Academy of Architecture for Health
On-line Professional Development

Holding Ourselves to Higher Standards:
Healthy Materials Every Time

Beyond the Basics Series

12 February, 2019

2:00 pm – 3:00 pm ET
1:00 pm – 2:00 pm CT
12:00 am – 1:00 pm MT
11:00 am – 12:00 pm PT

Presenters
Jean Hansen, FIIDA, LEED Fellow, CID, EDAC, AAHID
HDR

Anne Hicks Harney, FAIA, LEED Fellow, CSI CCS
Long Green Specs

Tanya Mejia, AICP, LEED AP BD+C, WELL AP
Perkins Eastman

Susan Kaplan, CCS, LEED AP BD+C
HLW

Moderator
Rita Ho, LEED AP

AIA Knowledge Community
Academy of Architecture for Health

AIA

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Beyond the Basics Series

The Academy's multi-channel on-line approach provides emerging professionals, journeymen, and master professionals with convenient and economical opportunities to develop their chosen area of interest.

Beyond the Basics Series sessions are tailored to provide healthcare design professionals with sufficient exposure to jump-start interest in wanting to learn more.

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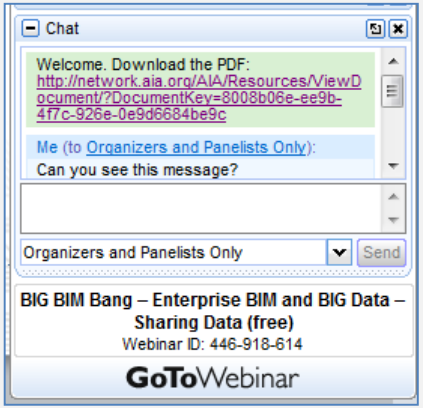

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Holding Ourselves to Higher Standards: Healthy Materials Every Time

Presenters

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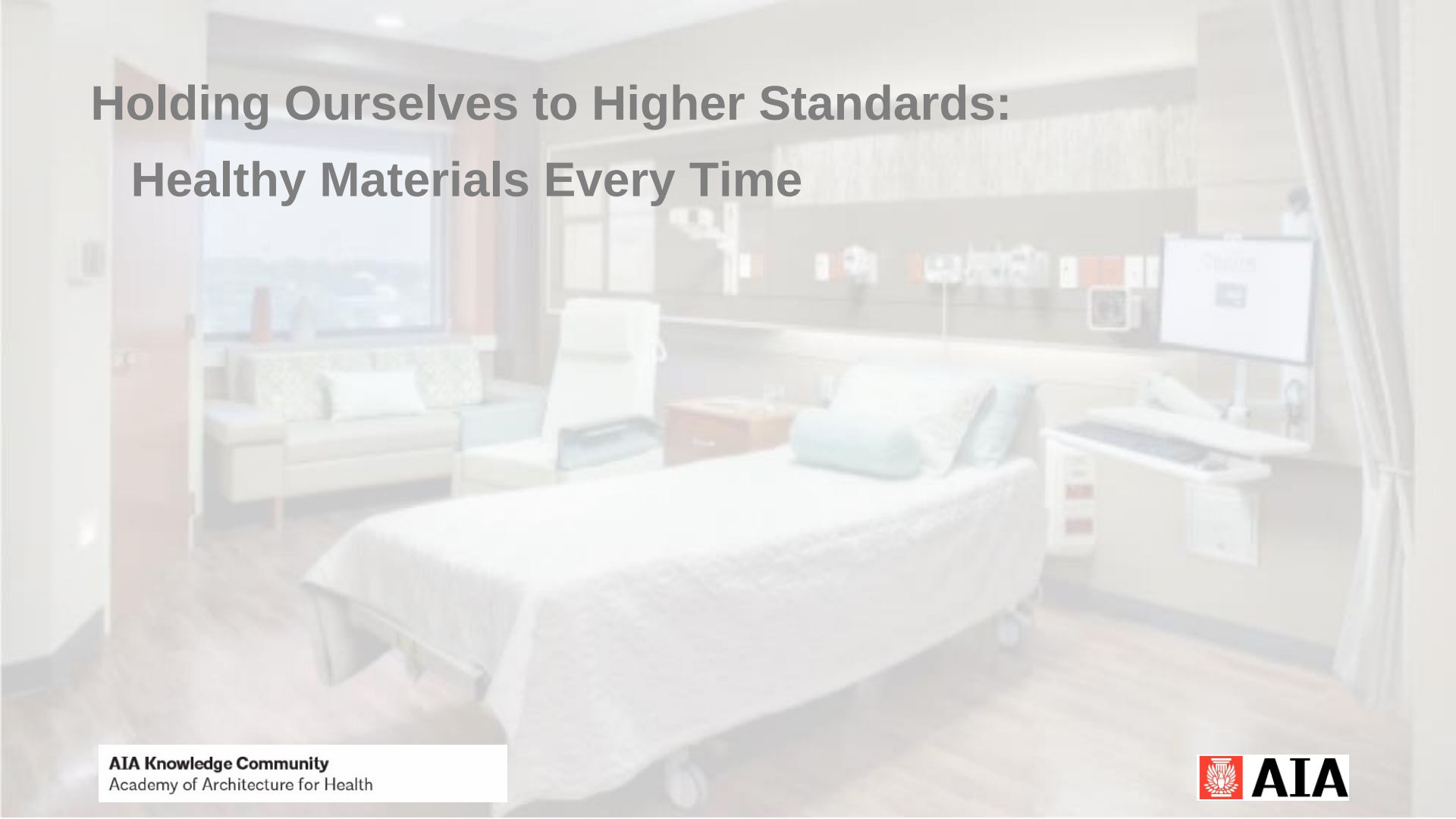
Holding Ourselves to Higher Standards:
Healthy Materials Every Time



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Safe v Legal

Safe v Legal

"Architects have a greater ability to improve public health than medical professionals."

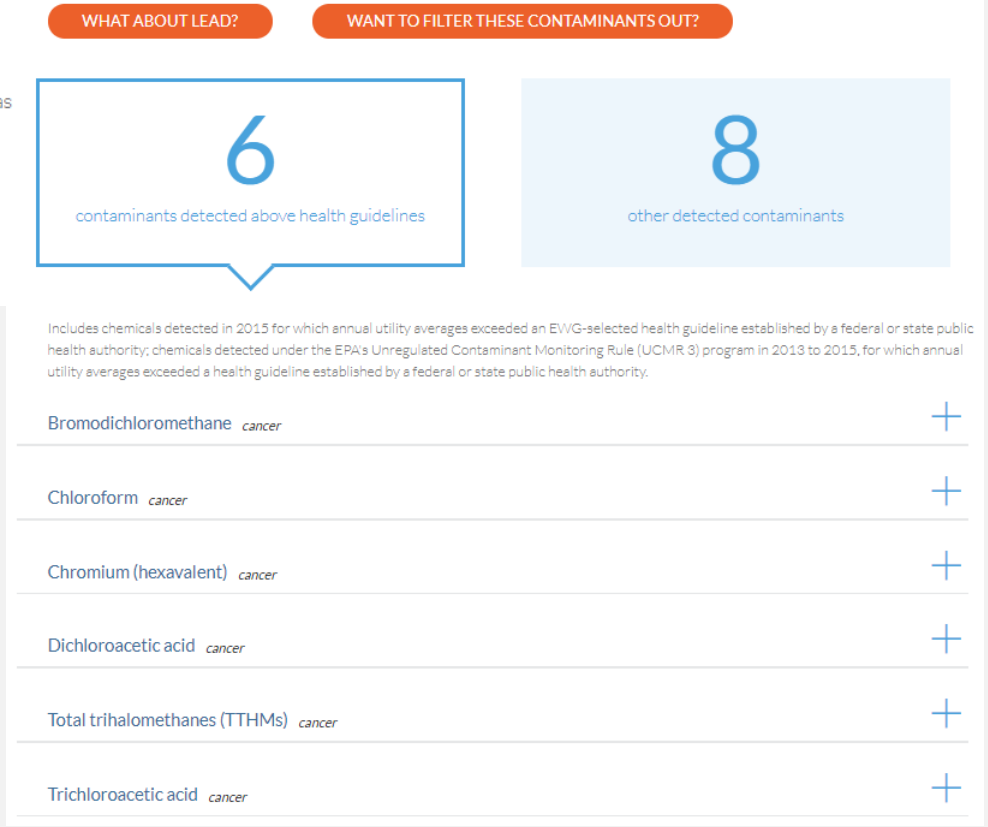
Dr. Claudia Miller, Assistant Dean, University of Texas School of Medicine

HKS Architects GreenWeek 2013

Safe v Legal

EWG's drinking water quality report shows results of tests conducted by the water utility and provided to the Environmental Working Group by the Maryland Department of the Environment, as well as information from the U.S. EPA Enforcement and Compliance History database (ECHO). For the latest quarter assessed by the EPA (July 2017 - September 2017), tap water provided by this water utility was in compliance with federal health-based drinking water standards.

…tap water provided by this water utility is in compliance with federal health-based drinking water standards.



Safe v Legal


Dichloroacetic acid cancer
Dichloroacetic acid, one of the group of five haloacetic acids regulated by federal standards, is formed when chlorine or other disinfectants are used to treat drinking water. Haloacetic acids and other disinfection byproducts increase the risk of cancer and may cause problems during pregnancy. Click here to read more about disinfection byproducts.
How your levels compare
STATE
NATIONAL
THIS UTILITY
HEALTH GUIDELINE:
0.7 ppb
6.00 ppb
5.57 ppb
13.6 ppb
The State and National averages were calculated using the averages of the contaminant measurements for each utility in 2015.
ppb = parts per billion.
Health risks of dichloroacetic acid in excess of health guideline
The health guideline of 0.7 ppb for dichloroacetic acid was defined by the Environmental Protection Agency as a one-in-a-million lifetime risk of cancer. Values greater than one-in-a-million cancer risk level can result in increased cancer cases above one in a million people.

The Rating Systems

Building product disclosure and optimization - environmental product declarations

Material & resources

Credit | Up to 2 points

Building product disclosure and optimization - sourcing of raw materials

Material & resources

Credit | Up to 2 points

Building product disclosure and optimization - material ingredients

Material & resources

Credit | Up to 2 points

Low-emitting materials

Indoor environmental quality

Credit | Up to 3 points

MATERIALS

RED LIST

IMPERATIVE 10

There are temporary exceptions for numerous Red List items due to current limitations in the materials economy. Refer to the v3.1 Materials Petal Handbook for complete and up-to-date listings.

The project cannot contain any of the following Red List materials or chemicals:[23]

- Alkylphenols
- Asbestos
- Bisphenol A (BPA)
- Cadmium
- Chlorinated Polyethylene and Chlorosulfonated Polyethylene
- Chlorobenzenes
- Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs)
- Chloroprene (Neoprene)
- Chromium VI
- Chlorinated Polyvinyl Chloride (CPVC)
- Formaldehyde (added)
- Halogenated Flame Retardants (HFRs)
- Lead (added)
- Mercury
- Polychlorinated Biphenyls (PCBs)
- Perfluorinated Compounds (PFCs)
- Phthalates
- Polyvinyl Chloride (PVC)
- Polyvinylidene Chloride (PVDC)
- Short Chain Chlorinated Paraffins
- Wood treatments containing Creosote, Arsenic or Pentachlorophenol
- Volatile Organic Compounds (VOCs) in wet-applied products [24]

23 A link to the list of CAS registry numbers that correspond with each Red List item is available in the v3.1 Materials Petal Handbook.

24 Wet-applied products (coatings, adhesives, sealants) must not exceed specific VOC levels. Refer to the v3.1 Materials Petal Handbook for details.

CONCEPTS / MATERIALS

MATERIALS

The WELL Materials concept ai
building material ingredients th
compounds or products knowr
replacements. Compounds kn
occupational workers and/or k
environment are also restricted

BACKGROUND

The chemicals industry is a central part o
major role in improving life expectancy a

Commonalities

- VOC Requirements:
  - CDPH
  - SCAQMD Rule 1113
  - SCAQMD Rule 1168

Commonalities

- VOC Requirements:
  - CDPH
  - SCAQMD Rule 1113
  - SCAQMD Rule 1168
- FSC Wood

Commonalities

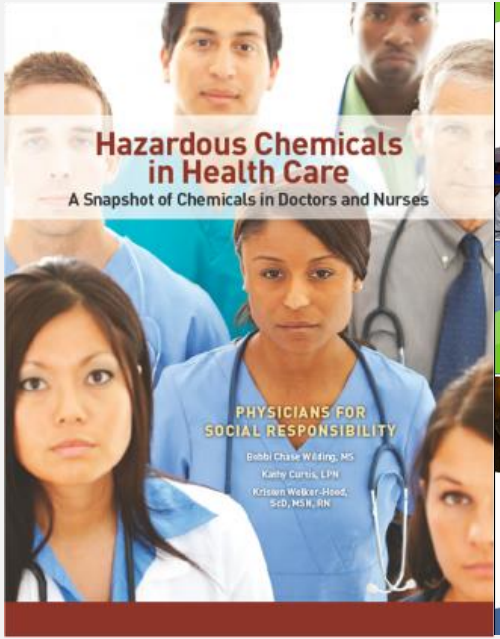
- VOC Requirements:
  - CDPH
  - SCAQMD Rule 1113
  - SCAQMD Rule 1168
- FSC Wood
- Material Transparency
  - Declare labels
  - Cradle to Cradle Certification
  - Health Product Declarations

"It's not enough that we succeed. Cats must also fail."

Organize an Approach

We are ALL Exposed

- CDC's ongoing analysis of 200 + environmental chemicals in blood and urine
  - Demonstrates widespread exposure to many chemicals
- Biomonitoring of 20 health care workers
  - PBDEs
  - Mercury
  - PFCs
  - Phthalates
  - Triclosan
  - BPA



Multiple Routes of Exposure

- Inhalation
  - Most Americans spend up to 90% of time indoors
  - U.S. EPA: Indoor air can have higher levels of pollutants than outside levels
- Cross placenta transfer
- Breast feeding
- Dermal
- Ingestion

Approach

Product Comparisons or Building Design

- VOC / Emissions
- Ecolabels / Standards
- Content / Transparency
- Sustainable Attributes, i.e.: Recycled
- Designed for Reuse / Disassembly
- Installation Methods
- Maintenance / Green Cleaning
- Warranty

Standards, Drivers, and Tools

- LEED Materials Credits (MR)
- Red List – Living Building Challenge
- WELL Building Standard
- BIFMA “level”
- Perkins + Will “Precautionary List”
- “Six Classes”
- Health Product Declaration (HPD)
- Cradle to Cradle (C2C)
- Declare

Project Focus

Where are we and what are we doing here?

How does this affect product choice?

Kindergarten In Bronx, NY?

Hospital in Miami, FL?

Example:

Starting to select a healthy flooring product for a Day Care Center in Florida

All bets are not off when you are selecting healthier products.

They still must function.

Conditions		Functionality	Health	Aesthetics
Who	Young children	Durable yet safe	Low in neurotoxins	Cheerful
Activities	Walking/crawling /playing	Easily washable	Low in SVOC	
Basic climate	Hot/humid	Easy to dry	Not prone to mold	Light colors
Community	Diverse/Latin American			Colors and textures
Economics	Low budget	May make these the most important		

Practice Area Application

Common Materials

Antimicrobials
(possible hormone disruption, antibiotic resistance)

Flame Retardants
(endocrine disruptors, neurodevelopmental problems)

Isocyanates
(asthmagen)

Formaldehyde
(carcinogen, reproductive & developmental toxicity)

Phthalates
(endocrine disruptors, developmental toxicity)

Perfluorinated Compounds (PFCs)
(endorine disruptor, carcinogen, reproductive & developmental toxicity)

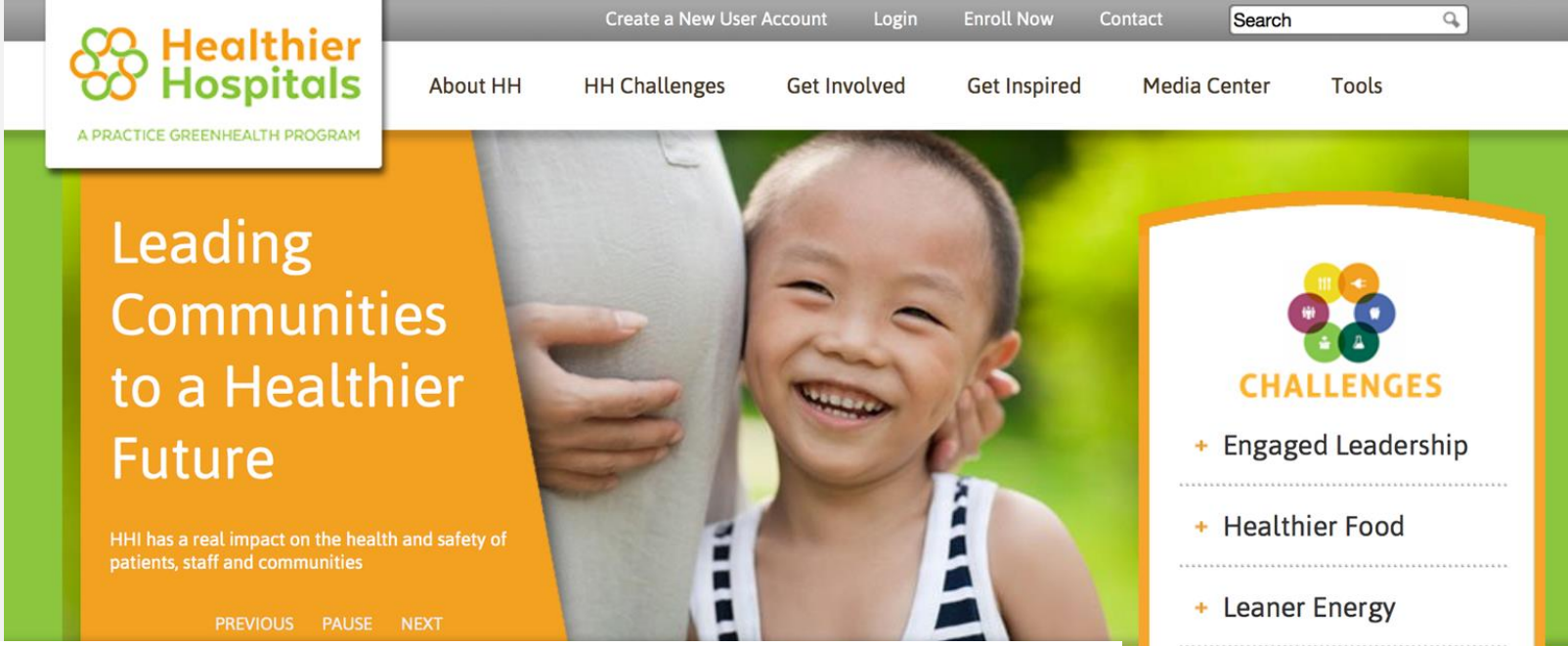
Potential Effects

Material	Common Products	Potential Effects	Guidance
Flame Retardants	Upholstered furniture, insulating foam, textiles, wall coverings	Developmental toxicity, endocrine disruptor	Products that do not contain chemical flame retardants
Phthalates	Coated fabrics, PVC flooring, carpet backings, wall coverings	Developmental toxicity, endocrine disruptor, suspected asthmagen, (PVC carcinogenic in manufacture)	Avoid PVC, confirm phthalate-free
Formaldehyde	Furniture (particleboard, MDF, etc), laminated fabrics, adhesives, wallboard	Respiratory & reproductive toxicant, carcinogen	Products that meet CA Section 01350, Greenguard Gold, SCS Indoor Advantage Gold
Antimicrobials	Furniture, fabrics, countertops, door handles	Possible hormone disruption, antibiotic resistance	No added antimicrobials, No triclosan, triclocarban
Isocyanates	Paints, varnishes, flooring finishes, Polyurethane systems (insulation, foam cushions, carpet backing)	Asthmagen, anticipated to be a carcinogen	Avoid in renovations, insulation, carpet backing and foam cushions
Perfluorinated Compounds (PFCs)	Furniture, fabrics, carpeting	Endocrine disruptor, carcinogen, reproductive & developmental toxicant	No stain/water repellant treatments that contain PFCs

Practice Area 1 - Healthcare

Growing Concern for Healthy Interiors

- Flame retardants
- Formaldehyde
- Perfluorinated chemicals
- PVC (vinyl) and phthalates
- Antimicrobials
- Heavy metals
- Chromium (hexavalent or trivalent)



Healthier Hospitals

- Over 1307 hospitals enrolled nationally
- 25% of hospitals committed to Safer Chemicals Challenge

Healthier Hospitals (HH): Healthy Interiors Goal

Ensure that 30% of the annual volume of furnishings and furniture purchases (based on cost) eliminate the use of:

- Flame Retardants
- PVC (Vinyl)
- Formaldehyde
- Perfluorinated Compounds (PFCs)
- Antimicrobials

Chemicals Found in Health Care (HHI)

Flame Retardants

- Electronics, building insulation, upholstered furniture, fabrics, wires & cabling

PVC

- Furniture, fabrics, flooring, wall coverings

Formaldehyde

- Furniture, fabrics, adhesives

PFCs

- Furniture, fabrics, carpeting

Antimicrobials

- Furniture, fabrics, flooring, countertops

Flame Retardants

Rationale

- Known health effects of well-studied flame retardants
  - Reproductive, neurocognitive, and immune system impacts
- Persistence, bioaccumulation, toxicity throughout life cycle
- Emerging health and safety concerns about alternatives
- Very significant data gaps
- Flame retardants showing up in dust

Guidance

- Purchase furniture meeting TB 117-2013 that does not contain flame retardants

Polyvinyl Chloride (PVC) or Vinyl

Rationale

- Can create persistent, bioaccumulative, and toxic byproducts in manufacture and at end of life
- Carcinogenic and highly toxic chemicals in manufacture
- Requires use of additives (lead, phthalates)

Guidance

- Products must not contain PVC
  - Small components exemption: > 1% of product by weight

Formaldehyde

Rationale

- Known human carcinogen
- Gastrointestinal or liver toxicant
- Reproductive toxicant
- Respiratory toxicant, asthma trigger
- Prop 65 carcinogen

Guidance

- Meet CA Section 01350
  - *CA Department of Public Health (CDPH): Standard Method for Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources using Environmental Chambers*) or equivalent standard

Perfluorinated Compounds (PFCs)

Rationale

- Moved from C8 to C6 chemistry (Shorter-Chain PFCs)
- Persistent in environment, bioaccumulative in people, wildlife
- Long half-life in animals, not known for humans
- Kidney and testicular cancer, thyroid disruption, elevated total cholesterol, obesity
- Emerging Health Information
  - Endocrine disruptors, Carcinogenic, Reproductive and developmental toxicant

Guidance

- Don’t use stain/water repellant treatments that contain PFCs

Antimicrobials

Rationale

- Very limited evidence that addition of antimicrobials to furnishings reduces rate of hospital-acquired infections
  - Emerging research on efficacy of copper on high-touch surfaces
- Can have toxic properties without adequate data on health impacts
- Can lead to development of antimicrobial resistant organisms that may pose greater hazards

Guidance

- Must not contain triclosan, triclocarban, or antimicrobials without evidence of demonstrated efficacy
- Requires evidence in clinical setting of HAI reduction

Practice Area: K-12 Schools

Vulnerable Populations

- “Children are not little adults: they have special vulnerabilities to the toxic effects of chemicals.”

  – World Health Organization

- Toxic chemicals may be triggering recent increases in neurodevelopmental disabilities among children

  – Harvard School of Public Health, 2014

- Schools impact entire communities

Targeted Advertising

- TOO much information
- CONFLICTING information
- Trending topics – where to focus?

Focus on Impact

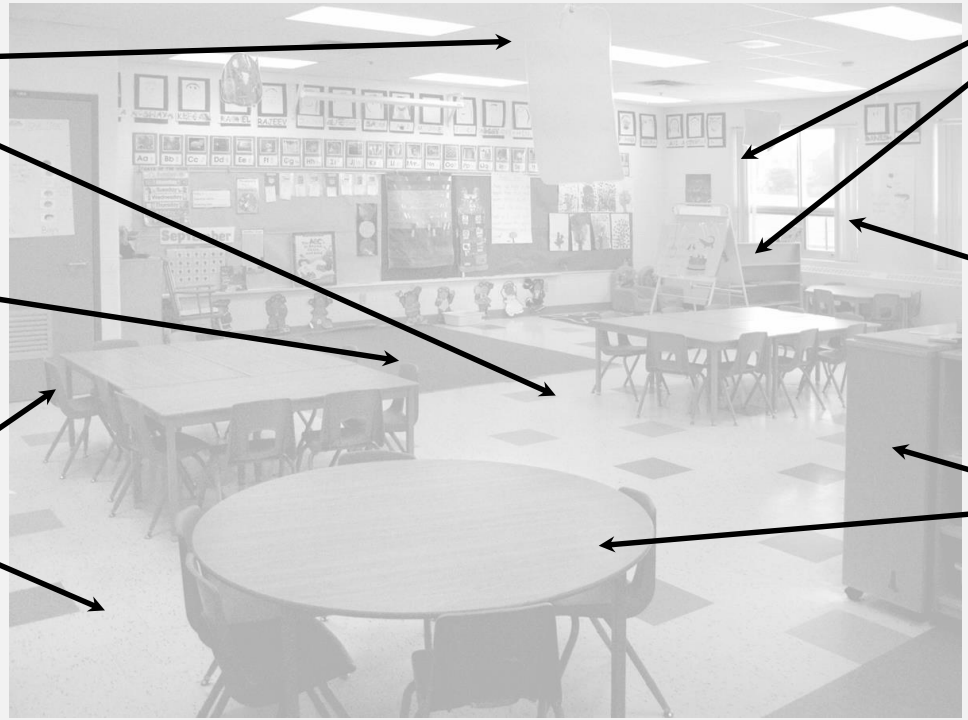
- TOUCH: Furniture, textiles, flooring, finishes
- BREATHE: Paints, coatings, adhesives, flooring

Renovation Challenges

Asbestos Containing Material (ACM)
(carcinogen, mesothelioma)

Flame Retardants
(endocrine disruptors, neurodevelopmental problems)

Phthalates
(endocrine disruptors, developmental toxicity)



Lead
(reproductive & developmental toxicity, anemia, high blood pressure)

Polychlorinated Biphenyls (PCBs)
(endocrine disruptor, carcinogen)

Formaldehyde
(carcinogen, reproductive & developmental toxicity)

Practice Area 3 - College & University

Building Ownership and Budget

AIA

Science based Standards

Science based Standards

1 – Highly Fluorinated Chemicals

Although useful, highly fluorinated chemicals remain in the environment indefinitely and may cause serious health problems.

2 – Antimicrobials

Antimicrobials have limited benefit, if any, and are associated with developmental, hormonal, and reproductive problems.

3 – Flame Retardants

Flame retardants are added to products to meet flammability standards. They often don't improve fire safety and can harm our health.

4 – Bisphenols + Phthalates

These hormone disrupting chemicals are so widely used that we are constantly exposed. They can harm our health, even at very low levels.

5 – Some Solvents

Some solvents used in consumer products are linked to neurological problems and increased cancer risk.

6 – Certain Metals

Metals are essential for many uses, but some, such as mercury, arsenic, cadmium, and lead, can cause health harm. Fetuses and young children are particularly susceptible.

Science based Standards

1 – Highly Fluorinated Chemicals

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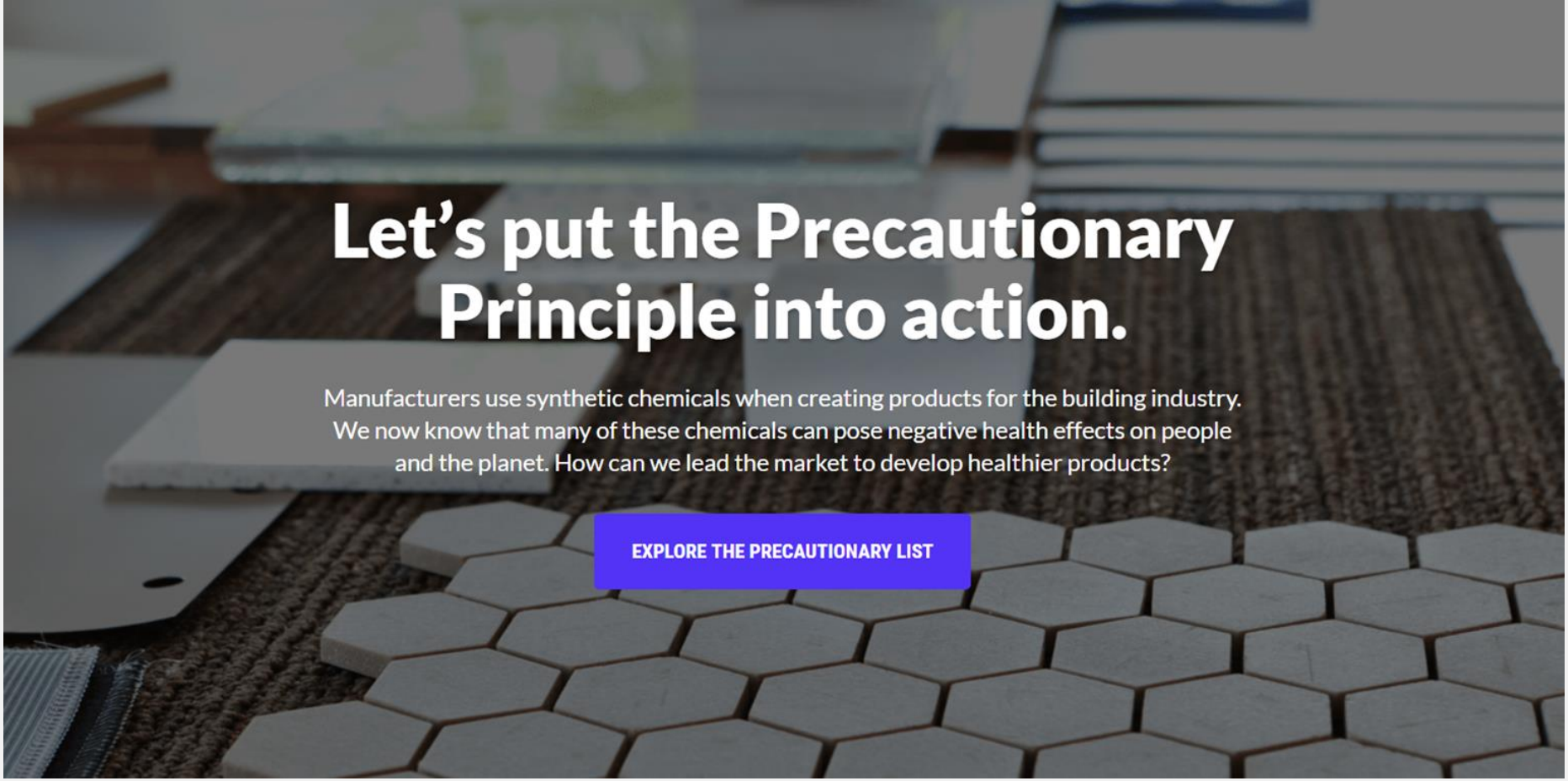

Let’s put the Precautionary Principle into action.
Manufacturers use synthetic chemicals when creating products for the building industry. We now know that many of these chemicals can pose negative health effects on people and the planet. How can we lead the market to develop healthier products?
EXPLORE THE PRECAUTIONARY LIST

Student Body Influence

Upcoming Break for Questions and Comments

Submit a question to the moderator via the chat box.

Practice Area 4 - Commercial

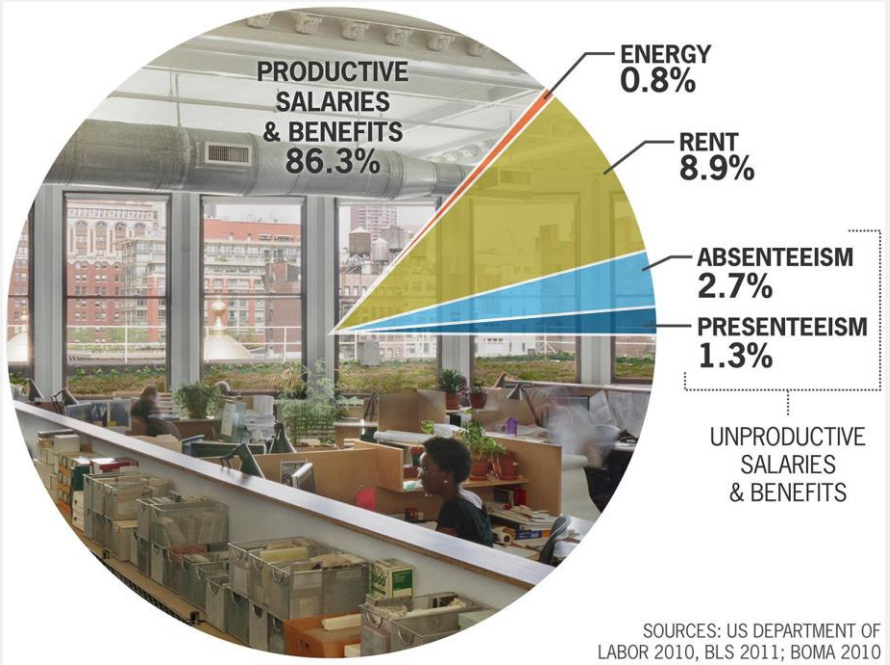
Population: Aware of Health Issues

Expectations:

- Not being harmed by materials in space.
- Spaces that increase wellness

Clients: Aware of Potential Cost Reductions

- Increased employee health and worker productivity were cited as the two most important social reasons to build green in every international market to participate in a recent McGraw-Hill survey.
- People in the U.S. spend about 90% of their time indoors.
- EPA studies indicate indoor levels of pollutants may be up to ten times higher than outdoor levels.
- LEED-certified buildings are designed to have healthier, cleaner indoor environmental quality, which means health benefits for occupants.[25]



Specific Problems

- Tenants do not necessarily have control over mechanical system, and maintenance systems
- Emphasis on aesthetics over health

Specific Mitigation

- Leases: Attempt to secure as much control as possible over mechanical system, cleaning, and maintenance system
- Emphasis on high-volume, high percentage materials

Specific Mitigation

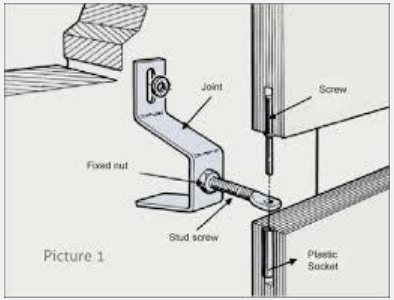
- Healthier material and design feedback loop: LBC projects have more limited palettes

Specific Problems

- The worst part of materials can be the means of attachment
- Frequent change of design

Specific Mitigation

- Change ways of attaching materials from adhesives to mechanical



- Appropriate durability, maintenance

Materials Transparency and Risk for Architects

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AIA SUSTAINABILITY WHITEPAPER
Materials transparency & risk for architects:
An introduction to advancing professional ethics while managing professional liability risks
April 2016
The American Institute of Architects

Be UNAMBIGUOUS about your intent

Use recognized 3rd party documents

Present materials content as one factor AMONG MANY

Make NO GUARANTEES re: actual materials content

Do NOT claim to have expertise you don't have

Best Practices


“We are unable to evaluate whether or not there is a risk of harm.”
Best Practices


22

Resources

- Healthier Hospitals Initiative: http://healthierhospitals.org/
- Healthy Building Network: https://healthybuilding.net/
- HPD Collaborative: https://www.hpd-collaborative.org/
- Six Classes: http://www.sixclasses.org/
- P+W Precautionary list: https://transparency.perkinswill.com/lists/precautionary-list
- Declare: https://living-future.org/declare/
- C2C: https://www.c2ccertified.org/

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Time for Questions and Comments

???-!!!

Moderator
Rita Ho, LEED AP

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04/09	Beyond the Basics Series	AAH/Center for Health-Design Knowledge Repository: How to Use and Example Application
05/14	HC 101 Series	Pharmacy Standards: USPS 795 & 800

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