

Environmental Excellence Resources

Waste Reduction Manual for Hospitals and Health Care Facilities

*A Step-by-step Approach to Developing
a Comprehensive Waste Reduction Program*

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1 Introduction

Waste Reduction Issues in Health Care Facilities

American hospitals are responsible for approximately one percent of all the municipal solid waste (MSW) generated in the United States. This means that in the course of providing health care, hospitals alone are sending 12 million pounds of waste per day to landfills and incinerators (almost 2 million tons a year!). Of this, U.S. hospitals currently classify approximately 15 percent of this waste as infectious, which must be treated differently from MSW. One thousand tons of the waste coming out of hospitals each day is treated as special waste. This is the waste that most often gets the attention of hospital administrators and managers--and in many cases the media.

Although stringent state and federal regulations governing the handling and disposal of infectious waste have focused attention on this portion of the waste stream, more subtle forces are starting to pressure hospitals - along with municipalities, states, and all other institutions and facilities - to pay attention to the rest of the waste they generate. In short, disposal options (landfills, incinerators, etc.) are becoming increasingly narrow. The pipeline of "products in, wastes out" has now become a funnel with an ever narrowing outlet for waste. Waste disposal practices have changed dramatically in the past 30 years from open burning, "dumps," and ocean dumping, to engineered "sanitary" landfills and highly regulated incinerators. Years of environmental abuse adversely affecting both water and air quality have caused thousands of landfills to close, with few new "safe" ones opening to replace them. Hospitals, which in the past legally operated incinerators without environmental safety controls, are finding that they must shut them down due to new regulations and poor public relations.

The large volume of wastes generated at health care facilities is the by-product of a large, growing system that has developed the ability to provide the best and some of the most advanced health care in the world. Previously, attention has been focused on the delivery of service and not on its side effects. Today, as hospital back doors and trash docks fill up with discarded packaging, corrugated boxes, plastic bottles, and other assorted debris, and as the cost of disposing of these items skyrockets, serious attention must be directed to minimizing the negative side effects that have accompanied medical advances in the health care field.

Reducing Waste Makes Good Business Sense

Recycling and waste reduction efforts have become increasingly important as critical strategies for meeting the changing needs of hospital waste management. Cost, new regulations, public health, community relations, and an emerging environmental consciousness are all combining to pressure hospitals to take a proactive stance in changing their waste management practices. Waste disposal is becoming an independent cost factor at many institutions, and many hospitals have found that the easiest money to find to implement new programs is money that they do not have to spend for disposal under old management practices (in other words, savings resulting from avoided costs).

Hospitals across the country are reporting significant success with waste reduction programs, and many have saved thousands of dollars a year by implementing a few simple measures. By cutting down on the amount of waste your facility generates, you, too, can save money, increase productivity, attract patients, and help protect the environment.

Conscious and well-planned recycling and waste reduction efforts can go far in meeting solid waste management goals such as cost containment, and can also result in a host of other benefits previously unrelated to solid waste management: These benefits include the following:

Economic advantages. Waste reduction results in savings of material and supply costs, and savings from more efficient work practices. In addition, landfill disposal costs are slashed when you reduce waste volume - for example, every ton of paper takes 3 cubic yards of valuable landfill space. Finally, with enough volume, you can earn revenues from the sale of recycled high-grade paper and corrugated cardboard.

Enhanced community image. Environmentally conscious hospitals attract patients. An increasing number of health care consumers consider environmental records in choosing a health care facility. The public relations value of recycling programs, therefore, is well established for hospitals and other large institutions. Such programs can put the hospital in a leadership role as a responsible corporate member of the local community in meeting local and regional waste management goals. These programs can also be proactive efforts in anticipating or meeting local and state regulations that would make or have made recycling mandatory for commercial operations and institutions.

Increased employee morale. Employees appreciate their institution's efforts to reduce waste and become more environmentally conscious. For this reason, progressive action in the workplace can lead to improved attitudes toward work. Employees will feel like a valuable part of the effort as they are encouraged to contribute and participate, and can be rewarded for their participation through incentive programs.

Positive environmental effects. Recycling can help to stimulate the market for recycled products, and to save natural resources. For example, *each ton of paper recycled saves about 17 trees.* In addition, recycling at work can have far-reaching effects, since employees may begin to recycle at home and pass on the message to family and friends. In sum, recycling conserves valuable resources and decreases environmental pollution. The recycling process results in less air, water, and land pollution than manufacturing using virgin materials.

Clear Definitions Facilitate Needed Distinctions

It is important to begin this discussion of waste reduction with some clear definitions concerning what is being reduced. The lack of standard definitions and an imprecise use of terms is one of the most significant barriers to improving waste management practices in hospitals. Given the current national solid waste and environmental crisis, hospitals must take an honest, *scientific* look at their waste stream. The cloak of mystery and fear that accompanies discussions of red-bag and medical waste must be put aside. Hospital waste is not some elusive, frightening, dangerous entity. Although it is true that a variety of hazardous and infectious wastes are generated in the hospital setting, hospital waste should not be thought of solely as special waste requiring specialized handling.

The following definitions of waste in health care facilities are based on work conducted by William Rutala, Ph.D., and C. Glen Mayhall, M.D.

- **Hospital waste:** All solid waste, both biological and nonbiological, that is produced at a hospital and is discarded and not intended for further use
- **Medical waste:** Materials that are generated as a result of patient diagnosis and/or treatment, or the immunization of human beings or animals
- **Infectious waste:** That portion of medical waste that can transmit an infectious disease; also referred to as regulated medical waste (USEPA) (NOTE: Based on current segregation and handling practices, approximately 15 percent of wastes currently generated at U.S. hospitals are considered infectious)

The current handling of hospital waste does not necessarily correspond to the real needs as addressed by these definitions. In most cases, hospital waste is over-handled and disposal costs far exceed what they really need to be. Much more medical waste and general hospital solid waste is handled as infectious waste because of archaic or dramatically overcautious management practices. Some of these practices relate directly to the fact that in the past many hospitals simply incinerated all their waste and did not have to make distinctions. Now that the hospital based incinerator option is fading and alternative disposal costs are increasing dramatically, learning to distinguish types of waste and making decisions on different disposal techniques is taking on increased significance.

A Hospital Success Story: Waste Segregation Equals Cost Savings

Mt. Sinai Medical Center, a research facility, medical school, and 1,100 bed hospital on the upper East Side of New York City, has developed a waste segregation program that saves the medical center more than \$1 million annually. The impetus for the segregation program was the Medical Waste Tracking Act, which went into effect in June, 1989. Under their old waste management practices, the total six month disposal bill for both MSW and "red-bag" wastes was \$912,256. Under the new program, the first six-month period cost Mt. Sinai a total of \$252,248, for a cost savings of \$560,008. The program was able to maintain its momentum, realizing a savings of \$1,120,016 at the end of the year and realizing similar savings each year since. Mt. Sinai achieved these savings by training nurses and housekeepers to distinguish red-bag items from MSW, and by withdrawing red-bag containers to centralized locations: medication, exam treatment, and soiled utility rooms.

The coming decade will see a major transformation in waste management practices at hospitals, which will be as significant as the previous shift that created the categories of infectious and hazardous waste. A conscious recognition based on scientific reality is needed to identify most hospital waste as material that can safely be handled as municipal solid waste (MSW), just as hotels, restaurants, and stores do. Work at dozens of hospitals around the country has shown that there are significant opportunities to reduce waste and contain costs by simply shifting common management practices in hospitals. This can take place, not just in the administrative office and cafeterias, but also in the operating rooms and patient care areas. Data from two recent studies have demonstrated that as much as 80 percent of the waste produced in the OR is packaging and is generated before the patient's arrival in the room. The handling of these wastes as if they were infectious is both unnecessary and costly. Waste reduction in clinical areas is dealt with in a later chapter; however, it should be noted here that the significance of savings resulting from changes in management practices based on these new definitions is enormous.

The Three "R's" of Hospital Waste Management

Reduction is a set of methods and strategies to decrease the volume of waste generated at the source or in actual use. Examples include: persuading a supplier to do away with layers of unnecessary packaging, requiring duplex copying, purchasing supplies in bulk to reduce the need for individualized packaging.

Reuse is a set of decisions or strategies to prolong the life of a material. Such strategies can result in cost savings, waste volume reduction, and resource preservation. Such actions include: switching to reusable diapers or gowns, purchasing equipment that can be easily re-sterilized and reissued for use, and initiating simple programs such as collecting scrap paper to be remade into notepads. The remanufacture of items (for example, computer ribbons and cartridges from laser printers and copiers) is also a function of reuse.

Recycling is the actual collection, sorting, and processing of discarded materials that will serve as the raw material for new products. Recycling is an industrial process, and although energy is often saved and pollution is reduced, it still does not have the same long term benefits as reduction and reuse. Recycling is part of a complete loop. Real recycling does not happen when materials are put out to be collected; real recycling is the result of people and institutions buying new products that have been manufactured using recycled contents.

Hospital Success Story: Recycling as a Cost-Containment Strategy

The term **cost containment** refers to the reduction of waste disposal costs. By segregating out the recyclable portion of the waste stream, a hospital can significantly reduce the overall volume of waste generated for disposal. Instituting a recycling program, even taking start-up costs into account, is a cheaper alternative than continuing to dispose of all trash in a landfill or incinerator. In today's era of escalating health care costs, significant monies can be saved through recycling that would otherwise be used to pay for disposal.

The Mt. Sinai Medical Center had been disposing of nearly two tons of corrugated cardboard and one ton of high-grade office paper daily. When the facility instituted a comprehensive program to collect corrugated cardboard and office paper for recycling, it was able to reduce the number of waste pickups from eleven to nine per week. This simple step resulted in a savings of more than \$37,000 in avoided disposal and hauling costs. No income is generated from the recycling of the materials; however, with the savings the hospital purchased a new compactor and a container to handle its corrugated cardboard. This investment was paid off in less than a year.

Ultimately, the real savings are available through waste reduction. The less material coming into the hospital that requires final disposal, the cheaper any waste management program is to operate. Although in the long run recycling programs are cheaper to run than taking waste to the landfill, they still cost money to operate. Working with vendors to reduce packaging; employing such methods as returnable containers, pallets, and the like; making decisions on new products giving close attention to resulting disposal costs; and finding new ways to divert materials, especially bulky materials, from the waste stream will be the most cost-effective efforts to employ.

The good news for future waste reduction is that much of this material is easily recyclable - or can be made to be easily recyclable - and the health care supply and packaging industry is consciously looking to streamline packaging to meet the hospital's need to provide both high-quality health care *and* efficient waste reduction. As the quality of care improves, the replacement of glass with plastic limits breakage; the cost of shipping and handling is reduced because of lighter weights; and materials handling is streamlined and standardized.

What, Where, Who, How, Why

This manual specifically deals with the part of the waste stream that can be properly managed as municipal solid waste (MSW), in other words, waste that could be treated as if it were generated at a hotel, restaurant, or store. This includes at least 85 percent of the waste now generated at hospitals, and more than that at other types of health care facilities (nursing homes, medical offices, etc.). Knowing **what** is being generated, **where** it is being generated, **who** is generating it and **who** has the responsibility for collection and disposal, **how** it is being collected and disposed, and **why** the management decisions that created the system were made is the first step in the process of more efficient waste management.

What. The composition of solid waste (noninfectious, nonhazardous) has been identified as highly recyclable. Although it varies from institution to institution and each hospital should analyze its own waste stream, the figures discussed below can generally be considered to be a good starting point for understanding the composition of a facility's solid waste stream.

Studies have shown that almost half the waste in hospitals is paper and paperboard. A large portion of this waste consists of corrugated cardboard shipping cartons. Another significant portion consists of paperboard packing material that holds instruments and supplies. Another large segment consists of office and computer paper. Many hospitals already have programs in place that deal with corrugated cardboard and office paper recycling. However, recent efforts have shown that a great deal more of this material could be either reduced at the source or further segregated for recycling or alternative disposal, such as composting.

The other materials making up the solid waste component of the hospital's waste stream are generated through some of the facility's other activities. For example, wood and other wastes represent 13 percent of the total. Hospitals often have carpentry, electrical, and maintenance shops to perform the many repair and maintenance

tasks needed. Debris from construction and demolition can often be diverted to alternative disposal (and sometimes recycling) options, if it is kept segregated. Other wastes may include bulky materials such as furniture, carpeting, mattresses, outdated equipment, etc. Many times, reuse opportunities can be found for these materials.

The hospital's food service function can be a major waste generator. A typical 500 bed hospital may serve up to 3,000 meals a day, literally making it one of the biggest restaurants in town. Much of the bulk food comes in plastic or metal containers. The metal containers can represent a large part of the waste coming out of the kitchen. The organic content of the waste stream is significant and usually heavy (an important factor for facilities who pay for disposal by weight). Commercial and community composting efforts around the country are experimenting with adding food waste to yard waste or agricultural waste composting projects as an alternative to traditional disposal.

Although in many cases, glass is being replaced by plastics, it still has a significant presence in the hospital. It can be found in almost every department holding food, beverages, and medications. For its volume it represents a great deal of weight in the hospital's waste stream.

A variety of other materials, including a surprisingly large volume of unused medical supplies, can be identified in even the most basic type of waste assessment. Understanding the nature of the waste the hospital is dealing with will help management decide how to initiate and operate a recycling program and will open up many opportunities for waste reduction and recycling initiatives throughout the facility.

A Hospital Success Story: Recycling Can Start in Small Ways

At the Medical Center Hospital of Vermont in Burlington, the dialysis unit was disposing of more than 36,000 one-gallon plastic jugs each year that had contained dialysis solutions. This created collection problems because the jugs quickly filled up area trash containers and were not easily compressed. A staff member noted that the jugs were made from high density polyethylene (HDPE - #2) plastic, a commonly recycled material in household programs, and that the hospital's waste handler was willing to take them for recycling. This approach significantly reduced the volume of waste being disposed from this department. Its success depended on the willingness of staff to participate, and it started with the simple step of identifying the composition of the material and recognizing an existing market for a comparable material in a local recycling program.

Where. Knowing where types of waste are generated lays the groundwork for deciding how to collect them. It is also the first step toward spreading some of the responsibility for the management of trash beyond the housekeeping or environmental services department. Collection for recycling can be an overlay of a trash collection system, but it may require new and different containers. Even though the actual volume of waste is unchanged, additional time must be scheduled for the collection of materials because of the additional separation. Knowing where materials are generated, especially those that may need special handling (for example, heavy glass, bulky metal food containers, etc.), helps define a collection strategy and will help planners evaluate the need for storage, vertical lift capacity (elevator access), timing of pickup, and collection route.

Who. Knowing who generates a particular component of waste allows hospital management to identify and make use of the necessary resource people in the design of the system. Ultimately, no recycling program works well without the participation and support of those who are its primary users. Knowing who generates trash also allows management to explore waste reduction techniques and alternative materials that may better fit into the system. Internal waste management systems that incorporate a level of awareness and responsibility on the part of every employee are an absolute must. Source separation must become standard practice for solid waste just as it is strictly enforced in clinical and patient care areas for infectious waste. Waste management needs to be expected of all employees and should be so stated in the employee handbook and during evaluations.

All too often, responsibility for trash is left to housekeeping, environmental services, or custodial services. Trash collection and disposal is considered to be that department's "job" and is perceived as "beneath the

responsibility" of educated, trained professionals. This thinking and hierarchy of hospital culture must shift. Environmental support staff, housekeepers, and custodial staff are there to provide support for the internal environment; they are not the "keepers" of other hospital staff. Although they are usually assigned the function of refuse handling, responsibility for waste generated at the hospital must ultimately be shared by everyone in the facility. Designing convenient systems for in-house day-to-day trash collection and making the use of that system an expectation of everyone's job are key components in responsible waste management.

How. Knowing the hospital's current system for waste handling is critical in designing a new system to incorporate recycling. Although any new separation system will require new collection and storage equipment, a great deal can be saved by making the best use of what the facility already has (laundry carts, plastic drums, etc.). This also offers an opportunity to work with those employees who have responsibility for collecting and disposing of waste. Their full support is vital to the success of the program.

Why. Many decisions and old practices contribute to the development of a hospital's waste management system. Because for many years waste system management was not given much attention, many hospital waste management systems do not meet current needs and would be difficult to adapt to the changing nature of the solid waste field. Before making major changes to an old system, it is important to understand why things are done the way they are. This will enable new waste managers to work more effectively with administrators, department managers, and housekeepers who may be accustomed to the existing system and reluctant to change.

Separation practices that determine which waste is treated as infectious in large part determine how much solid waste must be managed. The selection of disposal technology has a great deal to do with how waste is managed. For example, a hospital with its own incinerator has less incentive rigorously to separate infectious waste than does a hospital that contracts for infectious waste disposal with a private incinerator. Although this manual focuses on working with solid waste, it must be linked in management decisions and systems to the management of all waste.

2 Getting Started

The five key steps to prepare for a successful waste reduction program are:

- establish firm, visible management support
- designate a capable and enthusiastic program coordinator
- select an effective team (even two people make a team)
- conduct a waste assessment
- develop focused objectives (the best way to ensure success!)

Step 1: Establish Firm Management Support

The first step in waste reduction is actively to involve the administrator or top management who has committed your facility to the program and authorizes changes in operations. Waste reduction should be established by formal policy and considered the standard for your facility. Any program directives should come from management to encourage support at the departmental level.

Be sure to keep all management informed and involved as you develop your waste reduction program. Encourage your managers by sharing information on the range of benefits that come from waste reduction, such as cost savings and enhanced company image. Management can demonstrate support by:

- endorsing program goals
- communicating the importance of reducing waste within the facility
- authorizing the time necessary to work on the program
- making periodic announcements regarding program status
- encouraging and rewarding employee commitment and participation

Step 2: Designate an Enthusiastic Waste Reduction Coordinator

A successful waste reduction program requires a motivated coordinator who can foster a sense of teamwork and enlist the support of all employees. The coordinator will be responsible for administering your program and will act as a liaison between management, employees, and the waste reduction team. The coordinator will also be the contact for the recycler and the building or operations manager. Qualities sought in the coordinator include:

- planning and organizational talent
- enthusiasm about waste reduction
- ability to direct team efforts
- good communication skills

In many hospitals, this individual ends up being the head of housekeeping or environmental services, the area that has overall responsibility for trash collection. Depending on the size of the facility and the type of program being implemented, the position of coordinator can require a significant amount of time. In some facilities, the program may be big enough to warrant the creation of a new job. At Dartmouth Hitchcock Medical Center in Hanover, NH, the hospital hired the consultant who conducted the hospital waste audit to be its waste management specialist. At the Medical Center Hospital of Vermont in Burlington, a nurse who initiated recycling efforts at the hospital was hired full-time to work with the housekeeping department to implement recycling programs hospital-wide. In other cases, assistant managers have been put in charge. In all cases, waste reduction coordination should be incorporated into the person's job description. As such, it should be an official function, not a volunteer duty. Other likely candidates for waste reduction coordinator may be:

- an employee who has championed waste reduction
- a facility manager
- a waste disposal or operations manager
- an environmental manager
- a public relations manager
- an enthusiastic person at the administrative level

Step 3: Select an Effective Team

Recycling is a team effort. No one individual or department is able to make it happen alone. To be successful, planning has to be integrated and needs to incorporate feedback from all sectors of the hospital community. A team approach allows these tasks to be distributed among several employees and enables employees from all over the hospital to contribute directly to the effort. In some hospitals, teams have been pulled together to deal with the entire waste management system, including evaluating disposal options and the treatment of infectious waste. In other cases, recycling efforts have been incorporated into QIP (Quality Improvement Program) teams, where the facility is engaged in a total quality management (TQM) approach.

Your employee waste reduction team is responsible for planning, designing, implementing, and maintaining the program. The team size is determined by your facility size. A smaller facility might have a three person team whereas a large facility might have a dozen employees on its team.

Ideally, the team should be as representative as possible of all the major areas of the hospital and yet still be a manageable group. Conventional wisdom supports a cap of 12 members, especially if the group is to be working as a committee most of the time. Some key personnel to include on the team are:

- Housekeeping/environmental services
- Facilities management
- Clinical area representatives
- Nutrition services
- Clinical staff
- Materials management
- Infection control/quality control

- Purchasing
- Representative of top administration
- Engineering or technical operations management
- Employees interested or experienced in waste reduction

It is important to create a core team that will see the process through to the end. If the right team is assembled at the beginning, it will be able to address most concerns before any ideas for implementation leave the committee. Team members can be volunteers or appointed members. It is important, however, that they be enthusiastic and able to commit time to the effort. You might try making membership a basis for special recognition within the facility to increase motivation.

Typically, members of the waste reduction team are responsible for the following tasks:

- designing a mission statement and setting the preliminary and long-term goals of the program
- assessing facility waste streams, waste management and reviewing new technologies for collecting, processing and disposing of waste
- contributing department-specific ideas and suggestions
- designing the waste reduction program and overseeing its implementation
- promoting the program to fellow employees
- providing educational information
- tracking and evaluating program success
- reporting to management about program status

A Sample Mission Statement (adapted from the mission statement of the Medical Center-Hospital's Recycling Committee in Burlington, Vermont)

The (facility name) will take a positive and progressive position in relation to the environmental impact of materials used in providing high-quality health care. Our actions will be designed to reduce waste, increase the recovery of materials that must be used for recycling, and minimize the use of materials that are hazardous to the environment. Our objective will be to meet or surpass the local/ state goal of 40% for waste reduction and to comply with all regulations for waste management.

The members of the (facility name) community (employees, medical staff, students, and other allied health professionals) are collectively and individually responsible for active participation in all initiatives to reduce waste generation, increase recycling, and make effective use of materials. Management and supervisory personnel within the organization are individually responsible for ensuring that all possible efforts are made in their areas of responsibility to achieve the (facility name) objective of exemplary environmental responsibility.

Working with Key Departments. Although the inclusion on the waste reduction program committee of members from different key departments has already been discussed, it is important to emphasize that the success of any recycling program depends on the establishment of good working relationships and communications among several key groups.

Housekeeping/Environmental Services. The personnel in this department are responsible for the collection, separation, and management of recyclable materials. Without their cooperation, no program will succeed. Contact with the line personnel, as well as the managers from this department is important. The committee may want to make a presentation to the group and ask for feedback as it sets its mission and work scope. Keeping this department informed and involved at some level is important. Otherwise, implementation of the program will simply be dropped on department personnel and possibly only grudgingly carried out.

Purchasing. Whatever material is being collected for recycling was originally purchased through a decision-making process separate from the waste reduction committee. Purchasing decisions greatly affect the type and quantity of different materials that must be managed. If these decisions are not made in conjunction with the waste reduction planning process, any system set up for recycling will constantly have to change to accommodate a new and different material flow.

Warehouse/Materials Management. As one of the largest generators of easily recyclable waste (corrugated cardboard), this department deserves special attention. It has responsibility for receiving all materials coming into the hospital and then distributing them to the various departments. Any recycling program or shift in type of materials used at the hospital should take this department's needs into account. The staff in this department are also able to provide a great deal of information on the waste stream, because they see all the materials before they become waste. They may also help the committee in identifying ways to work with vendors to reduce waste at the source.

Infection Control/Quality Control. Because the facility is a hospital, concerns will undoubtedly be raised by in-house personnel, the waste hauler, landfill operators, and recycling markets as to the "infectious" nature of the materials they are being asked to handle. The complete cooperation and technical support of the hospital's Infection Control Officer will be needed to design a program that will ensure the complete safety of all material handlers and allay any unnecessary fears.

Clinical Staff and Physicians. In many cases, these practitioners determine what materials are purchased and used in the clinical care areas and decide where waste is disposed of. If the hospital's recycling program is to extend into clinical care areas, clinical staff and physicians must be included in the planning and design phase so that their concerns can be incorporated in the design of a system that will truly work. At some hospitals, nurses and physicians have been the driving force behind implementing recycling, and thus this group also represents a respected potential ally in selling the program to administration and other hospital personnel.

Recycling Coordinators/Contacts in Other Departments. Ultimately, the cooperation of every department in the hospital is crucial to the final success of the program. However, not everyone can sit on a waste reduction committee. One way to develop and maintain good communications with each department is to identify a key contact or recycling coordinator in each department. These key contacts will provide the committee with information on each department's issues and concerns, and also serve as a conduit for disseminating information throughout the hospital. Appointment of such contacts can be done informally or formally. This group may even come together on occasion as a whole to discuss specific problems or new programs. It is yet another way of getting a larger group of staff to participate in and "own" the program.

A Special Consideration: Nurses as Front-line Recyclers. Nurses are often the last people in the hospital setting to handle materials prior to their disposal as waste. Therefore, nurses are in an opportune position to recycle much of that waste. This sorting, or source separation, is really nothing new for nurses. From early on in a nurse's education, he or she is taught the need for the special handling of various types of waste, be it sharps, bloody materials, chemotherapeutic waste, or other materials. Nurses also learn how to discriminate between what is contaminated and what is not, and have extensive practice in sterile technique. Nurses also tend to be very caring and committed, concerned about their patients, their clinical practice skills, and their contribution to the promotion of the health and well-being of society.

Nurses use hundreds of products daily in the course of providing health care. Many of those products are over-packaged and create unnecessary waste, the disposal of which is an expense for the hospital. Many of the products nurses use are disposable, even when a suitable reusable product is available. Because nurses are incredibly busy given the present climate in most health care settings, convenience is important in terms of access to high-quality products and disposal of the residues. Educating nurses to understand the connection between the health of the environment and the health of the patient is critical.

Nurses, as primary users, need to be involved in the development of convenient, sustainable waste management systems. Space allocation, procedural systems, and procurement changes are needed to accomplish the goal of environmentally responsible waste management in the health care setting.

Step 4: Conduct a Waste Assessment

A waste assessment tells you what's in your trash. It is a tool that can be used to unveil wasteful practices in the health care facility. Waste is often symptomatic of inefficiencies in a system's operation. It consists of a careful review of the hospital's waste generation, waste stream content, waste management arrangements, and purchasing policies. This information is important because it will bring to light opportunities for waste prevention, recycling, and purchasing recycled products.

The basic steps of a waste assessment include:

- survey employees regarding waste generation and potential waste reduction (see sample survey in Part I below)
- examine your facility records (and complete the Waste Assessment Questionnaire included below)
- conduct a facility walk-through and interview employees
- perform a waste sort (if the situation requires)
- produce a Waste Assessment Report that formalizes decisions taken concerning recycling and waste reduction

The Macro View. In essence, a hospital is a mini-village. It includes living spaces, diagnostic facilities, dining areas, stores, offices, vehicle storage and maintenance areas, warehouses, facilities for building trades, public grounds, and public areas, as well as the specialized diagnostic and patient care facilities that make it a hospital. Some wastes are common throughout the facility; others are specific to individual work spaces within the hospital setting. Throughout the facility is found a mix of solid waste similar to that found in any other institution; e.g. paper, corrugated cardboard, cans, newspaper, etc. as well as waste generated specifically as a result of patient care. Patient care waste, or medical waste, is more complex to manage because it is composed of both solid waste and waste treated as infectious, red-bag waste. To design the best system for the hospital, it is necessary to become familiar with the waste types and generation patterns in all areas of the hospital. An overall list of materials produced by department is included later in this manual.

Waste Assessment, Part 1: Survey Employees

As a first step in the waste assessment, ask each employee to complete a brief survey. The survey should solicit information regarding:

- types and amounts of waste generated (see above list for examples)
- willingness to participate in recycling
- waste prevention suggestions

Employee input is important! For example, you may find that the employees most willing to recycle are those in the departments generating the most waste. These departments are an ideal place to begin your recycling efforts.

The survey can be distributed (printed double-sided or on the back of used paper), or posted on electronic mail. A sample survey is shown below. You might include an explanation that a waste reduction program is being planned, and that input from each employee is valuable to ensure a workable program strategy.

(SAMPLE) EMPLOYEE SURVEY

Department: _____

What types and amounts of waste do you generate? (please estimate the daily amount)

cardboard:	aluminum:	glass:
plastic:	pallets:	newspaper:
office paper:	computer paper:	laser cartridges:
food:	other: _____	

What materials do you currently recycle? (check all that apply)

aluminum laser cartridges plastic glass
 office paper computer paper newspaper cardboard
 food other: _____

Which best describes your feelings about recycling at work?

Glad to do it Willing to do it Don't care about it
 Don't want to do it Won't do it

Is it convenient for you to recycle at work?

yes sometimes no

Describe how recycling at work could be made convenient for you:

What ideas do you have to reduce waste in your department?

Would you like to help design our waste reduction program?

Waste Assessment, Part 2: Waste Assessment Questionnaire and Records Review

Administrative records can provide insight into the hospital's waste generation and handling patterns. Use the Waste Assessment Questionnaire that follows to help you gather important information from your records.

The types of records you might find useful include:

- waste collection and removal records and contracts
- contracts with recyclers and records of revenues from recycling
- equipment service contracts, maintenance logs, and repair invoices
- inventory, invoices, and purchasing logs

Waste handling information is useful to see how waste is removed from your facility and to estimate the amount paid for these services. Look at both on-site waste collection (gathering trash from individual departments/offices) and off-site waste removal (shipping the waste off-site for disposal). This information can be found in waste hauling contracts, maintenance and operating logs, and waste removal records. It may be helpful to include a review of any existing recycling or donation efforts.

Equipment service contracts, maintenance logs, and repair invoices can provide information on waste generated through equipment malfunctions; e.g. frequent printer and copier breakdowns may result in wasted paper. Purchasing records can give the team a better handle on the resources coming into the facility so the use and ultimate fate of these resources can be tracked. Opportunities for waste reduction purchasing practices (e.g. buying in bulk) or purchase of recycled products may be identified.

Waste Assessment Questionnaire

Shipping/Receiving

Do you ship/receive goods in permanent and/or reusable crating systems? yes no

If yes, please describe:

How are goods delivered to your site? (check all that apply)

supplier delivery service (UPS, Fed Ex)
 self US Postal Service

How are goods you receive packaged? (check all that apply)

cardboard container drum pallet
 stretch wrap/strapping bucket
 other: _____ other: _____

Purchasing

Are you presently purchasing recycled or re-manufactured products? yes no

If yes, please indicate: (check all that apply)

office paper tissue/toweling equipment
 packaging plastic containers file folders
 memo pads toner cartridges other: _____

Waste Reduction

What are your current waste reduction efforts? (check all that apply)

electronic mail duplex copying toner cartridge recharge
 voice mail on screen editing reusable plates/flatware
 plain paper fax refillable products reuse folders/envelopes/binders
 coffee mugs scrap paper reuse return/reuse packaging
 cloth towels post/circulate memos bulk dispensers
 other: _____

Describe any future plans for waste reduction or recycling:

Recycling

Do you have a recycling program? yes no

If yes, please indicate all materials separated for recycling:

white paper mixed paper corrugated cardboard
 newspaper plastics glass containers
 metal cans pallets equipment/furniture
 food waste yard waste other: _____

What equipment do you have to facilitate your recycling program? (check all that apply)

baler loading dock extra storage space
 vehicle shredder large storage containers

Where do your recyclables go? (check all that apply)

drop-off center hauler collects donations
 third party collects other _____

General

What is your biggest waste management difficulty?

Anything else you can tell us about your waste management (reduction, recycling, purchasing) program?

Waste Assessment, Part 3: Facility Walk-Through and Employee Interviews

A facility walk-through is a relatively quick way to examine your facility's waste generation practices. During the walk-through, the team will want to take note of:

- the types and amounts of waste produced
- waste generation and handling practices
- waste-producing or inefficient activities and equipment
- disposable materials that could be replaced by reusable or recyclable products
- existing space and equipment available for storage of recyclables
- current waste reduction efforts
- information provided by employees

The walk-through should cover all areas where waste is generated, handled, or stored. Be sure to contact each department to schedule the walk-through visit and to request that the supervisor and employees be available to answer questions or describe operations. These interviews can offer important details on waste generation and removal practices. Employees also are a valuable source of ideas for reducing waste. Before the walk-through, plan the important areas, questions, and topics you will want to cover.

Use the walk-through to network on item reuse. For example, you might find that one department routinely discarding cardboard boxes can provide them to another department that purchases them. Use worksheets similar to those outlined below to document your walk-through.

Facility Walk-Through Instructions. Use the facility walk-through form to identify and record the different waste-generating activities and equipment in your facility, the types of waste produced and any current waste reduction efforts. In addition, identify all materials that could be targeted by your waste reduction program and brainstorm ways to reduce, reuse or recycle these materials:

- obtain necessary information by conducting a walk-through of targeted functional areas. The walk-through entails carefully observing waste-generating activities and equipment, examining the contents of waste containers, and interviewing supervisors and employees
- pay close attention to areas and operations that generate the largest amounts of waste. Watch closely for activities and equipment that generate waste unnecessarily, as well as existing waste reduction efforts
- contact department managers to inform them of the visit and the possibility of short interviews with staff. Suggested questions to ask during the walk-through are listed following the walk-through forms. Be sure to interview the housekeeping workers and operations staff
- if possible, schedule the walk-through just before trash pickups to allow a sufficient amount of waste to accumulate. avoid scheduling it on a day that when non-typical wastes are produced
- ask questions about variations in daily waste generation. For example, periodic deliveries may result in more discards on the delivery day
- ask about any recent or upcoming changes within the department, such as new equipment or procedures, that could alter the types or amounts of waste generated
- larger hospitals will want to record information gathered on the walk-through by department

Facility Walk-Through Form

Company: _____ Recycling Coordinator: _____

Phone/Ext: _____

Department: _____ Department Manager: _____

Phone/Ext: _____

Team Members Conducting Walkthrough _____

Employees
 Interviewed: _____

Departmental Waste Evaluation

Waste Producing Area, Equipment	Waste Material Produced	Estimated Amount of Waste Produced Annually	Current Recycling or Waste Activity, or Reduction Activity

Facility Walk-Through Questions. Questions such as those listed below should be posed to department employees during the facility walk-through. Your questions should be phrased to encourage workers to share information with the team. Employees should feel they are doing something positive. By interviewing the staff while they are working at their departmental tasks, you will be able to foster better department-specific answers. These interviews should be kept brief so as not to disrupt the working schedule. If needed, more involved interviews should be scheduled separately:

- are there recent or pending changes in equipment or procedures that could alter the types or amounts of waste generated
- where can we be more efficient
- are there alternative products we can reuse over and over
- are there other products we could purchase that are more repairable, refillable, or durable than ones we are currently using
- are there products that come with too much packaging
- are there any hospital policies that are barriers to waste prevention
- what wasteful activities have you noticed

Waste Assessment, Part 4: Waste Sort

If you need more data than administrative records and a facility walk-through can provide, a waste sort can be conducted. A waste sort involves collecting and sorting a sample of your facility's waste to provide a "snapshot" of the total waste composition. Determining the baseline waste composition can help to:

- prioritize waste prevention and recycling efforts
- demonstrate to employees the quantities and types of waste being generated
- track changes in the waste stream

You have the option to select which departments or waste streams you want to consider in the waste sort. For some hospitals, it will be feasible to assemble and sort one day's waste. If this is not practical for your facility, a representative sample of approximately 50 pounds can be used. However, it will be important to estimate the relative size of the waste stream represented by each sample.

If there are significant day-to-day or periodic variations in the types and amounts of waste generated, the team might want to conduct multiple waste sorts. It is important to use a typical sample of your waste; otherwise, calculations on waste generation, waste composition, and waste removal costs can be skewed significantly. To perform a waste sort you will need the following tools:

- scale
- thick plastic dropcloth sheeting (enough to cover the floor in the room in which the sort will take place)
- duct tape (to tape the plastic to the floor)
- box of unsterile gloves
- tyvek protective suits
- protective eye gear

- tape
- surgical caps, surgical booties
- paper
- pens/pencils
- camera, film (slide) and flash
- video camera and videotape
- many assorted-size corrugated boxes
- large plastic trash bags
- markers
- trash gondolas
- tables
- red-bag waste collection containers (just in case)
- sharps container (just in case)

Waste Sort Instructions. Obtain permission. Consult with the staff who collects the trash and gain administrative approval. In order not to bias the sample, do not inform the department that is producing the trash.

Secure an adequate amount of space to conduct the sort. This is determined in part by the amount of waste to be sorted. It may be preferable to sort waste from discrete areas (department by department) for a defined period of time on an "average" day to obtain baseline data. Uncarpeted conference rooms, if properly prepared with protective plastic liners, can serve as good sorting space, because these rooms tend to have good lighting, are away from patient care areas, and are large enough to spread out. The room should have windows for proper ventilation.

Make arrangements with housekeeping or environmental services to help clean up the room after the sort is complete. Careful preparation of the room prior to the sort will minimize the clean-up needed after the sort.

Select the team. A waste sort is an eye-opening experience, Recruit staff to assist in this effort. A team of four or five people is a good number to begin with. Team assignments are a good way to maximize use of the team. Roles of team members include:

- sorters: three to four people to hand-sort the waste piece by piece. Sorters need to be aware of the potential risks associated with sorting waste. It is especially helpful to have nurses assist in this process, if waste from a patient care or medical area is being sorted because they are most familiar with many of the products and packaging in the waste stream. A physician also may be a valuable team player
- data recorders: one to two people to be assigned to assist the waste sorters recording data, either written or photographically, or both. Recording descriptive written data includes noting comments about findings its well as weights of the various components in the sort.

A presort session on sorting techniques is important to minimize the risk of anyone getting hurt. All sorters should wear personal protective gear. Ground rules should be set about methodology. For example, all bags should be dumped on a table and sorted from there, or sorters should look before touching anything.

Determine sorting categories. As the room is prepared, place cardboard boxes around the perimeter of the room and line with large plastic bags. Tape large signs to each box labeling what is being collected. Some boxes should be left unlabeled so that categories can be made up as necessary. Starter categories include:

- white paper-computer paper, office paper and possibly colored paper
- glass (clear, colored)
- cans (metal and aluminum)
- newspaper, magazines
- plastics (containers, stretch wrap, packaging, basins)
- boxboard (cereal box-type packaging, often in white or gray)
- IV bags/outer wraps
- gloves

- food wastes (paper cups, napkins, foam cups, straws)
- rigid plastic packaging

Finally, weigh the empty containers in which the sorted materials will be placed and note the weight on both the container and waste sort form.

Once you are thoroughly prepared and the waste has been collected, sorting can begin. Take time initially to ask questions as sorting begins. Sorters should talk among themselves to standardize sorting practices.

Place sorted wastes in labeled pre-weighed bags or boxes. As the bags fill they should be sealed and again weighed. Data recorders should record weight and any comments about the materials. A new liner should be placed in the empty box and sorting resumed. Place sorted, weighed bags of waste in a gondola for disposal.

Any unexpected findings should be recorded, especially the presence of sharps, saturated bloody wastes, instruments, unused medical/surgical supplies, or other items. It is useful to review the unusual findings of your waste sort with the person responsible for infectious waste at your facility. If you find any discarded instruments, collect and return them to the unit you obtained the waste from. Feedback of this type is not commonplace. Informing staff of wasteful habits may be enough to change behavior. During one waste sort, several very expensive surgical instruments were recovered. This alerted staff to the fact that they were inadvertently disposing of a reusable product. This mistake is an easy one to make given that there is an ever growing volume of disposable products.

Upon completion of your waste sort clean up the area by bagging all the waste you sorted and placing it into gondolas. If you are doing a large sort, you may want to involve housekeeping or environmental services to be on the alert, and retrieve the wastes as you fill the gondolas. If you discover any waste that should have been in the red-bag waste system, dispose of those materials properly.

It is helpful to videotape the sort for future reference. It is also helpful to take slides or photographs of the process of sorting and any unusual findings. Photographs may be useful as well; however, by using slides, you will be able to create slide shows to show others what you found.

Complete The Waste Sort Form

- Weigh each of the filled containers (partial and/or full) and note in "Full Container Weight" column on form.
- Subtract empty container weight from full container weight to get net component weight. Record net weight in "Waste Component Weight" column.
- Add all the net component weights to get the Total Waste Weight. Record this total figure in the respective "Totals" column and also in the "Total Waste Generated" column.
- Divide Net Component Weight by the Total Waste Generated and multiply by 100 to compute the Component Percentage.

Waste Sort Form

Date: _____ Department: _____
 Number of People in Department: _____ Total Employees: _____

Sample Collected over _____ 1 Day _____ 2 Days
 Sample Collected _____ All Waste at source _____ Representative Sample (weight _____ lb)

Waste Component	Container Weight Empty	Container Weight Full	Net Waste Component
Weight	Total Waste Generated	Component Percentage	
Sorted White Ledger			
Mixed Office Paper			
Corrugated Cardboard			
Newsprint			
Magazines			

CPO
Plastic Containers (1, 2, 6)
Glass Containers
Aluminum & Bi-metal cans
Food waste
Other:
Other:
Other:
Totals:

Waste Assessment, Part 5: Waste Assessment Report

Sort out the Waste Sort. Waste sorts provide some very interesting data. By playing with the numbers, one can determine what percent of waste from a designated area is composed of what types of material. One can also discover any weak links in the hospital's current waste system by any unexpected wastes found. Some materials are more predominate in the waste stream than others. It may be useful to ask questions about why that waste is present in such abundance and what could be done to reduce it. In short, waste sorts are discovery tools to help assist the hospital in learning the composition of its particular waste stream. When you assemble all the data, it should include:

- a graphic summary of waste stream component percentages
- a concise summary of your current waste management systems
- estimates of monthly and annual waste generation, per employee
- an evaluation of current waste prevention and recycling efforts
- site-specific waste reduction recommendations

Develop Focused Objectives. From this baseline information, realistic and measurable goals can be set for waste reduction in your facility. These goals might address issues such as:

- reducing the waste stream by a significant percentage
- improving the efficiency of existing efforts
- increasing operational efficiency in a specific area
- decreasing waste disposal expenses by a given amount
- recycling all paper and cardboard waste
- increasing use of recycled products to a certain level
- enhancing the hospital's image in the community

3 Designing The Waste Reduction Program

There are three steps to take in planning your program:

- develop waste prevention strategies
- design the recycling program
- determine purchasing policies and practices

In planning your waste reduction program, it is important to set dates by which you plan to accomplish each specific objective. This will help set a pace for achieving success and will allow everyone to know the plan.

The cost-effectiveness of your program will depend on these primary factors (Appendix D includes worksheets for evaluating the cost-effectiveness of waste reduction options):

- potential equipment, repair, and retraining costs
- avoided waste disposal costs
- avoided purchasing and operating costs
- potential recycling costs
- promotion and training costs
- baler/shredder rental or purchase
- revenue generated from recycling

- potential higher costs of some recycled products

Step 1: Develop Waste Prevention Strategies

Developing your waste prevention strategy begins with compiling a list of options based on your overall goals. For example, if your facility hopes to reduce waste removal costs as much as possible, and is charged for waste removal based on volume, the list of options should focus on high-volume waste materials. The benefits and drawbacks of each option under consideration should be summarized. The strongest considerations will be:

- potential for significant waste prevention
- potential savings compared to costs
- visibility for promotional purposes

The waste reduction team should also consider:

- whether waste volume or weight will be reduced
- capital, start-up, and operating costs
- effects on product or service quality
- compatibility with existing operations
- equipment requirements
- space and storage requirements
- operation and maintenance requirements
- staffing, training, and education requirements
- implementation time
- effects on employee morale and community relations
- long-term economic feasibility

Keep in mind that some capital expenditures, such as a baler, can yield impressive savings over the long term. Many collection services will place a baler at your property in return for a percentage of recycling revenue.

The team should clearly understand which criteria are most important. Many will not require extensive analysis. For example, if your facility already has a copy machine with the ability to make two-sided copies efficiently, then a policy mandating double-sided copying usually can be implemented easily.

Team members should focus first on waste prevention measures that will enable your facility to significantly reduce the amount of waste produced. Basic waste prevention strategies are listed below:

- Specify use of minimal and reusable packaging: Containers and packaging account for about one-third of municipal solid waste. Solutions include working with suppliers to obtain products with reduced or minimal packaging, buying in bulk, and buying in returnable or reusable packaging. The same solutions can be applied to packaging for your own products.
- Use and maintain durable equipment and supplies: Not only price, but quality and durability are important when purchasing items. Consider the costs of maintenance, disposal, and replacement.
- Reuse products and supplies: Reuse reduces both purchasing and disposal costs, and is one of the simplest waste prevention strategies to implement. For instance, cardboard boxes can be reused, and draft documents can be printed on the backs of single-sided waste paper.
- Eliminate the use of unnecessary items: Routine use of many materials and supplies may actually contribute little to your product service. Don't overlook the obvious opportunities for waste reduction.

After studying your facility's waste generation and management practices, you will likely have compiled a number of waste prevention options. Evaluate these measures according to your specific criteria as discussed at the beginning of this section. Keep in mind that one waste prevention option may result in savings in several different areas, including avoided purchasing, storage, materials handling, and removal costs. For example, switching to double-sided copying can result in cost savings associated with reduced paper purchasing, reduced space necessary for paper storage, reduced employee time associated with handling paper and filling paper trays, and reduced packaging removal costs. Some measures, such as circulating memos, may not require any additional equipment or training, but may simply be a matter of implementing specific practices as company policy. Appendix B presents an extensive list of waste prevention measures.

A Hospital Success Story: Overcoming the "No Funds" Argument and Having Fun

A small New Hampshire hospital was struggling to implement some waste reduction efforts, but kept running into the roadblock of having no funds to initiate its ideas. In an effort to get around this obstacle, the hospital launched a program to have employees donate a mug from their personal home collection for use in the hospital cafeteria. Each employee who brought in a mug got a free cookie. The hospital quickly had a full collection of reusable mugs at no cost (except to the cookie supply!). An additional benefit was that the collection turned out to be so tacky that there was no incentive for pilferage!

Step 2: Design the Recycling Program

It is evident that in the near future, all facilities, no matter what their size, will be forced to recover major portions of their waste products. New legislation, lack of landfill space and public demand will require it. Components in designing the recycling program include:

- determining which materials will be recycled
- establishing hauler arrangements
- determining the collection strategy
- acquiring containers

Recycling Program, Part 1: Determine which Materials to Recycle. Your team should now evaluate all recycling options to determine which materials you are interested in recycling and how to better manage waste that cannot be prevented. The team should consider the marketability of the materials to be collected. Again, this will vary from area to area. A detailed plan for recycling in each hospital area follows this section.

Recycling Program, Part 2: Establish Hauling Arrangements. The next step is to contact a recycling service provider. The amount you will pay for the service depends upon your location and the amount of waste you generate. In some instances, you may earn revenues for your recycled materials.

For rural locations, if the volume of recyclables generated by your facility does not meet hauler minimum quantity requirements, there are other options to consider:

- enter into a cooperative recycling arrangement with other facilities and a hauler. A hauler can service several businesses near each other. If you share a space with or are adjacent to other facilities, you can share a common recycling area and any cost or revenues.
- take the materials to a recycler. You may be able to earn revenues on even small quantities of materials if you deliver them to the recycler.
- take the materials to a drop-off recycling center. You won't earn revenue, but this may be the most convenient arrangement, depending upon your size and location.

It may be necessary to adjust collection frequencies, container locations, and collection routes. Open communication between the program coordinator and your recycling hauler is the key to success in this area. The waste reduction team should also work closely with personnel to schedule recycling pickups and ensure that the recyclables for each area are properly organized for pickup. A comprehensive sample Request for Proposal (RFP) for recycling haulers to give bids for hospital recycling is included in Appendix A.

Recycling Program, Part 3: Determine the Collection Strategy. As outlined below on an individual department basis, it is important to determine the location of recycling collection containers and who will be responsible for transporting and emptying them. A guiding principle for all locations is to make it as convenient as possible. The system must be both simple and reliable to ensure long-term success.

Office paper recycling increases significantly when collection begins at each desk. Employees sort recyclable paper into special containers beside or on their desks and then empty them into central collection containers located throughout the building. Multiple containers may be provided to sort multiple grades of paper.

Central collection containers should be placed in convenient locations, close to areas where materials are generated. At least one central container for every 15 to 20 employees is recommended. A single central collection site should typically serve no more than 50 employees. Trash cans should also be available at those sites in order to minimize unwanted trash (contamination) in recycling containers.

As indicated below for individual departments, designated storage areas are required to store the materials to be recycled. This area should be easily accessible to both your recycling service and to those responsible for transferring recyclables from the central collection bins. Do not overlook available outdoor locations. Containers should have tight fitting lids or covers and may need to be in an enclosed area if outdoors. Safety issues for containers are listed below for individual areas.

Recycling processors require that corrugated cardboard cartons be broken down or baled. Balers may be provided by the recycler, purchased, or rented, depending upon circumstances. Balers are available in various sizes and may be placed either indoors or outside in a covered area. Use of a baler significantly reduces the amount of space required to store cardboard and saves time by eliminating the need for employees to break down cardboard boxes.

Recycling Program, Part 4: Obtain Containers. Storage containers may be provided by your hauler or available for lease as part of their service. Containers are also available through a variety of other sources. A wide variety of recycling container styles are available. Any container may be affixed with the recycling logo for use as a recycling container. Your hauler will inform you of any special requirements.

Enough containers will be required to hold all the recyclables generated between pickups. They should be kept clean and clearly labeled, listing acceptable and unacceptable items. Consider the physical logistics for container placement, ensuring easy access. Wheeled containers are more convenient for employees.

You may want to give administrative employees a choice of deskside containers to make recycling as easy and convenient as possible. This approach may also help to secure employee support and participation. In smaller offices, available containers such as empty copy paper boxes may be used for individual recycling containers.

Following are detailed plans and special considerations for the main areas of hospital recycling.

Recycling Program, Part 5: Department Specific Concerns

Nutrition Services

Materials. Many materials in the kitchen are potentially recyclable. Although there is some variation from facility to facility, the following materials are generally found in the kitchen area:

- steel and aluminum cans
- clear glass
- #1 plastic - PETE
- #2 plastic - HDPE
- #5 plastic - PP
- #6 plastic - PS
- grease
- food waste
- stretch wrap
- aerosol cans
- sorted white ledger (white paper)
- mixed office paper (colored paper, post-its, envelopes, etc.)
- corrugated cardboard

In addition, the following materials are found in the cafeteria, coffee shop, or eating area:

- cans
- newspaper
- magazines
- #6 plastic - PS (disposable dishware, utensils, carry-out containers)

Special Issues. Most food service containers need to be rinsed prior to collection for recycling. Removal of organic matter from cans is a specification many recycling haulers insist on. Figuring out the easiest way to do that requires some thought. Some facilities have the pot washer rinse the cans, others put cans through the dishwashing machines. Additionally, some haulers require removal of paper labels, others do not.

Safety. Consideration must be given to staff safety in preparing cans for recycling. Rinsing sharp-edged cans must be done with care. Special long armed cleaning devices may need to be purchased to clean particularly sticky cans. Deciding whether to crush cans or remove tops and bottoms also generates safety concerns. If the decision is to crush, staff need to be instructed in the proper, safe operation of the crusher. If the option is for manual removal of lids and manual crushing, obtaining the best available tool for the job is a valid safety concern. Consideration must also be given to staff safety in collecting glass. A shattered glass bottle or jar in the kitchen area poses significant safety risks. Select an adequate size collection container and plan sufficient pickups to avoid overflowing containers.

Special Programs are available in most areas for Nutrition Service Departments:

- food waste composting
- supplying overstocked foodstuffs to local community shelter
- saving containers, (for example, strawberry baskets, plastic containers, boxes) for local schools, day care centers, etc.
- switching to "cows" (bulk serving containers) instead of individualized containers to serve liquid beverages
- discounting coffee and tea for those who bring reusable mugs
- grease recycling

Special Notes on Dishware. Current dishware choices include disposables (both paper and polystyrene), china, plastic reusables, and so on. Current flatware choices include plastic disposable and steel reusable. Switching to reusable dishware/flatware reduces the volume of waste generated. The initial cost of purchasing reusable dishware can be offset by concurrent savings from the need to purchase less disposable dishware. Additional labor, water, and energy usage should be taken into consideration when evaluating this option. Feasibility is variable, regionally and even from hospital to hospital, depending on space limitations. Special programs can include:

- a reusable mug program. This is a great way to advertise the hospital's recycling and waste reduction programs. Some places offer reduced prices for coffee in reusable mugs.
- reusable take-out trays. These can replace the disposable box take-out trays. Placing dirty dish containers at strategic locations throughout the facility will reduce pilferage and increase the return rate.

Administration and Departmental Office Areas

Materials found in these areas include:

- white paper
- computer paper
- colored paper
- newspaper
- corrugated cardboard
- boxboard
- toner cartridges (copiers and laser printers)
- magazines
- catalogs, glossy junk mail

- directories
- aluminum cans

Issues to Consider include the following:

- not all employees are hospital based. The hospital's education programs should also reach this group.
- paper is the largest single source of recyclable materials in these areas. Convenient and easy-to-follow collection systems should be established. Container choices range from divided waste containers (from two to four compartments for different papers and waste), desktop collection folders, and bins. Staff should be consulted as to what works best.
- responsibility for collection should be defined. Does each individual employee have responsibility for taking material from his or her desk to a central collection area?
- although office recycling may seem simple in comparison to collection systems in other departments, the need for education and support in these areas should not be ignored. A good many high-grade recyclables are generated here, and they should receive appropriate attention.

To establish a paper recycling program, you will need to determine which grade(s) of paper you want to recycle. There are dozens of grades of paper that can be recycled. If you generate a large amount of a specific type of paper, check with your recycling hauler to determine the best way to recycle it - whether mixed with other paper types or separated. The most common grades of paper for office recycling are:

- white paper
- bond computer printout
- groundwood computer printout (newsprint content)
- mixed office paper
- newsprint
- magazines (coated newsprint)
- corrugated cardboard and kraft paper

Paper clips, staples, and rubber bands typically do not need to be removed. Other contaminants may only be allowable in very small percentages.

Recycling options range from sorting multiple grades of paper, to simple mixed paper collection. Higher grade paper will bring a higher price. Thus, while mixed office paper diverts maximum quantities of paper from the landfill, the price paid per ton is significantly lower. This may not be of significance if you will not receive revenues for your paper (see next section). Other factors in determining what paper grade(s) to recycle are:

- the types and quantities of waste paper generated
- the willingness of employees to sort paper grades
- the capacity of storage areas (more grade separation generally requires more space)

Confidentiality. As paper recycling is implemented, the issue of confidentiality will have to be addressed. Areas such as human resources, purchasing, a crisis clinic, pastoral care, and medical records all have very sensitive documents in their administrative areas. Collection of these materials for recycling presents some special problems for a recycling program. One method of handling confidential paper is to have it shredded, either on-site by informed personnel or off-site by the hauler. Either way, certain actions must be taken such as:

- the hauler must be bonded and also familiar with the facility's confidential information policy.
- a hard copy confidential document disposal policy should be developed and put in the administrative policy and procedure manual.
- all in-house personnel involved in the recycling of confidential paper should be made aware of the policy.
- if the decision is to shred on-site, someone must be assigned the responsibility and space must be dedicated for this purpose.
- the hauler must be contacted to determine specifications for shredded paper. For example, what can be shredded together for maximum recycling value?
- devise a method to signal that bags contain confidential papers that are to be shredded. For example, some institutions have developed a colored see-through bag system to alert staff to the fact that the

contents are confidential and must be put aside for shredding. Another option is that of locked collection boxes. These boxes can be unloaded by a bonded hauler who has an approved system for handling confidential material. .

Pharmacy

Materials. The type of materials in the pharmacy area vary depending on systems used, procurement practices, and method of delivery. Fortunately, some pharmaceuticals are now delivered in reusable plastic totes, thereby reducing the volume of corrugated cardboard generated. There is also a trend to package more products in plastic rather than glass. Materials in this area include:

- corrugated cardboard
- white paper
- computer paper
- clear glass
- brown glass
- #2 plastic - HDPE
- #5 plastic - PP
- newspaper
- foam packing peanuts
- foam packaging
- batteries
- magazines
- journals, catalogs
- boxboard

Special Issues: Storage. A pharmacy generates significant quantities of recyclables during all hours of operation. Depending on staffing and collection systems, temporary storage for containers may be needed. Areas adjacent to the pharmacy are likely places to search for storage, or a collection system may be designed that eliminates the need for storage.

Preparation of recyclables. Most pharmacy containers need to be rinsed prior to collection for recycling, be they glass or plastic. Removal of residual solutions from containers is a specification many recycling haulers insist on. Rubber, plastic, and metal accessories must be removed from glass prior to recycling. Corrugated cardboard needs to be flattened for efficient transport to final destination.

Safety. Shattered glass in the pharmacy area poses a significant safety risk. An adequate-size container should be selected and sufficient pickups planned to avoid overflowing. Containers chosen for glass recycling should be easy to handle when full; glass is very heavy. Containers being recycled should be free of toxic chemicals and suitable for recycling. Questions about containers should be cleared with the hospital's environmental specialist and recycler.

Patient Care Areas

Materials. A variety of recyclable materials are generated in patient care areas. Designing collection programs requires a team approach to collection strategies. Materials in these areas include:

- newspaper
- corrugated cardboard
- magazines
- aluminum cans
- steel cans
- clear glass
- #2 plastic - HDPE (bottles)
- #5 plastic - PP (bottles)
- #6 plastic - PS (packaging, such as syringe wrappers)

- boxboard
- white paper
- computer paper

Special Issues. It is important to design a collection system that is convenient for patients, nurses, visitors, and the housekeeping staff responsible for collection and transport of materials from the department to the central collection area. The collection container must be distinctly different from any other collection containers in the room and must be explicitly labeled for recyclables.

A strict policy that clearly states the protocol for handling recyclables contaminated with regular trash or potentially infectious material must be promulgated. (For example, if a bloody dressing or used syringe was accidentally tossed in with the recyclables, the entire bag would be disposed of as red-bag waste.) Do not expose staff to unnecessary risk by having them sort contaminated recyclables.

Confidentiality may be a concern if the hospital generates computer printout care plans or cardexes. Sensitive information about patient diagnosis, care, or other data may be present on the paper destined for recycling. See discussion above for options to manage this issue.

Space. Because patient rooms are crowded, defining space for a container may be difficult. Efforts should not be limited to the floor space. For example, a small collection container could be mounted on wall space. Many hospitals use wall space to mount containers for collection of sharps and infectious waste.

The current number of waste receptacles in the room should be noted. If possible, a trash receptacle should be replaced with a recyclable collection container. However, nursing staff should be consulted first, because they may have alternative suggestions.

Labor. Staff should be requested to source separate waste. Nursing staff are already used to separating sharps, infectious materials, and chemotherapeutic wastes. Requesting further source separation of waste products into the appropriate containers for recycling is an extension of a familiar behavior. In communities where recycling is mandatory, this expectation should be part of every employee's job description.

Safety. It is important to provide ongoing waste and recycling education programs to reinforce the need for conscious waste disposal habits. Especially in patient care areas, materials contaminated with body fluids could contaminate recyclables. It is necessary to develop protocols for handling recyclables mixed in with infectious wastes. All should be handled as red-bag waste, and staff needs feedback about incidents to modify their habits.

Most of the time, the generator of the waste is responsible for its preparation. However, if the institution has support staff such as unit aides, service clerks, or volunteers who can serve as materials preparation staff, they should be utilized. They could assist in the removal of rubber, metal, and plastic attachments from glass containers prior to placement in recycling containers. They could also remove labels from cans, or rinse out milk jugs. If patients are given the opportunity to recycle, they should simply be provided with a container. However, any preparation of materials should be handled by staff.

Nurses' Stations generate a variety of materials depending on the type of activities conducted in the space. If computer printers are present, white paper collection containers can be located adjacent to them. If the area also serves as a place where staff eat or drink, aluminum can collection containers may be appropriate. Some nurses stations include a medication preparation area, which may be a likely place for a small glass collection container if glass containers are used for medication administration. Magazine collection containers may be placed on individual nursing floors to collect journals and magazines brought in by patients and visitors. Newspaper recycling containers may be placed adjacent to newspaper machines in waiting areas.

Laboratory

Materials found in this area include:

- white paper
- computer paper
- colored paper
- corrugated cardboard
- newspaper
- #2 plastic HDPE
- #5 plastic PP
- polystyrene foam packing peanuts
- polystyrene rigid foam packaging
- magazines
- catalogues
- clear glass, brown glass
- directories

Special Issues. Recycling containers should *not* be placed next to red-bag or other hazardous waste containers to prevent accidental placement of the wrong material in the container. Additionally, staff should be made aware of different types of glass and which ones are acceptable for recycling. Slides, pipettes, burettes, beakers, and other glass tubes are usually not acceptable for recycling. It is best to check with the hauler to be sure.

Safety. The containers being recycled must be free of toxic chemicals and suitable for recycling. Questions about containers should be referred to the environmental specialist.

Special Programs. There are many opportunities to reuse materials in the laboratory setting. Cardboard slide holders, glass solution bottles, insulated foam containers, and rubber bands are just a few materials that can be kept in circulation and reused again and again.

Cardiology Department

Materials. This area is not often included in recycling programs, yet there are many materials to be collected. These materials include:

- white paper
- colored paper
- computer paper
- clear glass, brown glass
- #2 HDPE plastic
- #5 PP plastic
- polystyrene foam packing peanuts
- corrugated cardboard
- newspaper
- steel and aluminum cans
- metal film canisters
- rigid plastic trays
- blue sterilization wraps, assorted plastic packaging materials

Safety. A clearly defined procedure should be in place for handling recyclable wastes that have accidentally become contaminated with other wastes. A shattered glass container in patient diagnostic areas poses a significant safety risk. An adequate-size collection container (e.g. a 5-gallon-bucket-type container) should be collected for glass recycling and sufficient pickups planned to avoid overflowing. Containers being used for recycling must be clearly labeled. Containers should not be placed near red-bag waste collection containers. Recyclables should be prepared in the following manner:

- glass products need to have plastic, metal and rubber attachments removed.
- plastic containers must be empty and clean.
- cans must be empty and free of organic matter.

- nonpatient contact rigid plastic trays should be stacked for easy handling.

Radiology Department

Materials found in radiology include:

- white paper
- colored paper
- computer paper
- newspaper
- magazines
- clear glass
- #2 plastic-HDPE
- #5 plastic-PP
- corrugated cardboard
- polystyrene foam packing peanuts
- steel and aluminum cans
- X-ray film boxes
- X-ray film
- fixer Solution
- blue sterilization wraps #5 plastic-PP

Safety. Residual chemicals must be removed from containers. Any doubts should be resolved with the environmental specialist or the recycling hauler. Additionally, shattered glass in patient diagnostic areas poses a significant safety risk. An adequate-size container (e.g. a 5-gallon-bucket-type container) should be selected and sufficient pickups planned to avoid overflowing. Recyclables should be prepared in the following manner:

- glass products need to have plastic, metal, and rubber attachments removed.
- plastic containers must be empty and clean.
- cans must be empty and free of organic matter.
- nonpatient contact rigid plastic trays should be stacked for easy handling.

Special Markets. X-ray film and the fixer solution both contain significant quantities of silver. This is a pollutant if simply washed down the drain or put in the landfill. However, it is a valuable resource if it is recovered. Many hospitals have contracts with processors who buy the X-ray film and the silver recovered from fixer solution.

Surgical Services

Materials found in surgical services include:

- white paper
- computer paper
- colored paper
- magazines
- catalogs
- steel cans
- aluminum cans
- corrugated cardboard
- #2 plastic-HDPE
- #5 plastic-PP
- #6 plastic-PS
- boxboard

Surgical services areas provide many opportunities and interesting challenges for recycling. A wealth of recyclable materials is generated in this area, particularly plastic packaging, much of which is discarded in

sterile environments before a patient even enters the OR. (One study demonstrated that 60 to 80 percent of the wastes generated in this area could be collected for recycling.)

Special Issues include:

- collection systems should be designed that do not interfere with delivery of care.
- a protocol for handling accidentally contaminated waste must be developed.
- comprehensive staff education is essential (physicians, nurses, OR technicians, residents, and so on)
- a policy and procedure guide should be developed for recyclable waste handling.

Dialysis Unit

Materials. The following materials in the dialysis unit are recyclable:

- white paper
- colored paper
- computer paper
- corrugated cardboard
- magazines
- catalogs
- steel cans
- aluminum cans
- #2 plastic-HDPE

Special Issues. Recycling containers must be placed away from patient care areas to avoid accidental contamination of materials from blood spills. Staff must also be instructed not to recycle any materials with bloody fluids on or in them.

Special Programs. Depending on the system the hospital uses for dispensing dialysis solution, there may be a very large quantity of easily recyclable materials. Some systems utilize one-gallon plastic containers (#2 - HDPE) to dispense the solution. Although larger containers may produce less waste, many hospitals have found that the one-gallon container provides the most efficient system. However, these containers are bulky and take up a lot of space in trash cans. Having a separate large collection container (for example, large laundry gondola) in an adjacent room to collect the containers may provide an efficient system if staff cooperation can be secured.

Shipping and Receiving

Materials. This area is where many materials begin their journey into the hospital. Primary packaging (such as corrugated cardboard) is often removed at this stage, and items are broken out and distributed as individual units. Almost all the waste in this area should be diverted into various recycling programs. Recyclable materials found in shipping and receiving include:

- corrugated cardboard
- stretch wrap
- white paper
- colored paper
- computer paper
- newspaper
- magazines
- catalogs
- directories
- pallets
- polystyrene foam packing peanuts
- polystyrene rigid-foam packaging
- steel and aluminum cans
- boxboard

Special Issues: Space. Areas must be kept open to accommodate movement of forklifts and equipment. Identify out-of-the-way areas for container placement. Corrugated cardboard and stretch wrap collection containers should be placed adjacent to specific areas where those wastes are generated. Consider rolling carts as collection containers.

Labor. Source separation should be included in shipping and receiving staff job descriptions.

Safety. Needed tools must be provided for preparation of recyclables such as safety blades used to flatten boxes. Recyclables should be prepared as follows:

- cans must be empty and free of organic matter.
- corrugated cardboard can be flattened (or may opt to bale or compact directly, if space and storage are available).
- stretch wrap must be segregated and bagged.
- pallets can be stacked to conserve space.

Facilities Management

Materials. Facilities management comprises the carpenter shop, the plumbing shop, and the electric shop. Recyclable materials in this area include:

- batteries
- scrap metal
- scrap lumber
- aerosol cans
- scrap wire
- corrugated cardboard
- newspaper
- directories
- magazines
- catalogs
- steel and aluminum cans
- polystyrene foam packing peanuts
- white paper
- colored paper
- computer paper

Special Issues. Much of the waste from the workshops is bulky and generation rates vary according to what projects are being undertaken. Ideal collection scenarios should be discussed with staff members to design optimal collection containers. These areas tend to have more nooks and crannies for storage under workbenches, in equipment rooms, and so on. The replacement of some waste cans with recycling containers should be considered.

Safety. Sharp metal objects (wire, nails, and so on) and splintery wood waste requires special handling. Heavy protective gloves and eye gear should be available to staff transporting and handling these materials. In addition, caution must be taken against creating overly heavy loads of materials; the frequency of pickup should be designed to optimize load size.

Special Markets. These areas typically generate valuable metals including brass and copper that can be sold as scrap. Some of the large construction and demolition debris also can be segregated for special recycling programs.

Housekeeping Department

Materials found in housekeeping include:

- white paper
- computer paper
- colored paper
- newspaper
- magazines
- catalogs
- #2 plastic-HDPE
- large containers (55-gal. drums) of cleaning products, waxes, and so on.

Note: Containers may or may not be recyclable. They often are plastic and should be labeled. An option is to see if the supplier will take the containers back.

Special Issues. Housekeeping offices face the same issues as administrative offices but, in addition, have a large collection of cleaning supplies and tools. Many of these come in containers that should be recyclable. The recycling of containers that held cleaning products must be done carefully, because some of these substances can be hazardous. Containers should be thoroughly cleaned. Housekeeping is the department most likely to be responsible for collection in other areas. Take the time to establish a model program in this department. People who knowingly care for their own area may be more motivated to encourage others to do the same.

Public Areas

Materials. Public areas include lobbies, waiting areas, patios, and grounds. Materials will be determined by products available in vending machines and various products available in other parts of the facility. Although the materials found in these areas vary, the following are the most common:

- newspaper
- aluminum cans
- glass containers

Special Issues. Containers need to be accessible and labeled. Attractive and informative labeling is good for public relations and makes the system friendlier for public use. Remember, people may not yet be used to having the opportunity to recycle in institutions. Trash cans need to be labeled as such. Attractive containers should be provided for these areas. Recycling in these areas provides the general public with an opinion as to how well the hospital's recycling efforts are doing. Containers should be kept clean and emptied on a regular basis. Contamination is to be expected in public areas. Remember, the public does not work at the hospital and will not have benefited from its education programs. A protocol should be developed for collection staff to follow (for example, no sorting of waste in public areas). Finally, it is important to be extra cautious. More money should be spent for fire-rated containers and frequent pickups. Containers should be kept empty during off-shift hours when combustibles are most likely to be problematic if a fire were to occur.

Gift Shop

Materials found in the gift shop are similar to those found in any retail shop and include the following:

- corrugated cardboard
- white paper
- colored paper
- computer paper
- magazines
- catalogs
- polystyrene foam packing peanuts
- boxboard

Special Issues. Gift shop staff may be composed of volunteers or hospital auxiliary. Both groups will require additional training. The gift shop may be an independent subcontractor. Its contract should include

participation in the hospital's recycling efforts. Contamination may be more of a problem in this area, especially with the types of corrugated cardboard produced by gift shop packaging. Many of the items for sale may come packed in Asian cardboard, which is often not accepted as part of a corrugated cardboard collection program.

Other Departments

Day-Care Area. Many hospitals have on-site (or off-site) day-care units. These operations generate white, colored, and computer papers, newspaper, magazines, clear glass, #2 HDPE plastic, and aluminum and steel cans (and possibly other materials). Collection systems can be set up to parallel other hospital collection. However, all collection containers should have child-proof lids.

Day-care areas can provide many opportunities for creative reuse of many materials often thrown out in other departments. For example, paper that has been used on one side in another department can be used for coloring. Also, many plastic trays and containers find a second life as toys in day-care units. Day-care personnel can be very creative in helping find uses for all kinds of materials that have previously been thrown out.

Laundry Facilities. If the hospital still maintains its own laundry facility, it could produce significant quantities of #2 HDPE plastics (detergent bottles), corrugated cardboard, as well as plastic and cardboard drums, and the usual white paper. All these could be collected and recycled. It is important that containers be cleaned out.

Mailroom. The hospital mailroom generates significant quantities of white, colored, and computer paper, which can be collected just as it is in administrative areas. Quantities of materials used can be reduced just by instituting a reusable mail-routing envelope system.

Satellite Offices, Physician's Offices. The hospital may maintain offices off-site (for example, drug counseling, health promotion office, day care, etc.). These areas are the recycling effort's responsibility as well. Often a hospital delivery truck or van visits these areas on a regular basis. An efficient haul-back system could be designed to pick up materials and return them to a central collection area at the hospital.

Step 3: Determine Purchasing Policies and Practices

The final waste reduction strategy is to purchase wisely. The purchasing director and the team should review purchasing policies and practices to ensure that, when possible, items purchased:

- contain recycled materials
- are reusable and/or recyclable
- use minimum packaging

Significant reduction can begin at the delivery door. Materials management/purchasing can specify packaging preferences, purchase in bulk, and negotiate with vendors to minimize wastes created. The buying power of hospitals, large and small, is incredible and can be used to effectively contain waste as it already contains cost for the hospital. Reduction efforts pay off, even for smaller facilities.

A Hospital Success Story: Saving at the Source

Itasca Medical Center in Grand Rapids, Minnesota, devoted itself to reducing as much of its waste as possible before recycling. As a result of reduction efforts alone, the hospital is "preventing" more than 238 cubic yards and 10,700 pounds of waste each year. Not including the savings from avoided disposal fees, these are actions resulting in a \$11,030 yearly cost savings for the hospital. From salad plates to rechargeable batteries to reusable underpads, this hospital examined its options product by product, and it worked.

Recycled products do not always cost more than other products. While paper made from recycled fibers has traditionally been more expensive than virgin paper, but now it is competitively priced. With recent improvements, there's no need to sacrifice quality when buying recycled products.

Many opportunities exist to use the hospital's buying power to reduce waste and encourage the growth of recycling markets, as listed below on an area by area basis. The team might contact current and new suppliers to discuss alternative products that meet your new purchasing criteria. You may wish to establish preferential purchasing policies, including:

- telling all suppliers that your facility is committed to the environment and encouraging them to participate in waste prevention and recycling
- reviewing existing purchasing policies to be certain they do not exclude the use of recycled materials and/or products designed to be reused or recycled
- modifying policies to promote procurement of products that: 1) are designed for long life (e.g. have long warranties and available repair services), 2) can be reused or recycled, 3) are made from recycled materials, and 4) have minimal packaging, if any
- providing a policy statement to your purchasing manager
- allowing price preferences for durable, reusable, repairable and recycled products, even if more expensive than comparable virgin items
- setting specific percentage goals for the amount of recycled products to be purchased. These goals are often met by purchasing a variety of recycled products, including corrugated cardboard, tissue products, packaging, office products, and other paper products
- requiring that certain items have a minimum percentage of recycled content
- allowing dual track bids from vendors offering recycled products and those offering virgin products, so each department has a choice in meeting their needs
- placing smaller orders to avoid shutting out manufacturers of recycled products who may be able to fill only part of an order
- purchasing recycled products in bulk beyond the needs of specific jobs, to decrease price

Consider these factors in the evaluation process:

- product lifespan
- warranty
- purchase price
- repairability
- reusability
- annual cost
- safety
- toxicity
- labor requirements
- weight and volume of waste
- recyclability
- recycled content

Test recycled paper for a wide range of uses to determine how well it works in your equipment and fits your needs. Consider using a blind test so that recycled and virgin paper products can be compared without bias.

Find out more about recycled products through the Buy Recycled Business Alliance (BRBA), a nationwide organization that is part of the National Recycling Coalition. BRBA educates about the value, reliability, and performance of recycled content products at no cost to members. Phase in your purchasing efforts. Many recycled content products are widely available and can be ordered in volume to suit your needs right away. Other items may vary in supply, but don't be discouraged! Maintain a regular dialogue with your suppliers so you can purchase recycled products as they become available.

Keep accurate records of recycled product purchases to identify successes and failures. Stay abreast of market developments and conduct annual reviews of your recycled product purchases, including information on purchases by grade, volume, price, and availability.

A Hospital Success Story: Reducing Product Packaging

Kaiser Permanente purchasing staff in Oregon have worked actively with vendors to reduce excess packaging in a variety of products. For example, Sherwood Medical used to pack its catheter kits in polystyrene foam, which was not recyclable in the Portland area. After Kaiser Permanente asked if recyclable packaging could be substituted, Sherwood Medical switched to corrugated cardboard. This also reduced the size of the package to require even less packaging.

Purchasing staff also noticed that goods were being delivered on odd-sized pallets, which frequently had to be disposed of. So they worked with vendors, such as Baxter, General Medical, Biddle & Crowther, and Owens and Minor, on an agreement to deliver goods on standard 48-inch by 40-inch four-way pallets. These standard pallets are now used by Kaiser Permanente for shipping and storage. When a surplus develops, the extras can be sold.

Buying in bulk has also reduced packaging and handling for Kaiser Permanente. Examples include purchasing 48 units of hand lotion at a time, instead of units of 12, and buying creamer in cases of 1,000 versus boxes of 50.

Finally, repacking and shipping supplies from Kaiser Permanente's warehouse to individual facilities generated a lot of cardboard boxes. To cut down on waste, staff now ship 50 to 70 percent of the volume of items leaving the warehouse in reusable, plastic totes. These totes are returned to the warehouse by the program's couriers and are reused again and again.

Reuse As a Source Reduction Strategy. Reuse used to be the rule. In the early part of this century, nearly everything was reused. And as few as 25 years ago, reuse was common for many materials. Preparing reusables was a time-consuming process, and concerns were raised about disease transmission. Today, many of the concerns that lead away from reusables can be addressed. However, cost, convenience, reimbursement practices, physician/nurse/staff preferences, and lack of access to reprocessing equipment at facilities are a few of the issues that come into play when serious consideration is given to returning to reusables. Health care costs are rising steadily and hospitals must be judicious in their allocation of dollars for equipment and supplies. Well researched efforts, however, are leading to the successful return to reusables in some settings. Successful examples of reuse, which are benefiting the environment and the hospital, include:

- dishware
- ventilator circuits
- resuscitation bags
- gowns
- underpads
- toner cartridges
- hypothermia blankets
- urinals and bedpans
- packaging totes
- sterilization trays
- decubitus care mattresses

The reuse/disposable controversy is not a simple issue and must be decided on a product-by-product and hospital-by-hospital basis.

In the Cafeteria. Provide employees with reusable hot mugs and sippy cups for: take-out drinks (give a discount to those who use them). Purchase reusable dishware for cafeteria and catering use. Provide reusable trays for take-out versus single-use disposable take-out trays.

A Hospital Success Story: Reusable Ware Even for Take-out!

The nutrition services department at the Medical Center Hospital of Vermont eliminated most single-use ware at the cafeteria and coffee shop operated by the department. The department started a program that encourages customers to use permanent ware for take-out service. The key to the program is the strategic placement of bus boxes throughout the facility. The bus boxes are located in each patient care unit and many departments throughout the hospital. When staff members take their lunch back to their work stations, they deposit the dirty dishes, trays, and glasses in the bus boxes. The bus boxes are then retrieved and replaced with clean ones by nutrition service workers. In some cases, a member of the unit or department brings the full bus box to the dish room for exchange.

For beverage take-out, the department sold more than 3,000 12-ounce insulated mugs imprinted with the hospital logo. Hospital staff who bring in this mug or any mug for a beverage refill receive a nickel discount off the regular price. Mugs are sold at a cost of \$1.25 each. Although the program will save the department money in the long run, the primary motivator behind the effort has been hospital-wide efforts to reduce waste.

In Patient Care:

- purchase mattresses with built-in egg crate pads rather than using disposable pads.
- use cloth underpads instead of disposable chux.
- purchase stainless steel bowls to replace disposable plastic ones.
- use cloth diapers instead of disposables
- revisit what is included in patient admission kits. Purchase only what is needed. For example, outpatients or brief-stay patients do not necessarily need a basin, pitcher, soap, lotion, toothbrush, comb, and so on.
- convert to reusable slipper socks or tie-on booties instead of disposable foam slippers.
- provide cloth exam gowns instead of paper ones.
- use cloth exam drapes instead of paper ones.
- consider minimal-size hard soap or liquid soap for patient bath purposes. Even small sizes currently issued by many facilities are wasted because length of stay is brief for many patients.
- provide cloth washcloths instead of disposable ones.
- consider the use of bedpans, urinals, and emesis basins made from recycled paper that can be placed in a disposal unit, pulverized, and flushed down the drain. (The Vernacare System is a good strategy, especially if the hospital currently uses plastic disposable human waste management products).

In Clinical Staff and Surgical Services:

- provide reusable gowns for barrier protection.
- use reprocessable ambu bags instead of disposables.
- use reprocessable ventilator tubing instead of disposables.
- amend surgical services policies to limit opening of excess materials until they are actually needed.
- request an annual update of physician preference cards to ensure that procedures do not generate unneeded waste in the form of opened, unused medical supplies.
- initiate a suture recovery/reprocessing program.
- reuse disposable products when possible. Products such as hypothermia blankets currently sold as single-use disposables can and do last more than one day. Consult with the hospital epidemiologist, the product manufacturer, and the accounting department to determine how (1) the item can be cleaned between patients, (2) product liability issues can be averted, and (3) charge for reuse of a disposable item can be captured. There is currently little incentive to do this, because the reimbursement system pays for a new one and designing the economics of charging for a used product requires factoring in the cost of reprocessing and tracking.

A Hospital Success Story: Reusable Respiratory Equipment Eliminates Waste

After careful evaluation, the respiratory care department at the Medical Center Hospital of Vermont in Burlington decided to invest in reusable resuscitation bags and ventilator circuit tubing. For this department it all came down to dollars and cents. On average, 12 cases of disposable resuscitation bags were used each week, an average of 72 bags. The cost of disposable bags was running \$1,152 a week, or \$59,900 a year. The department started by investing \$11,000 in 80 reusable bags to decrease the use of disposable bags from 12 cases to 4 per week. All bags are reusable except for those used in the ER and Code Cans. This step reduced the cost of disposable bags for the department to \$19,900 each year, an annual savings of \$40,000.

The unit then turned its attention to ventilator tubing. It used approximately nine cases per week, with six circuits per case for a weekly cost of \$162 and an annual cost of approximately \$8,425. The unit opted to invest \$36,000 in 105 reusable circuits, with an estimated four-year payback in avoided costs of purchasing disposables. Reusable tubing has a life of six to eight years. The pasteurizing system cost an additional \$36,000 (two pasteurizers, one dryer, and one cleaning assembly bench). Although this expense has a much longer payback period, it is rationalized by the fact that the savings on resuscitation bags has already paid for it in the department's overall budget.

In Administrative Offices:

- use remanufactured toner cartridges for copiers and laser printers.
- use remanufactured typewriter ribbons rather than buying new ones.
- print directories and employee handbooks in reusable binders; staff can recycle contents and insert new information into same binder.
- purchase or lease copiers with capability to do double-sided copying automatically. Train people how to do it and initiate a policy that requires all documents, memos, and the like to be double-sided.
- amend computer programs to provide access to documents and printing of documents to *only* those who actually need them; much excess paper could be avoided in this manner.
- encourage the use of phone mail, electronic mail, and other forms of nonpaper communication.
- route information rather than copy it.
- reconsider the use of forms. Can they be shortened? Can they be dual purpose? Observe the number and type of newspaper publications and professional journals available at the hospital. Are they all really necessary? Do away with those that are not.

In Labs:

- reuse slide holders again and again.
- reuse foam carriers for lab products for transporting specimens back and forth.

In Purchasing:

- voice concerns to manufacturers regarding excess or nonrecyclable packaging; put the concerns in writing.
- make certain that vendors performing work on-site are responsible for removal of waste they create in the process.
- put take-back clauses into contracts. For instance, request that vendors take back the pallets they deliver goods on.
- request product packaging that is compatible with the hospital's recycling program.
- buy in bulk.

4 Education And Promotion - Making It Happen!

Once you have designed your waste reduction program and made the necessary arrangements, it's time to make it happen! A successful waste reduction program relies not only on all the careful planning, but also on everyone's participation. To achieve a high level of participation, everyone must believe in the program, know exactly what to do, and be reminded often. It is environmental *awareness* that will help your program catch on among your diverse employee groups.

Step 1: Notify Personnel. It is essential that all employees are informed about the program and the importance of their involvement. To emphasize the program's high priority, begin with an announcement and endorsement from upper level management. This will demonstrate that the program has full management support. It will also capture employee interest and generate momentum for the program. The announcement should:

- introduce employees to waste reduction
- explain how waste reduction can benefit both the hospital and the environment
- describe the goals of the program
- outline the design and implementation stages of the program
- explain the potential for revenues and savings and where they will go
- courteously ask for participation
- provide dates and times of orientation sessions and who should attend each one
- list team member names and numbers to contact with questions, ideas, needs, or comments
- ask for suggestions and volunteers to help with implementation
- clearly but briefly explain each component of the program, what is expected of them, and the ease with which the procedures can be incorporated into daily routines
- list what is and is not acceptable for recycling

- include a reminder list and ask each employee to post the list in their area

The announcement should include information, such as phone numbers and instructions, to keep on file. Encourage staff to report overflows, ask questions, or request special assistance when they anticipate generating large amounts of recyclables. To reduce paper, the announcement should be double-sided or printed on the back of used paper. Employees who use electronic mail can be notified in this format rather than hard copy.

Sample Kick-Off Memo

TO: All Employees
FROM: The Operations Manager
SUBJECT: Waste Reduction Program

Our hospital will soon begin a waste reduction program. Our goal is to reduce the amount of waste generated and to recycle as much other waste as possible. This program presents a rare opportunity for everyone to contribute to a significant environmental improvement effort.

By reducing our waste and recycling, we can eliminate over half of all the waste that we currently send to the landfill. Sale of our recyclables will net revenues of approximately \$XX per ton. This is in addition to the fact that recycling conserves energy and natural resources and protects our overflowing landfill space. 50% of the revenues generated will be used for an employee appreciation event and 50% for hospital-wide improvements.

The waste reduction and recycling program will be simple; only small changes in our work habits will be required. Each of you will be asked to incorporate a few waste reduction measures into your daily routine. These measures are listed on the attached reminder sheet.

In addition, those of you in administrative departments will have a deskside recycling container for office paper. When the container is filled, please empty the accumulated paper into the designated box at conveniently located recycling stations on each floor. These stations will be clearly marked with the recycling logo and will be located at a place that you frequent in the course of your normal day.

A series of orientation sessions will be given to acquaint each of you with the program. A schedule of these is attached to this memo. Please plan to attend one of these sessions. Within the next week, program coordinators will set up the recycling stations. The attached list specifies what we will be recycling. Please familiarize yourself with this information.

The success of this program depends on your cooperation. If you have any questions, ideas, needs, or comments regarding the waste reduction program, please contact one of the waste reduction team members listed below.

Step 2: Orientation Sessions. Depending upon the size of your facility and the complexity of your waste reduction program, you may be able to effectively educate all employees by circulating memos or holding informal meetings. Larger facilities or more complex programs will require a full-scale training program. You may want to hold sessions for management first. Orientation sessions should be as convenient as possible for all employees, and should be mandatory. Avoid scheduling orientation sessions when staff may not be available, such as lunch hours, or at the beginning or end of the day. Reminder posters are helpful to advertise the orientation sessions. It may be necessary to provide bilingual information.

In the sessions, be sure employees are aware of exactly what is expected of them, the options being implemented, acceptable materials, changes in work patterns or equipment, and expected benefits. They must be well informed about any changes in system or equipment functions. Finally, waste reduction training

should be incorporated into your new employee orientation program and in job descriptions as they are updated.

A Hospital Success Story: Butterworth BEATs Waste

Butterworth Hospital in Grand Rapids, Michigan, is a 529-bed acute care teaching hospital that set out on a mission to reduce waste. Escalating disposal costs of 20 to 24 percent each year provided the incentive to form BEAT, the Butterworth Environmental Action Team. Through aggressive recycling and waste reduction efforts, Butterworth has reduced its solid waste by an amazing 33 percent.

A critical component of this effort was an early emphasis on reducing waste by not creating it. Some examples of the hospital's efforts and savings in this area include:

- the acquisition of durable pressure-relief mattresses that have eliminated the need for disposable egg crate pads, an acquisition that saved \$40,000 per year.
- sending toner cartridges out for remanufacturing rather than buying new ones. Savings: \$3,954 per year.
- washing and reusing disposable slippers until they wear out. Savings: \$5,000 per year.
- reusing plastic fracture pans and bedpans. Savings: \$2,160 per year.
- the laboratory has installed a distillation unit for reclaiming xylene and alcohol. Savings: \$1,700 per year.

Step 3: Continued Promotion. Ongoing education and visibility is important since the employee turnover rate is so high in facilities today. Keep employees apprised of the program's status and actively encourage their participation by regularly circulating or posting updates. Employees will feel a greater stake in the program if they receive frequent updates on the quantity of waste being reduced, reused, or recycled; the recycled products being purchased; and the cost savings that have resulted. These reports also might impress management, increasing their commitment to the program. Be sure to respond quickly to employees' questions and suggestions.

A great way to accomplish this is to designate a bulletin board in a prominent place where most employees will see it every day. More than one area may be required in larger facilities. Use this space in an eye-catching manner and post information in a format that can be quickly digested. Additional ways to get your message across include presentations or discussions at staff meetings, articles in employee newsletters, and notices on electronic mail. Topics to address include:

- reminders of proper procedures
- notices of changes in operation
- highlights of new recycled products
- participation rates
- quantities of recyclables that are collected
- revenues earned
- disposal cost savings
- problems/solutions
- requests for input (including suggestion sheets on bulletin boards)
- quotes of support from upper management
- departmental waste reduction success stories

Another method of promoting your program is visibility. Strategically placed posters and signs will serve multiple purposes by creating interest as well as reminding and informing. Managers or supervisors could sign the posters to endorse the program. Poster examples are:

- lists of acceptables/not acceptables posted above all central recycling containers
- posters over copiers reminding about double-sided copying and about making only as many copies as necessary
- signs at printers and in computer rooms, encouraging on-screen editing
- notices in the mail room and receiving, reminding to reuse and recycle packaging
- invitations to special "open" waste reduction team meetings, where employees can participate and offer input

- before and after photographs of trash and recycling areas

You might also consider holding special events, such as:

- slogan or logo contests
- incentive awards to employees most committed to waste reduction
- offering rewards for suggestions that are implemented
- special seminars on environmental topics

Step 4: Publicizing Waste Reduction Success. Spread the good news! Publicize your waste reduction success internally through hospital newsletters, meetings, and bulletin boards. Publicize your waste reduction success to patients and the community at large by highlighting it in brochures, presentations, advertisements, press releases, signs, or other promotional materials. Remember that "being green" is good for your bottom line; more and more people consider environmental responsibility to be an important quality in a health care facility.

5 Monitoring Program Success

Waste reduction is a dynamic process. Once the program is underway, the team should evaluate its effectiveness to ensure that goals are being met. Monitoring the success of your waste reduction program involves determining necessary adjustments by:

- reviewing program goals to see if they are being met
- soliciting employee feedback
- analyzing waste prevention measures to see if they have been effectively implemented
- evaluating progress in the purchase of recycled products
- monitoring participation in recycling
- reviewing collection procedures

Program monitoring is an ongoing effort of the waste reduction team. Team members should:

- express appreciation for waste reduction efforts
- address wasteful activities
- routinely screen wastebaskets for the presence of recyclables
- ensure that recycling container locations are kept neat and orderly
- ensure that central containers are emptied regularly
- screen containers for excess contaminants
- distribute reminders to those not participating in the program
- adjust recycling collection frequencies, container locations, and collection routes as necessary

Feedback from employees at all levels should be solicited at staff meetings and through a feedback form. The form should be simple but comprehensive, so that each employee will provide a full evaluation of the program.

In addition to ongoing program monitoring, full reviews should be conducted on a semiannual or quarterly basis. Conduct your first review one month after the program has started. These reviews will evaluate your facility's progress toward meeting your waste reduction goals. You may want to refine or expand them at this time. Consider establishing some long-term goals based on your experience. In addition, you will need to develop a plan of action to address needs that became evident during the review. The program coordinator should track the progress and effectiveness of the recycling efforts by recording:

- recovery and participation rates
- program operation costs
- revenues from the sale of recyclables
- amount spent on products with recycled content
- program problems, solutions, and successes

These records may provide information for ongoing publicity memos, progress reports for management, and help determine the average quantity of recyclables recovered per employee. All these data help portray the success of the program and generate additional interest and involvement.

Sample Recycling Reminder Notices

Observations in this area revealed recyclable materials in the trash can. This facility is now striving to recycle all office paper, corrugated cardboard and _____. Recycling saves energy, conserves natural resources, extends the life of landfills and reduces air and water pollution.

Please help promote our commitment to recycling by placing all recyclables (listed on reverse) in a designated container for recycling. If your work area/department does not have a recycling container, or needs additional containers, please contact a member of the waste reduction team, listed below.

Thank you for your cooperation.

Congratulations! You are doing a great job recycling in your area!

Your recycling efforts save energy, conserve natural resources, extend the life of landfills and reduce air and water pollution. Please continue your good work by encouraging co-workers to follow your excellent example.

Please contact a member of the waste reduction team, listed below, if you need additional containers or have any questions or suggestions.

Thank you again for your participation. Together we all make a *great team!*

6 References and Resources

The following materials were consulted in the preparation of this manual:

50 Simple Things You Can Do to Save the Earth. The Earth Works Group. Earth Works Press, Inc., Berkeley, California, 1991.

The Green Letter, The Hands-On Journal for Environmentally Conscious Companies. Tilden Press, Inc.

Guides to Pollution Prevention: Selected Hospital Waste Streams. U. S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, June 1990. EPA/625/7-90/009.

Guide for Reducing Solid Waste. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, November 1993. EPA/530-K-92-004.

Hospital Plastics Characterization and Recycling Feasibility Study. Cascadia Consulting Group, for the American Plastics Council.

Office Paper Recycling, An Implementation Manual. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, January 1990. EPA/530-SW-90-001.

Office Paper Recycling Guide. National Office Paper Recycling Project, The United States Conference of Mayors, 1991.

An Ounce of Prevention: Waste Reduction Strategies for Health Care Facilities. American Society for Healthcare Environmental Services, 1993

Recycling for Profit: The New Green Frontier. David Biddle. Harvard Review, November-December 1993. Reprint Number 93601.

Source Reduction Now, How to Implement a Source Reduction Program. Kenneth Brown, Minnesota Office of Waste Management, St. Paul, Minnesota, February 1993.

Waste Prevention - It Makes Good Sense! U. S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, September 1993. EPA/530-F-93-008.

Waste Prevention Pays Off, Companies Cut Waste in the Workplace. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, November 1993. EPA/530-K-92-005.

Waste Prevention Tools at Work. Jean Bonhotal, Cornell Waste Management Institute, Sherri Conway, Recourse Systems for the Environment, and Lynn Leopold, Tompkins County Solid Waste Management Division. Cornell University Media Services Resource Center, May 1994.

Appendix A: Sample Bid Contract for Recycling Services

Hospital Request for Proposals for Recycling Services

The Hospital is currently soliciting bids for the daily and weekly removal of collected recyclable items and/or items to be composted.

Your bid response must conform to the conditions and specifications as stated in this bid package. Any exceptions to the listed conditions and/or specifications must be clearly identified. Deviations from the specifications may be cause for rejection of your bid.

The Hospital reserves the right to accept or reject any or all bids.

This Hospital is a _____ bed hospital with _____ employees. We recognize that the hospital setting has special waste needs not encountered in other settings. The diversity of our non-infectious waste stream is somewhat different than regular MSW (see enclosure A) and therefore, the potential for recycling and waste reduction is great (see enclosure B). We are seeking a working partnership with a vendor to maximize our current recycling efforts and to expand to other materials during the course of the agreement.

This Hospital intends to award to the vendor who best addresses the overall needs of the hospital from both a service and cost perspective.

As part of the review process, a careful evaluation will be made of each bidders financial statements and annual report.

Any award resulting from this bid process will be subject to Hospital and the successful vendor entering into a signed written agreement.

Interested parties must submit their bids to I.M. Buyer, Purchasing Manager, Purchasing Department, Hospital, 123 Sun Street, Anytown, USA 12345 no later than August 7, 1992 at 4:00 P.M. Any bid received after such date and time will be rejected and returned to the bidder.

Pre-Bid Meeting. There will be a formal pre-bid meeting held on August 21, 1992, 10:00 AM in Purchasing Conference Room at the Hospital. Interested parties must attend this meeting. A representative from the hospital will take interested vendors on a tour of the institution to demonstrate our current recycling systems.

Proposal Format. Bids shall be submitted in a sealed envelope, plainly marked "Proposals for Recycling". Each bid must be signed and returned to The Hospital's Purchasing Department by the designated time.

Verbal Information. Bids shall not be based on verbal information from any employees of the Hospital. It is the responsibility of those submitting bids to be fully acquainted with all conditions and terms herein under. Failure to examine the premises shall not relieve the vendor of responsibility for the full performance of the contract terms. Failure to examine the premises is cause for bid disqualification.

General Terms and Conditions

1. Contract Period. The term of this contract will be for the time period October 1, 199_ through September 30, 199_. The contract may be renewed for one full year subject to mutual agreement of both parties.

2. Scope. This contract shall be to provide pick-up and hauling services, on predetermined schedules, for recyclable goods and items to be composted.

3. System for Removal of Recyclables. The Hospital shall provide its own in-house collection containers for recyclables (a combination of 60 & 90 gallon containers). The Hospital currently rents a 40 cubic yard, break away box recycling compactor. The current recycling compactor, utilized strictly for corrugated cardboard and #2 HDPE plastics, is filled and removed approximately every 6 days.

Bids submitted on the enclosed form, should outline costs for rental of a compactor and the associated hauling charges. Please submit as a second option, a bid assuming that The Hospital owns the compactor.

Vendor's equipment must be compatible with current space, mechanical and electrical facilities available. Any additional requirements needed to operate a vendors equipment must be provided for and by the vendor. In the case of hospital owned equipment, damage to the compactors by employees of the vendor, must be reported immediately to the Director to Housekeeping.

4. Recyclable Items and Collection System. The Hospital takes pride in its recycling program and expects continued growth in those efforts in the future.

A. The Hospital currently collects the following materials for recycling and expects all bidders to be able to handle these materials immediately:

- sorted white ledger
- mixed office paper
- newsprint
- computer print out
- corrugated cardboard
- metal and aluminum food and beverage containers
- HDPE #2 plastics
- PP #5 plastics
- clear glass

B. Recycling services for the following materials will be expected to be implemented beginning in 199_. The Hospital will provide internal containers for the collection of these materials upon consultation with the successful bidder. Each bidder needs to demonstrate a clear willingness and ability to handle the following materials:

- magazines
- catalogues, direct mail pieces
- telephone directories
- LDPE #4 (Stretch Wrap); miscellaneous containers
- bound books
- colored glass

C. Operating Room Materials. A specialized recycling program in the Operating Room will be initiated in 199_. Materials collected from this program are clean non-patient contact packaging materials generated from the surgical services of the hospital. (The diversity and volume of these materials is listed in appendix C.) These are primarily film and rigid plastic materials, all of which have been identified by resin

type. No bid will be considered unless allowances for recycling of these Operating Room materials are included. Bids may be presented as one of many options.

Option 1: Bid on collection of co-mingled, unsorted materials

- bid to include pickups as needed
- collection container (i.e. tractor/gaylord boxes)

Option 2: Bid on collection of sorted materials

- bid to include pick ups as needed
- bid to include collection container (i.e. tractor trailer/gaylord boxes)

At the Pre-Bid meeting specifics of this aspect of our recycling efforts will be discussed and reviewed. Markets for all materials have been available to bidders. The Hospital expects to recoup a percentage of revenues generated from the items to offset its costs.

As with all pick-ups requested in these specifications, pickups for these items must also take place on pre-scheduled dates and times. Because of the infancy of this effort, a schedule will be determined with the successful vendor.

The Hospital will be issued monthly reports on these materials from the recycling vendor. Reports will include an assessment of the overall operation, weights on specific material categories, and general market conditions.

In the case of a bid for co-mingled unsorted materials, the Hospital will be issued monthly written documentation of which materials are being recycled, stored for future marketing, and which are being landfilled. The Hospital reserves the right to require that materials NOT be incinerated due to emissions of the plastics into the environment.

Tracking of these materials will be required of the contracted vendor. Vendors must be willing to supply documentation of what materials, and in what volume, are going to each destination market. The information will be considered confidential.

Because of the uniqueness of this program, potential vendors are advised that the Hospital will require periodic access, scheduled in advance, to their facilities for photographic documentation and other purposes related to publicizing the hospitals recycling activities.

5. Cleanup. It will be the vendor's responsibility to keep the area (15 feet) around each recycling container free from waste spills and debris during the term of the agreement.

6. Contamination. The bidder should clearly outline quality standards for all materials collected and levels of acceptable contamination. A process should be clearly outlined for notification to the hospital of the hospital's contamination of goods beyond the acceptable standard. When contamination occurs, it is expected the vendor will take steps to assist and cooperate with the hospital in developing a solution to the problem.

7. Reporting. The hospital will require regular monthly reports, by material type, as to quantities recycled and revenues generated. These reports must be submitted in duplicate to the Hospital's Purchasing Office by the tenth (10) day of the following month.

8. Access to Containers and Compactors. All Hospital owned containers and compactors are/will be marked with hospital labels. Access to containers will be available to contractors as needed. In the event access to a container is blocked by other vehicles, the contractor will notify the Hospital's Housekeeping Department (555-2222) or Hospital Security (555-3333).

9. Schedule to be Maintained. All schedules as mentioned in these specifications, will be strictly adhered to. At varied times, additional pickups may be needed and those will be scheduled through and with

the Housekeeping Department. Any changes in the pre-established schedule must be coordinated and approved through Housekeeping Department. A back-up system for collection of any and all materials must be demonstrated by all bidders.

10. Insurance. The contractor shall provide, with their proposal, proof of insurance as stated below. The contractor shall secure, pay for and maintain in effect such insurance during the contract period as to protect the Hospital from claims under:

- workers compensation acts
- workers occupational disease act
- property and bodily injury (including death)
- general liability and product liability coverage with limits of not less than I million.
- hold harmless agreement. The contractor shall save and hold harmless the Hospital from and against all suits for claims that may be placed upon alleged injury (including death) to any person or property that may occur or that may be alleged to have occurred, in the course of the performance of this contract, whether such claim be made by an employee of the contractor, or a third person and whether or not it shall be claimed that the alleged injury (including death) was caused through a negligent act or omission of the contractor and at his own expense, the contractor shall defend any and all such actions and pay all charges and charges of attorneys and all costs and other expenses arising there from.

11. Cancellation. The Hospital reserves the right to cancel the contract at any time during the life of the contract if the performance of the contractor is determined to be unacceptable by the Hospital. Unacceptable performance includes, but is not limited to, missed pick-ups, inadequate reporting or not meeting the cleaning obligations herein under. The cancellation procedure will be in the form of two (2) written notices from the Hospital. The first notice is to advise the contractor of the unsatisfactory performance and to request corrective action. The final notice sent after thirty (30) days if corrective action is unsuccessful, will specify the date of cancellation of the contract. All written documents must be sent via registered/return receipt U.S. Mail.

12. Assignments. This contract cannot be assigned by the vendor to any other party without the prior written consent of the Hospital.

13. Confidentiality. The Hospital has a specific policy on information security (see appendix D). Potential contractors must show evidence that practices consistent with our Information Security policy will be enforced. All proposals are required to include the option of shredding confidential materials with costs associated with this service clearly outlined. Additionally, in the event Hospital opts to pre-shred its confidential materials, willingness of the vendor to accept such material is required. Paper that is rendered Non-Recyclable by the vendor, due to contamination, must be shredded prior to landfilling at no additional cost to the Hospital.

14. Reference List. Each vendor is required to submit a list of five (5) current customers that the vendor has been doing business with for a minimum of three (3) years. The list must include duration and scope of contract, contact person and telephone number. The Hospital may choose to verify this information with those listed.

15. Work Schedule. The Hospital requires full service Monday through Saturday, 7:00 A.M. to 5:30 P.M. including holidays, (special arrangements will be made when necessary). Additional service on Sunday may be necessary in unusual circumstances.

16. Hauling Charges. The hospital estimates, due to research and previous experience, that the successful contractor will be required to make pickups of the 40 cu yard recycling compactor approximately every sixth day. The compactor is currently used primarily for corrugated cardboard and #2 plastic. Charges and associated costs for each option listed below are requested.

Option A: Collected recyclables will be picked up daily or every other day from the Hospital, at a specified time. Collected recyclables will be in 60/95 gallon toter style containers. Food Waste for composting will be

in containers with a plastic liner. Contractor must be in a position to obtain and provide weights on all materials leaving the facility. Containers will be returned to the Hospital within 24 hours of pickup. Containers are to be clean and free of debris.

Option B: Collected recyclables will be picked up, no less than bi-weekly, from the Hospital at a location agreed to at the time of award of the contract. Recyclables will be stored in 60/95 gallon totes in a 40 foot tractor trailer to be provided by the contractor. The Hospital will transport its own recyclables to the site of the trailer. Food waste for composting will be picked up at the hospital by the contractor. Gaylord containers will be provided by the contractor for collection of loose plastics such as stretch wrap, PP#5, HDPE #2, etc.

If **Option B** is selected, a trial program will be established between the Hospital and the successful contractor. The purpose will be to determine the frequency of pickups and to address any additional issues associated with this option.

Option C: Collected recyclables (computer paper, newspaper, white office paper, colored paper, mixed paper, magazines, clear glass, aluminum and metal food and beverage containers) stored in a tractor trailer until the container is full. A second tractor trailer will be used to collect Hospital's plastics (PP#5, HDPE#2, LDPE#4, stretch wrap, Operating Room materials, etc) for recycling. The food waste component, (which has yet to begin operation) will have a separate path. Services for that project will essentially be limited to hauling materials to a designated site in closed, lined containers on a daily basis.

17. Payment. Terms of payment will be net 30 days, upon the approval of the invoice by the Director of Housekeeping. All invoicing submitted must include supporting documentation, as to the break down of all charges to be paid.

Bidder's Form. All bids must be submitted on this form. Bidders are free to include any other supporting documentation they feel better explains or enhances their bid. Blank lines indicate that the vendor does not charge for a particular service or does not expect to bill for any additional fees associated in providing that service. If a vendor does not provide a particular service, that must be indicated in that blank line.

1. Cost to the Hospital

A. Recycled Compacted Goods

Rental, 40 cubic yard compactor	Per Month
Hauling fee on 40 cubic yard compactor, rented	Per Month
Hauling fee on 40 cubic yard compactor, owned	Per Trip

B. Operating Room Recyclables Option #1 - unsorted materials

Pick-up fee	Per Trip
Container rental (per container)	Per Trip

Option #2 - sorted materials

Pick-up fee	Per Trip
Container Rental (per container)	Per Month

C. Collected Recyclables

Option A - Daily pick-ups at Hospital
Pick-up fee

Per Trip

Option B - Bi-weekly pick-ups/alternate site

Pick-up fee	Per Trip
Trailer Rental	Per Month
Container rental (per container)	Per Month
Corrugated Cardboard	Per Ton
Metal and Aluminum Containers	Per Ton

HDPE #2 Plastics	Per Ton
PP #5 Plastics	Per Ton
Clear Glass	Per Ton

Percentage of revenues generated by Operating Room materials rebated back to the Hospital	%
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All revenues returned to the Hospital must be documented and supporting by the reporting requirements outlined in the bid specifications. Revenues must be reported and paid monthly and can be submitted in the form of a check payable to the Hospital or as a credit on account.

Option C - Two trailer/alternate site	
Pick-up fee	Per Trip
Trailer Rental (per trailer)	Per Month

2. Revenues: Paid to Hospital

White Office Paper	Per Ton
Colored Paper	Per Ton
Newsprint	Per Ton
Computer Paper	Per Ton

Appendix B - Waste Reduction Strategies

General Tips

- Repair and reuse pallets or return them to suppliers
- Rent equipment that is used only occasionally
- Reuse worn out tires for landscaping, swings, etc.
- Purchase remanufactured office equipment
- Use rechargeable batteries
- Install reusable furnace and air conditioner filters
- Reclaim usable parts from old equipment
- Recharge fax and printer cartridges or recycle them
- Sell or give old furniture equipment to other organizations
- Use rechargeable batteries for TV remotes, beepers, etc.
- Conduct a water audit and find out which faucets are leaking and/or need low-flow aerators
- Consider automatic sensors to shut faucets off automatically
- Conduct a toilet audit, then install water-saving diaphragms, toilet dams, or low-flush model toilets
- Keep a separate bin for broken, unrecyclable glass
- Reuse or recycle solvents and other chemicals
- Reuse foam peanuts and other packaging

Energy Savings

- Use fluorescent lighting; use with reflectors in lobby and hallways
- Exit signs - retrofit with fluorescent, replace with LED
- Assign responsibility for turning off lights and equipment
- Complete caulking and weather-stripping - installed and maintained
- White ceilings with least texture reflect the light
- Insulate hot water holding tanks and hot and cold water pipes
- Service gas boilers and water heaters twice a year
- Consider heat recovery equipment on large air conditioning units to preheat water
- Use occupancy sensors in rooms that are infrequently used
- Install electronic ballasts and new bulbs when you put in reflectors
- Check hospital vehicles' tire pressure regularly to improve gas mileage

- Perform an energy audit and set a schedule to implement cost-effective changes
- Put thermostats on timers to save energy when the building is not occupied
- Turn off computers at night
- Turn off printers and copiers at night
- Purchase equipment with an energy-saving mode
- Install air-lock entrances

Purchasing

- Purchase local products
- Select vendors carefully (patronize those who have made environmental considerations)
- Buy recycled paper products
- Repair rather than buy; rent rather than buy equipment rarely used
- Require vendors to offer products with minimal packaging
- Require vendors to pick up packaging the day after delivery
- Evaluate all packaging coming in to determine parts that could be eliminated or reduced
- Require all packaging to be made with highest amount of post-consumer recycled content available
- Return containers to suppliers
- Exchange chemical drums
- Contact the Buy Recycled Business Alliance for recycled products listings
- Reuse packaging materials
- Make packaging materials or use shredded paper, scrap paper, etc.
- Ask suppliers to investigate use of non-toxic inks for printing on packaging
- Request unwaxed, unlined corrugated cardboard containers (totally recyclable)
- When a moisture barrier is needed, request a plastic liner that can be removed, or a recyclable alternative
- Improve the inventory system to control waste
- Advertise surplus items through a material exchange
- Substitute less toxic products
- Use more durable, recyclable, reusable products

Food Service

- Install energy efficient appliances
- Eliminate disposable tableware and polystyrene or plastic tableware
- Use the smallest paper napkins possible
- Use cloth napkins instead of paper when feasible
- Install low-flow sink aerators
- Use grease traps in all waste traps
- Eliminate individual packets of sugar, butter, jam, etc.; use refillable condiment dispensers
- Commercial, conveyor-type dishwashers should have an electric eye, so that water only flows when dishes are in conveyor
- Manual, pre-wash dishwashers use between .8 and 2.5 gpm, while automatic units ordinarily use between 3 and 6 gpm
- Install open-door buzzers on walk-in refrigerator doors
- Install plastic air curtains and air blowers over walk-in refrigerator doors
- Disconnect lights or remove bulbs in dessert and salad refrigerators in kitchen
- Install timers on hood fans, exhaust systems and hood lights
- Replace water-cooled ice machines with air-cooled ice machines
- Older water-cooled ice machines can be connected to your building's recirculating cooling water system if your system has the capacity.
- Service all gas-cooking equipment at least twice a year
- Use convection ovens instead of conventional ovens when possible
- Clean grills and grease filters daily for greater heat transfer
- Use paper straws instead of plastic
- Make chef aprons from retired tablecloths
- Reuse ice for plant and landscape watering

- Reduce the price of beverages for consumers who supply their own reusable cups
- Use bulk straw dispensers instead of individually wrapped straws
- Supply straws only for beverages served in bottles and cans
- Eliminate the use of lids on disposable cups for beverages consumed in restaurant
- Serve milk from self-service machines into reusable cups instead of individual cartons
- Require food preparation staff to wear cloth uniforms, hats, and aprons
- Compost or recycle food waste
- Use soda fountain dispensers instead of individual containers
- Donate excess food to shelters
- Post cafeteria environmental policy
- Ensure that all refrigeration units are sealed properly in order to contain environmentally-harmful coolants
- Use plastic or linen tablecloths instead of paper placemats
- Advertise without paper, when possible
- If menu changes frequently or daily specials are offered, use a chalk board or dry erase board
- For takeout service, use reusable dishes
- Charge a deposit for bottles and cans removed from the area
- Charge less for those who bring their own mugs or beverage containers

Outdoor Areas

- Exterior lighting - high-pressure sodium (yellow light); metal halide (natural light); mercury vapor (soft blue-white, moonlight); all are 50-1500 watts
- Put parking lot and walkway lighting on a solar timer
- Install motion sensors to turn lights on and off where appropriate
- Use live potted plants - those that require little water
- Sprinkler system - place on a timer, monitor for leaks; collect rainwater; use gray water for watering landscape
- Water during the cooler parts of the day (before 10 a.m. and after 5 p.m.) to minimize evaporation
- Direct rainwater from downspouts into gardens
- Plant native landscaping plants or "xeriscaping"
- Use 100% natural, biodegradable pest controls and fertilizers
- Compost or sell clippings as mulch
- Avoid using battery-operated appliances
- Use a mulching mower

Appendix C - Glossary

Baler - Compactor used to compress recyclables into bundles, reducing the volume.

Biodegradable - Able to be broken down into basic elements and compounds by microorganisms.

Brokers - Purchasers who arrange sales of waste materials or processed waste to processors or manufacturers.

Chlorofluorocarbons (CFCs) - Chlorine-based compounds used in aerosols, coolants in refrigerators and air conditioning, in fire extinguishers and as solvents; contribute to ozone-layer depletion.

Composting - Controlled decomposition of organic matter to produce a fertilizer or soil amendment.

Contaminant - Any non-acceptable material mixed in with recyclables, even if it is recyclable on its own.

Corrugated - Cardboard. In recycling language, these boxes are known as Old Corrugated Containers (OCC).

Disposal - Handling of solid waste for which no further use will be made.

Environmentally Friendly - An ambiguous term that refers to goods and services that have less negative impact on the environment than others; should include consideration of production, packaging, use and disposal.

Front-end Hauling - Smaller bins picked up by waste haulers; one price charged for pick-up and disposal.

Incineration - High-temperature combustion that produces gases and energy as a by-product of burning waste.

Landfill - A system of waste disposal in which the waste is buried between protective lining material such as plastic and compacted clay (formerly known as a garbage dump).

Market - A factory or distributor that buys materials recovered by a recycling program.

Package - A material or item to protect, contain, or transport a product or attached to a product for marketing or information purposes.

Polystyrene - A type of plastic foam used in disposable food containers such as coffee cups, plates, quick-service and egg cartons.

Post-Consumer - Recycled content that comes from materials that have actually been used by consumers. Many recycled products are made from factory scrap, which is good since it keeps that material out of the landfills.

Pull - Removing a load of waste or recyclables from your shipping dock.

Putrescibles - Garbage that quickly decays, such as food waste.

Recyclable - A material intended for the recycling process. On a packaging label, recyclable only means that a technology exists to recycle this material. It doesn't mean local haulers have a market for it.

Recycle - Any process by which materials that would otherwise be disposed of are collected, separated or processed, and then returned to the economic mainstream in the form of raw materials or products.

Recycled - Manufactured with recycled instead of virgin materials. Might or might not be post-consumer.

Recycled Content - The proportion of the package's weight made from recycled material.

Recycled Material - Reprocessed post-use and scrap material.

Reduce - To practice waste prevention.

Reuse - Using a product more than once, whether for its original purpose or for another purpose.

Roll-cart - A wheeled container such as a dumpster or smaller container.

Roll-off - A large box designed to "roll-off" and "roll-on" to a truck. It can hold 20-40 yards of material and can be subdivided into 3 or 4 compartments so that several materials can be collected simultaneously without commingling.

Solid Waste - Waste materials disposed of in essentially their original form by landfill or incineration.

Source Reduction - Reducing the amount of waste that must eventually be discarded. This includes minimizing the volume of products, minimizing the toxic substances in products, and extending a product's useful life. Also referred to as "waste prevention."

Source Separation - Keeping different materials apart from the start, rather than trying to sort them after they've been mixed up.

Tip Fee - The cost to dispose of waste at a disposal facility such as a landfill.

Waste Audit - A process that examines a waste stream, identifies its components, and makes recommendations on how to reduce, reuse, recycle, and better manage the waste stream.

Waste Disposal Facility - A facility for handling solid waste for which no further use is to be made. Options are landfill and incineration.

Waste Generation - The act or process of producing solid waste.

Waste Minimization - Any action to divert material from waste disposal facilities.

Waste Prevention - Minimizing the amount of waste generated by taking preventive measures.

Waste Reduction - Minimizing the amount of waste sent to the landfill, by implementing both waste prevention and alternative disposal (e.g., recycling).

Waste Stream - All the waste you and your establishment generate.

Yard - A cubic yard is the basic unit of measurement in the waste.