Green Infection Control

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Going green is a personal decision that takes many things into consideration such as:

- Your basic philosophy
- Scientific evidence
- Infection control efficacy
- Cost
- Ability (or authority) to take action
- Availability of products

General Information

- Greenhouse effect
- Ozone, VOCs, NOx, ODS
- Important green indicators
  - Green Seal; ECO logo; LEEDS; Energy Star; DfE; EPP
- The 3 Rs of going green
  - Reduce
  - Reuse
  - Recycle
- Biodegradable / Compostable
- More information
**Greenhouse Effect**

- The greenhouse effect is a natural occurrence that helps regulate the temperature of our planet.
- Infrared radiation (heat) from the Sun warms the earth. Some of this heat escapes back into space, but the rest is trapped in the atmosphere by water vapor and greenhouse gases. So the more greenhouse gases you have in the atmosphere the more heat that is retained on earth (“global warming”). Without these gases the earth’s temperature would be 60°F colder.

**Greenhouse Gases**

- CO₂, CH₄, N₂O, HFCs

Generated from:
- Humans breathing
- Burning of fossil fuels
- Deforestation

**“Bad” Ozone (O₃), VOCs, NOx**

- O₃ at ground level is the main component of urban smog – harmful to breathe
- VOCs + NOx + sunlight → O₃
- VOCs and NOx come from car exhaust, solvents, gasoline vapors, benzene, paints
“Good” $O_3$ and ODS

- $O_3$ is produced naturally in the upper atmosphere. This $O_3$ layer filters 95-99% of the Sun’s harmful UV radiation.
- ODS + sunlight $\rightarrow$ Cl and Br (destroy $O_3$)
  - This lets more UV light through: cataracts, skin cancer, damage to plants
- ODS = some solvents, propellants, coolants
- 1 mol Cl can destroy 100,000 mol $O_3$
- 1 mol Br can destroy 6 million mol $O_3$

Green Ad Claims

(Guidelines from FTC and EPA)

- Environmental claims should be specific and meaningful
  - “safe”
  - “non-toxic”
  - “biodegradable”
  - “eco-friendly”
  - “eco-safe”
  - “environmentally conscious”
  - “environmentally preferable”

Green Ad claims

(Guidelines from FTC and EPA)

- Confusing terms
  - “Recycled” (product or packaging material is made from recycled materials)
  - “Recyclable” (proof that the product can be collected and used again or made into other products)
  - “Please Recycle” (assume that there is a place that accepts the item)
  - SPI Symbol

http://www.ftc.gov/bcp/edu/pubs/consumer/general/gen02.shtm
SPI Symbol
(Society of the Plastics Industry)
(http://www.plasticsindustry.org)
- Indicates chemical nature of 7 types of plastics
- Most communities collect only 1 & 2 as recyclable (96% of all)

Positives of Recycling
- Recycling reduces emission of greenhouse gases and water pollutants, saves energy, supplies valuable raw materials to industry, creates jobs, stimulates the development of greener technologies, conserves natural resources (timber, water, minerals), and reduces the need for new landfills and incinerators.
- Recycling prevents pollution caused by the manufacturing of products from virgin materials.
- Recycling helps sustain the environment for future generations.
- Recycling, including composting, diverted 83 million tons of material away from disposal in 2008, up from 15 million tons in 1980.

Biodegradable / Compostable
- Biodegradation is the breakdown of materials by microbes in an appropriate environment.
- Composting is the process of controlled biodegradation outside of a landfill.
- Products advertised as "biodegradable" should be scientifically certified to do just that. (ASTM 6400; ASTM D6868; EN 13432)
Biodegradable / Compostable

- Uncontrolled biodegradation in a landfill can cause groundwater pollution, methane gas emissions, and unstable sub-soil conditions. As a result, modern landfills are kept dry and air-tight to prevent biodegradation.
- Biodegradable materials (food scraps, wet & soiled paper, leaves, grass, certain plastics) are still being sent to landfills where they will sit in an airless, dry environment to be mummified.

Federal MSWLF standards include

- Composite liners requirements - include a flexible membrane (geomembrane) overlaying two feet of compacted clay soil lining the bottom and sides of the landfill, protect groundwater and the underlying soil from leachate releases.

Operating practices - include compacting and covering waste frequently with several inches of soil help reduce odor; control litter, insects, and rodents; and protect public health.

Federal MSWLF standards include

- Leachate collection and removal systems - sit on top of the composite liner and removes leachate from the landfill for treatment and disposal.
Landfills

Important green indicators

- **Green Seal** (U.S. - green certification program - [http://www.greenseal.org](http://www.greenseal.org) accredited by ANSI)
- **EcoLogo** (Canadian “green” certification program - [http://www.ecologo.org/en/](http://www.ecologo.org/en/))
- **LEEDS** (Leadership in Energy and Environmental Design) certification by a non-governmental nonprofit group

Important green indicators

- **Energy Star** (EPA & DOE system to rate energy efficiency of products and practices) ([http://www.energystar.gov](http://www.energystar.gov))
- **DfE certified** (Design for the Environment). This program allows manufacturers to put the DfE label on household and commercial products, such as cleaners and detergents, that meet stringent criteria for human and environmental health. ([http://www.epa.gov/dfe](http://www.epa.gov/dfe))
- **EPP** (EPA’s Environmentally Preferable Purchasing Program) helps governmental agencies purchase “Green” products
EPA’s EPP program

- Minimizes exposure to concentrates
- No ozone depleting substances
- Recyclable packaging
- Recycled content in packaging
- Reduced bioconcentration factor
- Reduced flammability
- Reduced or no added dyes, except when added for safety purposes
- Reduced or no added fragrances
- Reduced or no skin irritants
- Reduced or no volatile organic compounds (VOCs)
- Reduced packaging

Need Further Information?

- EPA’s “Go Green” monthly newsletter
  http://www.epa.gov/newsroom/gogreen/index.htm
- If you Google “Going Green” you’ll get 133 million results, but don’t believe everything you read!

General approach to greening the office

- Reuse materials when appropriate
- Reduce volume of waste
- Recycle
- Reduce adding excess chemicals to the environment
- Conserve water
- Conserve energy
- Review/upgrade safety procedures
- Go paperless
Definitions
Green IC
Disease prevention and safety procedures and products that further reduce adverse health and environmental impacts

Non-green Infection Control
It’s difficult to imagine an infection control procedure that would improve the environment. Most have a negative impact that increases waste volume or enhances the spread of chemicals.

Greener IC & Safety
Consider:
- Reusables vs. disposables
- Hand-rubs vs. handwashing
- Aerosols vs. trigger/pump sprays vs. wipes
- Better inventory control (to eliminate discarding excess product past its expiration date)
- Recyclable products and packaging materials
Greener IC & Safety Procedures

Consider:
- Mixing (take shelf-life/use-life into consideration; mix/dilute accurately)
- Digital vs. film x-ray technology
- Make sure sterilizer and instrument cleaning units are full when used to reduce the number of cycles run per day

Reusables vs. Disposables

**Reusables**
- May be less expensive
- Reduce waste volume
- Require less inventory
- Save natural resources

**Disposables**
- Save reprocessing time and labor
- Use less energy and cleaning chemicals
- Prevent cross contamination
- Eliminate problems with device malfunction

Hand-rubs vs. Handwashing

**Hand-rubs**
- Kills microbes
- Saves time, water and paper towels
- No chemicals added to waste water
- Can be done anywhere
- May reduce skin reactions

**Handwashing**
- Kills and removes microbes
- Removes soil and debris from hands
- Uses non-flammable products
**Sprays vs. Wipes**

**Sprays**
- Excellent delivery of product to the surface

**Wipes**
- May add less chemicals to air

**Digital vs. Film X-rays**

**Digital**
- Does not add chemicals to the environment
- Provides quick results
- Requires less labor
- Paperless

**Film**
- Much less expensive
- Needs no wired sensors
- May be easier to share results with other offices

**Green Cleaning**

- Use of cleaning products claiming to be gentle on the environment (including glass cleaners, floor strippers, sealers and finishes, carpet spot cleaners, odor eliminators, toilet bowl cleaners, etc)
- Some “Green” products are “Green” because they have a reduced concentration of the active agent. This likely reduces the effectiveness.
“Green” Disinfectants
- In the past the EPA did not allow manufacturers to place any type of environmental claim or seal on any EPA-registered product including disinfectants.
- However, EPA is currently relaxing this policy to allow valid claims of “environmental preferability”.

EPA’s New Design for the Environment (DfE) Pilot Project for Antimicrobial Pesticides (e.g. Disinfectants)

Design for the Environment Antimicrobial Pesticide Project
- 36-month Pilot Project that allows the use of a DfE logo on qualifying antimicrobial pesticide labels.
- This logo enables consumers to quickly identify and choose products that can help protect the environment and are safer for humans.
What the DfE Logo Means on Antimicrobial Product Labels

By their very nature, most pesticides have the potential to pose hazards to human health or the environment. This is particularly the case if the label instructions are not followed precisely. Because of this, EPA cannot say that any registered pesticide is safe under all circumstances. However, if you see the DfE logo on an EPA-authorized antimicrobial pesticide label, you can be assured that the product:

- Is in the least hazardous classes (class III or IV) of EPA's acute toxicity category hierarchy. EPA registered products that bear the word “Danger” or “Warning” do not qualify for the logo.
- Has active ingredients that are unlikely to possess carcinogenic or endocrine disruptor properties.
- Has active ingredients that are unlikely to possess developmental, reproductive, mutagenic, or neurotoxicity issues.
What the DfE Logo Means on Antimicrobial Product Labels

- Has no outstanding “conditional registration” data issues for the active ingredient.
- Contains inert ingredients and mixtures that are accepted by EPA.
- Does not require EPA-mandated PPE to use the product.
- Has no unresolved or unreasonable adverse effects reported for the product.

What the DfE Logo Means on Antimicrobial Product Labels

- Has no unresolved efficacy failures (associated with the Antimicrobial Testing Program or otherwise) associated with the product.
- Has no unresolved compliance or enforcement actions associated with the product.
- Has the identical formulation as the one identified in the DfE application reviewed by EPA.

Disinfectant Manufacturers

To apply for use of the DfE logo on a disinfectant, go to:

Antimicrobial Product with DfE Logo on Label

List of disinfectants displaying the DfE Logo:

http://www.epa.gov/pesticides/labeling/labels/design-dfe-pilot.html#compliance

Final Comments

- Do not compromise an infection control procedure so you can go green
- Check CDC guidelines and OSHA rules before making changes in your IC program
- Must continue to use only EPA-registered disinfectants and appropriate FDA-cleared products

Final Comments

- Don’t use paper or plain cloth as surface barriers since these materials will allow penetration of moisture and microbes. CDC defines surface barriers as being impervious to moisture.
- Don’t reuse standard sterilization wraps and pouches for they are not designed to maintain sterility after more than one use.
Final Comments

- Don’t use plain woven cloth (e.g., denim) as sterilization wraps since it is not a good microbial barrier. CDC says to use packaging that has been FDA-cleared.

- Don’t reuse items that are sold as disposable.

Go green
but keep it clean