

Greening of the Red-Bag Waste Stream

A Guidance Document for Successful Interventions to Reduce Medical Waste Generation in California Hospitals



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Proper handling of medical waste in the hospital setting is paramount to ensure public health and worker safety protection. It is also a concern of residents that medical waste handling will not create problems through its collection, storage and disposal for the quality of life expectations they hold for their community. This paper reviews six interventions that can be made within the hospital setting to reduce the generation of medical waste thus protecting the community and improving or greening the environment. Additionally, these interventions can produce substantial savings for the hospital and at least one can increase worker safety through its implementation. These interventions are being used by some of the health care facilities participating in the California Department of Health Services' Hospital Pollution Prevention Program (HP³) and have therefore been found effective through use in hospitals.

Initiating the Process

To ensure success of the implementation of intervention strategies to reduce the medical waste stream, "buy-in" must be obtained from top management within the hospital.

Ideally, the Chief Executive Officer of the hospital should announce the initiation of the project to reduce medical waste and designate a person in charge to lead the process. The designated project leader's first task is to form a committee that will work with them in implementing the project. It is beneficial for this to be a cross-functional team with representatives of the various disciplines responsible for medical waste handling within the hospital. A representative from the Purchasing Department should be included on the cross-functional team along with representatives from Housekeeping or Environmental Services, Infection Control, Safety, Hazardous Materials Management, Risk Management and Administration. The exact number and disciplines represented on the team will vary from hospital to hospital depending on their organizational structure and assigned responsibilities. These teams often take a special name, such as the "green team" or "waste busters," to designate their mission.

In order to provide a success story to tell at the end of the project, the conditions must be documented at the time the project is initiated. Therefore, prior to taking any action to implement intervention strategies for reducing the medical waste stream, the current amount of medical waste being generated must be measured. If medical waste has been hauled off-site for treatment, the Purchasing Department representative can obtain the records of the amount of medical waste the hospital has shipped for treatment through billing records. If the waste is treated on-site, Environmental Services Department staff will have to measure or weigh the medical waste to determine how much waste they treat. Once a thorough understanding of the amount of medical waste currently being generated by the facility is known, the intervention strategies can begin to be implemented.

Interventions to Reduce Medical Waste

Six primary intervention strategies to assist in the reduction of medical waste generation within hospitals are discussed in this paper. These interventions can be implemented independently of each other and in any order. The following is a list of the intervention strategies, the remainder of the paper will expound on them in the order listed.

- **Eliminating solid wastes from the medical waste stream**
- **Bio-Elite red bag**
- **Blue wrap recycling**
- **Re-usable sharps containers**
- **Sharps containers manufactured with recycled plastic**
- **Recycling single use medical devices**

Some of the interventions may not be available to all hospitals because the services necessary for their implementation may not be universally available. Efforts to obtain these services can be instituted by the hospitals and while they wait for them they can implement the other available strategies.

Intervention Strategy #1

Eliminating Solid Wastes from the Medical Waste Stream

An estimated 100 million pounds (50,000 tons) of medical waste are generated annually in California. The cost to handle and dispose of medical waste is substantially more than solid waste handling. This makes efforts to reduce commingling of these wastes a worthwhile task. When solid waste is mixed with medical waste as shown in Figure 1 it must be treated as part of the medical waste stream. Medical waste can cost \$480 a ton or more to process in comparison to solid waste costs of \$25 per ton. It behooves the hospital to take appropriate steps to keep solid wastes out of the red-bag medical waste stream and avoid paying 19 times more for this incorrectly handled solid waste.

The Medical Waste Management Program in partnership with the California Healthcare Association developed a Self-Assessment Manual to assist hospitals in properly handling their medical waste. A self-assessment tool is included in the manual that allows assessments to be made of the entire hospital or used to cover specific areas. Staff training as to what should be placed into the red bag and sharps containers is an additional important step. This task can be reinforced by placing signs near medical waste containers indicating appropriate items for disposal into the red-bags. A poster depicting what is and isn't appropriate for placement into red bags and the Self-Assessment Manual are both available for



Figure 1: Solid waste in red-bag container

downloading from the [Medical Waste Management Program's](http://www.cdph.ca.gov/MedicalWaste) website found at: cdph.ca.gov/MedicalWaste.



Figure 2: Improper placement of a medical waste container

Equally important to staff training for keeping solid waste out of red-bags is the placement of red bag containers for receiving medical waste. The old real estate adage of the three most important factors for selling property being “*location, location, location*” also applies to the location of medical waste containers. A red bag container placed next to a hand-washing sink as shown in Figure 2 will be filled with paper towels and not medical waste. While it is easy to

dismiss container placement as being obvious, it nonetheless is often incorrectly done.

A classic find was beer bottles and paper cups in a red bag container at one hospital. It was obvious that some friends had “partied” with a patient. The solid waste reduction from the medical waste stream question from this case is: “If the patient was well enough to have visitors sneak in party goods, why was there a red bag container in that room?” Many hospitals have removed red-bag containers from patient rooms because medical waste isn’t typically generated there. They will place small red bags in a drawer in the room for use in an emergency.

To Implement Intervention Strategy #1:

- Use the Self-Assessment Manual developed by the Medical Waste Management Program and the California Healthcare Association to assess medical waste management within the hospital.
- Train staff as to what is appropriate/inappropriate to place in the red-bag medical waste stream.
- Enforce training with posters and signage as to what is appropriate/inappropriate for placement into red bags.
- Review the placement of medical waste containers throughout the hospital and remove or relocate them from areas where they are not needed or likely to collect solid waste.
- Document the reduction in the medical waste generation from removing solid waste from the red-bag waste stream.

Intervention Strategy #2:

Use the Bio-Elite Red Bag

Several years ago a plastic bag manufacturer asked the HP³ staff what it would like to see in a red bag for medical waste. HP³ staff indicated that the red bag would have to be strong enough to meet or exceed the ASTM 165 gram drop dart strength test.

Additionally, HP³ would prefer the bag to contain some percent of recycled plastic scrap content. Although other bag manufacturers had stated that the incorporation of recycled plastic into the composition of the bag would not be possible, this bag manufacturer said he thought it could be done.

Within a few weeks the bag manufacturer returned with a new red bag for medical waste use. The new bag passed the ASTM dropped dart test at 185 grams, was composed of 30 percent plastic scrap, was made of high-density plastic that weighed less than the traditional low-density plastic used in red bag construction. The new red bags also contained a “star” seal on the bottom to better distribute the weight and help prevent tearing or zippering along the bottom seam. In addition to all these new features, the bags could be sold approximately 15 percent cheaper than the current price of the low-density plastic red bags. Thus was born the *Bio-Elite* red bag for medical waste use.

The University of California, Davis Medical Center implemented the use of the *Bio-Elite* red bag in mid 2001. They were able to document the reduction of weight to their medical waste stream through the use of the lighter *Bio-Elite* red bag and the numbers are significant. The weight reduction to their medical waste stream from using the lighter weight high-density plastic *Bio-Elite* red bags amounted to 40,300 pounds during 2002.

To Implement Intervention Strategy #2:

- Consider replacing the use of traditional red bags with the *Bio-Elite* red bag for medical waste storage.
- Document the reduction of the medical waste stream through the use of the lighter *Bio-Elite* red bags.

Intervention Strategy #3:

Implement Blue Wrap Recycling

Blue wrap is used to package all materials for steam sterilization prior to going into the surgery suite. Once in the surgery suite the instruments and other materials to be used during surgery are removed from the blue wrap package and arranged for the operation. The blue wrap is then discarded into the red-bag or solid waste stream. Having been through steam sterilization as part of its use, blue wrap is one

of the cleanest wastes produced in the hospital and therefore does not need to be treated as medical waste. Blue wrap is composed of polypropylene, which has a recycling number of 6.



Figure 3: Blue wrap in a surgery suite

A subsidiary of Boise-Cascade located near Seattle, Washington utilizes blue wrap and other plastics; wood scraps and saw dust to manufacture a siding for houses called Home Plate.™ This company has a transfer station located in



Figure 4: Clean Source truck backhauling blue wrap for recycling

Oakland, California, which accepts blue wrap for recycling. The Oakland recycler had limited truck resources that limited the amount of blue wrap it could pick up. To increase the participation of hospitals in the blue wrap recycling program assistance was obtained from Clean Source, a company that sells and delivers supplies and equipment to hospitals. Their trucks routinely make trips to hospitals and return to their home base empty. They agreed to backhaul the blue wrap from their hospital customers.

During 2003, a total of 73,153 pounds of blue wrap were recycled from 35 hospitals. The blue wrap-recycling project being conducted with Clean Source found it is most beneficial to have the hospital bale the blue wrap in a manner similar to what they do for baling cardboard for recycling. This makes it easier to backhaul the blue wrap to Clean Source's facility shown in Figure 4 in San Jose where the blue wrap is stored until it can be picked up by the Oakland recycler. More hospitals continue to join this project every month.

To Implement Intervention Strategy #3:

- Contact Clean Source at (408) 202-1911 to obtain information about the blue wrap-recycling program.
- Work with the operating room nursing supervisor to determine how blue wrap can effectively be removed from the surgery suites and where the recycling containers should be located.
- Determine if a compactor is available or whether one should be purchased to compact and bale the blue wrap for ease of storage and transport.
- Train all staff involved in the process; from segregating the blue wrap in the surgery suite; removing it to the back dock for baling; to placing the baled blue wrap into storage.
- Implement the blue wrap-recycling process and monitor to ensure that no bloody blue wrap or other inappropriate wastes are included.
- Document the amount of blue wrap sent for recycling.

Intervention Strategy #4:

Install Re-usable Sharps Containers

Sharps containers account for a large portion of the medical waste stream so that the change to re-usable sharps containers can dramatically reduce the amount of medical waste being generated by the hospital. While conducting pollution prevention activities at a 250-bed hospital a study was undertaken to determine the amount of plastics that would be diverted from the medical waste stream if a re-usable sharps program were implemented. The Purchasing Department representative on the team provided data regarding the sizes and numbers of sharps containers that were purchased annually by the hospital. Armed with this data, other team members went to the Central Supply Department and obtained a new container of each size from inventory. The containers were weighed empty and the weights recorded and then multiplied by the numbers of containers used each year. The result indicated that 13 tons of medical waste could be diverted from the hospital annually by implementing a re-usable sharps container program.

The Daniels Corporation currently provides its Sharpsmart System for re-usable sharps containers in California. The Daniels Sharpsmart System containers are emptied, cleaned, disinfected and readied for re-use at California Medical Disposal Company's Fresno off-site medical waste treatment facility.

Stericycle recently purchased the Biosystems Company, which provides re-usable sharps container services. This will allow Stericycle to provide re-usable sharps containers to California health care facilities early in 2004. Stericycle is currently installing their Biosystem at their Vernon off-site medical waste treatment facility and plans call for a second site to be installed at one of their northern California off-site treatment facilities in the near future.

The implementation of a re-usable sharps container program focuses attention on these devices. The frequent change out of the containers and their more rigid, durable construction can assist in reduction of needle stick injuries. In addition to benefiting the environment by reducing the amount of plastics being treated in the medical waste stream, the re-usable sharps program should also save the hospital money through a reduction of purchasing single-use sharps containers and the savings in medical waste processing costs from the diverted re-usable sharps containers.

To Implement Intervention Strategy #4:

- Gather data as to the number and types of single-use sharps containers used at the hospital annually and their weights. Calculate the reduction in the medical waste stream that would be achieved by implementing a re-usable sharps container program.

- Contact the companies that provide re-usable sharps container programs and obtain cost information and quotes for implementing the program.
- Implement the re-usable sharps container program if economically feasible.
- Document any reductions in needle stick injuries, medical wastes generated and cost savings.

Intervention Strategy #5:

Use Sharps Containers Manufactured with Recycled Plastic

For those hospitals that do not implement a re-usable sharps container program another option is available for achieving pollution prevention benefits from their sharps container usage. That option has recently become available through Kendall Healthcare's new Renewables Sharps Disposal Containers that contain from 10-25% recycled plastics. The recycled plastics used are derived from processed medical waste sharps containers and their contents. These sharps containers take the medical waste stream full cycle by bringing a portion of it back into the hospital as a usable product.

The various styles and sizes of the Renewables Sharps Containers contain different amounts of recycled plastics. Specific amounts of recycled plastics can be obtained from Kendall Healthcare so that determination of the amount of recycled used by the hospital from the purchase of the Renewables Sharps Containers can be calculated.

To Implement Intervention Strategy #5:

- Gather data as to the number and types of single-use sharps containers used at the hospital annually and their weights. Calculate the reduction in the medical waste stream that would be achieved by using Renewables Sharps Containers.
- Contact Kendall Healthcare and gather information about their Renewables Sharps Containers and if economically feasible implement their use.
- Document the amount of plastics diverted from the waste stream through the use of the recycled plastics in the Renewables Sharps Containers.

Intervention Strategy #6:

Recycling Single-use Medical Devices

Recycling many of the single-use devices can significantly reduce the medical waste stream generated in surgery. Vanguard Medical Concepts, Inc. is approved by the federal Food and Drug Administration to reprocess and recondition single-use medical devices at their Lakeland, Florida facility. They are instituting a program in California's hospitals using 17-gallon teal colored recycling containers

into which surgery room staff can place used devices for reprocessing. The Vanguard container shown in Figure 5 is approved by the Department of Transportation for shipping single-use devices going for reprocessing. Vanguard is a Champion for Change in the Hospitals for a Healthy Environment (H2E) program and reports data as to the weight of devices diverted from the medical waste stream for each participating hospital.

The following types of single-use surgery instruments can be included in the recycling for reprocessing program:

- Arthroscopic shavers
- Arthroscopic wands
- Burrs, bits and blades
- Reamers and rasps
- Lap scissors, dissectors and graspers
- Laproscopic trocars
- Ultrasonic scalpels
- Electrophysiology catheters
- SCD/DVT sleeves
- Femostop
- Inflation devices
- Pneumatic tourniquet cuffs
- Pulse oximeter sensors
- Biopsy forceps

Although medical waste from surgery will need to be placed into red-bags and sharps containers, the recycling of single-use surgery instruments should decrease the use of large sharps containers in the surgery suites formerly used to capture these devices. The reduction in the medical waste stream should be monitored and tracked when the recycling of reprocessible devices is implemented. Vanguard estimates that reductions in medical waste disposal costs from surgery can be as high as 70 percent. Tracking of the number of devices purchased

should be performed and compared to the devices reported as being captured for reprocessing to determine the efficiency of the program. The savings from repurchasing reprocessed devices over what would have been paid for new single-use devices should also be measured to determine the full benefit of the program.



Figure 5: Medical devices being placed into a Vanguard container following surgery

To Implement Intervention Strategy #6:

- Gather data relating to the amounts of the above listed single-use items purchased and used in the hospital annually.
- Contact Vanguard Medical Concepts, Inc. at 1-800-887-9073 for information regarding their reprocessing program.
- If economically feasible implement the program and track reductions in the medical waste stream and weights of devices diverted from the medical waste stream for reprocessing.
- Determine cost savings from purchasing smaller and fewer sharps containers.
- Determine cost savings from purchasing reprocessed devices.