To: Hospital CEOs  
Nursing Directors/CNOs  
Infection Preventionists  
Risk Managers  

From: Ron Marshall, Director, Preparedness and Regulatory Affairs  

Subject: Cardboard and corrugated boxes in hospitals  

A question arose recently on the issue of hospitals allowing cardboard/corrugated containers to be used for storage in the facility. Angela Jirik, Survey Manager, with the KDHE Health Facilities Program provided the following information, and the recommendation that each facility conduct a risk assessment involving a multi-disciplinary team to determine what a hospital’s policies and procedure should be on this issue.

Below is Ms. Jirik’s response to the Kansas Hospital Association:

I have included several references below with information about using cardboard boxes for storage in a healthcare facility. I think the take away is that the facility needs to do a risk assessment including key members of their team (Infection Preventionist, Materials Manager, Food Services Director, Pharmacy Personnel, Laboratory Personnel, etc). It is pretty clear that external shipping boxes should be removed before reaching storage areas. Special attention should be made regarding storage of cardboard in the pharmacy, the OR areas, central supply and clinical areas.

There are no CMS regulations that address corrugated boxes within the hospital. General regulations pertain. For example:

- **A-0747 §482.42** Condition of Participation: Infection Control - *The hospital must provide a sanitary environment to avoid sources and transmission of infections and communicable diseases.*

There are no Joint Commission standards that directly relate to this issue. Surveyors rely on general requirements covering safe practices. For example:

- **IC.02.01.01, EP.1:** *The hospital implements its infection prevention and control activities, including surveillance, to minimize, reduce, or eliminate the risk of infection.*
• C.02.01.01, EP 1: The hospital identifies safety and security risks associated with the environment of care that could affect patients, staff, and other people coming to the hospital’s facilities.

• EC.02.01.01, EP 3: The hospital takes action to minimize or eliminate identified safety and security risks in the physical environment.

• What is the risk imposed by having corrugated cardboard boxes in the organization?
• Is there a difference between ‘outside’ corrugated cardboard shipping boxes and those corrugated cardboard boxes that have not been exposed in the shipping process?
• Are there places in the hospital where ‘outside’ corrugated cardboard shipping boxes may be allowed, outside of the materials management department?
• Can corrugated cardboard boxes ever be stored in sterile or ‘clean’ areas of the hospital?

There is good literature documentation that corrugated cardboard boxes should not be used in sterile, aseptic, or sub-sterile areas.

• Shipping containers are not stored or opened (i.e., torn or cut) in any area reserved for prepackaging medications or compounding sterile preparations.

ASHP recommends that Cardboard boxes are stored off the floor. Handling and storing shipping containers (e.g., cardboard boxes) must be done with minimal air disturbances and dissemination of dust particles. Intravenous (IV) bags and bottles and related supplies must be removed from cartons and wiped with an approved disinfecting agent prior to placing them in the sterile preparation area.

Storage - Before allowing container storage in patient care areas, an organization should consider conducting a risk assessment that looks at the following:

• The supply loading and unloading processes
• The appropriateness of bringing shipping boxes into patient care areas
• Whether the boxes come out of the original, larger shipping box, are labeled with contents, and are intended to be used as storage or distribution boxes in patient care areas.

Be careful if you start removing items from the cardboard boxes and putting them in plastic storage containers as typically the box has information that is needed e.g. expiration dates.

What is The Joint Commission’s position on managing cardboard or corrugated boxes and shipping containers?
Fire Safety: Cardboard in storage quantities (recommend consultation with your Fire Marshal) should be placed in hazardous areas protected per LS.02.01.30 and cannot obstruct the means of egress in accordance with standard LS.02.01.20. Containers that are contaminated should be removed based upon the cleanliness requirements of the storage area. Many suppliers have paper or cardboard distribution boxes that are designed for use in laboratory, pharmacy, patient care areas or sterile storage areas.

Infection Prevention and Control: The organization should conduct a risk assessment in accordance with standard IC.01.03.01 to determine the appropriateness of having the container type used in a particular area. This could include where to load or unload supplies, criteria for content break-down areas, and what level of packaging to keep within the area in question. The risk assessment could also address the use of boxes that came out of the shipping container where box labeling is essential to proper use (for example, expiration dates, contents, ingredients, directions for use, etc.).

When conducting the risk assessment, the organization should involve infection control personnel, as well as the primary occupant of the area being evaluated. A course of action should be determined, a policy generated, staff trained and the process implemented. The organization is expected to assess whether the desired affect was achieved, and adjust accordingly. Use of evidence-based guidelines may support and guide generated policy and procedures specific to this topic.

Here is an example for consideration from AAMI ST:79
5.2.1 General Considerations

- Clean or sterile items to be transported to central processing and storage areas within the facility should be removed from their external shipping containers before they enter the storage areas of the department. Any instructions for use accompanying the items should be kept with the items.

Rationale: External shipping containers have been exposed to unknown and potentially high microbial contamination. Also, shipping cartons, especially those made of a corrugated material, serve as generators of and reservoirs for dust.

Also, The Joint Commission standard LD.04.01.01 expects the organization to comply with other controlling authority(s) (for example, local or state health departments). Governmental entities (like the CDC or FDA), trade organizations, and other evidence-based guidelines are good assessment criteria resources for areas such a laboratory, pharmacy, sterile processing, food service, etc. The survey process will check to make sure there is a policy in place, and whether the policy is effective through policy review and tracer activities.
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Q: I am pushing to get all corrugated cardboard out of all areas of the hospital - not allowing materials management to send any items out of their department in corrugated cardboard. Is there a specific standard that support this?

A: There is no specific NFPA standard that speaks directly to corrugated cardboard boxes/shipping boxes. This is part of infection control because corrugated cardboard boxes are susceptible to moisture, water, vermin and bacteria during warehouse or storeroom storage, as well as transportation environments. The hospital must provide and maintain a sanitary environment to avoid sources and transmission of infections and communicable diseases and all areas of the hospital must be clean and sanitary. This includes all hospital units, campuses and off-site locations.

Cardboard boxes are manufactured and imported from many areas around the world without means of decontamination, especially for a sterile environment. Also, prior to delivery to a hospital cardboard boxes have been stored in different types of warehouses, with no protection for a sterile environment. Since cardboard boxes cannot be washed, they cannot be part of your regular required cleaning schedule.

Cardboard boxes are usually delivered to hospital receiving docks from other shipping dock locations on carts or pallets, prior to arriving into a health care facility. Mice, insects, vermin, dirt with pathogenic organisms can be carried into a hospital within the cardboard boxes used as external shipping cartons. Also, corrugated cardboard boxes can and do shed particles that contribute to dust in hospital environments, whereby microorganisms can hitch a ride. If corrugated cardboard becomes wet, it becomes a source for bacterial growth.

Please be aware that cardboard boxes and or cardboard shelving units should not be allowed or found in areas such as:

- OR storerooms
- Central Supply
- Clinical areas

Also, do not use cardboard boxes to store items in a dirty utility room. Cardboard boxes should never be used to store patient supplies- as these are considered dirty. You may wish to discuss this issue with the hospital Infection Control person as part of the hospitals routine scheduled environmental surveillance tours.
Q: We have a battle going on at our hospital regarding whether cardboard boxes can remain in a Pharmacy clean storage room. Some staff is saying the boxes must go. I thought that was only the case in an OR clean sterile room. In this situation, the Pharmacy clean storage room is 1-hour fire rated. I guess this question will apply to all of our clean storage rooms in our hospital.

A: You have two different standards at play, here. From a Life Safety Code point of view, you are compliant. Cardboard boxes are combustible, and having multiple cardboard boxes stored in a room requires the room to be maintained as a hazardous area. According to section 19.3.2.1 of the 2012 Life Safety Code, the room would have to be 1-hour fire-rated or be sprinklered. You say the room is 1-hour fire-rated, so you are compliant with the Life Safety Code. There is no other Life Safety Code requirement that would prevent the storage of cardboard boxes in that room.

However, as I said, there is another standard at hand here. From an Infection Control point of view, cardboard boxes used for shipment presents many problems:

- **The boxes are dirty.** They have been riding in the back of trucks for days, and they have been sitting on receiving docks which is a very transient environment. These boxes are not acceptable from an Infection Control consideration to be stored in a clean environment, let alone a sterile environment.

- **The boxes may contain insects or vermin.** In some cases, you have no idea where these boxes came from. Insects can make a home in the cardboard boxes and then be shipped to your facility. Vermin have been known to hide in a cardboard box and also be transferred to other places.

- **If left on the floor, the boxes may become wet.** A wet cardboard box becomes soggy and falls-apart and leaves a trail of contaminants that provides a place for mold or mildew to grow.

While there may not be a specific standard in the accreditation organization’s manual, or a CMS CoP standard that prohibits cardboard shipping boxes from being stored in a clean environment (i.e. pharmacy storage room), it is generally understood that most surveyors and inspectors will cite an organization for doing so. This is due to the perceived Infection Control issues described above. They would typically cite the facility under a general duty standard that requires the organization to maintain a safe environment for their patients and staff.

My advice is to remove the cardboard shipping containers from the facility at the point where you receive them (i.e. receiving dock) and discontinue storing any paper or cardboard container on a floor that has the potential to be wet. Discuss this issue with your Infection Control specialist. I’m sure they have an opinion on cardboard shipping boxes.
It is no surprise that hospital foodservice directors are vigilant in protecting patient safety, but it may raise a few eyebrows to find out that one of their critical patient care concerns is keeping corrugated boxes out of their facilities. This topic was brought to light in a recent report, *Hospital FSDs fighting a battle against corrugated cardboard.*

“The fact of the matter is, cardboard is filthy,” Eric Eisenberg stated bluntly in the piece. Eisenberg is corporate executive chef for nutrition, catering, retail and conference services at Seattle’s Swedish Health Services.

The issue with corrugated containers for hospital food storage operations is that the paper-based structures are porous. They can absorb and retain liquids, not to mention any contaminants they make incidentally contact on the truck or at the loading dock. Additionally, hospitals have a concern that they may become infested with insect pests as they move along the supply chain.

At Swedish Health Services and other facilities, products are de-boxed from corrugated outer cartons to eliminate these risks. Another health group following this protocol is the UC San Diego Health system. Foodstuffs are removed from shipping boxes upon receipt and placed in large plastic containers. Christopher McCracken, director of nutrition services, said that the state of California directed their new facility to have a de-boxing room.

The solution is not without challenges, however. McCracken noted that with de-boxing, there is a greater reliance on staff to make sure that stock in containers is being rotated to ensure that oldest items are used first. Additionally, he expressed concern about how to identify specific production lots in the case of a product recall.

In spite of the issues, the hospital foodservice directors are looking to keep corrugated out of their facilities. “We’re a long way from having a perfect solution—but I think [de-boxing] is going to become a part of people’s regular process,” Eisenberg noted to Food Service Director. “I think, in healthcare, the idea of cardboard will go away.”

**Corrugated Poses Other Challenges for Hospitals**

Aside from foodservice, the threat of cross-contamination and insect infestation is also top of mind for medical supply storage. As a result, some hospitals also mandate de-boxing requirements for those operations.

For example, a training document from Ontario’s University Health System states “Corrugated boxes are NOT appropriate as storage units in medical or clean supply rooms...Corrugated boxes may harbor dust, bacteria, and insects that may have entered the box during shipping.” The document instructs staff members to remove products from boxes and place them in plastic bins.
In addition to cross-contamination, another challenge for hospitals is simply dealing with the storage, flattening and removal of empty boxes. In recent years, hospital loading areas have become increasingly cramped for space, driven in large part by the waste generation associated with disposable medical items as their usage has grown.

One increasingly popular solution to dealing with solid waste, as well as the threat of cross-contamination is the use of an off-site warehouse facility to perform the de-boxing duties, placing only the required amounts of product in plastic containers on a “just-in-time” basis. This approach eliminates the need for the hospital to remove products from corrugated boxes, and because stock levels are minimized, it reduces concerns about stock rotation or the tracing of recalled product. Stanford University Hospital, for instance, receives two truckloads of supplies daily, packed in plastic totes to service its various department and stocking locations.

When it comes to providing the best in patient care, hospital administrators are increasingly looking to packaging selection as part of the cure. In this regard, they are not alone. Other industries, such as perishable products, are also exploring the positive role that transport packaging can play. RPCs, for example, are an alternative to corrugated packaging that not only preserves overall product quality throughout the supply chain, but which also provides dramatic environmental benefits and potential supply chain cost savings. How about your supply chain packaging – is it what the doctor ordered?