REDUCING THE PURCHASE OF MEDICAL WASTE

Mid-Atlantic Association of HealthCare Materials Management

4 February 2011
Reducing the Purchase of Medical Waste

Colonel George Nussbaum PhD, RN, CNOR
Senior Facility Planner and Deputy Director Clinical and Research Support Services
National Intrepid Center of Excellence
Assistant Professor, Graduate School of Nursing
Uniformed Services University for the Health Sciences
Bethesda, MD
Objectives

1. Discuss the reduction in the purchase of medical waste
2. Define the amount of materials entering the waste stream from the O.R.
3. Describe logistical manpower and space requirements
4. Maintain or improve O.R. staff comfort
5. Reduce surgical supply costs
6. Improve community environment
The Uniformed Services University, Graduate School of Nursing students and faculty conducting this study have no conflict of interest or affiliations with the manufacturer of any products, devices or services involved in this trial.
Goals for management of all healthcare facility generated waste should include:

1. Reduce or eliminate it

2. Contain costs associated with waste

3. Understand the true categories and definitions of waste

4. Appreciate waste as a “non-value added” component of the surgical process so that it can be systematically analyzed and functionally approached

5. Establish an environment in the perioperative setting that is safe from both physical and health hazards for staff and patients

6. Reduce all risks of occupational illnesses and injuries
Goals for management of all healthcare facility generated waste should include:

7. Consider the long term effects of surgically generated waste, beginning with the acquisition of the surgical supplies through to the ultimate disposition of all waste on the environment, people, equipment and property

8. Remain fully compliant with all regulations imposed by Federal, state and local laws. It is important to note that the requirements of some states for the management of RMW exceed those of other states

9. Maintain a constant vigilance and education process that covers personnel from the purchasing agent to the landfill contractor regarding the risks associated with hazardous and infectious waste

10. Establish flawless administrative and engineering controls to create, sustain and maintain safe work practices

- Shanner, H. & McRae, G.  http://www.nihe.org/eleveng.html
Typical Current Practice

Case Scheduled  →  Case supplies pulled  →  Case performed  →  Solid waste generated  →  Waste disposal company

Liquid waste generated  →  Disposed through sewer

Solid medical waste generated (red bag)  →  Solidified  →  Medical waste disposal company
Steps Required to Purchase Surgical Supplies Using Current Common Practices

1. Order placed to vendor
2. Order arrives warehouse dock
3. Truck unloaded at dock
4. Items moved from dock to warehouse
5. Items stored in bulk warehouse
6. Operating room places order to SPD
7. SPD orders packs from warehouse
8. Order arrives in SPD
9. SPD pulls packs for case cart
10. Pack delivered to operating room on case cart
How the Process Could Change

Supplies Needed
- Disposable or reusable
  - Reusable
    - Case Scheduled
      - Company called and supplies delivered
        - Liquid waste generated
          - Disposed through sewer
          - Regular or disinfected solidifier
    - Disposable
      - Case Scheduled
        - Ordered and stored
          - Case performed
            - Solid waste generated
              - Reusable supplies collected
                - Reusable company
                - Medical waste disposal company
                - Waste disposal company
              - Solid medical waste generated (red bag)
                - Solid waste disposal company

Disposable or reusable
- Ordered and stored
  - Case Scheduled
    - Liquid waste generated
      - Disposed through sewer
      - Regular or disinfected solidifier
    - Case performed
      - Solid waste generated
          - Liquid waste generated
          - Disposed through sewer
          - Regular or disinfected solidifier
    - Reusable supplies collected
      - Reusable company
      - Medical waste disposal company
      - Waste disposal company
“What goes around, comes around”

- Buddha said: “Our good and evil deeds follow us continually like shadows”
- The status eventually returns to its original value after completing some sort of cycle
Investigate the effect of alternative methods for surgical gowns, linens and basins on:

- Medical waste management
- Manpower efficiencies
- Product acceptability to user
Concept Comparative Questions:

- What impact would substituting sterile, non-disposable gowns, towels, mayo covers, back table covers, and surgical basins in the place of the current disposable custom packs have on the amount of materials entering the surgical waste stream?

- Could personnel efficiencies be improved through an alternative purchase practice for surgical packs that included non-disposable gowns, towels, mayo covers, back table covers, and surgical basins?

- How will surgeons and surgical technicians rate alternative sterile, non-disposable products compared to the disposable products currently in use?
Perioperative graduate students conducted an exercise in two major medical centers to compare:

- The amount of waste generated by using all disposable items, compared to an alternative practice of using reusable surgical gowns, back table covers, towels, mayo stand covers, basins, bowls and pitchers

- The number of process steps required in the supply chain for disposable items opposed to an alternative practice using a non-disposable service

- The acceptability of alternative, non-disposable, sterile products by surgeons and surgical technicians.
Comparative Strategy:

1. Obtain consent from the surgical administrative staffs

2. Partner with a local FDA regulated facility to supply 120 sterile re-usable packs

3. Develop concept comparison utilizing sterile re-usable gowns, towels, back table covers mayo stand covering and stainless steel basins

4. Provide a pre-comparison opportunity for staff members

5. Coordinate the convenience sampling of surgical procedures

6. Surgical procedures were selected each day based on the operating room schedule at each surgical facility.
7. All disposable surgical custom packs were pre-weighed prior to the start of each case at each surgical facility.

8. Single use items were pre-weighed, to include back table cover, gowns, mayo stand cover, pack of hand towels, disposable plastic emesis basin, large basin and pitcher to accurately reflect the added weight when these items were added to the sterile field during a procedure.

9. For the comparative exercise, a sterile, re-usable (non-disposable) pack was opened on to the back table (Figure 1) and the facility specific custom pack of disposable products was also opened (Figure 2).

10. Required disposable items were transferred to the operative back table. (Figure 3)

11. The remaining disposable gowns, towels, basin ware and back table covers items were removed and weighed (Figure 4).
Non-disposable Trial Product (open on back table)
Normal Disposable Pack Open for Access to Select Disposable Items
Required Disposable Items Transported to Back Table with Non-disposable Items
Disposable Items Replaced by Reusable Products
This represents the Items that Normally Enter the Surgical Waste Stream
## Participant Surgical Services

<table>
<thead>
<tr>
<th>Surgical Service</th>
<th>Facility A</th>
<th>Facility B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Dental</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>General Surgery</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Gynecology</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Orthopedics</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Otolaryngology</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Plastic Surgery</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Podiatry</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Urology</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Vascular</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total Procedures</strong></td>
<td><strong>59</strong></td>
<td><strong>60</strong></td>
</tr>
</tbody>
</table>
A questionnaire was developed for the surgical staff to compare the current disposable products to those replaced during the exercise for satisfaction with:

- comfort
- ease of use
- and protective properties
Surgeons were asked to:

- Rate the current disposable surgical gowns for comfort, ease of use, personal protection (5 Superior, 4 Good 3 Fair, 2 Poor, 1 unacceptable)

- Rate the comparison (non-disposable) surgical gowns for comfort, ease of use, personal protection (5 Superior, 4 Good 3 Fair, 2 Poor, 1 unacceptable)

Technicians were asked to:

- Rate the current disposable surgical gowns for comfort, ease of use, personal protection and to rate the back table cover and the mayo cover for ease of use and protective properties. (5 Superior, 4 Good 3 Fair, 2 Poor, 1 unacceptable)

- Rate the non-disposable surgical gowns, back table cover, and the mayo cover for comfort, ease of use, personal protection (5 Superior, 4 Good 3 Fair, 2 Poor, 1 unacceptable)
<table>
<thead>
<tr>
<th>Surgeons (n=108)</th>
<th>Superior</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Disposable Gowns</td>
<td>6%</td>
<td>38%</td>
<td>23%</td>
<td>33%</td>
<td>0%</td>
</tr>
<tr>
<td>Trial Re-usable Gowns</td>
<td>86%</td>
<td>10%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Surgical Technicians (n=64)</th>
<th>Superior</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Disposable Gowns</td>
<td>23%</td>
<td>38%</td>
<td>30%</td>
<td>9%</td>
<td>0%</td>
</tr>
<tr>
<td>Trial Re-usable Gowns</td>
<td>83%</td>
<td>9%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
# Ease of use: Towels and Gowns

<table>
<thead>
<tr>
<th>Surgeons (n=108)</th>
<th>Superior</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Disposable Gowns</td>
<td>33%</td>
<td>47%</td>
<td>19%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Trial Re-usable Gowns</td>
<td>87%</td>
<td>11%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Surgical Technicians (n=64)</th>
<th>Superior</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Disposable Gowns</td>
<td>53%</td>
<td>20%</td>
<td>24%</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>Trial Re-usable Gowns</td>
<td>86%</td>
<td>6%</td>
<td>8%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
### Gown Protective Properties

<table>
<thead>
<tr>
<th>Surgeons (n=108)</th>
<th>Superior</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Disposable Gowns</td>
<td>30%</td>
<td>45%</td>
<td>20%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>Trial Re-usable Gowns</td>
<td>92%</td>
<td>6%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

### Protective Properties: towels, gowns, basin ware, back table and mayo stand coverings

<table>
<thead>
<tr>
<th>Surgical Technicians (n=64)</th>
<th>Superior</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Disposable Products</td>
<td>23%</td>
<td>41%</td>
<td>33%</td>
<td>3%</td>
<td>0%</td>
</tr>
<tr>
<td>Trial Re-usable Products</td>
<td>94%</td>
<td>3%</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
“I loved the gowns, I wish we had these for all cases”

“Really liked the back table cover and happy we are saving the environment.”

“I am for switching to these gowns.”

“The gown is cooler. I was pleasantly surprised, I had my doubts but I really like the gown, it breathes.”

“I did not need to double drape the back table. I like the strength of the back table cover.”

“I love going green for the environment.”

“Of all the products trialed at this facility I actually like this one.”

“Do I have to give it back?”

“Gown moves better, much more comfortable.”
# Surgical Waste Reduction

<table>
<thead>
<tr>
<th>Facility</th>
<th>Total weight of disposable custom packs</th>
<th>Total weight of disposable items replaced by non-disposable products</th>
<th>Net change from utilization of reusable product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility A</td>
<td>59 packs 446.41 pounds</td>
<td>311.05 pounds</td>
<td><strong>70% reduction</strong> in material entering waste stream</td>
</tr>
<tr>
<td>Facility B</td>
<td>60 packs 461.35 pounds</td>
<td>268.56 pounds</td>
<td><strong>59% reduction</strong> in material entering waste stream</td>
</tr>
</tbody>
</table>
The issue of what should or should not be placed into regulated medical waste red bag waste was reduced by 70% through the use of the non-disposable surgical products.

This also represents a 70% reduction in the waste ultimately reaching a landfill or commercial incinerator.
## Potential Cost Avoidance

<table>
<thead>
<tr>
<th>Facility</th>
<th>Annual Procedures</th>
<th>Average waste decrease per procedure</th>
<th>Annual weigh decrease</th>
<th>Cost Savings at $0.28 lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility A</td>
<td>10,000</td>
<td>5.0 lbs</td>
<td>50,000 lbs / 25 U.S. tons</td>
<td>22,679.618 kilograms</td>
</tr>
<tr>
<td>Facility B</td>
<td>10,000</td>
<td>4.5 lbs</td>
<td>45,000 lbs / 22.5 tons</td>
<td>20,411.656 kilograms</td>
</tr>
</tbody>
</table>

Additional cost avoidance considerations for:
- Instrument loss
- RMW containers / boxes time, weight, storage, assembly
- Reduction of storage and handling costs pre and post procedure
Cost of Purchasing Medical Waste

Practice Greenhealth recommends the following formula to determine the cost of purchasing disposable medical items:

Purchase Price + Cost of Waste Disposal + Occupational Health Costs + Environmental Impact + Warehousing Cost

= True Cost of Disposables

Steps Required to Purchase Surgical Supplies Using Current Common Practices

1. Order placed to vendor
2. Order arrives warehouse dock
3. Truck unloaded at dock
4. Items moved from dock to warehouse
5. Items stored in bulk warehouse
6. Operating room places order to SPD
7. SPD orders packs from warehouse
8. Order arrives in SPD
9. SPD pulls packs for case cart
10. Pack delivered to operating room on case cart
Steps Required in Ordering Surgical Supplies Using Alternative Practice

1. Packs ordered from vendor
2. Packs delivered to SPD
3. SPD pulls packs for case carts
4. Packs delivered to Operating room on case carts
FOR IMMEDIATE RELEASE

CARDINAL HEALTH, SRI SURGICAL SIGN FIVE-YEAR AGREEMENT FOR SURGICAL KITS

Dublin, Ohio and Tampa, Fla., Dec. 1, 2008 – Cardinal Health and SRI Surgical Express, Inc. today announced a five-year supply and co-marketing agreement to offer surgical kits that include disposable health care products from Cardinal Health and reusable health care products from SRI Surgical.

The agreement makes Cardinal Health the exclusive manufacturer of SRI Surgical's complete line of more than 400 disposable surgical kits. In addition, the agreement provides for the development of a new product offering, the Hybrid Preference Pack™, in which SRI Surgical will combine its reusable surgical components with disposable surgical components from Cardinal Health. This new product will couple the convenience of disposables with the waste-wise benefits of reusable products.

SRI Surgical will deliver, reprocess and retrieve Hybrid Preference Packs on a daily basis directly to customers from its 10 reprocessing plants and four distribution centers located throughout the United States. SRI Surgical's reprocessing plants provide a closed loop process that delivers just-in-time sterile surgical linen, surgical instruments and disposable components to the operating room.

"Since 1991, SRI Surgical has provided products and services that assist each of our health care clients in providing quality care, while being environmentally conscious," said Gerald Woodard, CEO of SRI Surgical. "With Cardinal Health as our exclusive supplier for disposable kits, SRI will now focus on expanding its reusable product offering, while continuing to provide customers with the highest quality products and services."

Cardinal Health will manufacture the disposable surgical components for Hybrid Preference Packs at its network of four kit manufacturing facilities, where it already assembles more than 21 million disposable surgical kits each year.

"Cardinal Health's strategic alliance with SRI Surgical will provide hospitals with a broader range of environmentally responsible product alternatives to address their needs in the operating room," said Steve Inacker, president and general manager of Cardinal Health's Fresource Products and Services business. "In particular, SRI Surgical's expertise in reprocessing enables Cardinal Health to offer customers the choice of disposable or reusable products within their surgical kits."
Hybrid Pack Configuration with Disposable and Non-disposable Items Supplied as One Unit
Reducing the Purchase of Medical Waste
Waste issues begin in the purchasing department, since most of the items eventually leave the facility as waste. Reducing the amount of normal waste and regulated medical waste can appear to be an insurmountable task. There are numerous ways such as recycling, reusing, and reducing to accomplish this undertaking. One option to consider for preventing regulated medical waste from ending up in the landfills is to reduce the purchase of surgical materials that become waste entering the facility waste stream. Supply management in the perioperative arena is crucial to the reduction of regular and regulated medical waste. AORN strategies for supply conservation and management include considering the “impact of the item on the waste stream when purchasing supplies and equipment.”