



Environmental Health in Early Care and Education

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Objectives

1. Describe components of safe siting of Early Care and Education (ECE) facilities
2. Identify 3 environmental health risks commonly found in child care facilities
3. Identify 3 policies/practices that can improve the environmental health of child care facilities



Potential toxicant exposures in early care and education include:

Phthalates

Fire retardants

Pyrethrins

Formaldehyde

All of the above

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Asthma is both caused and triggered by all EXCEPT:

Bleach

Fire retardants

Radon

Cleaning products

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State Health and Safety Regulations for Child Care Centers:

Represent the minimum acceptable standards for keeping children in ECE safe.

Represent the highest quality standards for ensuring children's health and safety identified by the American Academy of Pediatrics and the American Public Health Association.

Require extensive review of the facility site prior to licensure.

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Potential toxicant exposures in early care and education include:

1. Phthalates
2. Fire retardants
3. Pyrethrins
4. Formaldehyde
5. **All of the above**

Asthma is both caused and triggered by all EXCEPT:

1. Bleach
2. Fire retardants
- 3. Radon**
4. Cleaning products

State Health and Safety Regulations for Child Care Centers

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How many children are in ECE facilities?

- In the U.S., 13 million children <5 years old receive care outside of their homes – about 30 percent of all children in the age group.
 - 6 million are infants and toddlers
- ECE facilities are numerous and diverse and include approximately 300,000 licensed child care centers and child care homes across the country.
- In Hawaii (2016), there are
 - 509 child care centers
 - 415 family child care homes
 - Totaling 26,098 slots, 91% of which are in centers
 - There is no Quality Rating and Improvement System (QRIS) in Hawaii

Why Should We Be Concerned about Environmental Health in ECE?

- Children
 - spend up to 90% of their time indoors,
 - indoor levels of pollutants may be 2-5 times higher than outdoor levels, and occasionally as much as 100 times higher,
 - have higher exposures to toxicants in the environment,
 - are more vulnerable to the effects of those toxicants than adults.
- Many toxicants found in ECE facilities are not addressed in state child care health and safety regulations.
- A child may spend up to 12,500 hours in an ECE facility if he/she starts as an infant and continues until entering school, more than the amount of time he/she will spend in school from kindergarten through the end of high school.
- Children exposed to indoor toxicants miss more days of school due to illness.

Health and Safety in ECE

- Child Care Licensing Regulations represent the minimum acceptable standards for protecting children's health in ECE.
- Many states have cumbersome procedures for updating their licensing regulations, and do it infrequently.

Health and Safety in ECE



- ***Caring For Our Children: National Health and Safety Performance Guidelines for Early Care and Education Programs***-national quality standards for health and safety in ECE, written by members of the American Academy of Pediatrics and the American Public Health Association.
- The Environmental Law Institute report, **Reducing Environmental Exposures in Child Care Facilities: A Review of State Policy**, summarizes state regulations that touch on environmental health. The report is available online at https://www.eli.org/sites/default/files/eli-pubs/reducing-environmental-exposures-child-care_4.pdf

Caring for Our Children: National Quality Standards for Health and Safety in Early Care and Education

Special Collection

Caring for Our Children: Environmental Health in Early Care and Education

*Applicable Standards from:
Caring for Our Children:
National Health and Safety
Performance Standards;
Guidelines for Early Care
and Education Programs,
3rd Edition*






A Joint Collaborative Project of

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Caring for Our Children

**National Health and Safety Performance Standards
Guidelines for Early Care and Education Programs**


Third Edition



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Early Education

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Environmental Health in Early Care and Education: What Are the Issues

Children in ECE are exposed to a number of possible toxicants, including:

- Pesticides
- Lead
- Cleaning, sanitizing, and disinfecting products
- Asbestos
- Fire retardants
- Phthalates
- Mold
- VOCs
- PAHs
- Formaldehyde
- Radon
- PCBs



Safe Siting of Child Care Facilities

- Child care centers often have less stringent requirements for siting than K-12 schools, despite their more vulnerable populations.
- Child care licensing requirements often lack a broader consideration of chemical contaminants in the environment, and conditions at/adjacent to a site where a center will be located.
- ATSDR has a child care safe siting initiative underway. The guidelines should be released this year.
- Safe siting practices should be incorporated into state laws, policies, planning and permitting decisions, regulations, licensing practices/policies.

Safe Siting of Child Care Facilities

Things to consider in the siting of ECE facilities:

- Former uses of a site that may have left chemical or physical hazards on the property (including the building and the land).
- Migration of harmful substances onto the site from nearby properties or activities,
- Proximity to frequently travelled highways or other sources of air pollution.
- Naturally-occurring harmful substances on site.
- Access to safe drinking water.
- Adjacent properties that pose risk via migration of VOCs, such as dry cleaners, nail salons.

In addition to health impacts, poorly sited child care centers can

- create stress and fear among parents when a problem is discovered and
- cost child care providers and states money in legal fees and expenses to remedy the problem.

Pesticides in ECE

- In a 2004 EPA study of children's total exposure to persistent pesticides and other persistent organic pollutants at home and at child care,
 - Children were generally exposed to higher levels of pollutants than adults in the same household, with the difference being statistically significant.
 - Exposures were frequently higher in child care centers than at home.
- Children can become exposed to pesticides in ECE environments when they breathe the air; ingest food, water, soil and dust; and touch contaminated surfaces.
- Health effects associated with pesticide exposure include:
 - cancer,
 - decreased cognitive function,
 - behavior problems,
 - birth defects, and
 - asthma

Pesticide Use in and Around Child Care Centers in California 2010

- 90% of child care centers reported at least one problem with indoor and/or outdoor pests
- 55% reported using pesticides to control pests
 - 47% reported the use of more hazardous sprays or foggers that can leave residues on surfaces and in the air and potentially expose children and staff.



Integrated Pest Management: A Toolkit for Early Care and Education



INTEGRATED PEST MANAGEMENT: A TOOLKIT FOR EARLY CARE AND EDUCATION PROGRAMS



California Childcare Health Program is a program of the University of California, San Francisco School of Nursing.
800-333-3212 • www.ucsfchildcarehealth.org • info@ucsfchildcarehealth.org



Pesticide Use in and Around Child Care Centers in California

- New California rule proposed to take effect September 2017 that will ban the use of crop dusting and other forms of crop spraying within a quarter mile of schools and child care centers.
 - Affects about 3,500 schools and child care facilities



Pesticide Use in and Around Child Care Centers in Hawaii

- There are at least 27 schools in the State of Hawaii within a mile of large-scale agricultural operations known to use high-volumes of restricted use pesticides.
- **What about child care centers?**
- Legislation (HB 1571) was proposed last year and amended to
 - Establish a pilot program in 5 schools that requires parental notification of pesticide applications and recordkeeping of pesticides used.
 - Establish a pilot program to create a vegetative buffer zone around the pilot 5 schools that border a commercial agricultural production area.
 - **require** entities applying restricted use pesticides to
 - **disclose** the pesticides they are spraying in various sensitive areas or by large-scale, outdoor commercial agricultural operations.
 - **notify communities** who could be potentially impacted by pesticide drift.

Phthalates

● Phthalates

- are suspected endocrine disrupting compounds, have adverse effects on the reproductive system and reproductive hormones, especially in males.
- used as plasticizers mainly to soften polyvinyl chloride-based (PVC) products
- are easily released into the different environmental compartments, increasing human exposure and uptake. Food is also a major source of exposure.

● A 2014 study of phthalate levels in dust and air from 40 ECE facilities in Northern California found

- 82–89% of children in California ECE had DBP exposure estimates exceeding reproductive health benchmarks.
- 8–11% of children less than 2 years old had DEHP exposure estimates exceeding cancer benchmarks.
- These risk assessments **underestimate** a child's overall exposure since children are exposed to phthalates in other indoor environments (e.g., home) and other important sources of phthalate exposure to children such as consumer products, toys, and food were not assessed.

Phthalates

- Sources of phthalates in ECE besides food include
 - Vinyl floors
 - Vinyl covered nap mats
 - toys
- Actions to take:
 - Serve children fresh fruits and vegetables, unprocessed foods.
 - Use stainless, ceramic or enamel ware to serve children food
 - Replace vinyl (PVC) covered foam nap mats with nap cots without foam or vinyl.
 - When replacing flooring, choose non-vinyl materials such as linoleum.
 - Choose wooden toys rather than plastic.

Fire Retardants

- Found in polyurethane furniture foam, car seats, electronics, carpet, and building insulation.
 - Many ECE facilities use nap mats containing FRs which contribute to FR levels in dust.
 - Donated old furniture containing FRs is common in ECE facilities.
- A 2014 study of 40 ECE centers in California found
 - flame retardants were always present in dust, and concentrations were higher in facilities where upholstered furniture and foam napping equipment were present.
 - Child chlorinated tris exposure estimates in this study exceeded age-adjusted NSRL benchmarks based on carcinogenicity in 51% of facilities for children <6 years old.
- Health effects include neurodevelopmental toxicity, endocrine disruption.
- Toddlers incur an estimated 90% percent or more of their exposure from dust, mostly ingested but some absorbed through the skin. Infants are most highly exposed through breast milk.

Fire Retardants

What can you do?

- Institute cleaning practices that capture indoor dust before it gets in the body including regularly:
 - wet wiping floors and walls
 - using a vacuum equipped with a HEPA air filter.
 - removing shoes at the door, using doormats to intercept dirt-bound contaminants.
- Make sure furniture such as couches does not have a label that says “Meets Technical Bulletin 117 (TB 117).” Look for this label:

NOTICE
THIS ARTICLE MEETS THE FLAMMABILITY
REQUIREMENTS OF CALIFORNIA BUREAU OF
ELECTRONIC AND APPLIANCE REPAIR, HOME
FURNISHINGS AND THERMAL INSULATION
TECHNICAL BULLETIN 117-2013. CARE SHOULD BE
EXERCISED NEAR OPEN FLAME OR WITH BURNING
CIGARETTES.

The upholstery materials in this product:
___ contain added flame retardant chemicals
X contain NO added flame retardant chemicals

The State of California has updated the
flammability standard and determined the fire
safety requirements for this product can be met
without adding flame retardant chemicals. The
State has identified many flame retardant
chemicals as being known to, or strongly suspected
of, adversely impacting human health or
development.

Why is it Important to Clean in ECE?

The presence of moisture, standing water and mold can cause respiratory problems such as asthma, and allergies.

Cleaning:

- Removes germs that may cause infectious disease
- Removes oil and grease that could prevent sanitizers and disinfectants from coming in contact with germs
- Removes biofilms that hide bacteria
- Protects the life cycle of materials used in facilities:
 - Carpet, tile, walls, furniture and fixtures.

Hazards of Cleaners, Sanitizers and Disinfectants

Many cleaning, sanitizing or disinfection products sold are not safe, even though they are available at most stores.

Many cleaning and sanitizing chemicals can cause health problems in children and staff.



Only the chemicals that kill bacteria, viruses, or mold (disinfectants) have to be labeled.

Manufacturers are not required to list all the ingredients on the label.

Health Hazards of Cleaners, Sanitizers and Disinfectants

Key Points:

- The words “natural,” “nontoxic,” and “green” that appear on product labels are unregulated by the government.
- Researchers have found that products labeled “green” often have as many toxic chemicals as conventional cleaning products.
- Cleaning products do not have to list ingredients on the label and manufacturers do not have to prove that they are safe before they market them.
- These gaps in ingredient information on product labels make it difficult for the consumer to make wise choices when purchasing cleaning products.

A 2016 study of cleaning practices in 310 nursery schools and elementary schools in France found:

- 584 different cleaning products were used, SDS were available for 218
- 152 chemical substances were identified via the SDS,
 - including alcohols, chlorides, terpenes, aldehydes, and ethers; more than half of them are irritants.
- Two endocrine disruptors, 2-phenylphenol and Galaxolide, were identified in two cleaning products used every day to clean the floors in seven kindergartens and in a nursery.
- Eleven reactive substances containing C=C double bonds, mostly terpenes, were identified in a wide variety of cleaning products. These react rapidly with ozone in indoor air, producing aldehydes and particles.

Wei, W., Boumier, J., Wyart, G., Ramalho, O., & Mandin, C. (2016). Cleaning practices and cleaning products in nurseries and schools: to what extent can they impact indoor air quality? *Indoor Air*, 26(4), 517-525. doi:10.1111/ina.12236

Fragrances

- A single fragrance in a product can contain a mixture of hundreds of chemicals
 - A survey of selected scented consumer goods showed
 - the products emitted more than 100 volatile organic compounds (VOCs),
 - including some that are classified as toxic or hazardous by federal laws.
 - they react with ozone in ambient air to form dangerous secondary pollutants, including formaldehyde, a known human carcinogen.
- Clean isn't a smell
- Always choose unscented products!

Triclosan

Many cleaning, sanitizing and disinfecting products contain the germ-killing chemicals triclosan and its relative, triclocarbon.

These active ingredients act to slow or stop the growth of bacteria, fungi, and mildew.

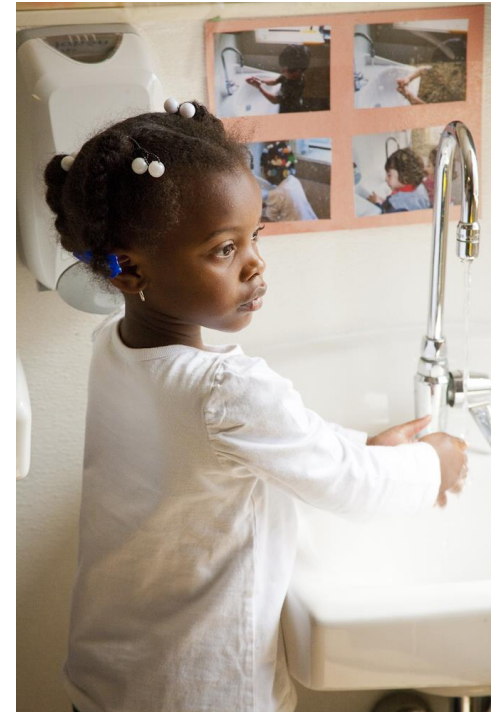
They are found in antibacterial soaps, deodorants, sponges and household cleaners and disinfectants.

Triclosan ends up in our drains, sewage systems and, eventually, our waterways and agricultural fields. Over 400,000 pounds, to be exact.

Much of the triclosan we flush, wash away, and dispose of in other ways ends up in the soil, where it may be absorbed by growing fruits and vegetables.

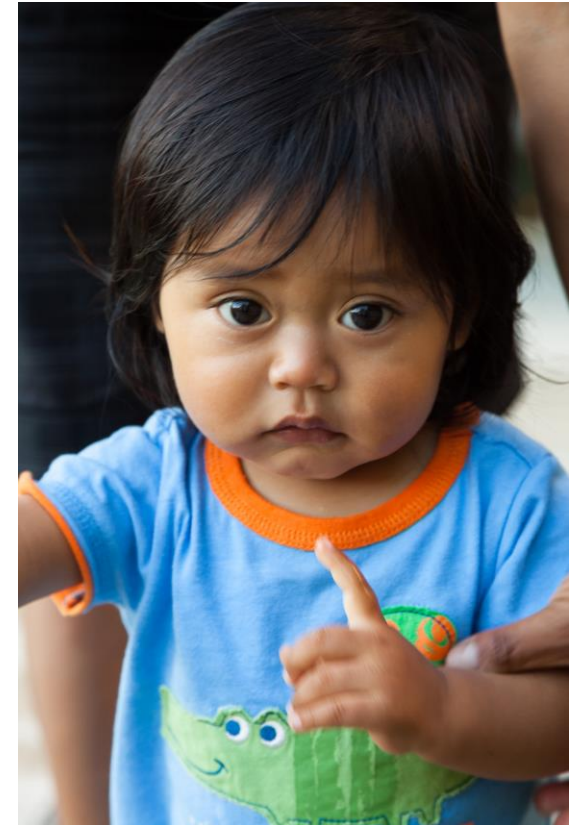
What's the Problem with Bleach?

- **Bleach:**
 - can cause asthma
 - triggers asthma episodes
 - can affect breathing
 - can irritate the skin and eyes
 - was the source of 35,000 poisonings in 2011
- **Children are at greater risk from breathing bleach vapors because their lungs are still developing.**
- **Bleach has a short shelf life, so must be purchased monthly and solutions mixed daily.**



What's the Problem with Bleach?

- Sanitizing and disinfection requirements mandate the use of a disinfectant dozens of times a day, especially in infant and toddler rooms where diapers are being changed.
- It is most commonly sprayed on surfaces, increasing aerosolization.
- Child care providers mix bleach daily, don't use personal protective equipment.
- Chloroform is a breakdown product.
- Many ECE providers report having developed asthma.
- There are safer alternatives that are not asthmagens.



Identifying Safer Products

The only way to know which cleaning products are safer:

Buy products certified as safer for human health and the environment by an independent third party agency.

Identifying Safer Products

Third-party certified cleaning products:

1. Green Seal



2. Design for the Environment-Safer Choice



epa.gov/saferchoice

3. Design for the Environment Pilot Disinfectant Project:

The only agency that can list disinfectants certified as safer for human health and the environment

4. Ecologo

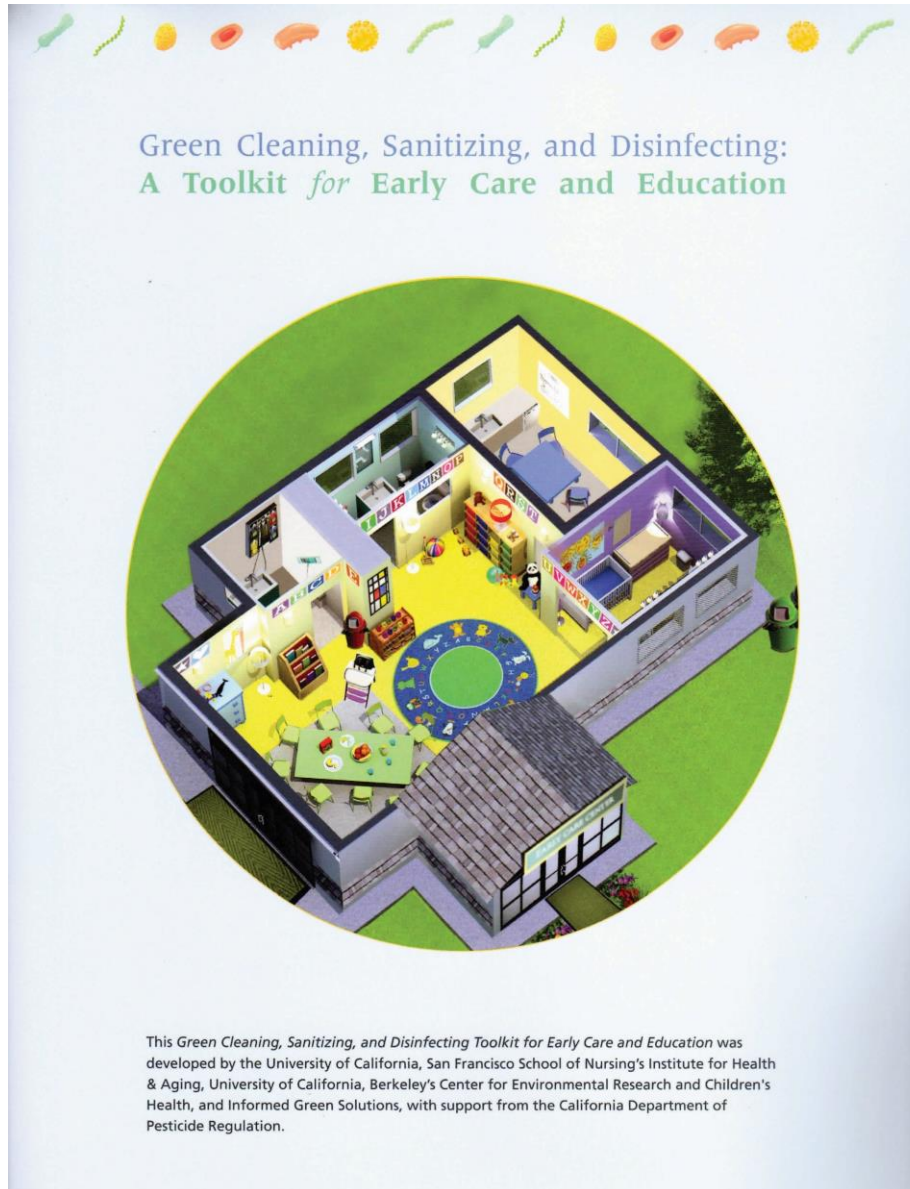


Choosing Safer Cleaning Products

▶ Look for the Following:

- Products that are third-party certified.
- The signal word **Warning** rather than **Danger** on the label.
- Non-aerosol.
- Fragrance-free and dye-free.
- All ingredients listed on the label or a website.
- No overwhelming chemical odor.
- Check the Environmental Working Group's **Guide to Healthy Cleaning** website.

Green Cleaning, Sanitizing, and Disinfecting: A Toolkit for ECE



This Green Cleaning, Sanitizing, and Disinfecting Toolkit for Early Care and Education was developed by the University of California, San Francisco School of Nursing's Institute for Health & Aging, University of California, Berkeley's Center for Environmental Research and Children's Health, and Informed Green Solutions, with support from the California Department of Pesticide Regulation.

Lead

- The First (and only) National Environmental Health Survey of Child Care Centers in 2001 found:
 - 28% (22% to 35%) of centers had LBP on either interior or exterior painted surfaces or both.
 - An estimated 14% (9% to 22%) of centers had significant LBP hazards.
 - 10%, or an estimated 470,000 children under age six (170,000 to 760,000) attended licensed child care centers with significant LBP hazards.

Exposures from Arts and Crafts Materials

During arts and craft time, ensure:

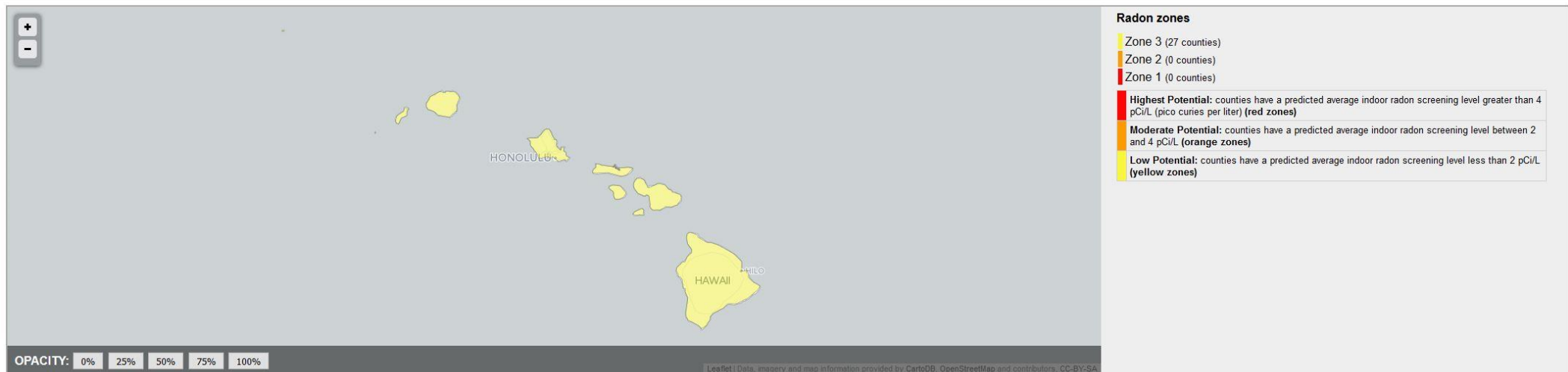
- the workspace is well-ventilated with open screened windows and fans, or take the project outside.
- only non-toxic art supplies approved by the Art & Creative Materials Institute (ACMI) are used. Look for ACMI non-toxic “AP” (Approved Product) seal. You can find a list of these products at www.acminet.org. Water based markers and paints have less VOCs.
- Have children wear protective smocks and wash their hands thoroughly after using art and craft supplies.
- Do not allow children to eat or drink while using art and craft materials.

Radon

- Radon exposure is the second most common cause of lung cancer and the first risk factor for lung cancer in never-smokers.
- ECE facilities should be checked for radon before site is occupied in areas where radon is high.
- Radon risks in Hawaii are low

Map of Radon Zones in Hawaii based on Environmental Protection Agency (EPA) data

[Back to Radon Zones in the United States](#)



Potential toxicant exposures in early care and education include:

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Fire retardants

Pyrethrins

Formaldehyde

All of the above

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Resources

Center for Environmental Health, **Nap Mat Fact Sheet** <http://www.ceh.org/wp-content/uploads/Nap-Mat-Fact-Sheet-rev.pdf>

Environmental Health Perspectives, **Indoor Air Quality: Scented Products Emit a Bouquet of VOCs** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3018511/>

Environmental Health Perspectives, **Environmental Exposures in the Context of Child Care** <https://ehp.niehs.nih.gov/121-a160/>

EPA's Safer Choice Program, <https://www.epa.gov/saferchoice>

EPA **Design for the Environment Antimicrobial Pesticide Pilot Project** <https://www.epa.gov/pesticide-labels/design-environment-antimicrobial-pesticide-pilot-project-moving-toward-green-end>

EWG, **Guide to Healthy Cleaning**, <http://www.ewg.org/guides/cleaners>

Green Science Policy Institute, **Hidden Harms: Parents' Guide to Flame Retardants** <http://greensciencepolicy.org/wp-content/uploads/2014/03/SafeKidsFlyer2014v2.pdf>

Green Seal <http://www.greenseal.org/>

GSA **Child Care Design Guide** <https://www.gsa.gov/portal/content/103653>

National Resource Center for Health and Safety in Child Care and Early Education, **Caring for Our Children**, <http://cfoc.nrckids.org/>

PEHSU, **Children's Potential Exposures to Formaldehyde from Building Furnishings for Health Professionals** https://wspehsu.ucsf.edu/wp-content/uploads/2016/07/PEHSU_Formaldehyde_Fact_Sheet_Health_Professionals.pdf

San Francisco Sustainable Facilities Tool: Child Care <https://sftool.gov/learn/about/502/child-care-centers#Source2>

Western States Pediatric Environmental Health Specialty Unit, **Promoting Environmental Health in Early Care and Education Project**. <https://wspehsu.ucsf.edu/for-clinical-professionals/training/pediatric-environmental-health-interactive-curriculum/resources/environmental-health-in-early-care-and-education-project/> contains links to online versions of the IPM and the Green Cleaning, Sanitizing, and Disinfection Toolkits for Early Care and Education.

W.K. Kellogg Foundation, **KEY FINDINGS: Managing Lead in Drinking Water at Schools and Early Childhood Education Facilities** <https://www.wkkf.org/news-and-media/article/2016/02/managing-lead-in-drinking-water-at-schools-and-early-childhood-education-facilities>

EPA, **Contaminants in Schools and Child Care Facilities** <https://www.epa.gov/sites/production/files/2015-06/documents/supplementary-topics-schools-and-child-care.pdf>

Western States Pediatric Environmental Health Specialty Unit

The findings and conclusions in this presentation have not been formally disseminated by the Agency for Toxic Substances and Disease Registry and should not be construed to represent an agency determination or policy.

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