

Health Devices Alerts Action Item**Accession Number : A8073**

Friday, December 1, 2006

Limiting the Temperature of Warming Cabinets Remains a Good Safety Practice [Update]*Priority :** High Priority**In This Issue:** Limiting the Temperature of Warming Cabinets Remains a Good Safety Practice

Warming Units, Blanket [10-414];

Warming Units, Multipurpose [10-540]

Device: Warming Units: (1) Blanket, (2) Solution [*Capital Equipment*]**See:** Action Item Accession No. A6411 dated June 10, 2005

Update Information: In the above-referenced Action Item (which was adapted from a Hazard Report in the May 2005 issue of *Health Devices*), ECRI warned that blankets and solutions warmed to temperatures above 110°F (43°C) have burned patients, and our recommendation has been to limit the temperature of warming cabinets to 110°F. The healthcare community has been very supportive of this recommendation. The Association of periOperative Registered Nurses and the newsletter *OR Manager* have expressed their support in print.

However, ECRI continues to receive questions from clinicians about the appropriateness of our recommendation. They cite problems that they believe are caused by limiting cabinet temperatures to 110°F. But, in fact, these problems arise from factors other than the temperature setting.

Getting to the Bottom of the Clinical Issues

Some clinicians contend that when warming cabinets are set at 110°F, they do not always meet clinical needs. Specifically, these clinicians state that solutions and, especially, blankets are not always warm enough when they are used, which can affect patient comfort. They also note that items in the cabinets can take a long time to warm up, impeding clinical workflow.

While it is true that these problems can occur, they are not the result of the 110°F limit. Typically, these problems occur for one or more of the following reasons:

- *A facility may not have sufficient cabinet capacity.* Some facilities do not have enough cabinet space to warm their blankets and solutions, which can lead clinicians to take the dangerous and ultimately ineffective step of increasing cabinet temperatures in order to warm items faster so that they can be removed to make room for other items. This step is dangerous because excessive temperatures overheat the outer layer of blankets and solutions, creating a burn hazard. And it is ineffective because even at elevated temperatures, items packed in the middle of a full cabinet will still take almost the same amount of time to reach the desired temperature.

Two primary factors tend to limit available cabinet space. First, regardless of temperature, one warmed blanket may not be enough to adequately reduce heat loss for a patient. In fact, up to three blankets may be needed, which increases the demand for blankets and the cabinets to warm them. Second, solutions and blankets can occupy a cabinet for as long as 8 to 12 hours before reaching their intended temperatures.

- *Warming cabinets may not be reaching their set temperature.* In some cases, cabinets may not be reaching the desired temperature of 110°F. If an inspection determines that a warming cabinet is in good condition and

functioning properly, then it is possible that the cabinet door is being inadvertently left open or being opened too frequently. Opening the door releases heat from the cabinet, extending the time needed for it to reach its set temperature, if it reaches that temperature at all.

- *Warming cabinets are not conveniently located.* The warming cabinets may be located too far away from the patient care area. Unfolded blankets in particular will cool off quickly. Readily accessible cabinet placement guards against clinicians' tendency to overheat blankets so that they stay warm while being taken to a patient.

Clinicians who understand these issues are more likely to accept a policy of keeping cabinets at 110°F. Some clinicians may still resist, however, so facilities may have to take steps to keep them from setting temperatures above the limit. This can be a challenge with older warming cabinets that have a manual temperature control (e.g., a turn knob). Upgrading to newer warming cabinets that provide some mechanism for controlling the maximum temperature would prevent users from easily setting the temperature higher than recommended. (Note that sometimes a code or a service provider visit is required to change the temperature limit.) Compliance would still need to be monitored periodically to ensure that the maximum temperature setting has not been increased.

Understanding the Risks

Our May 2005 article provides an extensive discussion of the hazards created by overheated blankets and solutions. Readers should review that article for a full analysis of the issues.

Two additional points not covered in that article are worth noting:

- Although ECRI recognizes that, in general, *unfolded* heated blankets pose little risk of causing skin burns, there is not any way—regardless of policies or user training—to ensure that an overheated, *folded* blanket will not be placed directly on a patient's skin. This is dangerous. ECRI has documented cases of skin burns from overheated blankets that, without being unfolded, were placed directly against the skin of insensate patients (e.g., those who are unconscious, sedated, anesthetized, or have neurologic damage).
- Many facilities believe that blankets can be safely heated to higher temperatures than solutions, and they try to achieve this by designating separate cabinets for each type of item or employing cabinets that have separate compartments. In practice, however, solutions are sometimes placed in cabinets designated for blankets, even if a facility has policies to the contrary. This is dangerous because overheated solutions used for surgical irrigation have caused severe internal injuries. Also, clinicians sometimes incorrectly use solution containers as hot water bottles or as surgical positioning aids, which has caused skin burns. Solutions used in this way are even more dangerous if they are overheated. (An additional minor consideration is that solutions are more likely to deteriorate when stored at elevated temperatures.)

ECRI continues to believe that the only way to reliably eliminate the risk of injuries from overheated fluids and blankets is to apply a uniform limit of 110°F for both solution and blanket warmers. Signs with clear warnings about the risks may help, but signs are often ignored or overlooked. Maintaining all warming cabinets at 110°F is a simple and safe way to prevent injuries. Temperatures above this level unnecessarily increase the risk of burns while providing no added clinical benefit.

Action Needed: These revised recommendations cover not only the issues addressed in our May 2005 Hazard Report, but also those that we raise in this update.

1. Alert personnel in the following areas to this problem and our report: the emergency department, intensive care units, postanesthesia care units, obstetrics, and operating rooms. In doing so, be sure to discuss the real reasons that cabinets may not be warming items effectively, as described above.

2. Ensure that warming cabinet temperature settings are limited to 110°F and cannot be increased. Consider replacing old warming cabinets that lack a suitable temperature-limit control with newer models that can be set as we recommend. (Note: Preventing clinicians from increasing the maximum cabinet temperature may require consultation with the hospital's clinical engineering department or the cabinet's supplier.)
3. Assign the responsibility for setting—and periodically monitoring—the temperature of warming cabinets to designated staff members in each clinical area that uses the devices.
4. Label warming cabinets or their individual compartments to identify their intended contents (solutions versus blankets) and their safe temperature settings.
5. Ensure that warming cabinets are inspected annually to verify proper temperature settings and performance. For example, is a warming cabinet set to 110°F actually heating to a higher temperature or, conversely, never reaching the set temperature?
6. Remind users to unfold or unroll warmed blankets before placing them on patients.
7. Take care in designing work practices to ensure that cabinet doors are opened for as little time as possible.
8. Ensure that warming cabinet capacity can meet the daily demand for warmed solutions and blankets. Consider purchasing additional units if necessary.
9. Assess the location of warming cabinets in relation to the patient care area and move cabinets closer if necessary.
10. If appropriate to the clinical application, consider using forced-air warmers or circulating-water hyperthermia units for prolonged patient comfort and using in-line blood/solution warmers for faster and more controlled warming of infused solutions. (For more information, see “Alternatives to Warming Cabinets” in the Comment section below.)

Source: ECRI. Limiting the temperature of warming cabinets remains a good safety practice [hazard report]. *Health Devices* 2006 Dec;35(12). (forthcoming)

Comment: This Hazard Report has been adapted for inclusion in *Health Devices Alerts*. The original version of the article will be available in the December 2006 issue of ECRI's *Health Devices* journal.

Alternatives to Warming Cabinets

Clinicians should, on a case-by-case basis, evaluate whether blankets and solutions warmed in cabinets are the appropriate technology to use. There are viable alternatives for both.

For instance, one study found that forced-air patient warmers or the use of reflective coverings placed on top of a single blanket that was prewarmed to 105°F (41°C) were each as effective in maintaining body temperature for trauma patients, as were three cotton blankets warmed to 105°F. In fact, warming a blanket may do little for extended patient comfort: A separate study found that after an hour of external use on a patient, a single blanket reduced heat loss by 33% ±5% regardless of whether it was warmed; warming the blanket did reduce heat loss by an additional 11% to 20%, but that benefit vanished after just 10 minutes. Therefore, an alternative such as using a forced-air patient warmer or a circulating-water hyperthermia unit may be a better practice.

Likewise, using cabinets to warm infused solutions may not always be the best approach. For example, in the operating

room or emergency department, in-line blood/solution warmers may be more appropriate for applications in which rapid and controlled warming of infused solutions is desired.

Suggested Distribution: Anesthesia, Clinical/Biomedical Engineering, Critical Care, Emergency/Outpatient Services, Facilities/Building Management, Nursing, Obstetrics/Gynecology/Labor and Delivery, OR/Surgery, Risk Management/Continuous Quality Improvement, Staff Education

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