## Problem

**What**
- Problem(s): Patient infections, OR closure, potential loss of accreditation

**When**
- Date: Preliminary decision of accreditation denial: October 8, 2014
- 4 patient infections in late May/ early June

**Where**
- Facility, site: Orange County, CA
- Unit, area, equipment: Hospital’s operating rooms (ORs)
- Task being performed: Hip-replacement procedures

**Impact to the Goal**
- Patient Safety
  - 4 patients developed surgical-site infections
- Environmental
  - Potential for germ-breeding environment
- Compliance
  - Potential for loss of accreditation
- Patient Services
  - 14 operating rooms closed
- Schedule/ Operations
  - Investigation, response
- Property/ Equipment
  - Implementation solution: Patients treated with antibiotics
- Labor/ Time
  - 4 patients receiving surgery

**Frequency**
- Infections among most common complications of hospital care (estimated 1 in 25 inpatients); <1% hospitals denied accreditation each year

### Analysis

**Basic Level Cause Map**

- **Patient Safety Goal Impacted**
  - 4 patients developed surgical-site infections

- **Surgical site exposed to microbes**

- **Hip replacement procedures**

- **Operating room atmosphere contaminated?**

- **Expense: Equipment cultured, found to not be contaminated**

- **Failure of heating/ ventilation system**

- **Environmental Goal Impacted**

### Solutions

The hospital has 23 days from the October 8th preliminary denial of accreditation to meet federal standards. The hospital is installing new heating and air conditioning equipment and is reviewing its procedures for “hospital documentation and staff communication”. Hopefully other processes will be reviewed as well. The hospital expects to reopen its operating rooms soon.

---

### Cause Map

**Problem Solving • Incident Investigation • Root Cause Analysis**

A hospital in California has received a preliminary denial of accreditation after reports that four patients had developed surgical-site infections within a month. The patients all recovered after administration of antibiotics. The hospital cultured equipment and instruments and found no contamination. However, three of the surgeries which resulted in the surgical site infections took place in an operating room that had been identified in February or March to have high humidity due to issues with the heating and ventilation system.

The germs that caused these infections can also be introduced to a surgical site by medical staff - usually due to improper hand washing or surgical prep procedures.

A hospital in California has received a preliminary denial of accreditation after reports that four patients had developed surgical-site infections within a month. The patients all recovered after administration of antibiotics. The hospital cultured equipment and instruments and found no contamination. However, three of the surgeries which resulted in the surgical site infections took place in an operating room that had been identified in February or March to have high humidity due to issues with the heating and ventilation system.

The germs that caused these infections can also be introduced to a surgical site by medical staff - usually due to improper hand washing or surgical prep procedures.

**Analysis**

**Basic Level Cause Map**

- **Patient Safety Goal Impacted**
  - 4 patients developed surgical-site infections

- **Surgical site exposed to microbes**

- **Hip replacement procedures**

- **Operating room atmosphere contaminated?**

- **Expense: Equipment cultured, found to not be contaminated**

- **Failure of heating/ ventilation system**

**Environmental Goal Impacted**

**More Detailed Cause Map**

- **Patient Safety Goal Impacted**
  - 4 patients developed surgical-site infections

- **Surgical site exposed to microbes**

- **Hip replacement procedures**

- **Operating room atmosphere contaminated?**

- **Expense: Equipment cultured, found to not be contaminated**

- **Failure of heating/ ventilation system**

**Environmental Goal Impacted**

**Analysis**

**Basic Level Cause Map**

- **Patient Safety Goal Impacted**
  - 4 patients developed surgical-site infections

- **Surgical site exposed to microbes**

- **Hip replacement procedures**

- **Operating room atmosphere contaminated?**

- **Expense: Equipment cultured, found to not be contaminated**

- **Failure of heating/ ventilation system**

**Environmental Goal Impacted**

**More Detailed Cause Map**

- **Patient Safety Goal Impacted**
  - 4 patients developed surgical-site infections

- **Surgical site exposed to microbes**

- **Hip replacement procedures**

- **Operating room atmosphere contaminated?**

- **Expense: Equipment cultured, found to not be contaminated**

- **Failure of heating/ ventilation system**

**Environmental Goal Impacted**

**Analysis**

**Basic Level Cause Map**

- **Patient Safety Goal Impacted**
  - 4 patients developed surgical-site infections

- **Surgical site exposed to microbes**

- **Hip replacement procedures**

- **Operating room atmosphere contaminated?**

- **Expense: Equipment cultured, found to not be contaminated**

- **Failure of heating/ ventilation system**

**Environmental Goal Impacted**

**More Detailed Cause Map**

- **Patient Safety Goal Impacted**
  - 4 patients developed surgical-site infections

- **Surgical site exposed to microbes**

- **Hip replacement procedures**

- **Operating room atmosphere contaminated?**

- **Expense: Equipment cultured, found to not be contaminated**

- **Failure of heating/ ventilation system**

**Environmental Goal Impacted**

**Analysis**

**Basic Level Cause Map**

- **Patient Safety Goal Impacted**
  - 4 patients developed surgical-site infections

- **Surgical site exposed to microbes**

- **Hip replacement procedures**

- **Operating room atmosphere contaminated?**

- **Expense: Equipment cultured, found to not be contaminated**

- **Failure of heating/ ventilation system**

**Environmental Goal Impacted**

**More Detailed Cause Map**

- **Patient Safety Goal Impacted**
  - 4 patients developed surgical-site infections

- **Surgical site exposed to microbes**

- **Hip replacement procedures**

- **Operating room atmosphere contaminated?**

- **Expense: Equipment cultured, found to not be contaminated**

- **Failure of heating/ ventilation system**

**Environmental Goal Impacted**

**Analysis**

**Basic Level Cause Map**

- **Patient Safety Goal Impacted**
  - 4 patients developed surgical-site infections

- **Surgical site exposed to microbes**

- **Hip replacement procedures**

- **Operating room atmosphere contaminated?**

- **Expense: Equipment cultured, found to not be contaminated**

- **Failure of heating/ ventilation system**

**Environmental Goal Impacted**

**More Detailed Cause Map**

- **Patient Safety Goal Impacted**
  - 4 patients developed surgical-site infections

- **Surgical site exposed to microbes**

- **Hip replacement procedures**

- **Operating room atmosphere contaminated?**

- **Expense: Equipment cultured, found to not be contaminated**

- **Failure of heating/ ventilation system**

**Environmental Goal Impacted**