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# Buildings and Health

### Radon

- In 1994, there were more than 70,000 schoolrooms with high short-term radon levels in use (EPA 402-F-94-009)
- EPA ranks indoor radon as one of the most serious environmental health problems
- More than 20,000 Americans die each year from radon-related lung cancer (U.S. Surgeon General, January 13, 2005)

### Lead

- “The number one environmental threat to the health of children in the United States.” – Secretary of the Department of Health and Human Services, 1991
- Old lead-based paint is the most common source
- Childhood exposures to lead can lead to problems such as:
  - Reduced intelligence/cognitive development
  - ADHD
  - Distractibility
  - Higher drop-out rates
  - Reading disabilities and delinquent behavior  
(<http://www.epa.gov/envirohealth/children/features/references.htm#1>)
- There is no safe concentration of lead in the bloodstream
- About 25% of all schools (1/3 of the oldest schools) were never renovated or renovated before limits were placed on the amount of lead in paint. (NCES, 1999).  
(<http://www.epa.gov/envirohealth/children/features/s1.htm>)

### Air Quality

- Indoor levels of air pollutants can be 2-5 times higher, and sometimes even 100 times higher, than outdoor levels. (EPA 402-F-99-008)
- Poor air quality has been shown to increase the deterioration of buildings:
  - One study shows that if an elementary school spent \$8,140 over 22 years for preventative maintenance that over \$1.5 million in repairs could have been saved (EPA 402-F-99-008)
- In 1995, the GAO reported that over half of the nation’s schools have problems that affect indoor air quality. (<http://www.epa.gov/iaq/schools/schgao.html>)
- “Poor indoor air quality remains one of the top health concerns that NEA members face! What’s more, as teachers and education support professionals, we are also concerned about our students, because we know full well that our working conditions are the students’ learning conditions. We need EPA’s Indoor Air Quality Tools for Schools Program because it works!” - Reg Weaver, 2003, NEA President

### Mold

- Inhaling mold spores can cause asthma attacks
- Even dead mold spores can cause serious health problems
- Over 24,000 homes had unresolved mold-related insurance claims as of December 31, 2005 ([http://healthandenergy.com/mold\\_in\\_buildings.htm](http://healthandenergy.com/mold_in_buildings.htm))
- In 2005, insurance companies paid out \$2.5 billion in mold-related claims (Hevesi, D. “The Turmoil over Mold in Buildings” New York Times 3/23/2003  
<http://query.nytimes.com/gst/fullpage.html?res=9C00E4D61031F930A15750C0A9659C8B63>)

## VOCs

- Volatile Organic Chemicals (VOCs) are emitted as gases from certain solids or liquids including paints, carpets, cleaning supplies, building materials, furniture, office equipment, glues and adhesives.
- Concentrations of VOCs are usually between 2-5 times higher indoors and can be as much as 10 times higher, regardless of either an urban or rural setting
- Exposure to VOCs can cause numerous health problems, such as:
  - Headaches
  - Eye, nose and throat irritation
  - Nausea
  - Liver and kidney damage
  - Cancer(<http://www.epa.gov/iaq/voc.html>)

## Costs

- Costs associated with employees amount to 78% of total costs, while operations, rent and maintenance costs totaled 9% (Carnegie Mellon University, 1999)
  - Measures that improve employee health comfort and productivity can therefore have large financial impacts
  - Banking giant ING moved their headquarters to a building that uses 92% less energy than its previous headquarters and saw absenteeism fall by 15% alongside other significant productivity gains. (<http://www.rmi.org/sitepages/pid208.php>)
- There are two types of costs associated with green design and sustainable buildings:
  - Real costs – costs saved from less energy use, fewer materials, etc.
  - Opportunity costs – media exposure/publicity, potential lawsuits, insurance costs, and numerous employee costs relating to productivity and absenteeism
- Fisk and Rosenfeld of Lawrence Berkeley National Laboratory estimate that annual savings from building improvements in the U.S. could be:
  - \$6-9 billion from reduced respiratory diseases
  - \$1-4 billion from reduced asthma
  - \$10-20 billion from reduced sick building syndrome
  - \$12-125 billion from improved worker performance(Lawrence Berkeley National Laboratory Center for Building Science Newsletter, Summer 1997, [http://eetd.lbl.gov/newsletter/cbs\\_nl/nl15/productivity.html](http://eetd.lbl.gov/newsletter/cbs_nl/nl15/productivity.html)  
Lawrence Berkeley National Laboratory Report, 2005 “National Expenditures for IAQ Problem Prevention or Mitigation.” <http://eetd.lbl.gov/ied/pdf/LBNL-58694.pdf>)

### A Few Examples:

- In Bloomquist v. Wapello, plaintiffs successfully sued employers and builders on the grounds that inadequate ventilation and pesticide application made their workplace unsafe. (Bloomquist v. Wapello County, Iowa 1993)
- In Tennessee in 2002, Heritage High School was closed for 4 weeks when mold was found in the school. The repairs cost an estimated \$1 million. ([http://www.iuoe.org/cm/iaq\\_happ\\_sch.asp?Item=363](http://www.iuoe.org/cm/iaq_happ_sch.asp?Item=363))
- In November of 2002, teachers in Fort Myers, FL sued the county school officials for failure to fix mold problems. ([http://www.iuoe.org/cm/iaq\\_happ\\_sch.asp?Item=363](http://www.iuoe.org/cm/iaq_happ_sch.asp?Item=363))

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