Hospital-acquired infections

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Introduction

Some people get infections while in hospital. These hospital-acquired infections are a risk that hospitals must control to manage health care economically and safely for patients. This chapter sets out the findings of our audit of Sunrise Regional Health Authority's processes to reduce hospital-acquired infections.

Sunrise Regional Health Authority (Sunrise) serves about 56,000 people. It has two hospitals (Yorkton 87 beds, Melville 30 beds) and four integrated facilities each having 10 to 22 acute care beds (Esterhazy, Canora, Kamsack, Preeceville). It also operates health centres in seven other communities. Sunrise has 2,756 employees.[1] It spent about $156.3 million in 2006-07.

Like other public service agencies, Sunrise must balance financial limitations and high public expectations. Its board is accountable for the quality of care and patient safety including infection control.

Background—the risk of hospital-acquired infections

A hospital-acquired infection is one that is not present when a patient enters the hospital. The infections most commonly acquired in hospitals are infections in surgical wounds or intravenous sites, urinary tract infections, and pneumonia; less common are outbreaks of infectious diarrhea and influenza.

Infections cause complications and increase the cost of care up to 2.8 times higher or $15,000 per infection due to longer hospital stays, greater use of drugs, more laboratory tests and other procedures.[2, 3] Some patients die due to infections acquired while in hospital. For example, in 2004, *clostridium difficile* infections in Montreal and Calgary hospitals caused severe diarrhea and resulted in over 80 deaths.[4] Saskatchewan hospitals do not routinely report hospital-acquired infections to the public.

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[1] As of January 22, 2007 per human resources department, Sunrise Regional Health Authority
[2] United Kingdom. National Audit Office. (2000). *The management and control of hospital acquired infection in acute NHS trusts in England.* London: Author. p.19.
[3] Montreal Jewish General Hospital 2004 study of ventilator-associated infections. Canadian Institute of Health Information.
[4] Eggertson, L. & Siddald, B. (2004). Need for national surveillance for hospital infections. *CMAJ 171*(1).

Canada does not have a national system to monitor the rate of infections acquired in hospitals. Hospital acquired infection rates vary widely by facility, type of patient, care procedures, and the way the agency calculates the rate of infections. A 2002 national study estimated that in 29 Canadian hospitals there were 110 hospital-acquired infections for every 1,000 adult patients (i.e., 11%).[5]

A large proportion of hospital-acquired infections may be preventable (e.g., 30 to 50% or more), thus avoiding harm to patients and the extra costs associated with infections.[6, 7] Basic hand washing and housekeeping practices can reduce the rate of hospital-acquired infections significantly. Sometimes prevention requires specific actions (e.g., less use of urinary catheters; timely use of intravenous antibiotics before surgery; raising the head of the bed slightly to avoid pneumonia).

The Hospital Standards Regulations (s.60-62) make boards accountable to prevent and control infections in hospitals. In addition to their role to protect patients from harm, boards also have a duty as employers to prevent exposing workers to infections as set out in the *Occupational Health and Safety Regulations* (s.302).

Audit objective and conclusion

The objective of this audit is to assess the adequacy of the Sunrise Regional Health Authority's processes to manage hospital-acquired infections as of June 30, 2007. The criteria set out in Exhibit 1 reflect legislation, regulations, and standards related to infection control as well as the current literature (see selected references).

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[5] Canadian Institute of Health Information. (2004). *Health Care in Canada*. Toronto: Author.

[6] United Kingdom. National Audit Office. (2000). *The management and control of hospital acquired infection in acute NHS trusts in England.* London: Author. p.5.
[7] Canadian Institute of Health Information. (2004). *Health Care in Canada*. Toronto: Author. p.61.

Exhibit 1—Criteria

To have adequate processes to manage hospital-acquired infections, Sunrise Regional Health Authority should:

1 **Plan to manage hospital-acquired infections**
  1.1 plan to meet all legislative requirements
  1.2 set out clear expectations
  1.3 update the infection control plan regularly
  1.4 plan a communication strategy

2 **Use good practices to prevent, control, and monitor infections**
  2.1 adopt methods to prevent and control infections
  2.2 train staff to maintain competence for safe practice
  2.3 provide resources to prevent and control infections (e.g., supplies, staff, guidance)
  2.4 monitor infection control practices regularly

3 **Use information systems effectively**
  3.1 use a central reporting system to monitor infections
  3.2 control quality of data about infections
  3.3 analyze data to identify emerging risks, trends, and areas for action

4 **Report results for continuous improvement**
  4.1 report infections promptly to health care practitioners
  4.2 report infection rates to management and infection control committee
  4.3 review infection control reports regularly
  4.4 inform relevant partners about infection risks and trends

As of June 30, 2007, the Sunrise Regional Health Authority had adequate processes to manage hospital-acquired infections except for its processes to plan for the prevention of hospital-acquired infections and report infection rates and causes.

During 2006 and 2007, several factors hampered Sunrise's efforts to manage hospital-acquired infections. For example, it had vacancies in key infection control positions and turnover in supervising positions. Sunrise is working to improve its infection control processes.

Findings—managing hospital-acquired infections

The sections below highlight what we expected (our criteria) in headings and italics followed by our significant findings and recommendations. The sub-headings often reflect more than one sub-criteria.

Planning to manage hospital acquired infections

We expect health agencies to plan for the management of infections that patients and staff can acquire in hospitals by:

♦ *planning to meet all legislative requirements*

♦ *setting out clear expectations*

♦ *updating the infection control plan regularly*

♦ *planning a communication strategy*

Legislative requirements

Sunrise has a good regional infection control manual that states one purpose of its infection control program is "to meet legal requirements for infection control." *The Hospital Standards Regulations* (s.60-62) require hospital boards to establish an infection control committee to prevent and control infections. Sunrise has three local committees (south, central, and north). Sunrise also has a regional infection control committee to guide its processes for preventing and controlling infections acquired in its hospitals.

Sunrise designed its regional infection control committee to lead and evaluate efforts to control hospital-acquired infection and meet legal requirements. Minutes show that in 2006 and 2007, the regional committee did not fully carry out its role. The regional infection control committee did not set out a plan to prevent infection. It did not receive regular reports about the rate of infections caused by hospital practices in health facilities across the region. It did not evaluate related training.

During 2006 and early 2007, all the local infection control committees met sporadically with meetings up to ten months apart due to various human resource issues (e.g., turnover, vacancies). Poor attendance also hampered the committees' work. The regional and local committees focused on masks and gloves that reduce the spread of infections and protect staff, and on pandemic influenza planning.

The Occupational Health and Safety Regulations (s.85-3) require an "exposure control plan" to set out essential actions if staff are exposed to blood or body fluids that may be infected. Sunrise's infection control manual contains a large section that has the required elements of an exposure control plan. A *Rapid Response Guide* is readily accessible to

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all staff throughout the region. It provides key information specific to individuals who play important roles in reducing the impact of exposure to infectious body fluids.

Expectations, updates, and communication

The regional infection control manual describes policies and specific procedures in good detail. Sunrise updated some parts of this manual in response to changing infection control needs. For example, after coping with influenza outbreaks that affected both staff and patients in its hospitals, in 2005, Sunrise updated its policies to improve how it manages influenza outbreaks. In 2006, Sunrise updated the "routine practices" section of the manual.

Sunrise has a regional communication plan that emphasizes a culture of safety. Policies direct staff in making decisions about communicating an infection risk to the staff or the public. The medical health officer is the primary person responsible to decide when to communicate with the public about infections that could spread to the community.

The regional strategic plan and one hospital's operational plan contain brief comments related to infection control. Sunrise regional infection control manual outlines broad goals for infection control (e.g., comply with legislation, safe workplace).

Sunrise does not have an infection control plan setting out objectives, measures, and targets to prevent and control hospital-acquired infections. A regional plan would help infection control committees to direct attention to high-risk areas and monitor the results of infection control processes. Also, a regional infection control plan would help managers and the board to oversee the prevention of hospital-acquired infections in the region.

1.   **We recommend that the Sunrise Regional Health Authority develop a regional infection control plan to guide the prevention of hospital-acquired infections.**

Using good practices to prevent and control infections

We expect health agencies to reduce hospital-acquired infections by consistently using processes to:

◆ *adopt methods that will prevent and control infections*
◆ *train staff to maintain competence for safe practice*
◆ *provide resources to prevent and control infections (e.g., supplies, guidance, staff dedicated to infection control)*
◆ *monitor regularly the use of practices that prevent or control infection*

Adopting methods and training staff

The regional infection control manual describes the methods that Sunrise adopts to prevent and control hospital-acquired infections. The manual identifies good practices for a wide range of infection-related situations. The manual is detailed, well organized, and provides clear guidance.

We observed that hospitals in Yorkton and Melville use good practices. For example, we noted that hand-washing solution was available at the entry, at nurses' desks, and outside patient rooms. On surgical wards, gloves were readily available by each patient's room to help prevent infections after surgery. Sunrise ensures its sterilization process works. For example, Sunrise cleans re-usable items before sterilizing them and checks its sterilization equipment each day it is used.

Sunrise alerts staff to their individual responsibility to prevent infections. All staff receive infection control training during their general orientation and written material is available for any staff unable to attend. The orientation specifically addresses hand washing, avoiding jewellery, wearing clean uniforms, and other routine practices that can reduce infections. Sunrise's hospitals remind staff of their responsibility to prevent infections with varied posters on display throughout the region.

Sunrise provides additional infection control training that is specific to work tasks such as housekeeping, sterile processing, and nursing infectious patients. For example, Sunrise provides detailed training to nurses about caring for patients who have infections that are resistant to antimicrobial drugs.

Sunrise does not train staff to investigate and analyze the cause of hospital-acquired infections. Written guidance or training about investigating infections could help Sunrise to identify all hospital-acquired infections, determine the cause, and report an accurate infection rate for

each type of infection. Guidance about investigating infections would also help those with oversight responsibilities (e.g., nurse managers, occupational health committee members) to identify quickly those practices that increase the risk of infections.

2.   **We recommend that the Sunrise Regional Health Authority provide guidance to help staff fully identify, investigate, analyze, and report hospital-acquired infections.**

Providing resources to prevent and control infections

Controlling infections is the responsibility of all staff and patients working together, but coordination and leadership improve the use of good practices. In 2004 to 2006, Sunrise had a full-time regional infection control officer who was a registered nurse with an infection control certificate. Sunrise assigned the regional infection control officer to be the regional expert and the local infection control officer for Sunrise's largest hospital. During 2006-2007, the position experienced frequent turnover of staff and was vacant for several months.

Sunrise's infection control manual sets out what supplies staff are to use. Other specific manuals are also available (e.g., housekeeping, laboratory). These detailed manuals specify the nature of cleaning supplies, wound care products, needles, and equipment of various kinds. They identify specific actions and how often they are required. For example, policies state that disposable supplies must not be re-used.

The Occupational Health and Safety Regulations highlight employers' duty to prevent exposing workers to infection (s.302) and to provide supplies or personal protective equipment such as gloves, masks, etc. (s.88). Preventing exposure to airborne infections is particularly difficult. Sunrise has invested considerable time and resources to ensure its staff have appropriate surgical and respirator-masks and are trained to use them to prevent the spread of airborne infections.

Sunrise infection control committees routinely evaluate products and practices to ensure that each product achieves the purpose intended and is safe for patients and staff. Sunrise tests supplies such as cleaning products and safety-engineered needles before staff begin to use them more widely.

One resource necessary for infection control is physical space that allows for the isolation of patients to reduce the spread of infections. The physical space available in Sunrise makes it difficult to isolate patients. For example, the Yorkton hospital does not have bathrooms in private rooms and some wards cannot be isolated as the space was designed without doors. Although Sunrise uses commodes for patients isolated in private rooms and makes other adjustments as required, these actions often require additional time and resources.

Monitoring practices that prevent or control infection

Sunrise encourages staff immunization to help protect patients and staff from communicable diseases and monitors immunization rates. Sunrise's managers routinely observe infection control methods used by staff. In addition to this informal monitoring, managers conduct more formal practice reviews daily, weekly, monthly, or quarterly depending on the severity of risk.

Managers often use checklists to monitor practices required to prevent infections. For example, Sunrise monitors sterile processing daily for effective cleaning of medical instruments and other patient care items. For housekeeping, Sunrise monitors the cleaning of patient rooms and also uses a detailed checklist monthly to ensure cleaning methods meet established standards.

Managers provide direct personal feedback if there is concern about the way staff do their work. Sunrise does not report the rate of various infections to give feedback to managers and staff about their success in preventing infections on their work units or throughout Sunrise.

Using information systems

We expect health agencies to use information systems that will help them reduce hospital-acquired infections and will:

♦   *use a central reporting system to monitor infections*

♦   *control quality of data about infections*

♦   *analyze data to identify emerging risks, trends, and areas for action*

Using a central reporting system to monitor infections

Sunrise uses a standardized, paper-based system to report hospital-acquired infections throughout the region. The infection control manual sets out useful data collection forms for specific situations related to outbreaks, infections discovered while a patient is in hospital, and infections discovered after an early discharge from hospital to homecare or long-term care.

The forms Sunrise uses to report infections record the symptoms, type of infection (e.g., surgical site, respiratory), and the positive laboratory test. The forms do not record the probable cause of the infection or observed risk factors. Sunrise expects the infection control officer receiving the form to investigate the cause of the infection.

Sunrise's policies require that infection control officers do chart audits[8] routinely after patients are discharged as this helps to identify hospital-acquired infections. Chart audits could be an important source of information for calculating infection rates and should be part of a regional infection control plan. Sunrise did not do chart audits during 2006 and 2007.

Data quality and analyzing infection risks and trends

The quality of data depends on the consistent use of standard forms and instructions about collecting and combining the data. Sunrise has good policies for surveillance and reporting of hospital-acquired infections. The policies define performance measures and explain how to calculate the rate of various types of hospital-acquired infections (e.g., urinary tract infection, pneumonia, diarrhea, etc).

Sunrise policies direct staff to collect and analyze data during outbreaks of infections using "line lists" of infected patients and staff. For example, during an outbreak of influenza or diarrhea, Sunrise staff record "line-lists" that track the spread of the infection and the number of patients and staff affected. A summary report for each outbreak identifies the number of people at risk, the number affected, and the duration of the outbreak. This

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[8] After patients are discharged from hospital, health records staff review patient charts and flag for the investigation of the infection control officer those charts where the patient had positive laboratory reports.

allows Sunrise to evaluate its success in reducing the severity of the impact of outbreaks.

Sunrise's policies about calculating infection rates are clear. Policies show that Sunrise intends to analyze various types of hospital-acquired infections by calculating the infection rate per 100 discharged patients on a monthly basis. During 2006 and 2007, infection control officers did not use this guidance consistently. This may be due in part to turnover of infection control officers and their supervisors. It also may relate to the challenges of reporting rates for small populations and small numbers of specific infections.

From January 2006 to June 2007, infection control officers created two reports that analyzed hospital-acquired infection rates over time: one for the Melville hospital and one for the Yorkton hospital. Neither of these reports covered a full year. The reports were not comparable. One report calculated an infection rate per month for all types of infections; the other recorded the number of infections by type but did not calculate rates. The reports did not describe common causes, risks, trends, or areas for action. We do not know if these reports included all hospital-acquired infections during the period of the report.

Reporting results for continuous improvement

We expect health agencies to:
♦   *report infections promptly to health care practitioners*
♦   *report infection rates to management and infection control committees*
♦   *review infection control reports regularly*
♦   *inform relevant partners about infection risks and trends*

Reporting infections and reviewing trends

Sunrise staff communicates the immediate risk of infection to health care practitioners as soon as they receive laboratory reports identifying an infection. If there is a concern about a possible outbreak of influenza or infectious diarrhea, a nurse consults the Medical Health Officer even before there are positive laboratory results. In this way, Sunrise is able to take action to isolate infectious patients to protect other patients and staff.

In addition, a confidential symbol automatically appears on a patient's hospital record if the person is a carrier for a drug-resistant infection.

Sunrise's infection control manual requires quarterly reports of hospital-acquired infections to go to the facility manager and the local infection control committee. Infection control officers did not produce quarterly reports during 2006 and 2007. Local infection control committees received some verbal reports about specific types of infections.

Local infection control committees need an up-to-date understanding of infection trends and risks in their health facilities. Quarterly reports should describe the rates, trends, and causes of hospital-acquired infections by facility and by unit or ward. Quarterly reports should also recommend action to protect patients and staff. Follow-up of recommended actions and infection trends would enable the committees to oversee progress in controlling infections acquired in hospitals.

Policies require local infection control committees to submit an annual report of the rates of hospital-acquired infections to the regional infection control committee. Two out of three local committees submitted annual reports, but the timing was ad hoc. There is almost no mention of these reports in minutes and the committees did not review the reports for completeness, trends, causative factors, etc.

Neither the infection control officers' supervisors nor the regional committee considered whether the reports accurately recorded all hospital-acquired infections on various work units throughout Sunrise.

Informing relevant partners about infection risks or trends

Sunrise makes timely reports of infection risks to its partner agencies. When Sunrise transfers patients to other health care facilities, nursing staff routinely inform the ambulance staff and the receiving facility of any infection risk verbally and in writing. The Medical Health Officer receives reports submitted to the infection control committees and is involved in managing infectious outbreaks (e.g., influenza).

All Sunrise health providers could be partners in reducing the rate of infections if they were kept better informed. For example, in early 2006, a local infection control officer informed the local committee that a patient in

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the local hospital had a *clostridium difficile* infection—one of the dangerous infections that may not respond to treatment and can be life threatening. Although the regional infection control committee met that month and again three months later, the minutes show no discussion of this serious infection risk. The minutes are Sunrise's main tool for communicating with health providers about infections in the hospital.

During 2006-07, Sunrise made two reports to the board about outbreaks of diarrhea and influenza in the hospital (October 2006, January 2007). It also sends outbreak summary reports to Saskatchewan Health.

Sunrise did not report the rate of hospital-acquired infections to the managers, physicians, the board, or the public. Sunrise's policies do not require it to make public its rate of hospital-acquired infections.

3.   **We recommend that the Sunrise Regional Health Authority focus its actions to prevent and manage hospital-acquired infections by reporting and monitoring:**
   ♦   **the rates and causes of hospital-acquired infections**
   ♦   **progress toward targets by type of infection**

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