Subject: Draft Safer Chemical Management Procedure **Policy Reference:** FB **Strategic Plan Goal Reference:** Goal 5	**Date:** July 10, 2008 **Enclosures:** 5 **REASON FOR CONSIDERATION:** Action Information **X**

Background (Purpose)

In 2005, the School Division and Local Government established independent Environmental Management Systems ("EMS") that utilize a framework of policies and standard operating procedures. Both the Division and Local Government have appointed EMS Steering Committees to review EMS policies and to provide guidance to their respective Environmental Compliance Managers.

Over the last few years, Building Services, General Services and Parks and Recreation have been testing and using safer alternatives to traditional synthetic cleaning products, pesticides and herbicides as part of their EMS work and in response to an increased stakeholder interest in the types of products routinely used by the County.. Staff have significantly reduced the volume of synthetic products used on grounds and in school and local government facilities, replacing many of these products with green certified and organic alternatives. In addition, they have made significant strides toward implementing safer chemical management practices.

In June, 2007 the Board of Supervisors directed the County Executive to work with the Superintendent to create a a joint Division/Local Government committee to develop a policy that would further implement safer chemical management practices. Shortly thereafter, the Safer Chemical Committee ("SCC") was formed and has held nine meetings since June 2007. Division membership included the Environmental Compliance Manager, the former Assistant Director of Building Services and the Assistant Director of Custodial Services, as well as the County's Occupational Health, Safety and Wellness Manager. The SCC has developed a draft Safer Chemical Management Procedure ("Procedure") (Attachment A) for inclusion in the policies of the two Environmental Management Systems. Local Government staff presented the attached draft EMS policy for information and comment by the Board of Supervisors on June 4, 2008.

The same draft procedure is being submitted to the School Board for its information and comment. As with Local Government, this procedure would become a component of the Division's existing EMS policies.

Administrative Consideration (Rationale)

Procedure

The Procedure is a draft operational procedure intended to be implemented as a component of the Division's overall Environmental Management Policy, and promotes the use of non-chemical methods and safer product alternatives in day-to-day County operations and activities in lieu of using traditional, synthetic products. The Procedure advocates replacing traditional and synthetic chemicals with non-chemical methods and less-toxic product alternatives. Implementation of the Procedure would be managed at the department level. In summary, the Procedure stipulates: 1) custodial products be certified by Green Seal™, Green Guard™ or Environmental Choice™ (See Attachment B), or meet outlined criteria; 2) high-touch surface areas (e.g. bathrooms, kitchens) be routinely sanitized or disinfected as deemed appropriate by the manager overseeing custodial operations, and that disinfection occur as soon as practicable in response to a blood-borne pathogen event or viral outbreak, or as directed by the Department of Health; 3) chemical usage be eliminated when practicable and feasible in grounds management; if chemicals must be used, then organic or biological-based alternatives be used, with 5 outlined exceptions; and 4) the County implement a formal integrated pest management (IPM) program by August 2008 for the management of

indoor pests (See Attachment C). Additionally, sections 3(F) and 3(G) of the Procedure provide a waiver process for situations requiring the use of a product that does not meet the specifications and criteria of the Procedure, or for emergency situations. Lastly, the Procedure requires an annual audit to be conducted by the Environmental Compliance Managers, with a report of the annual audit being provided to the School Board for their review and information.

Environmental, Health and Safety Benefits

Implementing the Procedure will support the Division's commitment to continual environmental improvement and to safety. For example, Green Seal™ requires that its products in *undiluted* form not be toxic to humans, not contain carcinogens, and not contain any ingredients known to cause reproductive toxicity or skin or eye irritations. Green Seal™ certified products cannot contain substances that contribute to the production of photochemical smog, tropospheric ozone, and must not exceed thresholds outlined in the Green Seal Standard (GS-37) for volatile organic content. Please see Attachment B for a more detailed description of green certified programs and their requirements.

Routine Disinfection

The administration of routine disinfection was a point of much discussion, research, and some contention within the Committee. Both school division and local government buildings have historically been routinely disinfected, specifically "high touch" surface areas in restrooms and nurses' stations in schools. Two committee members voiced concern regarding this practice, and suggested that the County routinely and thoroughly clean, but only *disinfect* in the case of a blood-borne pathogen incident, or in response to a viral outbreak such as MRSA. Their concern is based on the idea that employee and student exposure to the disinfecting chemical could result in short and/or long-term adverse health effects. The majority of the Committee, however, supports the continuation of routine disinfection in the aforementioned areas based on the following considerations: 1) several peer-reviewed journals (Attachment E) reveal health benefits from disinfection; 2) the products used in both school and local government buildings are diluted so that they have a Hazard Materials Identification System (HMIS) health rating of one ("Slight Hazard: Irritation or minor reversible injury possible) according to the Material Safety Data Sheet (MSDS); 3) the products are used according to the label, after hours, and with the appropriate personal protective equipment; and 4) the School Health Advisory Board recommends the continuation of routine disinfection. The School Division is researching the use of another disinfectant with an HMIS health rating of zero ("No Significant Risk to Health"). The majority of the Committee recommends the continuation of routine disinfection allowed at the discretion of custodial supervisor, and as written in the draft Procedure as Option "A", whereas two Committee members support Option "B" (See Attachment A, pg. 2). At its June 4th meeting, the Board of Supervisors provided guidance to Local Government staff favoring the use of Option "B."

Implementation Timeline

The Committee believes that complete implementation of the Procedure can occur by January 1st, 2009. This approximate six-month time span would allow the various departments to phase out existing products that do not meet the Procedure specifications. It is important to note that the affected departments are currently *only procuring* products that meet the standards outlined in the Procedure. In addition, departments have in large part already made many product substitutions and have begun implementing some non-chemical-using practices.

Since the Committee last met, the County Attorney's Office has reviewed the draft procedure, making clarification and process recommendations, but no substantive changes.

Budget Implications (Short and Long Term)

The budgetary impacts are broken down into the functional areas of grounds management, custodial operations and Integrated Pest Management (IPM). Please see Attachment D for a more detailed budget estimate. A budget range is presented with the low end representing the use of a traditional pre-emergent in

lieu of corn gluten and continued use by custodial departments of a disinfectant with a health rating of 1. The high end represents the use of corn gluten as a pre-emergent and a switch to a disinfectant with a health rating of 0. Further research is required in order to determine the effectiveness of corn gluten as a pre-emergent, and the costs associated with the two health ratings for disinfectants are presented to illustrate the cost difference in using a product with *very low* toxicity as compared with a completely non-toxic option. For purposes of estimating the 5-year budget impact, a figure of 3% has been added to each year to account for inflation. The estimated budget impacts below include costs "above and beyond" existing operational budgets required to operate these programs. While there are clearly increases expected in hard costs in order to implement the Procedure, the "soft" benefits in the areas of environmental, health and safety protection should be significantly weighed.

The Committee estimates that the School Division would need to spend between $72,669 and $100,430 in FY09 in order to implement the Procedure. The 5-year budget range for FY09-FY13 is estimated to be $352,409 - $465,693.

Recommendation/Future Direction/Time Line

Staff requests that the School Board receive the report, review the draft Procedure, and provide comments to the SCC. Once the Procedure is finalized it will become a component of and implemented as part of Albemarle County Public Schools' Environmental Management Policy.

ATTACHMENTS:

Attachment A – Draft Safer Chemical Management Procedure (SOP-CHEM-01)
Attachment B – Green Seal, Green Guard, and Environmental Choice Information
Attachment C – Integrated Pest Management (IPM) Information
Attachment D – Budget Impacts
Attachment E – A Summary of Peer-Reviewed Journals and Staff Research on Disinfection

PREPARED: Diane Behrens

REVIEWED: _____ ITEM NUMBER:

RECOMMENDED:

Attachment A: Safer Chemical Management Procedure

County of Albemarle / Albemarle County Public Schools			Subject: Safer Chemical Management / Integrated Pest Management		
Document No.: SOP-CHEM-01	Issue Date:	Last Revised: 05-20-2008	Page: 1 of 4	Prepared By: LAC/SET	Approved By:

1.0 PURPOSE

The purpose of this procedure is to ensure a safer approach to the selection and application of custodial, grounds and pest control operations within the County of Albemarle, as the County aims to minimize chemical usage to the greatest extent practicable in its day-to-day operations and activities. This procedure is intended to be implemented as part of the County's and Schools' respective Environmental Management Policies (AP-X).

2.0 DEFINITIONS

A. *Carcinogens* refer to any substance or agent that can cause cancer. Compound listed in the latest edition of the Annual Report on Carcinogens, U.S. Department of Health and Human Services, National Toxicology Program as known or reasonably anticipated to be carcinogenic.

B. A *disinfectant* is used on hard inanimate surfaces and its objective is to destroy or irreversibly inactivate infectious fungi and bacteria but not necessarily their spores. Disinfectant products are divided into two major types: hospital and general use. Hospital type disinfectants are the most critical to infection control and are used on medical and dental instruments, floors, walls, bed linens, toilet seats, and other surfaces. General disinfectants are the major source of products used in households, swimming pools, and water purifiers. (EPA: Pesticides – Antimicrobial Pesticide Products Factsheet; http://www.epa.gov/pesticides/factsheets/antimic.htm)

C. *Endocrine disruptors* are exogenous substances that act like hormones in the endocrine system and disrupt the physiologic function of endogenous hormones.

D. *Integrated Pest Management* (IPM) is a pest control strategy that promotes the use of a variety of tactics including pest-resistant cultivars and biological, cultural, and physical controls. Pesticides are a control tactic employed in IPM, but are only used when needed. When a pest problem is identified and non-chemical means are exhausted, only the least toxic and most effective pesticide is used.

E. A *mutagen* is a physical or chemical agent that changes the genetic information (usually DNA) of an organism and thus increases the frequency of mutations above the natural background level.

F. A *neurotoxin* is a substance that is poisonous to nerve tissue (i.e., lead, mercury).

G. A *teratogen* is any medication, chemical, infectious disease, or environmental agent that might interfere with the normal development of a fetus and result in the loss of a pregnancy, a birth defect, or a pregnancy complication.

H. A *sanitizer* is used to reduce, but not necessarily eliminate, microorganisms from the inanimate environment to levels considered safe as determined by public health codes or regulations. Sanitizers include food contact and non-food contact products. Sanitizing rinses for surfaces such as dishes and cooking utensils, as well as equipment and utensils found in dairies, food-processing plants, and eating and drinking establishments comprise the food contact Sanitizers. These products are important because they are used on sites where consumable food products are placed and stored. Non-food contact surface sanitizers include carpet sanitizers, air sanitizers, laundry additives, and in-tank toilet bowl sanitizers. (EPA: Pesticides – Antimicrobial Pesticide Products Factsheet; http://www.epa.gov/pesticides/factsheets/antimic.htm)

I. *Volatile organic compounds (VOCs)* are gases emitted from certain solids or liquids, which may have adverse health effects (i.e., paints, varnishes, pesticides, cleaning supplies). (http://www.epa.gov/iaq/voc.html)

3.0 PROCEDURES

A. Custodial Operations

Custodial categories include multipurpose cleaners (e.g. surface cleaners, floor cleaners), specialty cleaners (e.g., floor strippers, floor finishes and glass cleaners) and disinfectants.

1. Multipurpose and Specialty Cleaners
    a. Products used shall be certified by Green Seal, Green Guard or Environmental Choice
    b. If a product does not have such certification, the product shall not contain carcinogens, mutagens, teratogens, endocrine disruptors, or neurotoxins, and contain low or no volatile organic compounds (VOC).
2. Sanitization and Disinfection

    Option A:
    a. High-touch areas (e.g. bathrooms, first aid/nurse stations and kitchens) will be routinely sanitized or disinfected as deemed appropriate by the manager overseeing custodial operations for the facility.
    b. Disinfectants shall be used in response to blood borne pathogen or bodily fluid incidents, in response to viral outbreaks, or as directed by the Virginia Department of Health (VDH).

    Option B:
    a. High-touch areas will be routinely cleaned or sanitized as deemed appropriate by the manager overseeing custodial operations for the facility.
    b. Disinfectants shall be used in response to blood-borne pathogen or bodily fluid incidents, in response to viral outbreaks, or as directed by the Virginia Department of Health (VDH).

B. Grounds Care

"Grounds care" includes both the management of grounds and outdoor pests.

1. Grounds care departments will continually evaluate the feasibility of changing traditional practices in the interest of eliminating chemical usage (e.g., manually pulling weeds).
2. If it is determined that a chemical application is necessary, then organic or biologically-based alternatives shall be used, with the following exceptions:
    a. Treatment of stumps of woody invasive species and poison ivy
    b. Use of non-selective herbicides for spot-treatments of skinned areas of baseball infields and warning tracks as needed
    c. One-time application of broad-leaf pre-emergent herbicide to reduce broadleaf weeds, so that Bermuda grass can compete with crabgrass for establishment of a new field
    d. Emergency spot treatment for grub worms
    e. Spot treatment of parking lots, along rip-rap and in ditches
3. Any County employee or contractor applying pesticides on County or School Board-owned property must hold a current Registered Technician or Commercial Applicator License as issued by Virginia Department of Agriculture and Consumer Services (VDACS).
4. Each application of pesticide or herbicide must be documented on the "Pesticide/Herbicide Tracking Log" (Appendix A), including the amount applied, active ingredient and application location. Tracking logs will be maintained by the Environmental Compliance Managers.

C. Indoor Pest Management

A formal Integrated Pest Management (IPM) program for each school and local government building will be completed by August 2008. IPM procedures will be incorporated as a separate procedure of the

Environmental Management Policy. Until a separate IPM Procedure is completed, the following steps will be used to make a decision regarding each indoor pest management need:

1. Physical means of preventing pests will be implemented first.
2. When pesticides are used, only the least toxic with the most effective outcome shall be used.
3. Records of all pesticide applications indicating the amount of pesticide, active ingredient and affected area will be maintained by the Environmental Compliance Managers.

D. Employee Safety

1. County employees will have access to Material Safety Data Sheets (MSDS) for all products used. Employees shall follow all guidelines and instructions listed on MSDS, including personal protective equipment (PPE) recommendations.
2. Hazard Communication (HAZCOM) training shall be provided to all employees before use of any product requiring a MSDS.

E. Annual Audit

An annual audit of this procedure will be conducted by the Environmental Compliance Managers. An audit report will be presented to the Board annually for review.

F. Waiver Process

If a situation arises requiring the use of a product that does not meet the above specifications (e.g., not Green Seal certified), then a waiver must be applied for and approved before a product may be purchased or used:

1. The Waiver Request (Appendix B) shall be submitted to the Environmental Compliance Manager for the schools or local government, as appropriate, and shall include: the purpose of the requested chemical, the MSDS, the area where the chemical will be used, the anticipated frequency and duration of use, application technique, and anticipated usage amount.
2. If a waiver is granted, the written waiver will include an expiration date, and alternatives consistent with the procedure must be explored when the waiver expires. All granted waivers will be presented with the annual audit results to the Board.

G. Exemptions

Exemptions to the waiver process include (1) emergency situations that could impact human health or safety, and (2) practices required in order to maintain insurance policies. If an emergency situation requiring chemical use arises that is not identified in this section, the request for use of a product or practice must go through the Waiver Process, as described in Section F. The following are exemptions to Sections A, B, and C of this procedure:

1. Treatment of bees, wasps or hornets
2. Periodic termite treatment or other insurance-related pest control requirements

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Appendix A
Pesticide / Herbicide / Fertiziler Application Records

Date	Time of Applica-tion (Indicate AM or PM)	Site	Pesticide/ Herbicide/ Fertilizer?	Brand Name (Be as Specific as Possible)	Amount Applied (gallons - otherwise indicate units)	Type of Area Treated	Size Area Treated	Treat-ing For?	Re-entry Time? (N/A if not applic-able)	Name of Applica-tor

Attachment B
Summary of Green Certification Programs

The following provides a summary of the certification programs that are part of the Safer Chemical Management SOP – Green Seal, GREENGUARD, and Environmental Choice. Additional programs may be added to the SOP in the future if the programs include the high level of environmental and safety requirements found in the three programs summarized below.

Adopting the Safer Chemical Management Policy will allow the Division to minimize chemical usage thereby improving both safety and environmental protection. For instance, by changing to the Environmental Choice certified flooring system, approximately 4,400 pounds of sludge from floor stripping will be avoided each year. The sludge represents the average weight of stripper and old floor finish removed from the floor. With traditional systems, this sludge could contain chemical components that are non-biodegradable, including VOCs, styrene, urethanes and zinc.

By minimizing the amount of pesticide usage, the Chesapeake Bay will benefit from reduced chemical contamination. Chemical contaminants are constantly entering the Chesapeake Bay and its tributaries through wastewater, stormwater and air pollution. Stormwater runoff from urban and suburban areas carries residue from roadways, agricultural lands and other contaminated areas to local streams and storm drains. Of the 50 major tributaries that flow into the Bay, just three deliver about 80 percent of the fresh water, with the James River contributing 14%.

Green Seal™ Certification

Website: http://www.greenseal.org/

Founded in 1989, Green Seal™ provides science-based environmental certification standards that are credible, transparent, and essential in an increasingly educated and competitive marketplace. Our industry knowledge and standards help manufacturers, purchasers, and end users alike make responsible choices that positively impact business behavior and improve quality of life. A 501 (c)(3) nonprofit organization, Green Seal issued its first environmental standards in 1991-2, and the first product certifications were completed in 1992. Hundreds of products and services from major companies such as 3M, Benjamin Moore, and Andersen Windows have now been certified to meet Green Seal™ standards, and the number of major product categories covered by standards has increased to more than 40.

GS-37 is the Green Seal™ Environmental Standard for General-Purpose, Bathroom, Glass, and Carpet Cleaners Used for Industrial and Institutional Purposes.

GS-37 Product-Specific Health and Environmental Requirements:

- **4.1 Toxic Compounds**
  The *undiluted* product shall not be toxic to humans. Dispensing-system concentrates shall be tested as used. A product is considered toxic if any of the following criteria apply:

Oral lethal dose 50 (LD_{50}) $\leq$ 2,000 mg/kg

Inhalation lethal concentration (LC_{50}) $\leq$ 20 mg/L*

* If the vapor-phase concentration of the product at room temperature is less than 20 mg/L, it should be tested at its saturation concentration. If it is not toxic at this concentration, it passes the inhalation criterion.

Toxicity shall be measured on the product as a whole. Alternatively, a mixture need not be tested if existing toxicity information demonstrates that each of the ingredients complies. Ingredients that are nonvolatile do not require inhalation toxicity testing (Appendix A). It is assumed that the toxicity of the individual component compounds are weighted and summed and that there are not synergistic effects (Appendix A).

The toxicity testing procedures should meet the requirements put forth by the Organization for Economic Cooperation and Development (OECD) Guidelines for Testing of Chemicals. These protocols include Acute Oral Toxicity Test (TG 401), Acute Inhalation Toxicity Test (TG 403), and Acute Dermal Toxicity Test (TG 402).

- **4.2 Carcinogens and Reproductive Toxins**

  The *undiluted* product shall not contain any ingredients that are carcinogens or that are known to cause reproductive toxicity. Carcinogens are defined as those chemicals listed as known, probable, or possible human carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), the U.S. Environmental Protection Agency, or the Occupational Health and Safety Administration. Chemicals known to cause reproductive toxicity are defined as those listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Code of Regulations, Title 22, Division 2, Subdivision 1, Chapter 3, Sections 1200, *et seq*.).

  Naturally occurring elements and chlorinated organics, which may be present as a result of chlorination of the water supply, are not considered ingredients if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 Code of Federal Regulations (CFR) Part 141.

- **4.3 Skin and Eye Irritation**

  The *undiluted* product shall not be corrosive to the skin or eyes. Dispensing-system concentrates shall be tested as used. The undiluted cleaning product shall not be corrosive to the skin, as tested using the Human Skin Construct systems (Liebsch et al. 2000; Fentem et al. 1998). The undiluted cleaning product shall also not be corrosive to the eye as tested using the bovine opacity and permeability test (BCOP) (Sina et al. 1995) after a 10-minute exposure. Green Seal will also accept the results of other peer-reviewed or standard in vitro or in vivo test methods demonstrating that the product mixture is not corrosive.

- **4.4 Skin Sensitization**

  The *undiluted* product shall not be a skin sensitizer, as tested by the OECD Guidelines for Testing Chemicals, Section 406. Dispensing-system concentrates shall be tested as used. Green Seal shall also accept the results of other standard test methods, such as those described in Buehler (1994) or Magnusson and Kligman (1969), as proof that the product or its ingredients are not skin sensitizers.

- **4.5 Combustibility**

  The *undiluted* product shall not be combustible. The product or 99% by volume of the product ingredients shall have a flashpoint above 150 °F, as tested using either the Cleveland Open Cup Tester (ASTM D92-97) or a closed-cup method International

Standards Organization (ISO) 13736 or ISO 2719. Alternatively, the product shall not sustain a flame when tested using ASTM D 4206.

- **4.6 Photochemical Smog, Tropospheric Ozone Production, and Indoor Air Quality**
  The product *as used* shall not contain substances that contribute significantly to the production of photochemical smog, tropospheric ozone, or poor indoor-air quality. The volatile organic content of the product as used shall not exceed the following

  • 0.1% by weight for dilutable carpet cleaners

  • 1% by weight for general-purpose and bathroom cleaners

  • 3% by weight for glass cleaners

  • 3% by weight for ready-to-use carpet cleaners
  The volatile organic content shall be determined by California Air Resources Board Method 310.

- **4.7 Toxicity to Aquatic Life**
  The product *as used* shall not be toxic to aquatic life. A compound is considered not toxic to aquatic life if it meets one or more of the following criteria:
  Acute LC_{50} for algae, daphnia, or fish $\geq$100 mg/L
  For purposes of demonstrating compliance with this requirement, aquatic toxicity testing is not required if sufficient aquatic toxicity data exist for each of the product's ingredients to demonstrate that the product mixture complies. Aquatic toxicity tests shall follow the appropriate protocols in ISO 7346.2 for fish and in 40 CFR 797, Subpart B for other aquatic organisms.
- **4.8 Aquatic Biodegradability**
  Each of the organic ingredients in the product *as used* shall exhibit ready biodegradability in accordance with the OECD definition except for a FIFRA-registered ingredient in a bathroom cleaner and the polymer portion of a carpet cleaner. However, all other ingredients in a FIFRA-registered bathroom cleaner or carpet cleaner must comply. Biodegradability shall be measured by one of the following methods: ISO 9439 carbon dioxide (CO_2) evolution test, ISO 10708 (two-phase closed-bottle test), ISO 10707 (closed bottle test), or ISO 7827 (dissolved organic carbon removal). Specifically, within a 28-day test, the ingredient shall meet one of the following criteria within 10 days of the time when biodegradation first reaches 10%:
  Removal of dissolved organic carbon (DOC) > 70% Biological oxygen demand (BOD) > 60% % of BOD of theoretical oxygen demand (ThOD) > 60% % CO_2 evolution of theoretical > 60%

For organic ingredients that do not exhibit ready biodegradability in these tests, the manufacturer may demonstrate biodegradability in sewage treatment plants using the Coupled Units Test found in OECD 303A by demonstrating dissolved organic carbon (DOC) removal > 90%.
Testing is not required for any ingredient for which sufficient information exists concerning its biodegradability, either in peer-reviewed literature or databases or proving that the ingredient was tested in accordance with standard test procedures.

- **4.9 Eutrophication**
  The product *as used* shall not contain more than 0.5% by weight of total phosphorus.
- **4.10 Packaging**
  The primary package shall be recyclable. Alternatively, manufacturers may provide for returning and refilling of their packages. An exception may be made for lightweight flexible packaging (e.g., pouches or bags) that represents a significant reduction in material use when compared with rigid packaging.
- **4.11 Concentrates**
  The product must be a concentrate, except for FIFRA-registered bathroom cleaners and absorbent compound carpet cleaners.
- **4.12 Fragrances**
  Manufacturers shall identify any fragrances on their material safety data sheets (MSDSs). Any ingredient added to a product as a fragrance must follow the Code of Practice of the International Fragrance Association.
- **4.13 Prohibited Ingredients**
  The product shall not contain the following ingredients:
  • Alkylphenol ethoxylates
  • Dibutyl phthalate
  • Heavy metals including arsenic, lead, cadmium, cobalt, chromium, mercury, nickel, or selenium
  • Ozone-depleting compounds
  • Optical brighteners

GREENGUARD Certification

Website: http://greenguard.org/Default.aspx?tabid=14

The mission of GREENGUARD Environmental Institute (GEI) is to improve public health and quality of life through programs that improve indoor air. In accordance with that mission, GEI currently has three third-party certification programs.

GREENGUARD Certification Standards for Low-Emitting Products

GREENGUARD Environmental Institute (GEI) has established performance-based standards to define goods with low chemical and particle emissions for use indoors, primarily building materials, interior furnishings, furniture, cleaning and maintenance products, electronic equipment, and personal care products. The standard establishes certification procedures including test methods, allowable emissions levels, product sample collection and handling, testing type and frequency, and program application processes and acceptance.

GREENGUARD Children & Schools Product Certification Program complies with the State of California's Department of Health Services Standard Practice (CA Section 01350) for testing chemical emissions from building products used in schools. As such, GREENGUARD Children & Schools Certified products can be used as a strategy to earn valuable credits in the CHPS Best Practices Manual for K-12 schools.

GREENGUARD Emission Criteria For Children & Schools

Requirements to be met at 168 hours (7 days) with no preconditioning.

Individual VOCs[1]	≤1/100 TLV and ≤½ CA chronic REL
Formaldehyde[2]	≤ 0.0135 ppm/13.5 ppb
Total VOCs[3]	≤ 0.22 mg/m³
Total Aldehydes[4]	≤ 0.043 ppm/43 ppb
Total Phthalates[5]	≤ 0.01 mg/m³
Total Particles[6] (≤10 µm)	≤ 0.02 mg/m³

[1] *Any VOC not listed must produce an air concentration level no greater than 1/100 the Threshold Limit Value (TLV) industrial workplace standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Bldg D-7, Cincinnati, OH 45211-4438) and/or no greater than 1/2 the CA Chronic Reference Exposure Level (CREL) (http://www.oehha.ca.gov/air/chronic_rels/AllChrels.html - (CRELS) Adopted by the State of California Office of Environmental Health Hazard Assessment (OEHHA), February 2005).*

[2] *Formaldehyde criteria established so that emission levels reach 0.014ppm (13.5ppb) within 14 days of installation (meeting CA 1350 requirements).*

[3] *Defined to be the total response of measured VOCs falling within the C_6-C_{16} range, with responses calibrated to a toluene surrogate.*

[4] *Defined to be the total response of a specific target list of aldehydes (2-butenal; acetaldehyde; benzaldehyde; 2,5-dimethylbenzaldehyde; 2-methylbenzaldehyde; 3-and/or 4-methylbenzaldehyde; butanal; 3-methylbutanal; formaldehyde; hexanal; pentanal; propanal), with each individually calibrated to a compound specific standard.*

[5] *Defined to be the total response of a specific target list of phthalates including dibutyl (DBP), diethylhexyl (DEHD), diethyl (DEP), butylbenzyl (BBP), di-octyl (DOP), and dimethyl (DMP) phthalates (conducted using a modified phthalate specific analytical method, OSHA 104).*

[6] *Particles applicable to fibrous, particle-releasing products with exposed surface area in air streams (a forced air test with specific test method).*

Environmental Choice

Website: http://www.ecologo.org/

Established in 1988, the program helps consumers identify products and services that are less harmful to the environment. A product or service may be certified because it is made or offered in a way that improves energy efficiency, reduces hazardous by-products, uses recycled materials or because the product itself can be reused. Product manufacturers, importers or purveyors of services may apply for a license to use the Eco-Logo once a guideline containing criteria relevant to the product or service type has been approved. Environmental Choice guidelines are based on the best information available at the time and are upgraded as new information and technology make higher standards possible. Guidelines are developed in consultation with industry, environmental groups, universities and independent technical and scientific advisors.

Currently, Environmental Choice has more than 1400 approved products, with 119 licensees and 29 guidelines under which companies may be licensed and their products certified. The EcoLogo Program certifies and recognizes products and services that are environmentally preferable. It develops and promotes higher standards of environmental performance against which products and services can be assessed. These higher standards are called “Certification Criteria Documents” (or CCDs) and contain the exact environmental and performance requirements an applicant must meet to become EcoLogo certified.

The development of EcoLogo certification criteria is a multi-step process involving purchasers, environmental groups, industry, consumers and consumer groups, academia, government, and other interested groups. As a “Type I ecolabel” (as defined by the International Organization for Standardization in the standard ISO 14024), criteria are developed using a life-cycle approach, meaning all stages of the process - from raw material extraction through production to the final disposal of the product - are evaluated. EcoLogo is North America’s only ecolabel to successfully be assessed against ISO 4024 by the Global Ecolabelling Network (GEN), making EcoLogo a valuable, trustworthy and globally recognized multi-attribute label.

The criteria development and review process is scientifically rigorous and robust, and guided by the principles of transparency and openness. The process begins with a critical evaluation of the environmental profile of the product/service type of interest. Stakeholder input during the criteria development process and public consultation on draft criteria constitute a large part of the development process, and are essential to the Program’s success.

Attachment C

Integrated Pest Management – Program Summary

Integrated Pest Management (IPM) is a way to reduce pesticide use and still keep bugs at bay. It is environmentally sound and reduces human exposure to pesticides. IPM takes a reduced toxicity approach to pest control and employs a variety of pest prevention methods instead of relying on pesticide alone.

Control strategies in an IPM program begin with prevention - structural and environmental modifications that reduce pest access to resources like food, water, and harborage. Chemical control methods are still used, but only on an "as needed basis". When chemical control methods are necessary, only the least toxic, most effective products are used.

Inspection
The pest management technician begins an IPM program by making a thorough initial inspection of each building to evaluate the pest control needs of the County facilities. The technician will identify problem areas and any practices or structural features that are contributing to pest infestations. Using the building floor plan as a permanent record, the technician will suggest site specific solutions for eliminating pest entry and access to food, water, and harborage. Any problems and suggested corrections need to be reported to the facilities manager so they can be addressed.

Monitoring Program
The technician will next set up a pest monitoring program in areas where an active pest infestation, pest evidence, or conditions conducive to pest infestation were observed during the initial inspection. Cafeterias and other food service areas should always be included in the monitoring program, because these locations are particularly susceptible to pest invasion. The technician will establish a Pest Sighting/Pesticide Application logbook at each school facility as part of the monitoring program. Inspections and establishment of the monitoring program should be completed prior to any pest control methods being applied.

Monitoring for the First Time
After the inspection, the pest management technician will obtain a floor plan of those specific areas selected for monitoring (i.e. the cafeteria or school kitchen). Using the floor plan, he or she will decide where the monitors should be located. Traps should be placed in areas that have pest evidence and conducive conditions. Additional traps should be placed throughout the room to get full coverage of the entire area. After monitoring locations are selected on the floor plan, they should be numbered in a systematic and logical fashion so they are easy to find.

After monitoring locations are numbered on the floor plan, the technician should number the same quantity of sticky traps (high quality, low-line design, or roach-motel-type design) and put one at each monitoring location. Monitors are left in place for 24 hours and then collected by the technician. The pests found in each trap should be identified, counted, and recorded on the floor plan.

Based on the monitoring results the technician will decide how many traps will be needed to monitor on a monthly basis. If pests are found in 10 different monitoring locations, then all of these locations need to monitored monthly in addition to locations with conducive conditions. If pests are found in only 2 monitors, then those two locations need continuous monitoring in addition to areas with conducive conditions. If no pests are found in any of the traps, then only those areas with conducive conditions need monthly monitoring.

Monitoring Program
When the final number of monitoring locations is determined, they should be marked on the floor plan. Copies of the monitoring plan will be placed in the Pest Sighting/ Pesticide Application logbook for the technician to use from month to month. The monitors will be checked and replaced every month, and the technician documents all pest problems and pesticide applications on the floor plan.

Information adapted from Virginia School IPM Program Overview (http://www.ext.vt.edu/schoolipm/whatisipm/index.shtml)

Attachment D - Budget Impacts
Safer Chemical Management

Budget Estimate Totals

School Division	Low[1]	High[2]
Grounds	$ 5,903.82	$ 12,098.82
Custodial	$ 50,160.00	$ 71,726.00
IPM	$ 16,605.00	$ 16,605.00
FY09 Total	$ 72,668.82	$ 100,429.82
5-Yr Total	$ 352,409.03	$ 465,692.94

1. The low range represents the use of traditional pre-emergent instead of corn gluten and continued use of disinfectant with health rating of 1.
2. The high range represents the use of corn gluten as a preemergent and switching to a disinfectant with a health rating of 0.

Please note that as demand increases for safer chemicals, some options can be expected to become more cost effective.

Attachment E
Disinfection Issues and Literature

I. Support for Surface Disinfection

A. Prevention of Surface-to-Human Transmission of Rotaviruses by Treatment with Disinfectant Spray [Abstract attached]

The study examines the effect of Lysol disinfectant on preventing the transmission of rotaviruses. Consumption of the rotavirus that was sprayed with Lysol Disinfectant by 14 subjects caused no infection, whereas 13 of 14 subjects who consumed the unsprayed virus became infected.

B. Fecal Coliforms on Environmental Surfaces in Two Day Care Centers [Abstract attached]

Disinfection of inanimate objects, in addition to good handwashing, may be important in controlling the spread of enteric diseases in day care centers.

C. Chemical Disinfection to Interrupt Transfer of Rhinovirus Type 14 from Environmental Surfaces to Hands [Abstract attached]

Rhinoviruses can survive on environmental surfaces for several hours under ambient conditions. Hands can become contaminated after contact with such surfaces, and self-inoculation may lead to infection. Whereas hand washing is crucial in preventing the spread of rhinovirus colds, proper disinfection of environmental surfaces may further reduce rhinovirus transmission.

D. Chemical Disinfection of Hepatitus A Virus on Environmental Surfaces [Abstract attached]

Outbreaks of hepatitis A are frequently associated with eating establishments, hospitals, day-care centers, and schools. Chemical disinfection of environmental surfaces and hand antiseptics are relied upon to prevent and control such outbreaks.

E. An outbreak of hepatitis A: school toilets as a source of transmission

An outbreak of hepatitis A associated with a Middle school involved 23 cases; 17 were pupils attending the Middle school, one was a teacher, one was a relative of a case, and four were from the associated First school, of whom three had sibilings in the Middle school. A questionnaire survey and salivary IgG and IgM anti-HAV testing of the pupils demonstrated a statistically significant association between the infection and the use of a changing room toiler for defecation.

F. The Science Behind Lysol: Relevance for Schools
Journal of School Nursing, Joseph R. Rubino, MA; and Donna Gaber, MT

In the last 15 to 20 years, studies have shed some light on the hidden pathways pathogens traverse, and have demonstrated that handwashing and surface disinfection are effective ways to reduce the transmission of many communicable diseases in children.
The pathogens that case colds, as well as those responsible for other common ailments such as influenza and gastroenteritis, are often transmitted by hand-to-hand and surface-to-hand contact.

Many rotavirus infected samples came from moist surfaces, such as drinking fountains, toilet and sink handles, toys, and a water play table.
These findings suggest that hard surfaces in schools and daycare centers act as virus reservoirs.

G. Role of Surface Disinfection and Hand Hygiene in Reducing Illness
Journal of School Nursing, Lorraine M. Harkavy, RN, MS, CIC
October 2002

Bathrooms are hot spots of contamination, and studies suggest a strong relationship between bathroom sanitation and incidence of infection.

H. Highlights from 'The Benefits of Surface Disinfection'
Data Source: William A. Rutala, Ph.D., M.P.H.[1]
Professor, Division of Infectious Diseases, Department of Medicine
University of North Carolina at Chapel Hill
http://disinfectionandsterilization.org/

i. Introduction

- Surfaces are considered "noncritical" in the three categories of germicidal action to prevent a risk of infection associated with the use of equipment or surfaces.
- Use of noncritical items or contact with noncritical surfaces carries little risk of transmitting pathogens to patients, therefore the routine use of disinfectant to disinfect housekeeping surfaces is controversial.

ii. Benefits of Surface Disinfection
Surfaces may contribute to transmission of epidemiologically important microbes (e.g., VRE[2], MRSA[3], C. difficile[4])

Pathogens implicated in transmission via contaminated noncritical surfaces:

- Bacteria (Acinetobacter, Pseudomonas, Clostridium difficile, Oxacillin-resistant Staphylococcus aureus, Vancomycin-resistant Enterococcus spp.)

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[1] In addition to being a Professor for the Division of Infectious Diseases at the University of North Carolina's School of Medicine, Dr. Bill Rutala serves as the Director of Hospital Epidemiology, Occupational Health and Safety Program at the University of North Carolina Hospitals. He is also Director and co-founder of the North Carolina Statewide Program for Infection Control and Epidemiology at the UNC School of Medicine and a retired Colonel with the U.S. Army Reserve. Dr. Rutala is certified in infection control. He is an advisor to the Centers for Disease Control and Prevention (a former member of the Healthcare Infection Control Practices Advisory Committee), the Food and Drug Administration (a member of the General Hospital and Personal Use Devices Panel), the U.S. Environmental Protection Agency (a member of the Scientific Advisory Panel on Antimicrobial Research Strategies for Disinfectants) and the Federal Trade Commission.

[2] Enteroccocci are bacteria that are normally present in the human intestines and in the female genital tract and are often found in the environment. These bacteria can sometimes cause infections. Vancomycin is an antibiotic that is often used to treat infections caused by enterococci. In some instances, enterococci have become resistant to this drug and thus are called vancomycin-resistant enterococci (VRE). Most VRE infections occur in hospitals.

[3] MRSA: *Staphylococcus aureus*, often referred to simply as "staph," is a type of bacteria commonly carried on the skin or in the nose of healthy people. Sometimes, staph can cause an infection. Staph bacteria are one of the most common causes of skin infections in the United States. Most of these skin infections are minor (such as pustules and boils) and can be treated without antibiotics. However, staph bacteria also can cause serious infections (such as surgical wound infections, bloodstream infections, and pneumonia).

[4] *Clostridium difficile* [klo-STRID-ee-um dif-uh-SEEL] is a bacterium that causes diarrhea and more serious intestinal conditions such as colitis.

- Viruses (SARS, Rotavirus, Respiratory syncytial virus)

In experimental settings, treatment of surfaces with germicide has been found to interrupt transmission

- Prevention of surface-to-human rotavirus transmission by treatment with disinfectant spray (J Clin Microbiol 1991; 29: 1991)
- Interrupts transfer of rhinovirus from environmental surfaces to hands (Appl Environ Microbiol 1993; 59: 1579)

Studies demonstrating reduced transmission with improved disinfection

- Reduction in C. difficile-associated diarrhea rates in the Bone Marrow Transplant Unit (8.6 to 3.3) during the period of bleach disinfection (1:10)

iii. Disinfectants are more Effective in Reducing Microbial Load
Soap and Water Microbial Load Reduction – 80.4%
Phenol Load Reduction – 99.0%

Detergents become contaminated and result in seeding the patients environmental with bacteria

Table 1: Microbial Contamination of Mop Water

	Soap (CFU/mL)	**Phenol (CFU/mL)**
Before Cleaning	10	20
After Cleaning 1/3 of Ward	650	10
After Cleaning 2/3 of Ward	15,000	30
After Cleaning Complete Ward	34,000	20

- Allergies: Literature Review (Medline) from 1966 to April 2004 provided no evidence that suggest the use of low level disinfection (LLD) results in allergic symptoms in health care workers.
- Increased Resistance: No evidence that using LLD selects for antibiotic-resistant organisms in nature or mutants survive.

II. Literature Against Routine Surface Disinfection

i. *Quaternary ammonium compounds and occupational asthma*
Int Arch Occup Environ Health - Purohit A, Kopferschmitt-Kubler MC, Moreau C, Popin E, Blaumeiser M, Pauli G.
2000 Aug; 73(6):423-7

Quaternary ammonium compounds are commonly used as antiseptics, disinfectants, detergents and preservatives. They can cause occupational asthma, which however, has been rarely reported so far, despite wide use of these products. Female nurses were three of the cases studied and manifested asthma symptoms upon handling disinfectant solutions containing benzalkonium chloride. These three cases, in addition to others reported in the literature, point out an as yet poorly known etiology of occupational asthma to quaternary ammonium compounds in hospital employees. The exact mechanism of the action remains unexplained.

ii. *Disinfectant use as a risk factor for atopic sensitization and symptoms consistent with asthma: an epidemiological study*
Eur Respir J. 1996 Jul;9(7):1407-13. Preller L., Doeskes G., Heederik D., Vermeulen R., Vogelzang PF, Boleij JS.

Exposure to some nonallergenic compounds has been shown to increase the risk of atopic sensitization and asthmatic symptoms. In order to gain more insight into the largely unknown aetiology of respiratory symptoms in pig farmers, we studied the role of nonallergenic exposure. Atopic sensitization was found to occur more frequently in farmers who used disinfectants containing quaternary ammonium compounds. The results suggest that occupational exposure to nonallergenic agents (disinfectants) may induce immunoglobin E sensitization to common aeroallergens, and that the combination of atopy and exposure to nonallergenic (disinfectants and endotoxin) is an important risk factor for development of symptoms consistent with asthma.

III. Referenced Abstracts

Prevention of Surface-to-Human Transmission of Rotaviruses by Treatment with Disinfectant Spray

RICHARD L. WARD,[1]* DAVID I. BERNSTEIN,[1] DOUGLAS R. KNOWLTON,[1] JAMES R. SHERWOOD,[1] ELIZABETH C. YOUNG,[1] TIMOTHY M. CUSACK,[2] JOSEPH R. RUBINO,[2] AND GILBERT M. SCHIFF[1]

Division of Clinical Virology, James N. Gamble Institute of Medical Research, Cincinnati, Ohio 45219,[1] and L&F Products, Montvale, New Jersey 07645[2]

Received 1 April 1991/Accepted 20 June 1991

A model was developed to examine the effects of disinfectants on the transmission of infectious rotavirus from a dried surface to humans. The initial experiments were designed to find a method of preserving rotavirus infectivity during drying. Culture-adapted human rotavirus (CJN strain) was dried at room temperature in different organic suspensions, including fecal matter, several laboratory media, and nonfat dry milk (NDM). Recoveries of infectious virus were then compared. Fecal matter provided little protection in this study relative to distilled water, but the other suspensions were quite protective, especially NDM, which consistently allowed recoveries of >50%. When 10^3 focus-forming units of unpassaged CJN virus were dried in NDM and administered to subjects who licked the dried material, 100% (8 of 8) became infected. The effect of Lysol brand disinfectant spray (LDS) was next examined. Although NDM provided some protection against inactivation by LDS, spraying under conditions recommended by the manufacturer consistently caused the CJN virus titer to decrease >5 $\log_{10}$. Consumption of CJN virus (10^3 focus-forming units) sprayed with LDS caused no infection in 14 subjects, whereas 13 of 14 subjects who consumed the unsprayed virus became infected ($P < 0.00001$). The methods developed in this study could be used to test the effects of other disinfectants on the spread of infectious rotavirus from inanimate surfaces to humans.

Fecal Coliforms on Environmental Surfaces in Two Day Care Centers

BRUCE G. WENIGER,[1]†* A. JAMES RUTTENBER,[2] RICHARD A. GOODMAN,[3,4] DENNIS D. JURANEK,[1] SUZANNE P. WAHLQUIST,[1] AND J. DAVID SMITH[4]

Division of Parasitic Diseases, Center for Infectious Diseases,[1] Chronic Diseases Division, Center for Environmental Health[2]; and Field Services Division, Epidemiology Program Office,[3] Centers for Disease Control, Atlanta, Georgia 30333, and Office of Epidemiology, Georgia Department of Human Resources, Atlanta, Georgia 30334[4]

Received 16 July 1982/Accepted 10 November 1982

A survey of environmental surfaces in two Atlanta area day care centers was conducted to determine the prevalence of fecal coliform bacteria, considered a marker for the presence of fecal contamination which might contain pathogenic parasites, bacteria, or viruses. Fecal coliforms were found in 17 (4.3%) of 398 representative samples of building surfaces, furniture, and other objects. These surfaces may be involved in the chain of transmission of enteric diseases among children. Therefore, disinfection of inanimate objects, in addition to good handwashing, may be important in controlling the spread of enteric diseases in day care centers.

Chemical Disinfection To Interrupt Transfer of Rhinovirus Type 14 from Environmental Surfaces to Hands

SYED A. SATTAR,[1]* HEATHER JACOBSEN,[1] V. SUSAN SPRINGTHORPE,[1] TIMOTHY M. CUSACK,[2] AND JOSEPH R. RUBINO[2]

Department of Microbiology & Immunology, Faculty of Medicine, University of Ottawa, Ottawa, Ontario, Canada K1H 8M5,[1] and L&F Products, Montvale, New Jersey 07645[2]

Received 29 September 1992/Accepted 15 February 1993

Rhinoviruses can survive on environmental surfaces for several hours under ambient conditions. Hands can readily become contaminated after contact with such surfaces, and self-inoculation may lead to infection. Whereas hand washing is crucial in preventing the spread of rhinovirus colds, proper disinfection of environmental surfaces may further reduce rhinovirus transmission. In this study, the capacities of Lysol Disinfectant Spray (0.1% *o*-phenylphenol and 79% ethanol), a domestic bleach (6% sodium hypochlorite diluted to give 800 ppm of free chlorine), a quaternary ammonium-based product (7.05% quaternary ammonium diluted 1:128 in tap water), and a phenol-based product (14.7% phenol diluted 1:256 in tap water) were compared in interrupting the transfer of rhinovirus type 14 from stainless steel disks to fingerpads of human volunteers upon a 10-s contact at a pressure of 1 kg/cm^2. Ten microliters of the virus, suspended in bovine mucin (5 mg/ml), was placed on each disk, and the inoculum was dried under ambient conditions; the input number on each disk ranged from 0.5×10^5 to 2.1×10^6 PFU. The dried virus was exposed to 20 μl of the test disinfectant. The Lysol spray was able to reduce virus infectivity by >99.99% after a contact of either 1 or 10 min, and no detectable virus was transferred to fingerpads from Lysol-treated disks. The bleach (800 ppm of free chlorine) reduced the virus titer by 99.7% after a contact time of 10 min, and again no virus was transferred from the disks treated with it. On the other hand, the quaternary ammonium and phenolic products were able to inactivate only 14.7 and 62.3% of the virus on the disks, respectively; contact of fingerpads with disks treated separately with these products resulted in the transfer of 8.4% ± 3.6 and 3.3% ± 1.9%, respectively, of the infectious virus remaining on the disks after the disinfectant was allowed to dry. Virus transfer from the control disks was 0.58% ± 0.35%. These findings suggest that care must be exercised in the selection of disinfectants if transfer of rhinoviruses from environmental surfaces to human hands is to be interrupted efficiently.

Chemical Disinfection of Hepatitis A Virus on Environmental Surfaces

JOHN N. MBITHI, V. SUSAN SPRINGTHORPE, AND SYED A. SATTAR*

Department of Microbiology and Immunology, Faculty of Medicine, University of Ottawa, Ottawa, Ontario, Canada K1H 8M5

Received 20 June 1990/Accepted 28 August 1990

Hepatitis A virus disinfection was assessed on contaminated stainless-steel disks. Ten microliters of fecally suspended hepatitis A virus was deposited on the center of each disk, dried for 20 min, and then covered with 20 μl of the test product for 1 min. Of the 20 formulations tested, only 2% glutaraldehyde, a quaternary ammonium formulation containing 23% HCl (toilet bowl cleaner), and sodium hypochlorite (>5,000 ppm [>5,000 μg/ml] of free chlorine) reduced the virus titer by >99.9%; phenolics, iodine-based products, alcohols, and solutions of acetic, peracetic, citric, and phosphoric acids were unable to do so.

IV. Literature regarding Antibiotic Resistance Resulting from Disinfection

A. Use of Germicides in the Home and the Healthcare Setting: Is There a Relationship Between Germicide Use and Antibiotic Resistance?

To date, there is no evidence that using recommended antiseptics or disinfectants selects for antibiotic-resistant organisms in nature. Disinfectants and antiseptics should be used when there are scientific studies demonstrating benefit or when there is a strong theoretical rationale for using germicides.

Use of Germicides in the Home and the Healthcare Setting: Is There a Relationship Between Germicide Use and Antibiotic Resistance?

David J. Weber, MD, MPH; William A. Rutala, PhD, MPH

BACKGROUND. The spread of antibiotic-resistant pathogens represents an increasing threat in healthcare facilities. Concern has been expressed that the use of surface disinfectants and antiseptics may select for antibiotic-resistant pathogens.

OBJECTIVE. To review the scientific literature on whether there is a link between use of germicides (ie, disinfectants and antiseptics) and bacterial resistance to antibiotics. In addition, we will review whether antibiotic-resistant bacteria exhibit altered susceptibility to germicides that are recommended for use as disinfectants or antiseptics.

DESIGN. A review of the appropriate scientific literature.

RESULTS. In the laboratory, it has been possible to develop bacterial mutants with reduced susceptibility to disinfectants and antiseptics that also demonstrate decreased susceptibility to antibiotics. However, the antibiotic resistance described was not clinically relevant because the test organism was rarely a human pathogen, the altered level of antimicrobial susceptibility was within achievable serum levels for the antibiotic, or the antibiotic tested was not clinically used to treat the study pathogen. Similarly, wild-type strains with reduced susceptibility to disinfectants (principally, quaternary ammonium compounds) and antiseptics (principally, triclosan) have been reported. However, because the concentration of disinfectants used in the healthcare setting greatly exceeds the concentration required to kill strains with reduced susceptibility to disinfectants, the clinical relevance of these observations is questionable.

CONCLUSION. To date, there is no evidence that using recommended antiseptics or disinfectants selects for antibiotic-resistant organisms in nature. Disinfectants and antiseptics should be used when there are scientific studies demonstrating benefit or when there is a strong theoretical rationale for using germicides.

Infect Control Hosp Epidemiol 2006; 27:1107-1119

V. Green Cleaning Policies Inclusion of Routine Disinfection

A. State of Illinois: Green Cleaning Schools Act

State of Illinois
Illinois Green Governments Coordinating Council

Green Cleaning Schools Act
(Public Act 095-0084)

GUIDELINES AND SPECIFICATIONS

Disinfectants and Sanitizers[8]

Disinfectants and sanitizers are similar to all-purpose cleaners with supplementary ingredients added to kill bacteria and other unwanted organisms. Because disinfectants kill organisms, they are regulated as "pesticides" under the Federal Insecticide, Fungicide and Rodenticide Act

(FIFRA). The U.S. EPA interprets FIFRA as prohibiting manufacturers from making claims that disinfectants and sanitizers are "green" or "environmentally sensitive." Nonetheless, disinfectants and sanitizers play an important role in all green cleaning policies. When selected with care, and used with the proper procedures and methods, they are effective tools in preventing the spread of infections and illnesses. The following are some of the specific issues to compare for this product category:

- ?? Toxicity: Use the least toxic disinfectants and sanitizers (i.e., avoid those products that display the signal word "DANGER").
- ?? pH: Prefer those with a more neutral pH (closer to 7) versus those with extreme pH (closer to 1 or 14).
- ?? Dyes and Fragrances: Prefer those with no or low levels of dyes and fragrances where appropriate. If dyes or fragrances are necessary for safety or other non-aesthetic purposes, use those that are approved for foods and cosmetics.
- ?? Biodegradability: Prefer those that are readily biodegradable as compared to those that are slower to degrade.

B. New York State Office of General Services – Green Cleaning Guidelines for Schools

Category #37:
The Guidelines should restrict the use of disinfectant/sanitization cleaning products.

State Response:
OGS recognizes that disinfectants and sanitizers must be used in certain areas and circumstances in schools. A new section (entitled *Related Rules and Guidelines*) has been added to the OGS Guidelines to clearly explain where existing regulations and guidance require the use of a disinfectant or sanitizer. The Guidelines do not establish criteria for environmentally sensitive disinfectants or sanitizers.

The public health benefit of using disinfectants and sanitizers as part of routine cleaning is a controversial topic. Cleaning with soap or detergent and water removes large numbers of microorganisms from surfaces (Sehulster *et al.*, 2004). Furthermore, cleaning is a necessary first step to sanitization or disinfection because many soils will reduce the effectiveness of a sanitizer or disinfectant. Unless disinfectant cleaners are used according to the label requirements for use as a sanitizer/disinfectant, the product could be providing no antimicrobial function and only contributing to an increased, unnecessary load of antimicrobial agent to the environment. These label requirements require that a surface first be cleaned and then kept wet with a fresh solution of the product for several minutes to sanitize the surface. In schools, routine sanitization of all floors is not considered necessary. Thus, the OGS Guidelines permit the routine use of disinfectant cleaning products in bathrooms and permit the necessary uses of disinfectants in other situations, as covered in regulations and guidance described in the Guidelines.

A particular product or process was suggested as an effective disinfectant and cleaning solution. To be sold or used in NYS, any product that makes a disinfecting or sanitizing claim must be registered by USEPA and by NYSDEC or contain active ingredients that are exempt from such registration. When used, the label precautions and use instructions must be strictly followed. These concepts are clearly explained in guidance presented in Section III.C of the OGS Guidelines.

C. Healthy Schools Campaign's Quick & Easy Guide to Green Cleaning in Schools Author

Steve Ashkin, president of **The Ashkin Group**, is the author of Healthy Schools Campaign's *Quick & Easy Guide to Green Cleaning in Schools* and a leader in the effort to green the cleaning and maintenance industry.
(http://www.healthyschoolscampaign.org/campaign/green_clean_schools/ask_steve.php#7)

Q: How do you select a green disinfectant when they're aren't any certifications?

A. Disinfectants can be a very valuable part of a green cleaning program in our effort to create healthier buildings. The trick is to use them only where necessary to prevent overuse and to select the "greenest" product for the job.

Unlike some of the other categories of products where there is a certification program (i.e. Green Seal) that makes selection easier, there are NO certification programs for specifically for disinfectants. Thus, you'll need to apply the definition of "green" to help you make a "greener" selection.

Green is defined by Presidential Executive Order 13101 as a "product that reduces the impact on health and the environment compared to similar products." Thus, in lieu of a certification program you'll need to compare attributes of the product itself. Those attributes includes:

- The active ingredient: Some, like chlorine or phenolic compounds, have greater health and environmental risks compared to quaternary ammonium compounds (quats) and hydrogen peroxide, which would be greener alternatives.

- pH: Some disinfectants have a pH at the extreme end of the spectrum (closer to 0 or 14), which typically makes them much more corrosive (causes burns) to eyes and skin. If this is the case with the current product, a greener alternative would be to select an alternative with a more neutral pH (closer to 7).

- Fragrance: Many disinfectants have extremely strong fragrances that can cause respiratory irritation and trigger asthmatic episodes. If this is the case with the current product, a greener alternative would be to select a product with less fragrance.

- VOCs: Some disinfectants include other ingredients such as solvents that can result in a high percentage of volatile organic compounds (VOCs) which, like fragrances, can cause respiratory irritation and trigger asthmatic episodes. In addition, VOCs contribute to environmental issues such as smog formation. If this is the case with the current product, a greener product would be one with no or low VOCs.

- Other ingredients: Some disinfectants use 2-butoxyethanol as a solvent -- which is absorbed through the skin and can cause a host of health problems, including reproductive problems and attacks major organs. If this is the case with the current product, a greener product would be one with no 2-butoxythanol (butyl-free).

I hope this gives you a sense of how we approach "green" disinfectants, as well as other product categories when we can't simply suggest that they look for certified products. And for the record, it is NOT the certification that makes it green. Certification simply means that somebody else already has gone through the above exercise, which means they have simplified the purchasing process.