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## Main points

Medical equipment (e.g., intravenous pumps, ventilators, cardiac monitors) is essential to diagnose and treat patients. Medical equipment requires preventative maintenance to help ensure it works as planned. Properly-functioning medical equipment helps the health system to provide safe, patient-centred care.

The Saskatoon Regional Health Authority (Saskatoon) had appropriate processes to maintain its medical equipment in three Saskatoon hospitals and the Humboldt District Hospital. However, it needs to document policies and procedures for maintaining medical equipment at all of its healthcare facilities.

We encourage other regional health authorities to use the criteria described in this chapter to assess the effectiveness of their own processes to maintain medical equipment.

## Introduction—Maintaining medical equipment

The Saskatoon Regional Health Authority (Saskatoon) is responsible for providing health services to over 300,000 residents. Saskatoon has approximately 13,000 staff and 847 physicians. Saskatoon provides health care services in 10 hospitals (including its affiliate St. Paul's Hospital), 29 long-term care facilities, 12 primary health care sites and 14 public health sites.<sup>1</sup>

Saskatoon is responsible for the overall quality of care for its patients. To provide a high level of patient care, Saskatoon uses medical equipment to help diagnose and treat patients. In 2009-10, Saskatoon spent \$16.7 million to purchase capital equipment.<sup>2</sup>

## Background

Medical equipment (e.g., intravenous pumps, ventilators, cardiac monitors, diagnostic equipment, beds, lifts) is essential to diagnose and treat patients. Medical equipment requires preventative maintenance as well as emergency (unplanned) repairs. Such maintenance helps ensure the equipment works as planned. For example, well-maintained intravenous pumps help ensure the correct dosage of medication.

Properly-functioning medical equipment maintains the capacity of the health system to provide safe, patient-centred care. Preventative maintenance of medical equipment can also reduce overall capital spending over the long term by extending the life of equipment.

Manufacturers set out preventative maintenance requirements in their recommended standards. Legislation also sets out preventative maintenance requirements for medical equipment. For example, the Regulations under *The Occupational Health and Safety Act, 1993* require RHAs to use competent persons to implement preventative maintenance programs that meet manufacturers' recommendations for equipment to mobilize, lift, hold, turn, position, or transfer patients. Also, the Regulations under *The Hospital Standards Act* require regional health authorities to take precautions to ensure anaesthesia equipment is maintained in a serviceable condition for immediate use.

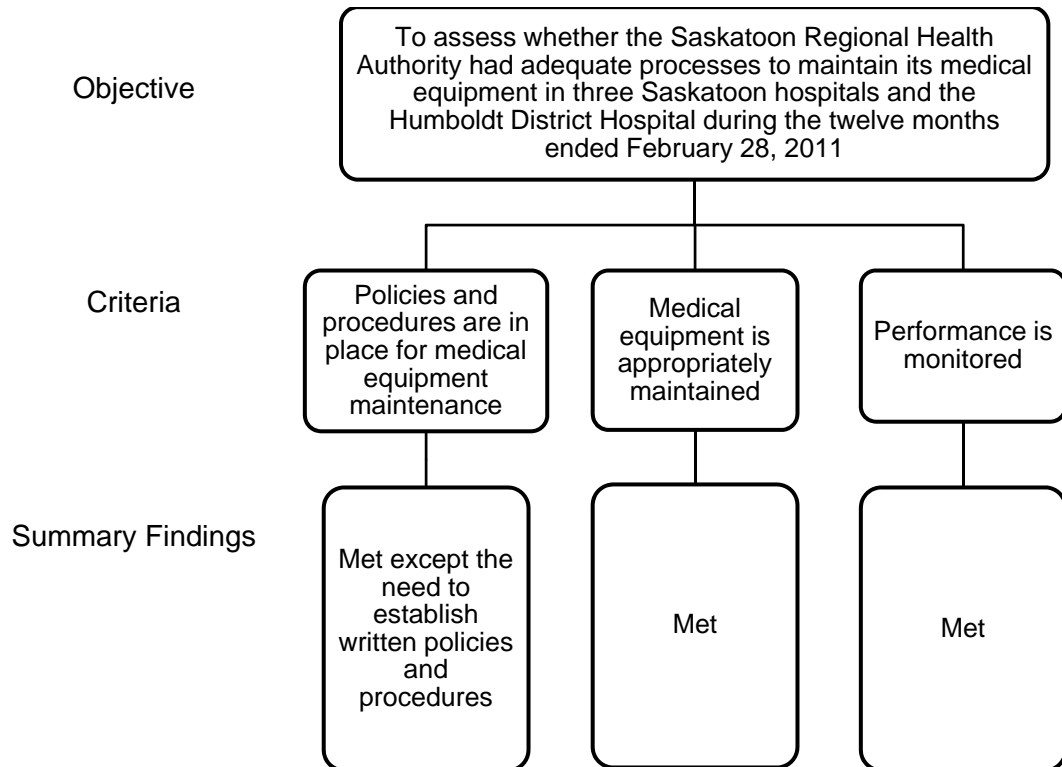
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<sup>1</sup> Saskatoon Regional Health Authority's 2009-10 Annual Report, p. 5.

<sup>2</sup> Ibid., p. 92.

Poorly-maintained equipment could malfunction resulting in incorrect diagnosis or treatment. Furthermore, equipment failure could result in unsafe care that may harm patients.

## Audit objective, criteria, and summary findings



To conduct this audit, we followed the *Standards for Assurance Engagements* published in the *CICA Handbook - Assurance*. To evaluate Saskatoon’s processes, we used criteria based on our past work and the work of other auditors listed in the selected references. Management agreed with the above criteria.

We assessed the adequacy of Saskatoon’s central processes. We also assessed the adequacy of medical equipment maintenance processes used at the three Saskatoon city hospitals and a district hospital.

## Conclusion

**We concluded that, for the twelve-months ended February 28, 2011, the Saskatoon Regional Health Authority had adequate processes to**

maintain its medical equipment in three Saskatoon hospitals and the Humboldt District Hospital except it needs to establish written policies and procedures for maintaining medical equipment.

## Key findings and recommendations

We set out below what we expected (in italics) for each criterion and our key findings.

### Setting policies and procedures for medical equipment maintenance

*We expected Saskatoon to set policies and procedures for medical equipment maintenance by:*

- ◆ *Establishing maintenance policies that are consistent with recognized maintenance standards*
- ◆ *Assigning responsibility for medical equipment maintenance*
- ◆ *Reviewing and updating policies and procedures regularly*

Saskatoon has not established adequate policies and procedures to maintain medical equipment at its healthcare facilities. Saskatoon has some policies for specific types of equipment. For example, it has maintenance policies for certain laboratory equipment. However, Saskatoon does not have documented policies and procedures for maintaining all medical equipment at all of its healthcare facilities.

1. **We recommend that the Saskatoon Regional Health Authority establish written policies and procedures for maintaining medical equipment at all of its healthcare facilities.**

In early 2011, Saskatoon developed a draft policy and procedures for management, inspection, maintenance, and repair of medical equipment for the region. At April 14, 2011, the Board had not reviewed and approved this policy.

Once the Board has approved the policy for maintaining medical equipment, Saskatoon should review and update the established policy on a periodic basis.

Saskatoon maintains medical equipment in one of two ways: in-house by its employees or through service contracts with manufacturers. Saskatoon employees maintain approximately 70% of the equipment and the manufacturers maintain the rest. Saskatoon has documented the roles and responsibilities for maintaining medical equipment through employee job descriptions. The service contracts set out the roles and responsibilities of the manufacturers.

## **Maintaining medical equipment**

*We expected Saskatoon to carry out medical equipment maintenance by:*

- ◆ *Identifying medical equipment that requires maintenance*
- ◆ *Scheduling preventative maintenance*
- ◆ *Performing maintenance*

Saskatoon uses a preventative maintenance database and program to document information about its medical equipment. It records all maintenance activities for the medical equipment its staff (i.e., clinical engineers) maintain. Saskatoon assigns equipment a risk class based on the manufacturer's maintenance standards. It uses the risk class to determine the frequency of preventative maintenance (i.e., quarterly, bi-annually or annually).

Each month, the preventative maintenance program generates a list of the equipment that is scheduled for maintenance. Technical staff receive a list of equipment that they must maintain based on their training and skills. Once they complete such maintenance, they update the database.

Saskatoon's technical staff also perform preventative maintenance on medical equipment at Saskatoon's rural healthcare facilities, such as the Humboldt District Hospital. Every six months, a senior technical employee sends a letter to each rural facility indicating the medical equipment that is scheduled for maintenance. Technical staff visit these facilities to perform the maintenance. Once completed, each facility receives a letter with the details of the maintenance performed.

As noted above, Saskatoon has service contracts with manufacturers for all medical equipment that is not maintained by Saskatoon's employees. The service contracts set out the type and frequency of maintenance required for specific medical equipment.

## Monitoring performance

*We expected Saskatoon to monitor performance by:*

- ◆ *Monitoring equipment downtime*
- ◆ *Taking action to address issues identified*
- ◆ *Reporting maintenance results*

As described below, unplanned repairs are usually done in one day. If the equipment is out of service longer than one day and a spare is not available in that facility, Saskatoon has a process to share equipment from other facilities. If it determines that the equipment is not worth the repair, Saskatoon replaces the equipment through the capital equipment acquisition process. Management told us that equipment downtime has not been a significant issue for Saskatoon.

When medical equipment does not function properly, employees using the equipment request an unplanned repair either internally or through the service contracts. During the audit, we found that the service providers and Saskatoon staff completed all requested repairs within one to two days of the request.

Senior management receives reports on maintenance. For example, after maintenance is performed on medical imaging equipment, a Safety and Preventive Maintenance Inspection Report is prepared for senior management.

Senior management report to the Board any instances that may have caused harm to patients, including those that involved malfunctioning medical equipment. The Board has a process to follow up on all such instances reported.

## Selected references

Auditor General of Nova Scotia. (2007). Management of diagnostic imaging equipment – Capital Health and Cape Breton District Health Authority. In *Report of the Auditor General*. Halifax: Author.

Provincial Auditor Saskatchewan. (2010). Chapter 11C – Maintenance of medical equipment. In *2010 Report – Volume 2*. Regina: Author.

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