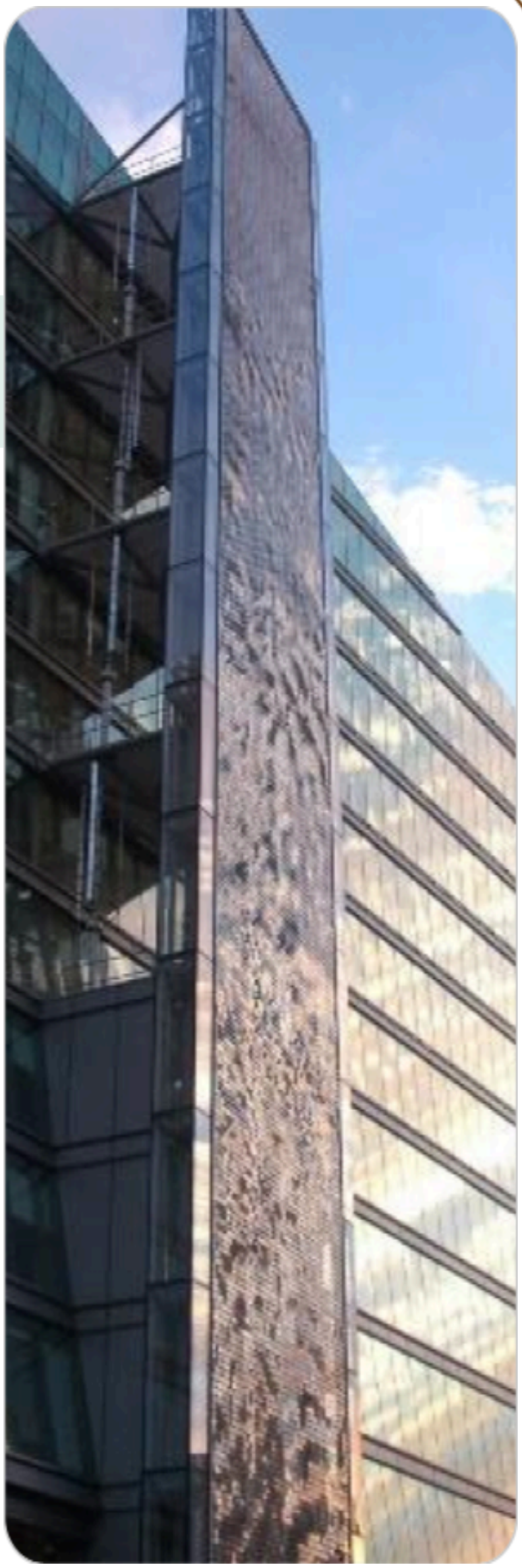
ZERO WASTE CASE STUDIES - HOSPITALS

Managing Challenging Materials



Hospitals contend with difficult materials that are bulky and may end up in landfill. But options exist to prevent and recycle this refuse.

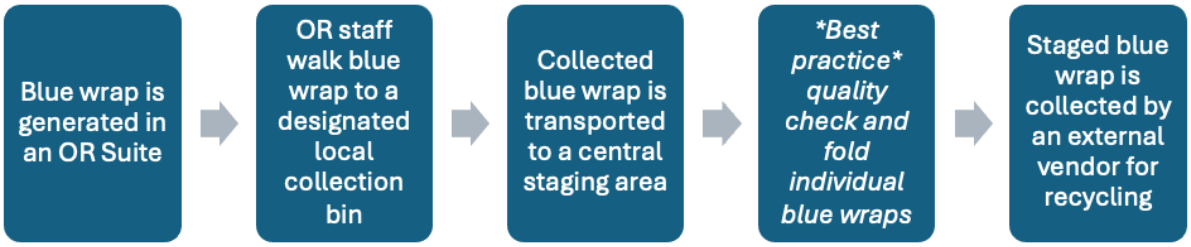
On the road to zero waste, hospitals contend with more difficult materials than most organizations due to both the types and volume of product and packaging materials generated. San Francisco has a zero waste goal, meaning that hospitals in the city are facing these challenges sooner than most counterparts across the country. A closer look at two of these challenging materials, sterilization wrap and cardboard, and how some San Francisco hospitals are addressing them, can provide a starting point for others to create solutions and generate next steps.

Opportunities for reducing and recycling blue wrap

Sterilization wrap (aka 'blue wrap') is used in the Operating Room (OR) to cover surgical supply trays. The polypropylene non-woven fabric allows for sterilization of tray contents and then provides protection from contamination. Made of a single plastic resin (#5) and typically used only once, it's one of the cleanest materials that you'll find in a hospital, and there's lots of it. Sterilization wrap makes up approximately 20% of hospitals' surgical waste, with hospitals in San Francisco generating on the order of 10,000 pounds per month. Discarded sterilization wrap may be upcycled as a durable fabric, processed into polypropylene pellets, or recycled via other

methods. Reducing or recycling this material can contribute significantly to hospitals' and the City of San Francisco's zero waste goals.

Sterilization wrap recycling begins at the point of generation, as OR staff unwrap surgical trays in preparation for a procedure. To recycle the material, staff walk the wrap to a designated collection bin. Collected sterilization wrap must then be transported from the OR to a clean staging area before it is finally picked up by a vendor and taken to a recycling facility.



Like any recyclable commodity, sterilization wrap needs to be kept clean and dry to be successfully recycled. In the hospital setting, this requires thoughtful bin set-up and standard procedures with clear roles and responsibilities to support quality work. The dense polypropylene fabric is bulky, creating storage challenges in typical space-constrained hospital facilities. When developing a collection process, hospitals may begin by assessing how materials currently move through the surgical suite and by whom, and align sterilization wrap recycling collection with existing work. In June 2024, UCSF Health established a sterilization wrap recycling program at three of its hospitals, working with staff in the OR, hospitality, and materials management services to coordinate pickups and logistics. Blue wrap is collected in central bins at the surgical suites and then placed on the waste dock for collection by the recycler. Collaboration between OR staff, materials management, sustainability staff, and Iron Mountain is key to the success of UCSF Health's blue wrap recycling effort.

Given that used sterilization wrap is generated and handled by staff members across multiple departments, continual quality improvement must be a core feature of a recycling program. Regular quality audits with feedback should be conducted at each step of the collection process. Common contaminants generally include clean exam gloves, foam, and other packaging components, but any contamination limits the quality of a recyclable material. Further, quality audits build shared ongoing assurance with collection vendors that clinical recyclables are clean, dry, and safe to collect. A recommended best practice to ensure contaminant-free, space-efficient blue wrap collection is to fold individual wraps

before central staging. This not only maximizes the amount of blue wrap that can be staged, but provides a visual shorthand that materials have been quality checked. At San Francisco's St. Mary's Hospital, Sustainability Lead Matt Richardson learned that the sterilization wrap recycling program was failing the contracted hauler's 8% contamination limit, resulting in rejected loads. To remedy the problem, Matt educated Operating Room (OR) nurses during morning huddles, sharing the requirements along with current quality findings, and getting the team's feedback about whether they could meet the standard. The staff was eager to reduce the ORs' environmental impact and immediately implemented quality improvement measures. Matt continues to educate the team and audit the blue wrap recycling program, and is planning similar efforts with sister hospital, St. Francis.

Hospital customers depend on stable and reliable collection service in order for a recycling program to succeed long-term. For recyclers, a successful sterilization wrap recycling program requires sufficient volume, quality, and a reliable downstream market for economic viability. The costs associated with transportation and storage of materials can limit the value of the program, as can unsteady demand for recycled materials. Some confidential paper shredding companies have periodically provided sterilization wrap recycling services, using their existing national logistics networks to minimize operational costs, and using the offer of sterilization wrap to attract new hospital customers. In most cases, shredding companies have offered sterilization wrap collection only with a primary document shredding contract. When any contracting requirement is added to a hospital program, the time and administrative effort involved slows the path to success, often by months at a time. Still, collection of blue wrap by shredding companies is instructive, as hospitals can consider their existing logistics network as potential collection partners for any clean recyclable material. UCSF Health negotiated a stand-alone blue wrap recycling contract with document shredding company Iron Mountain, establishing collection at each of its hospital facilities.

To navigate the ups and downs of the commodities market, sterilization wrap recyclers need flexibility to respond to market changes while partnering with hospital clients to achieve the highest, best use of recycled materials. To support hospitals' environmental aims, vendors must be transparent and collaborative when making decisions on the end disposition of recyclables. Hospital recycling programs rely on timely and accurate collection data and feedback in order to evaluate programs against their stated goals. At St. Mary's Hospital, Matt is working with his sterilization wrap recycling vendor on collection data quality and understanding the end processing of collected materials, as the hospital Green Team explores the potential of upcycling the wrap into products that can be used by hospitals such as tote bags. Investing in products made from upcycled blue wrap is one way to support the economic stability of the recycling program long-term. Regional

partnerships among hospitals could be leveraged to establish reliable local upcycling solutions, using collective scale to achieve cost efficiency and a stable materials supply.

Aligning with the waste reduction hierarchy, avoiding sterilization wrap generation is the best choice when possible. Some hospitals have indeed minimized the material by replacing it with reusable rigid sterilization containers. According to one study, over a 10-year period, these containers produce half the greenhouse gas emissions of blue wrap and generate only 12 percent of the waste (see Figure 1). One hospital that shifted from disposable sterilization wrap to reusable hard cases in 66% of OR cases showed a 40% payback in just 12 months, from avoided blue wrap purchases and reduced waste disposal fees. Closer to home, in San Francisco, Sutter Health/California Pacific Medical Center (CPMC) invested in reusable sterilization containers for its campuses. When considering opportunities to replace single-use disposable plastics with reusable materials, surgical hard cases offer a promising investment.

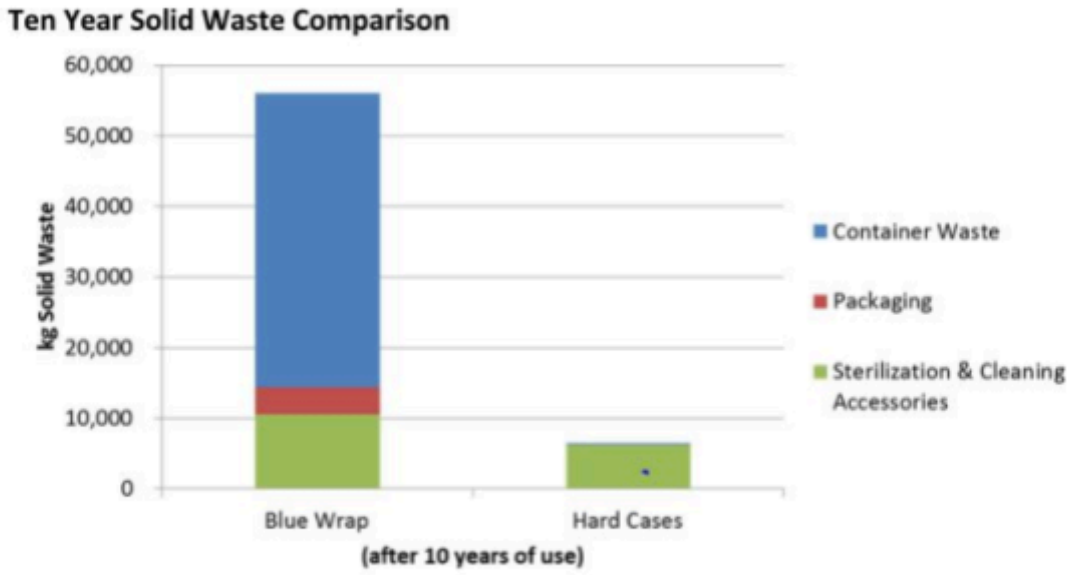


Figure 1: Comparison of solid waste generated from blue wrap versus hard cases for OR kit sterilization at Mayo clinic. Source: GreenBiz 2013.

The hidden costs of cardboard

While blue wrap is a specialty material unique to surgical settings, hospitals also navigate similar challenges in managing a more familiar materials stream, cardboard boxes. Like blue wrap, cardboard is a single-use, disposable packaging item that presents collection

challenges because of its bulk, weight, and the high volumes in which it is generated. Some facilities dispose of cardboard in a compactor and others bale the cardboard to better manage its volume. While the City's franchise waste hauler, Recology, provides cardboard collection service to facilities, Recology does not collect bales of cardboard that are not within a container due to worker safety concerns. As a result, hospitals that bale cardboard must contract a separate collector, and receive no municipal diversion credit for the cardboard, increasing municipal waste management costs.

In San Francisco, a common cardboard collection challenge is limited dock space. One San Francisco hospital struggled with overflowing cardboard due to limited dock space and inconsistent cardboard collection. This was due in part to Recology no longer collecting baled cardboard and in part to the fact that the hospital's single narrow waste collection bay was often occupied by other waste vendors. Working with Recology, the hospital was able to place a large container in a space conducive for collection. The situation is much improved, although the amount of cardboard generated by the hospital exceeds the container's capacity despite Recology service six days a week. So the hospital needs to hire an outside contractor to collect the remaining cardboard volume. Recology continues to partner with the hospital to navigate additional challenges such as safe access to the heavy lidded cardboard container by staff.

Unforeseen vendor changes can also create additional cardboard management burdens on staff. William Lam, Dietary Supervisor at Zuckerberg San Francisco General Hospital (SF General), was dismayed by the amount of cardboard stacking up in the hallway adjacent to the hospital's kitchen. In the past, Bay Cities Produce provided deliveries in reusable crates rather than cardboard, and picked up the crates when empty (see Figure 2). When Bay Cities shuttered its business last year, another SF General food vendor added produce to the list of foods it delivers to the hospital - all in cardboard boxes. "The impact on our staff was staggering" said William. He estimates that it takes his staff additional time to unpack the boxes, break them down and stack them. The extra cardboard then needs to be placed in a recycling bin, taken out to the dock when full, and loaded into the facility's cardboard compactor. The additional staff-hours needed to manage the cardboard ranges from 16 to 31% of a full-time employee in labor demands.

More staff time shifted to cardboard management was not the only challenge. The added cardboard volume means that more recyclables requiring quality management are generated and filling the compactors, which may contribute to more recycling loads being rejected or an increased pickup frequency and costs. To avoid these risks, William notes that the next time the purchasing department asks for his input on contracting language, his number one priority will be shifting produce back to reusable crates.

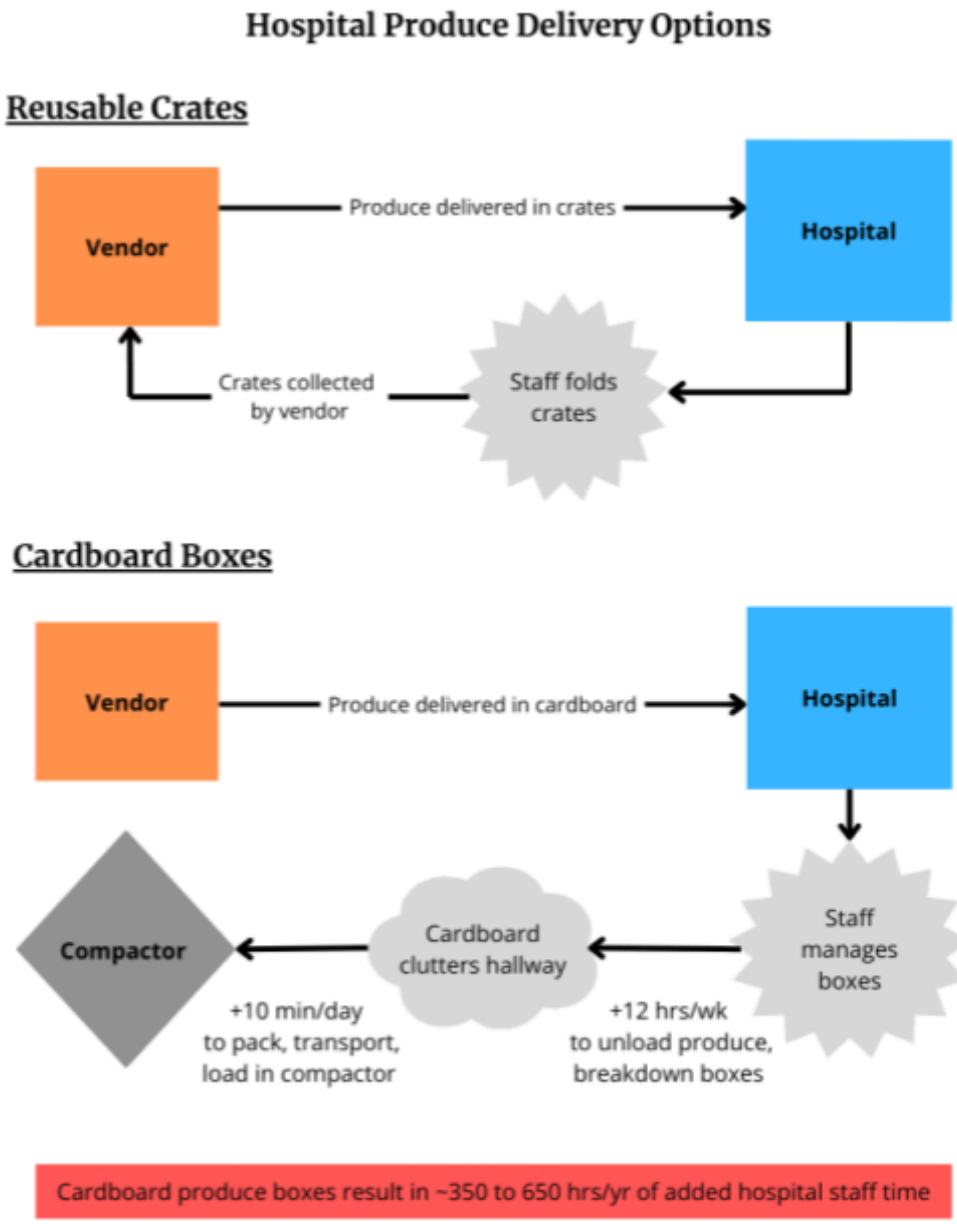


Figure 2. Process diagram representing delivery and disposal/collection pathway produce packaging alternatives, reusable crates and cardboard boxes.

Where to go from here

Similar to blue surgical wrap,the best way to handle difficult materials such as cardboard is to avoid them altogether, where possible. To facilitate the most effective transition, hospitals, local governments and even state governments should collaborate to find scalable and reusable replacements for disposable products. Hospitals can consider adding contract language that specifies reusables both for blue wrap (to hard case) and produce packaging (reusable crates). These options would reduce a significant amount of

refuse, helping hospitals meet their zero waste goals, reduce refuse collection costs, and free up labor for other tasks.

In the interim, hospitals should consider an extended producer responsibility (EPR) model for surgical wrap, in which the contract specifies that the supplier must arrange for the take-back and recycling of the material and provide transparency on what happens once it's picked up. Tying recycling to the purchase of the sterilization wrap could stabilize the recycling process by eliminating contractual barriers and streamlining stakeholders, and may help create a more reliable source of the material, making it easier for businesses interested in recycling polypropylene to more confidently enter the market. Current efforts have been fraught with challenges, but a regional model, in which the material is generated and recycled locally, offers promise.

Local governments, for their part, referencing their own zero waste and climate priorities, could work with food vendors on voluntary or mandatory initiatives to support use of reusable crates for produce deliveries. Local governments could also work with hospitals and large generators, incentivizing those that prioritize substituting reusables for single-use items. They could also play a role in building a reliable regional market for blue wrap recycling, analyzing market barriers, convening hospitals, manufacturers, and recyclers regionally to address them. At the state level, legislation like SB54 in California, an EPR program which puts the onus of managing packaging and single-use plastics on industry, and organizations like the California Product Stewardship Council, provide good models of how states and state-level NGOs can leverage policy tools and programs to move markets towards more environmentally sustainable and lasting alternatives.

Blue wrap and cardboard are not the only challenging materials hospitals contend with, but they do represent a large portion of hospital waste for which solutions are available. Contracting language that supports zero waste goals will help ensure that suppliers are accountable and transparent, increasing the likelihood that hospitals will have reliable strategies for reducing or diverting these materials from their waste streams. Local and state government policy can help ensure that any shifts to increase recycling or to reusables will be permanent.

Learn more about San Francisco businesses working towards zero waste and helping the City meet its zero waste and climate goals at SFEnvironment.org.