

Greening the Neonatal Intensive Care Unit (NICU):

Improving Environmental Health for Patients, Staff, and the Environment

Reducing or eliminating environmental toxicants in the hospital environment can create healthier and safer environments for patients during a time when they are extremely vulnerable.

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Who is Affected by Green Building Efforts?

Hospital Community (patients, staff, visitors)

Local Community

Global Community

Materials (PVC, engineered wood, insulation, carpets, curtains, electronics, wall coverings) release toxicants (phthalates, formaldehyde, VOCs) linked to health problems

What are Some of the Toxicants in our Health Care Environment?

- Polyvinyl Chloride (PVC)** - wide and potent range of chemical emissions throughout its life cycle
 - Wall coverings
 - Carpet-backing
 - Vinyl floors
 - Privacy and cubicle
 - Upholstery and furniture
- Volatile organic compounds (VOCs)** - gases released by materials
 - Formaldehyde
 - Toluene
 - Benzene
 - Acetaldehyde
- Halogenated Flame Retardants (HFRs)** - chemicals added to prevent ignition or spread of flames
 - Textiles
 - Electronics
 - Foams

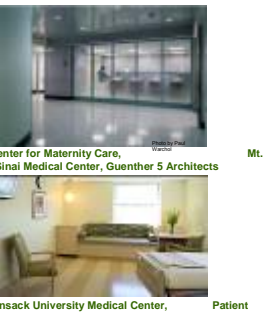
Newborns: Vulnerable Population

Newborn infants are highly **vulnerable** to trace chemicals in the environment...

FIRST DO NO HARM

Why use materials and products in the NICU that expose patients to known toxicants?

Why not switch to safer alternatives?



PVC/DEHP

Environmental impacts of PVC production, use, and disposal

- Dioxin/furans produced during PVC production and incineration
- Leaching of plasticizers, stabilizers (often metals) from landfills
- Potential impacts on direct patient health and safety - leaching of DEHP
- Difficult to recycle
- Bind to dust - can be inhaled or ingested

Health impacts of PVC

Phthalates (DEHP)

- Well characterized male reproductive toxicants (animal studies)
- Pregnancy loss and infertility in females (animal studies)
- Evidence of an association with asthma and other respiratory symptoms

Dioxins (low dose health effects)

- Known carcinogen
- Alters levels of many enzymes, growth factors, and hormones
- Reproductive/Developmental
- Endocrine
- Immune system

Volatile Organic Compounds (VOCs)

Environmental impacts of VOCs

- Gases released by building materials
 - formaldehyde - toluene
 - acetaldehyde - benzene
- Emit at high level shortly after installation, taper off with time
- Dry materials emit for longer time causing more long-term exposures

Health impacts of VOCs

Acute effects - "Sick Building" Syndrome

- dizziness
- headache
- eye, nose, throat irritation

Chronic effects

- liver damage
- kidney damage
- brain/nervous system damage
- increased cancer risk

Halogenated Flame Retardants (HFRs)

Environmental impacts of HFRs

- Persistent Bioaccumulative Toxicants (PBTs). Some resemble PCBs
- Released into the environment through manufacturing and during use and disposal
- Human and wildlife levels of brominated flame retardants (BFRs) are increasing rapidly
- BFRs found in indoor dust samples

Health impacts of HFRs

No acute toxicity

Chronic toxicity

- Neurodevelopment
- Endocrine disruption
- Reproductive system effects
- Immune suppression
- Carcinogenicity

There are Alternatives



Working in Hospitals: Dangerous to Your Health?

Worker Respiratory Claims

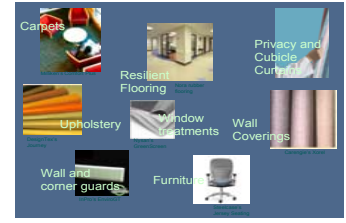
The number of worker respiratory claims in health care environments more than doubled in 5 years between 1985 and 1995, and has continued at the same rate since measurements were taken

The CABE Study: The Role of Hospital Design in the Recruitment, Retention and Performance of NHS Nurses in England

Research consistently has seen the benefit of high working environment inputs to staff and patient health. Working in such an environment is a positive, quality designed work environment requires hospital staff to perform better and to contribute to a safe delivery of services. Improving the work environment can help to reduce the negative impact of high patient and nurse stress.

Resources

www.noharm.org www.healthybuilding.net



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