

DOMESTIC HOT WATER TEMPERATURE LIMITS
Legionella/Scald Control

1. PURPOSE: This Veterans Health Administration (VHA) Directive provides guidance in establishing domestic hot water temperature policy and engineering procedures. It replaces VHA Directive 97-027.

2. BACKGROUND

a. Water temperatures exceeding 120 degrees Fahrenheit (F) are required to prevent the rapid growth of Legionella in hot water systems. Cold water systems (below approximately 70 degrees F [20 degrees Centigrade (C)]) tend to be too cold to foster rapid growth of the organism. For normal or otherwise healthy individuals, 120 degrees F at the sink tap seems adequate to minimize the risk of scalding. Some patients, due to illness, disabilities, advanced age or medication, may be less sensitive to heat and thus be subject to tissue damage caused by extended exposure to hot water.

b. For immersion bath water, scalding is possible at temperatures exceeding normal body temperature; however, the risk is small below 105 degrees F. At 117 degrees F, scalding risk increases significantly and at 140 degrees F second degree burns require only three (3) seconds' exposure. Some patients are extremely sensitive to scalding.

c. It is not possible to maintain water temperatures at the tap that prevent the growth of Legionella and simultaneously eliminate the possibility of scald injury in persons partially or fully insensitive to hot water temperature.

d. This Directive attempts to balance the risk of inhalation of living Legionella bacteria with the risk of scalding from skin exposure to domestic hot water by suggesting the use of two proposed approaches that could be adapted at Department of Veterans Affairs (VA) medical facilities in responding directly to possible problems of Legionnaires' Disease, scalding, and energy conservation.

3. POLICY: It is VHA policy to have individual facility procedures established for domestic hot water temperatures.

4. ACTION:

a. If Legionnaires' Disease is not considered to be an historic or current problem at a VA medical facility, consider the following:

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(1) Raising the water temperature of all domestic hot water storage tanks to a minimum of 140 degrees F to prevent growth of Legionnaires' Disease bacteria. A master thermostatic mixing valve assembly shall be installed on the discharge side to reduce water temperature to 130 degrees F before distribution with a maximum decrement in water temperature of 10 degrees F at the tap (120 degrees F).

(2) Eliminating stagnation points in the hot water distribution system by capping branch piping after connection to last fixtures.

(3) Replacing aerators with laminar flow devices.

(4) Installing scald guards in areas where patients may be insensitive to hot water temperatures and where patient immersion is likely.

b. If nosocomial Legionnaires' Disease has actually occurred and is a problem in patients or staff at a VA medical facility, then the following tasks may be considered:

(1) Draining all water from hot water heaters and storage tanks. Remove all residue. Consider shock-chlorination of the tanks at 50 to 100 parts per million for 24 hours.

(2) Resetting temperature to 170 degrees F minimum in hot water tanks and throughout hot water distribution system. Flush system by opening all valves selectively for at least ½ hour. Temperatures at remote outlets must be documented to be 150 degrees F or higher.

NOTE: Since scalding is a significant problem at these water temperatures, *extreme care must be taken to protect end users of the hot water distribution system.*

(3) Eliminating stagnation points in the hot water distribution system.

(4) Removing aerators in plumbing fixtures and replacing with laminar flow devices.

(5) Providing circulating hot water systems where economically feasible. In many situations, this may be impractical.

(6) Conducting periodic (e.g., three to four times a year) environmental monitoring with cultures for Legionella to establish the effectiveness of the preceding measures.

(7) Installing scald guards in areas where patients may be insensitive to hot water temperatures and where patient immersion is likely.

NOTE: *In some circumstances, other measures may be preferable (electronic copper-silver ionization) and may result in water and energy conservation and prevent piping system deterioration. Clinical efficacy and safety data are being developed in this area.*

c. Each medical center Director is responsible for developing written policies and procedures regarding hot water limits, to include the following:

- (1) Documentation of consideration of the facility's patient population and past experiences with furnishing too high (scalding) or too low (Legionnaires' Disease) water temperature.
- (2) Documentation of the maximum domestic hot water limit and consideration of the use of other techniques, described in the following, to prevent Legionnaires' Disease, to minimize the possibility of scalding, and to conserve energy.
- (3) For bathtubs and any appurtenance where partial immersion (e.g., foot bath) is the means of patient contact with heated water, the following is required:
 - (a) Mixing valves capable of holding tap (outlet) temperatures at, or below, 110 degrees F are required. These mixing valves must be capable of regulating temperature of the outlet water while inlet hot and cold water temperature and pressure vary, and must be capable of stopping flow in the event of loss of cold water pressure. For any new installation, or when replacing a mixing valve(s), a "fail safe" device is to be used to prevent scalding. Mixing valves must be regularly inspected for proper function with varying temperatures and pressures of supplied hot and cold water. The outlet temperature must be measured with a regularly calibrated thermometer. **NOTE:** *The frequency of these inspections is to be determined locally, based on manufacturer's recommendations and facility's experience with operation of mixing valves (see Joint Commission on Accreditation of Healthcare Organizations' Environment of Care Standard, specifically the section on hospital plans for managing utilities).*
 - (b) All patient immersion baths must be equipped with a large digital readout device displaying the bath water temperature. The readout temperature must be verified by taking the temperature of the water with a hand held thermometer (preferably non-mercury containing, see VHA Directive 2002-018) and comparing this reading with the reading of the tub thermometer. **NOTE:** *Using sensation alone (hand, wrist, elbow) is not acceptable practice for determining safe water temperature.* The actual temperature of water in the tub must be accurately monitored before and during each bath; consideration needs to be given to the documentation of these temperatures. Medical centers must determine an acceptable range of temperature for patient immersion baths.
 - (c) Documentation of procedures to be used to prevent patient burns caused by localized hot spots of water due to poor mixing, or introduction of water that is too hot.
- (4) Notification of patient care staff when maintenance procedures:
 - (a) Will be taking place that could affect the water system,
 - (b) When those procedures have been completed, and
 - (c) When affected systems have been tested and are returned to normal operation.
- (5) Educational components for employees charged with the engineering controls to safeguard against Legionella and patient scalding and for employees performing patient care activities that would include partial immersion of patients into heated water.

5. REFERENCES

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6. FOLLOW-UP RESPONSIBILITY: Chief Consultant, Acute Care (111) is responsible for the contents of this Directive. Further clarification about the clinical issues involved may be obtained at (513) 475-6398. Questions regarding the engineering component of this directive may be directed to (202) 273-5844.

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7. RESCISSIONS: VHA Directive 97-027 is rescinded. This VHA Directive expires November 30, 2007.

Robert H. Roswell, M.D.
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