Environmental Health at Home & in the Nursery

New York State Pollution Prevention Institute
Rochester Institute of Technology (RIT)

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Contains portions of some materials initially prepared with support of the US Environmental Protection Agency Great Lakes Restoration Initiative in the amount of $104,192 and by the NYS Pollution Prevention Institute through a grant from the NYS Department of Environmental Conservation.
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Although the information in this document has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement NE97201911-0 to the Rochester Institute of Technology, it has not gone through the Agency’s publications review process and, therefore, may not necessarily reflect the views of the Agency and no official endorsement should be inferred.

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Agenda

• Vulnerability of pregnant women and young children to environmental toxins
• Potential toxics that may be found in the nursery & home
• Where they’re found
• Potential effects
• How to reduce your exposure
We are Exposed to Chemicals Every Day

**Food**
pesticides in produce, mercury in fish, chemicals stored in fat

**Indoor Environment**
cleaning products, toys, plastics, fabrics, personal care products, dust, wastes, paint, carpets, cookware, furniture, tobacco smoke, lighting, clothes

**Occupation & Hobbies**
furniture/working environment, chemicals

**Outdoor Environment**
air pollutants, pesticides, fertilizers, contaminated soil, pharmaceuticals in water
Body Burden

- Chemicals typically enter our body when we **breathe them in** or eat **food contaminated** with them
- Once in the body, many chemicals are **stored in fat**
- Chemicals in mothers **can pass to their unborn babies**
- Chemicals that may **affect the endocrine and reproductive systems** have been found in pregnant women
- Many of these chemicals are found in **household products**
Why should pregnant women be concerned about environmental health?

There is substantial evidence that prenatal exposure to certain toxins is linked to:

– Miscarriage
– Low birth weight
– Preterm birth
– Birth defects
– Motor and cognitive delays in children
– Impacts to early brain development
Children are Vulnerable

**Children are at higher risk of suffering effects than adults**

1. Children have a heightened sensitivity as their bodies are growing and developing
2. Children have greater pound-for-pound intake of air, water, and food
3. Children’s skin is 30% thinner than adults’ & can absorb more from the skin’s surface
4. Children don’t have the same ability to excrete toxins
5. The blood brain barrier that helps block chemicals from penetrating the brain isn’t fully developed until 6 months of age
6. Children have more years of future life left
7. Children spend more time close to the ground
8. Children have a tendency to put things in their mouth
Endocrine Disruption

Disruption of the endocrine system can occur in various ways

1. MIMIC a natural hormone
   - Fools the body into over-responding (e.g. growth hormone that results in increased muscle mass)
   - Fools the body to respond at inappropriate times (e.g. producing insulin when not needed)

2. BLOCK the effects of hormones
   - For example, blocks growth hormones required for normal development

3. DIRECTLY STIMULATE or INHIBIT the endocrine system
   - Causes an overproduction or underproduction of hormones (e.g. an over- or under-active thyroid)

Exposure linked to: learning disabilities, severe attention deficit disorder, cognitive and brain development problems, deformations of the body, sexual development problems, feminizing of males, masculine effects on females
Environmental Health in the Nursery

- Paint
- Mattress
- Wood furniture
- Flooring
- Foam furniture & other foam products
Volatile Organic Compounds

- VOCs are chemicals that are released from a material and enter the air, where we usually breathe them in or they settle on objects as dust. Paint fumes and chemical cleaners are examples.
- Health effects vary greatly from chemical to chemical
- Key signs: irritation, nose and throat discomfort, headache, allergic skin reaction, shortness of breath, nausea, vomiting, nosebleed, fatigue, dizziness.
- May also cause damage to liver, kidney, and central nervous system; memory impairment
Paint

What is the concern?

• Household paints are generally either oil-based or water-based (latex)
  – Oil based paints emit more chemical vapors than latex paint, but latex paint may still contain harmful chemicals such as formaldehyde, glycol ethers and biocides

• Solvents in paints and paint thinners can be hazardous to the health of mom and baby
  – May cause headaches, nausea, dizziness, and fatigue
  – Studies have linked some paint solvents to increased risk of miscarriage

• Lead based paint was typically used before 1978
  – Avoid scraping/sanding any surfaces older than 1978
Paint

What is the concern with lead based paint?

• If a woman is pregnant and becomes exposed to lead, she may increase her risk of:
  – Premature Birth – Premature babies have a higher risk of illness and death
  – Miscarriage or Stillbirth – High levels of lead can cause babies to die before birth
  – Low Birth Weight – Babies do not grow inside the mother’s womb at a normal rate

• How is an Unborn Baby Exposed to Lead?
  – A pregnant woman can breathe in or swallow lead in paint
  – If a pregnant woman was exposed to lead in the past, lead can be stored in her bones for many years and then be released during pregnancy
    • During pregnancy, calcium in the mother’s bones goes into the bloodstream. When calcium leaves the pregnant mother’s bones, so does lead. Calcium also comes from a new mother’s bones to make breast milk. Breast milk may also contain lead.
Paint

What can I do to reduce the concern?

**BEST:** Avoid all painting in your home while pregnant and with a newborn

**GOOD:**
- Choose low-VOC or zero-VOC paint
- Non-pregnant adults paint inside the home
- When pregnant, air out a freshly painted room for at least 3 days

**If you must paint:**
- DO NOT PAINT with a newborn in the room
- Use low-VOC or zero-VOC paints
- Wear long pants, long-sleeved shirts and gloves to prevent skin contact
- Properly ventilate the room with fans
- Limit time spent in freshly painted rooms and allow the room air out for at least one week before spending time in it
Wood Furniture

What is the concern?

Cribs and furniture made from composite wood typically contain VOCs, especially formaldehyde

- **Particleboard** (shelving, cabinets, some furniture)
- **Plywood paneling** (cabinets, some furniture)
- **Medium density fiberboard** (drawer fronts, cabinets, furniture tops)

Other VOCs may be present in coatings & glues
Wood Furniture

How can pregnant women & infants be exposed?

Formaldehyde is emitted into the air

− Can cause nose and eye irritation, neurological effects, asthma and/or allergy, eczema and changes in lung function

Effects of formaldehyde on babies & children

− Very likely that breathing formaldehyde will result in nose and eye irritation
− Asthma in children exposed to formaldehyde in homes
Wood Furniture

How can I safely use particleboard furniture?

**Best** to avoid particleboard & fiberboard furniture

**Use it safely**

- Pregnant women and children should not sleep or spend significant time in a room with new furniture
- Air it out in a garage for a week before bringing it into your house or if it can’t be aired outside
  - Place in a room that isn’t usually occupied
  - Place in the room it will be used & open the windows
  - Avoid spending a lot of time in the room with the furniture for at least a week
Flooring

Vinyl flooring is made from PVC (polyvinyl chloride)

– Contains DEHP, a phthalate, that offgasses from the floor
– Difficult to measure amount of phthalates offgassed; PVC flooring is associated with increased levels of phthalates in house dust

Hardwood

– Choose sustainable woods, such as cork or bamboo
– Avoid flooring coated or sealed with formaldehyde-based chemicals (emit VOCs), or polyurethane (contains diisocyanates, which cause or aggravate asthma)

Carpet & adhesives emits VOCs during installation

– With good ventilation, VOC emissions typically fall to very low levels within 48 to 72 hours after installation
– Carpets can harbor pesticides that are brought in with shoes, house dust, and other contaminants

When choosing flooring, talk to your contractor/retailer about the safety of flooring material and sealants, adhesives, or other chemicals used

Crib Mattresses

What are the components?

Crib mattresses are composed of a structural core, a middle layer of padding, flame retardant materials, and ticking (cover). Each may contain a variety of materials and include chemical additives to provide water resistance, flammability reduction, or antibacterial properties.

**COVER/“TICKING”**
- Cotton
- Wool
- Polyester, and/or
- Vinyl
- May be coated with other chemicals

**FLAME RETARDANT**
- Chemicals added to ticking or padding, or
- Layer of fire-resistant material

**PADDING**
- Cotton, or
- Polyester

**CORE**
- Foam/Latex
- Steel springs, and/or
- Natural batting

Image source: The Mattress Matters: Protecting Babies from Toxic Chemicals While They Sleep, Clean & Healthy New York, November 2011
Crib Mattresses

What is the concern?

- **Core** may be made from **polyurethane foam** (chemicals used to make foam are carcinogens, contains VOCs) or **synthetic latex** (contains VOCs)

- **Cover** may be made from **PVC** (may leach phthalates & contain metals)

- May be coated in **antimicrobial protection** (linked to endocrine disruption)

- **Flame retardant** may contain **bromine** (linked to neurobehavioral effects in children\(^1\) and other health effects), **antimony** (breathing or ingesting high amounts can cause severe health effects) or **boric acid** (eye & respiratory irritation)
Crib Mattress Shopping Tips

✓ **Choose** third party certified mattresses (see next slide)
✓ **Choose** a mattress free of potentially harmful chemicals: vinyl, phthalates, heavy metals, antimicrobial protection, bromine, PBDE

✓ **Choose** a mattress made of natural/less hazardous materials – cotton, rubber latex, plant based foam, polyester batting, wool

✓ **Choose** food grade polypropylene or polyethylene cover

✓ **Choose** wool - it is naturally flame retardant; some mattresses are wrapped in a layer of wool & need a separate cover to be waterproof

✓ **Choose** baking soda & hydrated silica flame retardants

✓ **If vinyl covers can’t be avoided**, wrap the mattress with a separate polypropylene or polyethylene cover

✓ **When using vinyl covered mattresses**, take the new mattress out of the packaging and put it in your garage or unoccupied room for a week or two so a large portion of the phthalates and/or other VOCs offgas before the baby sleeps on it
Mattress & Furniture Certifications

PREFERABLE

GreenGuard: indoor air quality mattresses must meet limits for VOCs, formaldehyde, aldehydes, phthalates, and particles to be certified

GOTS (Global Organic Textile Standard): organic mattresses mattresses must contain at least 95% organic fibers

Oeko-Tex: safer materials limits/forbids heavy metals, phthalates, perfluorinated compounds, pesticides, formaldehyde, toxic flame retardants, and others from mattress components

Watch for vague statements like “eco-friendly” or “non-toxic.” These aren’t regulated so products don’t have to meet a standard to use the terms.

USDA Organic: organic mattresses & components components and/or mattresses must contain 95% organic content
Chemicals found in Living & Bed Rooms

**Lead paint:** increased risk of miscarriage and still birth, low birth weight, and preterm birth; neurodevelopmental effects

**Glue in particleboard, plywood paneling, & MDF** typically contains formaldehyde – eye, nose, throat irritation; linked to childhood asthma; may cause allergic skin reaction

**Adhesives, solvents, and finishes** may contain benzene, xylene, & toluene – eye, nose, throat, & skin irritation

**PBDEs** flame retardants, potential hazards: disruption of thyroid function, developmental toxicity, toxic to the brain, liver & reproductive system, neurobehavioral effects in children

**Vinyl PVC** contains phthalate – endocrine disruptor

**Hardwood** may be coated with formaldehyde-based chemicals or polyurethane - cause/aggravate asthma

**New carpet & adhesives** emit VOCs - eye, nose, skin & throat irritation; fatigue; headaches; shortness of breath/cough; can harbor pesticides & house dust
Environmental Health at Home

- cookware
- lighting
- cleaners
- household hazardous waste
Compact Fluorescent Lights (CFLs)

What is the concern?

• CFLs use about 75% less energy than incandescent bulbs

• Contain mercury vapor
  – About 4mg per bulb (old thermometers contain about 500mg)
  – Mercury can affect the brain and nervous system

• CFLs release mercury into the air and ground when broken
  – Be careful when handling them
  – May break during trash pickup or in the trash can

• No risk of mercury being released from a bulb that’s not broken

• Recycle CFLs instead of trashing them
Compact Fluorescent Lights (CFLs)

Why is it important to clean up a broken CFL safely?

Pregnant women should not clean up broken CFLs

Pregnant women, babies, and children should leave the room or home immediately after a CFL breaks to avoid mercury

• When CFLs break, they release mercury vapor into the air
• Vapor can travel through ductwork at home, contaminating air throughout the house
• If you are concerned about exposure to mercury, contact your physician

See US EPA’s guide to Cleaning up a Broken CFL for the right way to clean up a broken CFL

EPA Cleanup Tips
• Turn off your heating/air conditioning system for several hours
• DO NOT VACUUM, as it could spread mercury powder or mercury vapor
Cookware

What is the concern?

- Teflon® coated non-stick pans contain small amounts of PFOA
- PFOA has been found in house dust, water, & food
- PFOA remains in people for a very long time
- PFOA is linked to
  - Infertility, thyroid disease & higher cholesterol level
  - Increased risk of attention deficit hyperactivity disorder (ADHD) in US children aged 12–15
  - Earlier and later onset of puberty in girls
  - Signs of reduced fetal growth including lower birth weight
Cookware

What products contain PFOA & chemicals like it?

• These chemicals have been used for decades to make products that resist heat, oil, stains, grease and water

Products that may contain these chemicals:
• Stain resistant carpets & furniture
• Grease proof food papers, like microwave popcorn bags, fast food wrappers, candy wrappers, and pizza boxes
• Non-stick pans
• Cosmetics
• Cleaners
• Clothing
Cookware

How can pregnant women & infants be exposed?

• Teflon® coated non-stick pans contain trace amounts of PFOA that may be emitted from the pan as it’s heated, and it may be inhaled

• Infants may ingest or inhale chemicals from carpets when playing on the floor
Cookware

Actions you can take to avoid PFOA at home

✖ Avoid overheating nonstick pans
✖ Avoid burning food in nonstick pans
✔ Choose non-reactive cookware and cooking utensils, such as uncoated metal, silicone, glass, and cast iron
✖ Avoid stain resistant carpets, furniture, clothes, and other fabrics
✖ Avoid infants chewing on carpets and furniture
Kitchen Cleaners

What is the concern?

- **Disinfectants** typically contain pesticides
  - Very irritating to eyes and skin and will burn your throat
- **Drain cleaners** typically contain lye and sulfuric acid
  - Corrosive & can cause severe skin burns
- **Oven cleaners** typically contain lye
  - Corrosive & can burn the skin and eyes
- **Automatic dishwasher soap** sold in other states may contain high levels of phosphorus
  - Phosphorus makes it’s way to water bodies because our water treatment plants can’t remove it
  - Once in the water, it promotes the growth of algae which contributes to beach closings and other water quality issues
  - Can also cause skin irritation or burns
Bathroom Cleaners

What is the concern?

- **Toilet cleaners** typically contain hydrochloric acid and bleach
  - Very irritating to eyes and skin, can burn your throat

- **Mold and mildew removers** typically contain fungicides
  - Caustic & may cause breathing problems

- **Antibacterial cleaners** contain pesticides
  - Very irritating to eyes and skin and will burn your throat

- **Air fresheners** contain VOCs
  - Flammable, irritate eyes, skin, and throat
Cleaners

Actions you can take to use them safely

✗ Avoid cleaners labeled “danger” or “poison”
✗ Avoid using cleaners while pregnant
✗ Avoid using cleaners in rooms with infants; move the infant out of the room while cleaning and until the cleaner smell is gone
✗ Use cleaners in a well ventilated area
✗ Wash your hands after using cleaners & before handling infants
✓ Choose fragrance free cleaners
✓ Choose third party certified cleaners
✓ Choose cleaners that do not contain hazardous ingredients
✓ Make your own cleaners
✓ Use baking soda to absorb odors

Examples of third party certifications
What is the concern?

• We are exposed to a lot of scented products – personal care, cleaners, air fresheners, laundry soap, etc.

• Add scent to cleaning products
  – Recognize the smell of Pine-Sol and other ‘lemon’ scents

• Usually made up of a blend of chemicals

• May be from natural or synthetic sources

• Typically contain phthalates and musks that are both endocrine disruptors and may build up in the body
Fragrance ... The Smell of Clean??

How are pregnant women & infants exposed?

- **Breathe it in** – perfume, cleaners, air freshener, scented candles, other airborne products
- **It is absorbed through the skin** – shampoo, soap, lotion, other personal care products, laundry soap on clothes & bed sheets

Can hide many chemicals as the composition does not have to be disclosed on the label

During use, fragrance can become airborne and is easily inhaled

Nearly 38% of Americans report adverse effects when exposed to some kind of fragranced product

*a*
Fragrance ... The Smell of Clean??

Actions you can take to avoid fragrance

❌ Avoid products with “-phthalate”, “musk”, “parfum”, or “fragrance” as an ingredient
❌ Avoid air fresheners and scented candles
✓ Buy unscented or fragrance free products
  ✓ Specifically labeled “unscented,” “free of perfumes and dyes,” or “fragrance free”
✓ Use homemade, unscented cleaner recipes
Chemicals found in the **Kitchen**

**Styrene** may leach from polystyrene - neurotoxin with long term exposure

**BPA** may be in lining of canned foods - endocrine disruptor, linked to Down’s syndrome, obesity, hyperactivity, breast & prostate cancer

**May contain mercury** linked to:
- Brain damage
- Metal retardation
- Poor coordination
- Blindness
- Seizures
- Nervous and digestive system problems
- Kidney damage

**May contain parabens** that are linked to endocrine disruption

**Disinfectants may contain phenols** that affect the kidneys

**Detergents and scented cleaners may contain alkylphenols** that are linked to endocrine disruption

**Food storage**

**Contaminated fish**

**Cleaners**
Household Hazardous Waste

What is the concern?

• **Household hazardous wastes** are common household items that contain toxic chemicals and are handled and disposed of differently than regular trash.

• These products may cause serious affects if a child or expecting mother comes into contact with them.
Indoor Pesticide Use

Avoid using pesticides while pregnant
Pregnant women & infants should avoid all areas where chemical pesticides are being applied and used

• Common pesticides in homes
  – Insecticides: insects
  – Rodenticides: rodents
  – Disinfectants: microbes

• Source of Contamination include:
  – contaminated soil or dust that comes in from outside, usually on our shoes
  – stored pesticide containers

80% of people's exposure to pesticides occurs indoors and measurable levels of up to a dozen pesticides have been found in the air inside homes*

Alternatives
– Houseplant Insecticides: spray plants with luke warm soapy water then rinse well
– Rodents: use live traps and prevent by eliminating food source and sealing entry holes
Household Cleaners

In 2008, the American Association of Poison Control Centers reported that more than half of the 2 million poisoning incidents each year involve children younger than six years old.

Leading causes of poisoning include cosmetics such as perfume and nail polish, deodorant and soap, household cleaning products and medications.

-EPA, March 11, 2010
Monroe County

How can I get rid of my household hazardous waste?

FREE program for Monroe County residents

Monroe County residents can bring up to 30 gallons of liquid and 75 pounds of solid HHW per appointment without charge.

To schedule an appointment call 753-7600 (Option 3) or visit [http://www.monroecounty.gov/ecopark](http://www.monroecounty.gov/ecopark)

Location: 10 Avion Drive, Rochester [near the airport]
Pharmaceuticals

What is pharmaceutical waste?

- Pharmaceuticals that have expired or are no longer needed
  - Prescription drugs
  - Over the Counter (OTC) Medications
  - Vitamins and Nutritional Supplements
  - Veterinary Medications
Pharmaceuticals

What is the concern?

• Medication ends up in the environment
  – Flushed medication goes to the local water treatment plant
  – Medication in the trash ends up in a landfill and the water that’s collected goes to the local water treatment plant
  – The water treatment plant cannot remove these contaminants and they are discharged to Lake Ontario

• Adverse effects on fish have occurred, including\textsuperscript{11}
  – Decreased reproduction rates
  – Feminization of male fish
  – Slower development rates
  – Additional appendages

• Scientists feel they may be indicative of similar effects on humans\textsuperscript{12}

• There are many concerns, but the long term effect on people is still unknown
Pharmaceuticals

What types of medicines are the highest concern?

- Hormones and Endocrine Disrupting substances
- Antibiotics
- Painkillers
- Depressants – sleeping pills and anti anxiety drugs
- Stimulants like those used to treat ADHD
- OTC cough suppressants
Pharmaceuticals

What is the best way to dispose of them?

• Scheduled local collection events
  – Police department collections
  – Ecopark
Making Better Choices

- **Buy** what you need and will use
- **Donate** used or unused products to other parents
- **Prioritize high exposure and frequently used products** when purchasing or replacing products
- Consider purchasing **gently used furniture or products** and accept hand me downs – check recall notices to ensure products meet safety requirements
- **Read product labels before purchasing** to understand what materials the product is made of and how to clean it
- Find **brands you trust** and shop from them
- **Replace** products when they start to wear out
- **Avoid fabrics with stain or antimicrobial treatments**, especially those that your baby will spend significant time near, like mattresses
- **Choose cast iron pans** – they’re cheap, last a long time, and are non-stick without the chemicals that are in Teflon coated pans
- **Air out particleboard furniture** before using
- Be your own **advocate** and advocate for your child
Upcoming Workshop

Environmental Health and Children’s Products and Toys
Monday 11/18, 7-9pm at RGH

There are so many children’s products and toys on the market, it’s difficult to choose. It’s important to understand the products’ details and their potential impacts on your health and the health of your baby.

Learn how to choose environmentally preferable children’s products, including bottles and feeding products, car seats, personal care products, and toys.

Sources for toy testing and product recalls, as well as purchasing tips, will be discussed.
Questions & Discussion

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New York State Pollution Prevention Institute
http://www.nysp2i.rit.edu
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5 Why should pregnant women be concerned about environmental health?
Johns Hopkins Women’s and Children’s Health Policy Center, Environmental Toxicants and Maternal and Child Health: An Emerging Public Health Challenge


6 Body Burden

7 Critical Window

8 Children are Vulnerable
Landrigan, et. al., Assessing the Effects of Endocrine Disruptors in the National Children’s Study, Environmental Health Perspectives, 111:13, October 2003.

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www.epa.gov/oppt/exposure/pubs/inpaint5.pdf
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