



The focus of this Guide is the development of a pilot to implement a comprehensive green cleaning program. To simply switch out a single low-impact product like glass cleaners, you may not need a full-blown pilot program—as described here. For information on green cleaning product specifications and certification, or for tips on contracting for green cleaning with outside cleaning services—see H2E’s Environmentally Preferable Purchasing webpages.

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## Green Cleaning Implementation

### Introduction: Why Green Cleaners?

Since Florence Nightingale first helped make the connection between cleaning and improved health outcomes, health care workers and the cleaning industry have responded with a wide array of effective and economical products and processes. However, we now know that some of these older and traditional cleaning products and processes can negatively impact both health and the environment. Today, new, less toxic cleaning products are becoming an integral component of a healing environment by: 1) reducing stress on the building’s occupants, 2) improving safety and 3) contributing to improved ecological health.<sup>1</sup> To understand why this is so, it is useful to review cleaning products’ documented impacts.

#### Patient and staff comfort

Cleaning products are a major contributor to indoor air quality issues in closed environments. Many contain high levels of volatile organic compounds (VOCs) which can give rise to respiratory irritation, headaches and other symptoms in workers and building occupants.

#### Worker health and safety

An estimated 35% of conventional cleaning products can cause blind-

ness, severe skin damage or damage to organs through the skin. A review of Washington State workers compensation data indicated that the average reported injury costs companies \$625 in lost time and medical expenses.<sup>2</sup>

#### Environmental damage

Some ingredients in cleaning products are associated with eutrophication<sup>3</sup> of streams and toxicity to aquatic organisms. VOCs released from cleaning products contribute to smog formation, and VOC content is regulated in some jurisdictions for this reason.<sup>4</sup> Other ingredients, such as alkylphenol ethoxylate surfactants, persist in the environment (don’t break down completely) and may interfere with the hormonal system of exposed organisms, which can cause a wide variety of health issues.<sup>5</sup>

#### Long term health issues

Many cleaning products contain carcinogens (known to cause cancer), asthmagens, and substances associated with reproductive organ damage, birth defects, kidney damage, neurological impacts and other serious health effects. Janitorial workers also experience very high rates of occupational asthma—625 cases per million workers in one study, or more than twice the rate for any other occupation.<sup>6</sup>

**Cleaning Issues in Healthcare** Infection control is serious business. An estimated 88,000 deaths per year have been found to be caused by nosocomial (hospital-acquired) infections.<sup>7</sup> Because of this, hospital staff and administrators often react anxiously to suggested changes in cleaning practices.

Yet many current cleaning practices are based on perceived rather than actual risks. For example, many hospitals respond to high infection rates by using disinfectants in almost every area, and on almost every surface. According to the Center for Disease Control and Prevention, however, no epidemiologic evidence supports over-disinfection. Microorganisms are a normal contaminant of walls, floors, and other housekeeping surfaces, and are rarely associated with direct transmission of infection to patients or personnel.<sup>8</sup> In addition, many expectations about cleaning—shiny floors, strong fragrances—have more to do with marketing of cleaning products than they do with actual cleanliness or low rates of infection. To adequately clean facilities and maintain low rates of infection, we need to distinguish between actual efficacy and assumptions based on customary practice.

This Guide outlines a simple 10-Step approach to implementing a comprehensive green cleaning program. It is designed for busy staff people in environmental services or housekeeping who don't have a lot of time to spend reading background material. The Guide includes policy development, careful selection of products, staff training, standardized operations, adequate equipment and supplies, and monitoring of innovative efforts.

## Ten Steps to Implementing a Green Cleaning Program

### Step One: Form a Team and Gain Commitment

Cleaning practices may involve changing long-standing protocols (whether based on “it’s the way we’ve always done it,” or lack of knowledge about newer technologies). A comprehensive green cleaning program requires collaboration with a multi-disciplinary team, including background research, careful implementation and oversight. First define and clearly articulate the objective of the effort to transition to greener cleaners, based on—for example, improved indoor

air quality, worker and patient safety concerns and/or improved environmental performance. The specific action items will become better defined as the project progresses but having a stated goal will assist in getting support. Identify facility champions who will support the objective. “Usual suspects” may include environmental services, housekeeping supervisors and staff, nursing, employee health, and public affairs as well as EH&S staff and purchasing personnel. Of course it is essential to include Infection Control and other high-level staff who may have concerns about the changes, including operating room and/or emergency room staff. Some members will be responsible for the technical review and decision-making process, some for training or communication coordination, and some simply as cheerleaders within your organization.

Once the initial “team” is in place, gauge the level of support from all members of the team. Participation and support from senior-level administration may mean less time spent convincing staff to participate, and will allow the project to advance faster. If lower levels of support are encountered, it may require that the project move more slowly and methodically. Identify potential barriers as you develop a specific plan of action.

Set up a system to measure and report progress through Infection Control or Environment of Care committees, or through a Safety Committee or “green team.” Performance can be measured as an H2E goal and as a Performance Improvement Indicator (PI) for the Joint Commission.

### Step Two: Review Current Products and Practices

Quality improvement initiatives typically require doing a baseline assessment before implementation, in order to measure progress and improvement.

#### Inventory Cleaning Products

First, review purchasing records to determine current inventory of cleaning products. Next, conduct a walk-through survey to determine what products are being

Hospitals that have transitioned to greener cleaners, such as Hackensack University Hospital, have not had an increase in nosocomial infection rates as a result of greener cleaners.

purchased outside of central purchasing. Add these products to your inventory. (Try to determine where these products are coming from and why. Consider confiscating all products not approved by the facility at a later date, when your project is fully underway.)

- Record the following information for each product purchased or found during your research:
  - Product cost—to be used later when comparing alternatives
  - Manufacturer, vendor and/or distributor information
  - Material Safety Data Sheets (MSDS) and label warning language
  - Personal protective equipment (PPE) requirements
  - Special handling and disposal requirements
  - Where the product is used and for what application
- Identify any products that have been linked to worker injuries or staff or patient complaints.
- Investigate whether specific products have been implicated in any regulatory compliance issues.
- Note areas where unapproved items are being used, or unusual quantities are found, etc.

Transitioning to a safer cleaning protocol is also an opportunity to standardize practices among multiple sites and improve efficiency, something JCAHO looks for when surveying facilities with multiple sites.

### Inventory Cleaning Equipment

This step shouldn't yield any surprises, but quantifying your tools and equipment, including paper products, is an important step when addressing process changes. Record the following information for equipment found in your research:

- Number and types of equipment located in different departments
- Purpose each piece of equipment is used for and how often it is used
- Identify type of filtration on vacuum cleaners
- Determine if high speed floor machines use vacuum attachments
- Investigate what treatment—laundering, disinfection, disposal—different cleaning tools require, to compare with proposed alternatives

### Review Policies and Operations

Review processes currently used in your facility, including:

- Body fluid spill cleanup policy, as required by OSHA
- Disinfection policies, including where EPA-registered products are required.

## Step Three: Evaluate and Categorize Facility Areas

Identify critical, semi-critical and non-critical care areas facility-wide, to strategically determine the need for disinfection versus general cleaning, and to develop thoughtful and effective cleaning protocols. The CDC offers helpful guidance on characterizing the different areas of health care facilities according to level of criticality.<sup>9</sup>

**Critical care** areas include the operating room, isolation rooms, and acute care areas, and should be disinfected as part of the cleaning process. Disinfection is necessary for surfaces or equipment that will come into contact with broken skin or mucous membranes. CDC recommends these critical care surfaces be cleaned, then disinfected. Use EPA-registered intermediary grade disinfectants that kill pathogens causing TB and Hepatitis B<sup>10</sup> if the surface is contaminated with blood or body fluids. When identifying surfaces to disinfect, consider level of hand contact and likelihood of body substance contamination.

**Semi-critical** areas include exam rooms and a variety of treatment rooms. The multi-disciplinary team can identify which areas are semi-critical, since this category can vary from hospital to hospital. Identify rolling stock and high touch items, and decide as a group which ones require disinfection versus just thorough cleaning. Open up the discussion to really examine current practices. For example, as

Remember to stress the importance of hand hygiene as you change cleaning protocols. Proper hand hygiene will do more to reduce infection than any other activity, including disinfection. For more information and training materials, see <http://www.cdc.gov/handhygiene/>

soon as someone touches a disinfected surface, it is no longer free of microorganisms. Is it worth disinfecting door knobs, then, when they are touched so frequently? Is disinfection of doorknobs a science-based method of prevention?

**Non-critical care** areas such as offices, waiting areas, hallways and the cafeteria, should be cleaned with general cleaners and need little disinfection. Interestingly, non-critical care areas account for anywhere between 45% to 65% of the average facility.

**Patient Rooms** present a wide variety of needs depending on the potential for infection posed by specific illnesses and conditions, and will require the team to evaluate and discuss the appropriate level of disinfection and cleaning necessary on a case-by-case basis.

In addition to non-critical areas, there are numerous non-critical items that either do not touch the patient or touch only intact skin—these do not need disinfection. These items may include patient care products and room surfaces such as bed boards, visitor chairs and wall coverings. Discuss the full array of patient care items with Infection Control staff to assess which may be treated as non-critical.

Working with facility drawings, identify critical, semi-critical and non-critical care areas by color—red for critical, yellow for semi-critical and green for non-critical care areas. This information can be shared with staff to ensure understanding of where different cleaning/disinfection protocols will ordinarily be used.

## Step Four: Determine Evaluation Criteria for Products and Operations

### Review Product Attributes

Confirm performance and environmental criteria goals identified in Step 1 and include additional criteria developed since the project started. Evaluate the different methods for assessing required cleaning product performance and environmental attributes. Remember that using third parties—your GPO, a certifying organization, or a procurement entity that has done

product testing and verification—may streamline and simplify your choices. It is crucial to include Infection Control in this part of the process, as they need to feel comfortable with the efficacy, as well as the environmentally friendly aspects, of the new products chosen.

### GPO Contracts

Work with your Group Purchasing Organization (GPO). They may have done a lot of the background work for you by developing green cleaners contracts or including environmentally preferable alternatives in their general cleaning contracts. What options do you have through your current contracts? What criteria did the GPO set to qualify products to be termed “green,” and how were vendors’ products evaluated? Have other members been satisfied with the products available on contract?

### Certified Products

Using third party environmental certification such as Green Seal or Canada’s Environmental Choice program as a product screen takes a lot of the guess work out of product selection. Third party certification provides assurance that a product has been independently tested and found to meet criteria which verifiably reduce its negative environmental and health impacts. It also ensures that a program of repeat verification and factory inspection is in place to ensure continuing compliance. If a product is certified by Green Seal under the GS-37 Standard for Institutional Cleaners, or the GS-40 floor care products standard, for example, you can be sure it has met numerous health and environmental criteria and that it has been evaluated for successful cleaning performance as well. Check with your current cleaning product vendor or GPO to see if they carry Green Seal or other certified products, or specify Green Seal yourself. Non-certified products may also meet the certification criteria, but will require more work on your part to review and compare vendor lab data to the standard or have them tested by a third party.

For more information on Green Cleaning specifications and certification organizations, see the Green Cleaning section of H2E’s EPP webpage.

### Operations Changes

In addition to determining desired product criteria, consider physical plant and process changes, and new tools. Preventive strategies like removing absorbent materials (i.e. carpet) from areas where moisture is present to address mold contamination; or reducing

Cleaning of walls and blinds should only be done when visibly soiled, and then, only upon patient discharge.

soiling and wear on floor surfaces by installing walk off mats at all entrances, can reduce the need for cleaning with harsh chemicals. Eliminating spray application in favor of pour and wipe products wherever possible can significantly reduce airborne contamination inside your facility. Reducing the frequency of floor-finish buffing, which can aerosolize finish polymers and cause respiratory problems, and using buffing equipment with active vacuum attachments, can minimize patient and staff exposures. New tools such as microfiber mops and automated equipment such as autoscrubbers and extraction machines can significantly reduce chemical and water usage as well as improving the ergonomics of floor cleaning—decide if you want to incorporate them into your pilot project as well.<sup>11</sup>

### Step Five: Select Products

When the critical, semi-critical and non-critical care areas of the facility, and the attributes you want alternative products to possess have been identified, it is time to select and prioritize cleaning products to trial. Make sure you stick with the performance and environmental criteria you identified, and require proof, not simply an assurance from a vendor, that a product meets your criteria.

The committee may identify some product changes that can be implemented immediately, facility-wide, without intensive review. For example, glass cleaner is not critical to patient or staff safety, and many environmentally preferable alternatives are available, so you might want to simply select a certified glass cleaner and transition immediately. Other products such as disinfectants will take serious time and study.

When selecting products, make sure to compare their cost to that of conventional cleaning chemicals on a per-cleaning rather than per-ounce cost basis, and include an estimate for avoided costs for worker protection, special handling, or disposal issues. Many users find that green cleaners that employ one solution at different concentrations for multiple cleaning tasks can save closet space, help staff avoid confusion and reduce costs.

- **General Cleaners, Toilet Bowl Cleaners, Carpet Cleaners and Glass Cleaners** are certified under Green Seal's GS 37 standard,

which requires products to meet numerous health, environmental and performance criteria. Aside from toilet cleaners, these products are not essential to maintaining infection control standards. They may be the first group of alternative products you wish to incorporate into your operations.

- **Floor strippers and waxes**—These products are the source of many indoor air complaints, triggering symptoms such as nose and lung irritation, rashes, headaches, nausea, and asthma in workers and building inhabitants. Traditional floor-finish strippers can have VOC (volatile organic compound) levels between 15% and 30%.<sup>12</sup> Alternatives are available—for example, Green Seal's GS40 floor care standard identifies floor strippers and finishes that have (among other attributes) low VOC content, low aquatic toxicity, no heavy metals or phthalates, no ozone-depleting chemicals, and that meet stringent performance requirements. The list of certified products has grown rapidly since the standard was finalized in 2005.
- **Disinfectants**—Because all disinfectants have toxic properties, green cleaning in this area consists of appropriate and limited use of disinfectants on an as-needed basis. Disinfectants are toxic by design in order to kill pathogens. Because of this, there is always a risk of side effects when using disinfectants. For example, bleach (sodium hypochlorite) is an effective treatment against bloodborne pathogens, but is also highly corrosive and a respiratory irritant, which makes it dangerous to workers, damaging to many surfaces, and toxic when released to the environment. (In addition, bleach may be contaminated with low levels of mercury during manufacture.) Other disinfectants have their own strengths and risks. While we can't always eliminate their use, we

**Disinfection 101**— Remember, surface cleaning is required prior to disinfection. Disinfection without cleaning is ineffective!

Surface cleaning requires a detergent, water and mechanical action, like scrubbing to remove visible dirt, organic material and bacteria. Combination disinfectant/cleaners may cause maintenance personnel to ignore proper residence times for disinfectant ingredients, or lead to excess disinfectant use.

For this reason, separate products may be preferable in many instances. If using combination products, be sure to train cleaning personnel to use specified amounts (more is not better) and observe disinfection residence times.

should limit disinfectant applications to the appropriate setting, amount, and target organism. When selecting disinfectant products, care should be taken:

- to choose a product specific to your disinfection needs,
- to assess and minimize risks to patients or staff,
- to thoroughly clean before use, and
- to use the product in the most effective manner.

Some disinfectants, while highly effective, may pose too much risk to be appropriate in certain settings—for example, phenolics should be used sparingly and with extra precautions—if at all—in neonatal or pediatric care units, since infants and small children cannot metabolize them.<sup>13</sup> More is not better with disinfection. Use of excess product, or broadcast application of products when targeted surface treatment would be effective simply increases occupational and environmental risks without increasing effectiveness.

## Step Six: Develop a Pilot Plan

After having evaluated cleaning area categories and specific products with which to begin your program implementation, develop a plan to pilot your choices. You will need to:

- Identify the area(s) where a pilot will be implemented—you may choose all non-critical areas to start, or a mixture of levels of criticality to assess applicability to different environments
- Determine your evaluation criteria—do you simply want general feedback from housekeeping staff? Do you need to do bacterial swipe tests? Do you need to assess the impact of specific events/conditions (i.e. winter weather)? Balance your need for detailed assessment against your ability to devote time, energy and money to following through.
- In addition to alternative cleaning chemicals, are you also implementing process changes? If so, consider how new processes or tools may impact the evaluation of the new cleaning chemicals. How can you control for one aspect of the program when evaluating another?
- Develop pre-implementation and post-implementation surveys for facility staff, patients and visitors based on your team members' concerns. Questions might touch on perceptions of cleanliness, presence or absence of reactions to current products and alternatives, and convenience of product usage. You

may wish to develop separate surveys for maintenance staff, including these questions and some additional inquiries about ease of use and changes in the amount of time needed for specific processes. The surveys can be as simple or detailed as the team feels is necessary, but they should not be too complicated or time-consuming for respondents to fill out, since you want a good response rate.

- Determine how you will solicit ongoing feedback during the pilot. A suggestion box? Poster with an email address? Will you interview staff and patients about their response to the changes in the area? Who will be responsible for fielding suggestions or complaints, and how will they be addressed by the team? (In an optimal situation there will be no questions or complaints, but it is best to plan ahead!)
- Determine your time frame for implementation and assessment of the pilot project—make sure it is long enough to allow people to become accustomed to any changes, so that your assessment is not based on first impressions, but on performance over time. Most pilots last approximately 3 months, but some items such as floor care products may take longer to assess performance.

## Step Seven: Execute Your Pilot— Training and Feedback

Even effective green cleaners may need an adjustment in cleaning protocols, and the switch could be a disaster without an effective training and education program. Change is a challenge, but the more people understand, the easier the shift in culture—and facilities can take this opportunity to improve general training and awareness for cleaning staff. So educate, educate, educate! And make sure education is multilingual in case your facility employs staff with limited English.

Product vendors should have training materials and programs to offer you (this is one of Green Seal and other groups' certification requirements). Training should address proper dilution, labeling, standardization of practice, appropriate residence time for disinfection and cleaning products, and any protective equipment requirements. Cleaning protocols for the new products should be posted in janitorial closets to refresh on methods of practice—remember, some housekeeping staff may respond better to graphic training materials rather than extensive text. Vendors should also be able to offer help with communications—by helping staff to

**Proper Labeling** – OSHA requires labeling of all products, including any spray bottles used for diluted product. Worker injuries and failed cleaning can result from improper labeling.

**Proper Dispensing** – Dispensing systems can aid in proper dilution of chemicals, reduce worker exposure, eliminate spills and reduce waste. Make sure workers have information on proper dilutions and are comfortable using the system.

develop posters, newsletters, door hangers and policy memos from leadership, and presenting the program to any and all committees from the Board of Directors, to Labor Relations, to Nursing Leadership to Department Heads!

During the course of the pilot, make sure a designated member of your Green Cleaning team maintains regular communication with key staff in the area where the pilot is taking place. If there are any complaints or questions, make sure you field and respond to them immediately, before staff become frustrated by a lack of assistance. Keep in touch with your manufacturer's rep(s) and get their help with diagnosing and remedying any issues that arise. Revise procedures and training materials as needed.

## Step Eight: Pilot Evaluation

Pre-pilot surveys allow you to develop a baseline for staff and patient response to cleaning methods and products before starting your pilot effort. When your pilot has run for the designated time period, begin the next assessment phase. It is not necessary to stop using alternative products during this phase—your assessment may show that they have worked really well—but it is important to gain some detailed information about how the changes have been received, and whether they have succeeded at the level of performance. This will provide support for expansion of the pilot to full-scale implementation, or let you know that there are aspects that need to be worked out before expansion is possible.

- Administer post-pilot surveys to obtain information about staff, patient and visitor reactions (if any) to the changes. These can be the same survey administered before the pilot.
- Survey janitorial workers, nursing staff and others

who may be involved with the pilot to see if they have any issues or concerns about using the new products, tools or processes.

- Evaluate any objective data you have gathered during the implementation phase—rates of chemical usage, water usage, bucket changes, mop heads laundered, and so forth.
- Use the results of your surveys to identify those products or processes that are highly successful, and to flag those which did not work as well, and need to either be readdressed or dropped in future efforts.
- Make sure to solicit feedback from those who expressed reservations about the pilot to ensure that they feel heard and respected—perhaps their concerns have been allayed by the process, or perhaps they still have doubts which need to be integrated with more positive feedback to develop a fair assessment.

## Step Nine: Celebrate Success!

- Take advantage of opportunities for positive press, staff recognition and for taking the lead in creating a healing environment for staff, patients and visitors. Assuming your pilot has gone well and you expect to expand your green cleaning program, you will want to spread the word to build support and understanding for the changes ahead.
- Develop a case study on your pilot program, including information on why green cleaning is important to the environment and to building occupants' health; information on the products and tools selected for the pilot; a narrative of how the pilot proceeded, with quotes from maintenance workers, other facility staff, patients and visitors about their reaction to the new procedures.
- Develop materials to use in future green cleaning projects—for example, door hangers to explain the program to patients and visitors, intranet web/newsletter materials to explain to staff what areas will be transitioning next. And in collaboration with your public affairs department, develop materials to inform your local or regional press about the successful implementation of green cleaning in your

facility, and highlight how it reduces toxic releases to the local wastewater stream and increases patient and staff comfort.

## Step Ten: Expand your efforts

Institutionalize your pilot effort—set general purchasing standards in your facility cleaning chemicals contracts that exclude products containing toxic chemicals in favor of the alternatives you have successfully used. Expand your training to all housekeeping/janitorial staff and implement your successful green cleaning programs facility-wide. All non-critical areas should be immediately included in this expansion—your team can determine which semi-critical areas, and which aspects of critical areas can also be included in expansion.

Broaden your environmental quality improvement initiative by looking at other opportunities within Environmental Services and Housekeeping. Take a look at the entire process and you will be in the best position to see opportunities for improvement. Some examples:

- Green building material choices and cleaning protocol changes can reduce the frequency of floor finish and stripper use.
- Paper products and plastic garbage bags and cans can be procured with recycled content
- Fragrance-free products can reduce impacts on those sensitive to fragrances
- Microfiber mopping can offer water reduction and ergonomic improvements
- Buffing floors can aerosolize polymers and expose staff and patients—consider alternative floor care techniques and equipment
- Waterless hand soaps can be purchased in non-pressurized cans that reduce exposures and do not constitute hazardous waste when disposed of
- Integrated Pest Management strategies, including specific housekeeping protocols, may significantly reduce use of toxic chemical pesticides in the facility

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### FOR MORE INFORMATION, CONTACT:



P.O. Box 376  
One Lyme Common  
Lyme, NH 03768

Phone: 603-795-9966  
Fax: 866-379-8705  
[www.h2e-online.org](http://www.h2e-online.org)

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