Evaluation and Response to Incidents of Temperature and Humidity Extremes in the Surgical Suite

Best practice recommendations

Objective

To provide direction about:

- Daily monitoring and documentation of the temperature and relative humidity in operating room (OR) theatres and sterile supply.
- Actions to be taken if the recommended humidity is exceeded.

Note: This guidance may also be used in sterile supply areas outside of both the surgical suite and medical device reprocessing areas (e.g. other advanced procedural areas, interventional radiology, etc.).

Applicability

Compliance with this document is required by all Alberta Health Services employees, members of the medical and midwifery staff, students, volunteers, and other persons acting on behalf of Alberta Health Services (including contracted service providers as necessary) working within the surgical suite and other areas with sterile storage.

See also *Evaluation and Response to Incidents of Temperature and Humidity Extremes in the Medical Devices Reprocessing Area, Sterile Storage Area, and Decontamination Area*.

Elements

1. The facility shall monitor and document relative humidity (RH) levels and temperature at least daily. Current guidelines recommend the following:
    - RH levels of 30 to 60%.

      AND
    - Temperature between 18°C to 23°C within the surgical suite and other areas with sterile storage and between 22°C to 24°C for sterile storage areas.

    RH measures water vapour but is relative to the temperature of the air. It is expressed as the amount of water vapour in the air as a percentage of the total amount that could be held at its current temperature.

2. The table below outlines recommended actions based on RH and temperature.
    - The time interval of concern depends on the circumstances of a particular event.
    - Also take into account the larger picture beyond RH, temperature and time parameters when deciding next steps (e.g. staff/physician discomfort, wet packs, visible condensation, etc.).
    - Once RH exceeds 60% and temperature exceeds 24°C, recommended actions in the table below should be followed as a proactive measure.
    - RH exceeding 70% should be treated as an event that needs an immediate appropriate response. If packages are exposed to these conditions for prolonged periods, sterility might be compromised.

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3. A multidisciplinary team (MDT) should be assembled to coordinate further notifications and to evaluate corrective actions. The MDT may include (but is not limited to):
   - Surgery Site Chief or designate
   - Surgery Program Executive Director
   - Surgical Suite Unit Manager and/or Patient Care Manager
   - Site Medical Device Reprocessing Area (MDRA) Executive Director or designate
   - Facilities Maintenance and Engineering (FME)
   - Infection Prevention and Control (IPC)
   - Site IPC Physician
   - Workplace Health and Safety (WHS)
   - Site Administration/Senior Leadership
   - Site Medical Director
   - Other program representatives as deemed necessary

4. Occasional incidents when the relative humidity rises to between 60% and 70% are generally not considered cause for concern for the safety of medical devices. However, frequent incidents of this nature indicate that HVAC systems may need to be adjusted or improved.

5. This document has a focus on higher than acceptable RH. In some instances, RH may be lower than the acceptable (i.e. less than 30%).
   - Follow a similar process; also consider RH level, timelines, and other specific circumstances.
   - Assemble an MDT to coordinate further notifications and to evaluate possible corrective actions.

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TABLE 1: LEVEL OF CONCERN and ASSOCIATED ACTIONS*

*See also *Evaluation and Response to Incidents of Temperature and Humidity Extremes in the Medical Devices Reprocessing Area, Sterile Storage Area, and Decontamination Area*.

Operating Rooms:

Temperature should be maintained between **18°C and 23°C**. RH should be maintained between **30% and 60%.**

The time interval of concern depends on the circumstances of a particular event.

Level 1 (Mild)
 	
RH 61% to 65% [intermittent]
	• There is a temperature or humidity concern identified by either FM&E or the OR:
	  ○ OR notifies FM&E or
	  ○ FM&E notifies OR
	• FM&E verifies the RH and temperature.
	• Once verified, FM&E will monitor to assess if the RH or temperature continue to rise and begin corrective actions.
	• OR staff notify OR leadership of situation.
	• OR staff monitor operating conditions within the ORs and report any staff comfort concerns to OR leadership. Worker Incident Report should also be submitted.
	• FM&E to report status updates at regular intervals to OR leadership and FM&E leadership, until the situation is under control.
	• OR leadership reports possible issue to site leadership
	• MDT may be assembled (recommended).

Level 2 (Moderate) If greater than 65% and less than 70% RH [extended periods less than 4 hours]	• OR staff notifies OR leadership and FM&E. • FM&E to take corrective actions to control RH and temperature FM&E to advise OR leadership prior to increasing the room temperature to control RH. • FM&E to advise OR leadership if either RH or temperature cannot be controlled below 65% and 24°C. • OR staff monitor if humidity is affecting either OR operations or staff comfort and reports changes to OR leadership. Worker Incident Report should also be submitted. • OR leadership reports possible issue to site leadership and MDT is assembled.

Level 3 (Severe)
 	
RH exceeds 70%
[for greater than 4 hours]
	• FM&E notifies OR leadership and FM&E that the RH has reached 70% for greater than greater 4 hours.
	• FM&E continues to work towards lowering RH or temperature to acceptable levels.
	• OR staff continue to monitor staff comfort level in OR and report changes to OR leadership. Worker Incident Report should also be submitted.
	• Site Leadership and MDT meet to discuss:
	  ○ staff comfort concerns
	  ○ staff safety issue/ability to maintain sterility during surgery
	  ○ risk of contamination to sterile supply
	  ○ appropriate actions
	• Site/OR leadership advises zone leadership.
	• If the standard methods of reducing RH are not achieving the desired effect, use of a dehumidifier may be considered. See dehumidifier usage guide.

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Dehumidifier usage guide

Use of a dehumidifier may be considered to reduce humidity extremes if an OR theatre or the surgical suite is the impacted area and continued operation is required to support ongoing patient care.

The dehumidifier shall be:

- dedicated to the area
- strategically placed to minimize air turbulence in the sterile field area (e.g. in the hallway)
- cleaned and disinfected after each use
- stored covered in the surgical area

To prevent organism growth, two milliliters (2mL) of bleach shall be added to the reservoir for every one litre (1L) of water the reservoir can hold when:

- The dehumidifier drain cannot be directed to a utility sink (utility sinks are different from hand hygiene sinks), or
- The dehumidifier reservoir is emptied (dehumidifiers shall be checked every two hours and emptied as required).

Using a zone standardized form, sites shall document the following information:

- date
- time
- initials of staff member who emptied the reservoir tank and changed the bleach solution

Sites determine location of forms.

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References

- Alberta Health Services Documents
    - Environmental Public Health: Cleaning and Sanitizing Food Contact Surfaces, Equipment, Toys and Other (PUB-0698-201404)
- Non-Alberta Health Services Documents
    - *Canadian Medical Device Reprocessing*. (Canadian Standards Association)(CAN/CSA Z314:23)

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