include warming cabinets, supply cabinets and table parts cabinets. Digitally equipped ORs also require equipment cabinets to accommodate electronic equipment such as routers, amplifiers, recording and playback equipment, video processors and the like. For maximum flexibility, these can also be accessible from both front and back, and be mechanically cooled to offset equipment heat loads.

10. Select the best location for the documentation centre. This is a small computer workstation from which communications, information retrieval, and charting can occur. The documentation station should be located away from the sterile field. It should have a clear view of the OR table in order to facilitate charting. The documentation station might also need to be located in close proximity to the equipment cabinets as it is often necessary for the circulating nurse or other staff member to access the documentation equipment during a procedure.

11. Consider ceiling heights in relation to the height of articulated service arms (also known as equipment booms). The number of electrical hubs available, plus the space constraints of the ceiling height, will affect how many OR lights and equipment booms can be provided and where they should be located.

12. Co-ordinate the ceiling plan. This includes mechanical services, lighting equipment mounts, and how the electrical/ communications services are linked to the building infrastructure.

13. Accommodate the needs of other elements in the room. This includes x-ray view boxes (which will be phased out entirely over the next five to ten years) and clocks or other devices.

14. Consider if the OR will need to accommodate infectious cases? If yes, new CSA standards require that the OR be equipped with a positively pressurized vestibule at all entrances.

SARS

LE SYNDROME RESPIRATOIRE AIGU SÉVÈRE ET SES EFFETS SUR LES SOINS DE SANTÉ

Comment le Canada a fait face à cette crise

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Résumé

- L'épidémie mondiale du syndrome respiratoire aigu sévère (SRAS) a eu un effet indirect sur tous les établissements sanitaires des pays touchés tout en mettant les pays non touchés en état d'alerte.
- Les professionnels de la santé ont le devoir d'être au courant des mesures de prévention des infections afin de prévenir la propagation du SRAS.
- Cet article examine cette nouvelle maladie et la façon dont elle a influencé la prestation des soins médicaux au Canada.

Les salles d'opération du monde entier adoptent quotidiennement les nouvelles technologies et les nouvelles techniques chirurgicales. Le personnel infirmier, cependant, peut souvent oublier l'impacte que la découverte d'une nouvelle maladie peut avoir sur l'exercice de sa profession. Il est important de minimiser les risques d'une telle découverte autant pour le personnel infirmier que pour les patients, les membres de leurs familles et amis, pour ne pas oublier la population mondiale en général.

Courtesy L. Socha

Mask being worn correctly

SEVERE ACUTE RESPIRATORY SYNDROME AND ITS EFFECTS ON HEALTH CARE

How Canada Has Dealt With This Ordeal

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In Brief

- The global epidemic of severe acute respiratory syndrome (SARS) indirectly has affected all health care facilities in affected nations and has unaffected nations on alert.
- Health care practitioners need to be aware of infection control measures to prevent the spread of SARS.
- This article looks at this new disease and how it has affected the delivery of health care in Canada.

Surgical suites worldwide embrace progress in technology and new surgical techniques daily. Nurses, however, often forget about the impact that discovery of a new disease could have on nursing practice. It is important to minimize the risks of such a discovery for health care providers as well as patients, family members, friends, and the world population in general.

BIRTH OF A NEW DISEASE

November 2002 is the estimated birth date of severe acute respiratory syndrome (SARS), although global knowledge of the disease was not achieved until February 2003.[1,2] It is believed to have originated in the Guangdong Province of China.[3] A Chinese nephrologist carried the disease to Hong Kong where 12 hotel guests contracted the virus in February 2003. Most affected hotel guests occupied the same floor as the physician. The disease then spread to Singapore, Toronto, and Hanoi, Vietnam – the race was on.[4]

The initial diagnosis was made on the Chinese nephrologist in Hong Kong in March 2003, and the world has witnessed the impact ever since.[3] A physician in Hanoi informed the World Health Organization (WHO) in February 2003 that a "novel" severe pneumonia had been detected. This information prompted WHO to issue a global alert, and health care professionals worldwide began to consider the concept of a new respiratory disease. Infectious disease experts worldwide began the journey to identify, name, analyze, control, and isolate the virus and to find a solution to the outbreak. Approximately 30 countries in Asia, North America, and Europe have been affected directly.[5] Outside the hot spots such as Toronto and Hong Kong, SARS has resulted in global awareness and planning for an outbreak to begin hastily.

Severe acute respiratory syndrome is a new infectious disease that can cause a potentially lethal respiratory illness. It is spread by close person-to-person contact.[1,6,7] The signs and symptoms of SARS include, but are not limited to, fever greater than 100° F (38°C), rigor, headache, general malaise, cough, myalgia, difficulty breathing, and dyspnea.[1,3,5,7] Fever often is followed by rapidly progressive respiratory compromise. Usually symptoms occur two to seven days after infection but have been found to occur as long as 10 days after infection. The severity of this disease is varied and unpredictable, from mild to fatal. In some patients, the illness is severe enough to require intubation and mechanical ventilation. Treatment also has varied; regimens have consisted of antibiotics, steroids, and treatment of symptoms.[4,7]

Severe acute respiratory syndrome has been classified as a coronavirus.[1,4,8] There are three known groups of coronavirus associated with various diseases in humans and animals,8 including gastroenteritis and upper and lower respiratory tract diseases. It has been suggested that SARS is a fourth type of coronavirus. In immune-competent individuals, the coronavirus primarily causes only mild to moderate signs and symptoms. The most common disease associated with the coronavirus is the common cold. Noteworthy is that in animals, the coronavirus may cause moderate to severe illness. This leads researchers to believe the same can be held true for humans; SARS confirms the theory. Today presents a different scene for respiratory ailments; there is a new, infectious, potentially lethal virus.

THE IMPACT OF SARS IN CANADA

Late June 2003 marked a SARS milestone – 100 days of known cases. Health care professionals have learned a great deal in a short time. The WHO sponsored an international SARS conference around the time of the milestone. The conference was held in Malaysia, and approximately 1,400 delegates reviewed and studied the new disease. Severe acute respiratory syndrome has left a definite impression – more than 800 deaths and numerous secondary consequences. In Canada alone, tourism dropped in many affected locations, resulting in spin-off consequences such as people employed in tourism being laid off; segregation of portions of the population, such as health care workers; and high health care costs.

Infection control. Countless infection control departments throughout Canada, along with professionals in occupational health and safety departments, worked numerous hours preparing for the possibly imminent arrival of the first case of SARS at their facilities. These departments ensure that adequate plans, guidelines, and procedures are in place in the event that there is a possible/probable SARS case. Infection control measures are paramount. In developing these measures, many things were considered (*Table 1*). These considerations are not presented in order of importance, and further precautions may be used. Infection control departments provide guidelines and education sessions about using and following precautions. If family members and visitors are allowed to visit patients with SARS, it is imperative that staff members take time to teach them the proper procedure for donning and removing personal protective wear (PPW), as well as proper hand washing. Visitors and staff members entering a patient room must sign a contact list. Free access to the remainder of the building by visitors should be curtailed or denied. After patients are discharged, precautions must continue with terminal cleaning. The recommendation is to clean twice and allow the room to stand empty for a minimum of one hour with the door closed and labeled to allow proper air ventilation. Supplies remaining in the room must be removed and destroyed. Curtains or blinds must be taken down carefully to prevent aerosolization and then cleaned. Full PPW must be worn by cleaning staff members, which is time consuming, costly, and absolutely necessary. Containing the epidemic is not an easy chore.

Infection control guidelines from such agencies as the Centers for Disease Control and Prevention (CDC), Health Canada, and WHO are to be followed. Another source of information is the National Institute of Allergy and Infectious Diseases, which provides information, surveillance, epidemiology, and research. These organizations provide updates on outbreaks, as well as guidance and information. They also issue travel alerts regarding affected areas. In-depth discussions of their suggestions are beyond the scope of this article. Most health care workers should be familiar with these types of recommendations because of prior experience with vancomycin-resistant enterococci, methicillin-resistant Staphylococcus aureus, and influenza on a regular basis. In fact, it has been suggested that the SARS outbreak is a very strenuous test of readiness for a pandemic.

Surgery and SARS. Surgical suites have not escaped SARS. Normally, patients with infectious diseases are postponed from surgery, if possible; however, there may be an urgent need to provide surgical services to patients with SARS. Keep the number of staff members in the theatre to a minimum – have additional staff members in another theatre to help gather necessary equipment and supplies. Place signage on entrances to the theatre noting precautions to be taken. Take measures to prevent spread of the infection. Airborne and droplet precautions should be adhered to throughout surgical suites and postanesthesia care units. Patients should wear a mask during transport from the ward to the surgical suite, if possible. Staff members assisting in patient transfer should wear full PPW during transfer and remove PPW and wash their hands when leaving the surgical suite.

Careful consideration should be given to the induction and extubation phases in which surgical team members have close contact with and exposure to a patient's respiratory system. Full face shields as well as full PPW should be worn. Full face shields are very important, especially if the planned surgery includes bronchoscopy. Oral suction should be handled gently to prevent aerosols from spreading when placing equipment. Touching equipment with gloves used for intubation/extubation should be minimized, or gloves should be changed. The anesthesia cart should be placed outside the theatre but close enough for quick access – this helps prevent contamination.

Specimens obtained from patients should be handled carefully, and biosafety precautions in handling, testing, and transporting should be followed. Place specimens gently in a container, wipe the container with a facility-approved cleaning agent, mark the container as infectious, and place it in a bag for transport to the laboratory. Make gentle, precise movements when removing and placing items such as laryngoscope blades or bronchoscopes on the table to prevent splatter and to decrease aerosolization of particles.

Careful handling and decontamination of the surgical suite, equipment, instrumentation, laundry, and garbage is important. Place linens in hampers instead of tossing them to prevent aerosolization of particles. Due to the close proximity of blood and body fluids, all personnel should wear PPW, including gowns, gloves, masks, and protective eye shields, throughout the surgical intervention, cleaning, and recovery period. This includes theatre-cleaning staff members, service aides, porters, circulating staff members, and recovery room staff members. After completing a procedure on a patient with SARS, the supplies left in the theatre should be disposed. Be sure to communicate the patient's potential for infection with SARS throughout the surgical experience – notify personnel in the postanesthesia care unit.

Rapid means of travel has made many things possible. The world shrinks with technology but becomes a vast pool of possibilities when faced with an outbreak such as SARS. Canadian transplantation programs had to implement

additional donor screening measures to reduce theoretical risks of SARS transmission through transplantation. Donors who were exposed to SARS-affected areas, who have come in contact with people who have SARS, or who have a history of SARS are being deferre. Visiting procurement teams are required to complete a screening tool to determine their SARS exposure and, therefore, their ability to travel to other facilities. Increased screening of possible donors, recipients, and visiting teams has increased the cost to and workload of facilities. One major challenge is balancing the benefits of transplantation to a recipient with the public health risk of potential secondary SARS transmission from the recipient to hospital staff members and other close contacts.

The effects of SARS. The arrival of SARS has affected nursing practice. Health care facilities throughout Canada have plans and guidelines in place to care for their first patient with SARS. Perhaps the most noticeable change is the highly visible presence of posters strategically placed in facilities in Regina and Saskatoon. They depict someone wearing a mask with the caption: "Respect the health of others. If you have a cough, wear a mask. Ask a nurse for a mask." Until recently in the Toronto region, anyone going into a hospital was met by screeners who squirted hand-cleaning solution on their hands and asked them to fill out a questionnaire about SARS. People are checking and changing travel plans based on outbreak areas. The emergence of a new virulent respiratory illness warrants further research. Will it behave as the cold and flu? Perhaps. Hopefully, health care will be better prepared for the next wave. The WHO believes the global outbreak had been contained as of July 2003.[9] Along with this announcement, the organization asked global authorities and experts to be aware and continue surveillance, because the world has not yet been declared disease free.

THE FUTURE OF SARS

There is much to learn from and about SARS. There is no cure, no vaccine, no specific treatment, and no idea whether it will recur seasonally. Certainly more is known now than in February 2003. The SARS outbreak is several months old, yet no one can predict the outcome, scope, or potential magnitude of this virus. These issues alone present major global challenges. Historical evidence shows that face-to-face contact is the usual mode of transmission, and although viral respiratory infections are well-known, there are no foolproof cures. Hopefully, a collegial effort and the sharing of clinical results and global communication regarding infectious outbreaks will keep science ahead of this new respiratory foe. A Canadian commission investigating the spread of SARS held public hearings at the end of September 2003 to seek information from the public and health care workers who were affected directly by the SARS outbreak. The independent Commission to Investigate the Introduction and Spread of SARS hopes to use this information to strengthen the system in preparation of potential future epidemics.

On Aug 6, 2003, Canada's Health Care Ministries released directives stating that hospitals finally can relax how they screen outpatients, staff members, and visitors for SARS at entrances to facilities.[10] Screening still will be in place for all patients admitted to ERs and for all direct admissions, but each facility is to determine its own visiting policies.

Unknown quantities of time and resources have been spent rapidly preparing for the possibility of other Canadian facilities receiving a patient with SARS. The costs for Ontario and the Toronto region have been immense, and the costs to the Canadian health care system have been immeasurable. Awareness of the disease and the possibilities it may pose has everyone taking note. Diseases are not new, but the fear of the unknown is one of the most frightening aspects of health care. Practitioners deal with illness daily, but SARS once again has reminded them of the fragile hold science has over disease.

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TABLE 1: Considerations for Developing Infection Control Measures for Severe Acute Respiratory Syndrome (SARS)

Determine whether one facility in the region should be chosen as the designated site for SARS cases.

Determine what infection control measures should be employed –airborne and contact precautions are to be used.

Isolate patients suspected of having SARS as soon as possible.

Use negative pressure rooms and private patient rooms with separate bathrooms – keep doors closed.

Have all staff members who treat patients wear personal protective wear (PPW).

Have alcohol hand gel/rubs available near doors so health care workers may clean their hands after removal of PPW and before washing.

Use disposable equipment whenever possible.

Have patients wear masks when feasible.

Place as many patients with SARS or suspected of having SARS in the same unit or ward as possible.

Use dedicated equipment on patients with SARS when possible—leave only essential supplies and equipment in patient rooms.

Decrease patient movement/transport.

Restrict visitors to the facility, ward, and patient.

Allow only essential staff members in patient rooms.

Wear PPW to greet patients arriving in the emergency room who are suspected of having SARS.

Handle specimens carefully using appropriate biosafety precautions—label specimens as infectious.

Take care with treatments involving aerosolizing therapy.

Report possible SARS patients to appropriate authorities (ie, public health, infection control department, infectious disease specialists).

Use guidelines from appropriate regulatory bodies (eg, Centers for Disease Control and Prevention, World Health Organization, Health Canada).

Allow only symptom-free health care workers from endemic areas to return to work.

Monitor health care workers for at least 10 days after possible exposure.

Educate patients, staff members, families, and the public.

Continued on Page 45

SARS (cont.)

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UPDATE FROM THE AUTHORS:

Today we know more about SARS and its impact on our health care system than we did at the time of this article's original publication. Shortly after this article appeared, Health Canada released a document titled *Learning from SARS – Renewal of Public Health in Canada* (October 2003). This 234 page document, based on World Health Organization (WHO) guidelines for alerting and verifying public health management of SARS, is located on the Health Canada website (www.hc-sc.gc.ca), reports on two major elements: the short-term assessment of what was learned from current public health practices when dealing with outbreaks such as SARS and the necessary long-term actions needed to control and prevent such infectious diseases. This third party analysis of, and recommendations regarding, current public health practices as well as the lessons learned from the outbreak will influence future infectious disease control practices. The analysis sets out a plan for renewal of public health systems and an increase in Canada's capacity to detect, prevent, manage and understand infectious disease outbreaks.

We now see varying policies/guidelines for infectious disease control, reporting, and surveillance in place in health care facilities across the country. As a result of the 2002/2003 SARS outbreak health care facilities are paying increased attention to communicable diseases, infection control practices, surveillance practices and general preparedness. Federal, Provincial, and Municipal/County funds have been allocated to accommodate further training and infection control practices. In addition, Health Canada has created the position of Chief Public Health Officer (CPHO) to demonstrate its commitment to the protection and improvement of the health of Canadians.

The Canadian SARS story included both tragedy and heroism within healthcare. We quickly learned we were not as prepared as we should have been when it came to infection control/public health issues, but thousands of healthcare workers rose to the challenge. No doubt future threats to our public health will be unpredictable in their timing and location. But as a result of the time and commitment invested since 2003 Canada is better prepared for future situations.

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