

# Maintenance of medical equipment

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## Main points

To provide adequate patient care, regional health authorities must adequately maintain medical equipment used to treat and diagnose patients. Preventative maintenance of medical equipment can help reduce overall capital spending over the long term. Poorly maintained equipment could malfunction resulting in incorrect dosage and treatment. Equipment failure could result in unsafe care and patient harm.

Kelsey Trail Regional Health Authority (Kelsey Trail) did not have adequate processes to maintain its medical equipment. It needs to clearly define roles and responsibilities for maintaining its medical equipment and establish written policies and procedures. It must also maintain a complete and current list of all medical equipment, its location, and its maintenance record. About 28% of the equipment that we tested at Kelsey Trail did not conform to the manufacturer's preventative maintenance standards.

The chapter has seven recommendations for Kelsey Trail to help strengthen its processes. We encourage other regional health authorities to use the criteria described in this chapter to assess the adequacy of their processes to maintain medical equipment.

## Introduction

The Kelsey Trail Regional Health Authority (Kelsey Trail) has approximately 1,580 staff and 35 physicians. It has three district and three community hospitals. Kelsey Trail has 116 acute care and 482 long-term care beds.

Kelsey Trail is responsible for the overall quality of care of its patients. To provide a high level of patient care, Kelsey Trail uses medical equipment to help diagnose and treat patients. In 2009-10, it spent \$1.4 million on capital equipment purchases<sup>1</sup> and \$698 thousand on repairs and maintenance.<sup>2</sup>

## Background

Providing safe, patient-centred care is an objective of the Government. Fostering a culture of quality improvement and client-centred service, and transforming the care and service experience through a focus on patient/client safety are two of seven strategic goals set by Kelsey Trail.<sup>3</sup>

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. Such maintenance helps ensure the equipment works as planned. For example, well maintained equipment pumps help ensure the correct dosage of medication.

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

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 regional health authorities to use competent persons to implement

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<sup>1</sup> Kelsey Trail Regional Health Authority's 2009-10 Annual Report, p 83.

<sup>2</sup> Ibid, p 99.

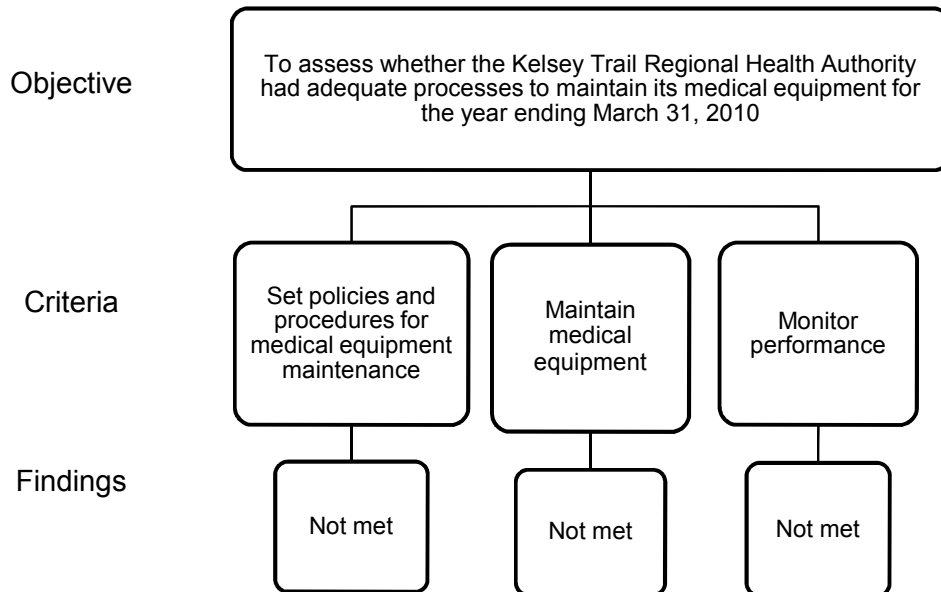
<sup>3</sup> Ibid, p 7.

preventative maintenance programs that meet manufacturers' recommendations for medical 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.

Management told us it maintains medical equipment in one of three ways: a service contract with a manufacturer, an agreement with an affiliate of another regional health authority (service provider), or Kelsey Trail employees. Manufacturers maintain approximately 55% of the equipment, the service provider maintains about 30%, and Kelsey Trail employees maintain the rest.

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

## Our audit objective, criteria, and summary findings



To conduct this audit, we followed the *Standards for Assurance Engagements* published by The Canadian Institute of Chartered Accountants. To evaluate Kelsey Trail's processes, we used criteria that we established based on the work of other auditors and current literature

listed in the selected references. Management agreed with the above criteria.

We assessed the adequacy of Kelsey Trail's central processes. We also assessed the adequacy of medical equipment maintenance processes used at the Melfort and Tisdale hospitals.

## **Our conclusion and recommendations**

**We concluded that, for the year ended March 31, 2010, Kelsey Trail Regional Health Authority did not have adequate processes to maintain its medical equipment.**

Kelsey Trail did not adequately delegate responsibility to maintain medical equipment. Its policies and procedures were not complete. Nor did Kelsey Trail have adequate oversight of maintenance work done by manufacturers or its service provider. As a result, Kelsey Trail did not know if medical equipment in use was properly maintained. We make the following recommendations to help Kelsey Trail strengthen its processes.

- 1. We recommend that Kelsey Trail Regional Health Authority clearly define roles and responsibilities for maintaining all of its medical equipment in accordance with recommended standards.**
- 2. We recommend that Kelsey Trail Regional Health Authority maintain all equipment in accordance with the required standards.**
- 3. We recommend that Kelsey Trail Regional Health Authority establish written policies and procedures for maintaining medical equipment at all of its healthcare facilities.**
- 4. We recommend that Kelsey Trail Regional Health Authority make an agreement with its service provider for the maintenance of medical equipment.**
- 5. We recommend that Kelsey Trail Regional Health Authority monitor the medical equipment maintenance work performed by manufacturers and its service provider.**

6. **We recommend that Kelsey Trail Regional Health Authority maintain a complete and current list of all medical equipment, its location, and its maintenance record.**
7. **We recommend that Kelsey Trail Regional Health Authority provide reports to the Board of Directors and senior management on the state of medical equipment at all of its healthcare facilities.**

## **Our detailed findings**

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

### **Setting policies and procedures for medical equipment maintenance**

*We expected Kelsey Trail 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*

Kelsey Trail has not established adequate policies and procedures to maintain medical equipment at its healthcare facilities. It needs policies and procedures that are consistent with maintenance standards and legal requirements. Kelsey Trail should also implement processes to keep its policies and procedures up to date.

Kelsey Trail did not have complete and up-to-date inventory records of its medical equipment. Officials could not tell us what processes they use to ensure service providers have complete and up-to-date inventory records of Kelsey Trail's medical equipment.

Without such information, Kelsey Trail may not know if it is complying with the legislative requirements to ensure a competent person performs preventative maintenance on medical equipment. Kelsey Trail staff at both hospitals did not always know what preventative maintenance was

required for medical equipment and who was responsible to do such maintenance.

Lack of clear information about roles and responsibilities could put patients at risk and reduce public confidence in the healthcare system.

## **Maintaining medical equipment**

*We expected Kelsey Trail to carry out medical equipment maintenance by:*

- ◆ *identifying medical equipment that requires maintenance*
- ◆ *scheduling preventative maintenance*
- ◆ *performing maintenance*

Manufacturers of equipment set maintenance standards ranging from daily to annual tests. Manufacturers may also require equipment to be returned after a specified amount of use. For example, ventilators have daily, weekly, and monthly maintenance requirements. In addition, the manufacturer standards require Kelsey Trail to return ventilators after 6000 hours of use.

We found about 28% of the equipment that we tested in the two hospitals did not conform to the manufacturers' preventative maintenance standards. For example, the last complete testing of a ventilator in use was 1998 and the last annual maintenance of a cardiac monitor was in 2007. The manufacturer standards require annual preventative maintenance for the cardiac monitor. Kelsey Trail needs to ensure all equipment is scheduled for preventative maintenance in accordance with manufacturer standards. Poorly maintained equipment could put patient care at risk.

In June 2009, Kelsey Trail hired a bio-medical technician. The technician is responsible to maintain equipment that is not maintained by the manufacturer or the service provider. Management told us the technician has begun to tag equipment and identify maintenance requirements. Management also told us that Kelsey Trail has recently purchased a software program and hired staff to track equipment and document medical equipment's maintenance requirements.

## Monitoring performance

*We expected Kelsey Trail to monitor performance by:*

- ◆ *monitoring equipment downtime*
- ◆ *taking action to address issues identified*
- ◆ *reporting maintenance results*

Kelsey Trail did not adequately monitor equipment performance. Equipment downtime monitoring was limited to certain specific equipment in Kelsey Trail's laboratory services.

Management told us that Kelsey Trail has an agreement with a service provider to maintain its equipment. However, Kelsey Trail could not provide us with a copy of the written agreement.

As we stated earlier, Kelsey Trail did not have processes to ensure its equipment receives preventative maintenance that the manufacturers and the legislation require. Nor did Kelsey Trail have a complete list of its equipment and its location. Reports provided by Kelsey Trail's service provider in the past year indicated that the service provider could not find about 16% of the equipment it needed to test. We found no evidence of Kelsey Trail's efforts to find such equipment.

Kelsey Trail does not provide its Board of Directors or senior management with periodic reports on the state of Kelsey Trail's medical equipment. Nor does it provide adequate information to employees using the equipment. As a result, employees may not be aware of medical equipment that is working incorrectly or is unsafe for use.

## Selected reference

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