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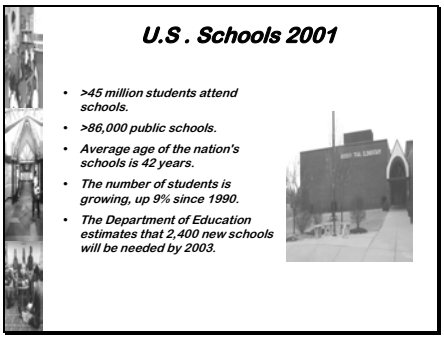

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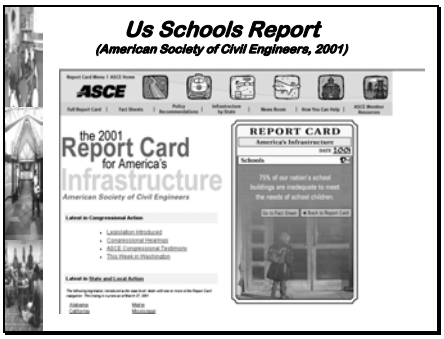

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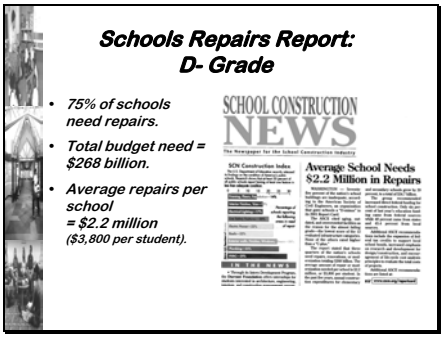

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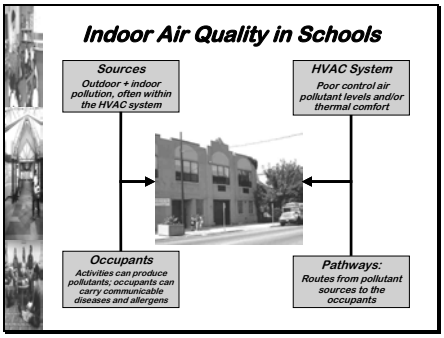

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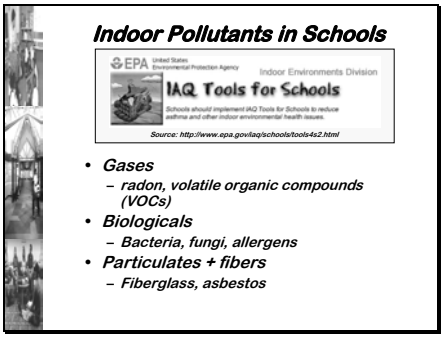

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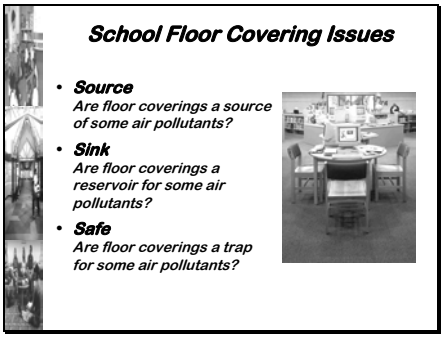

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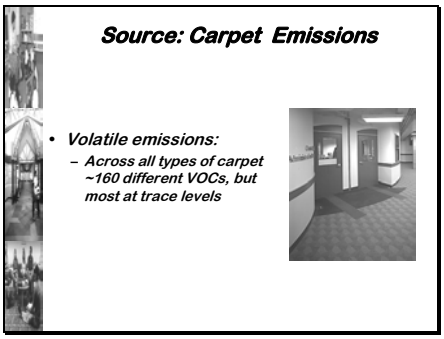

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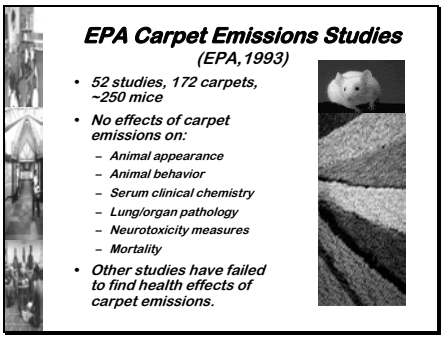

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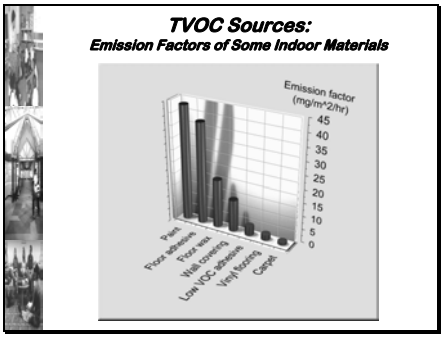

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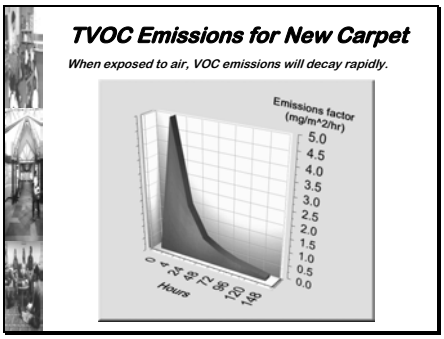

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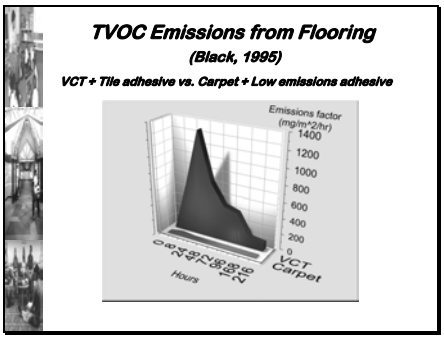

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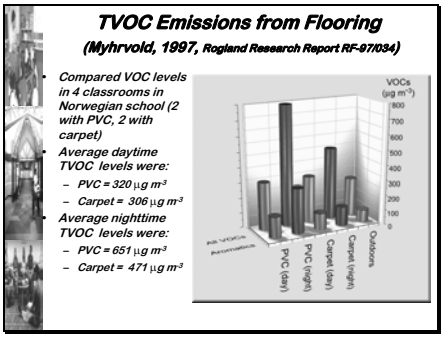

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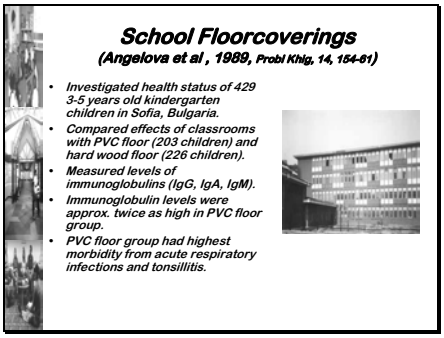

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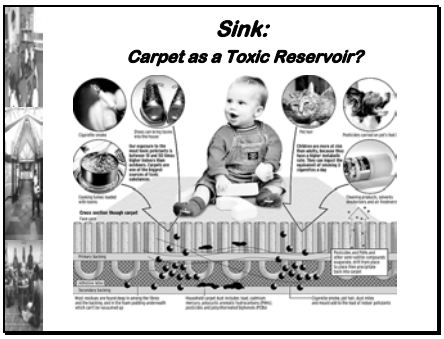

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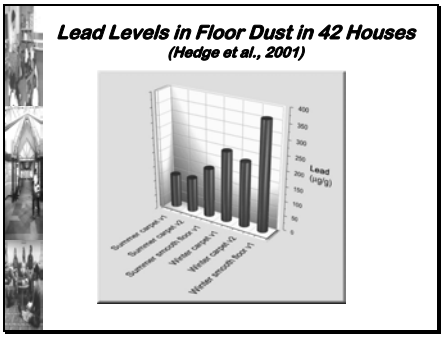

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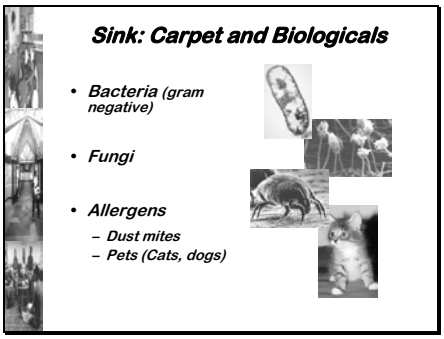

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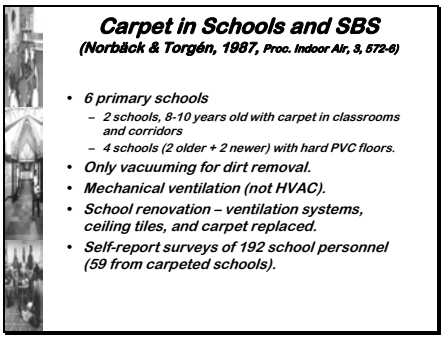

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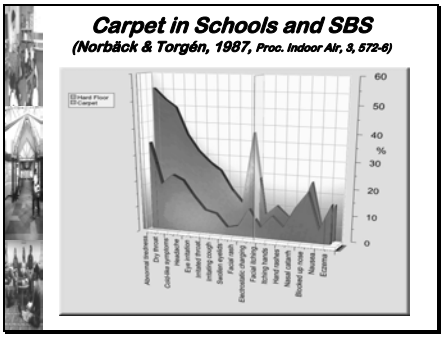

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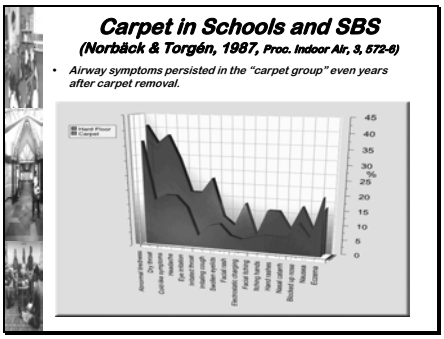

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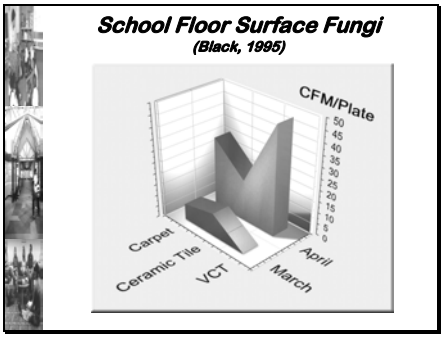

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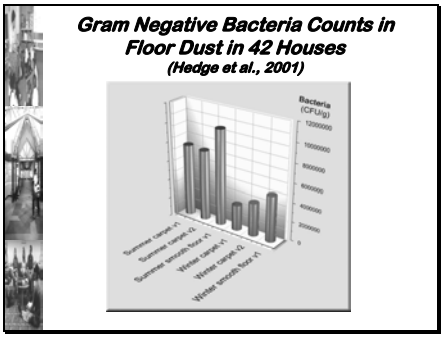

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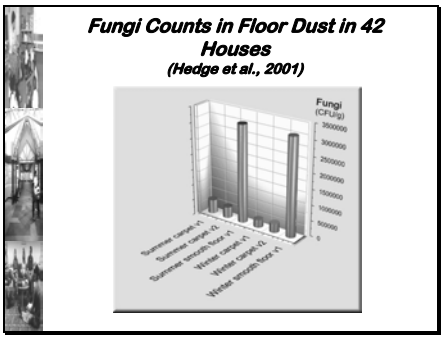

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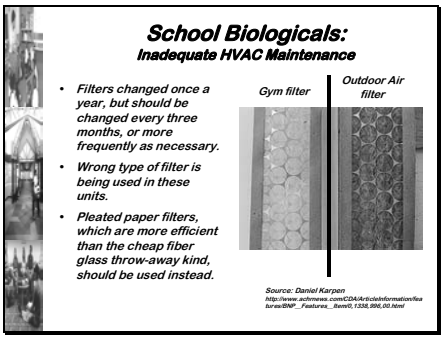

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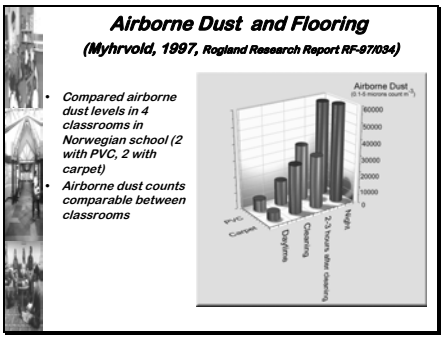

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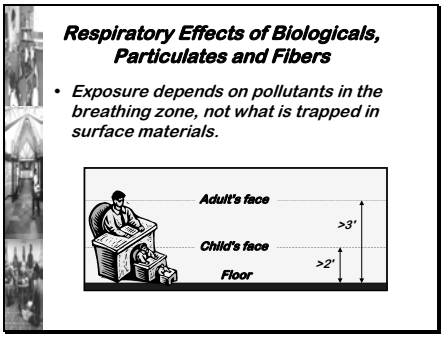

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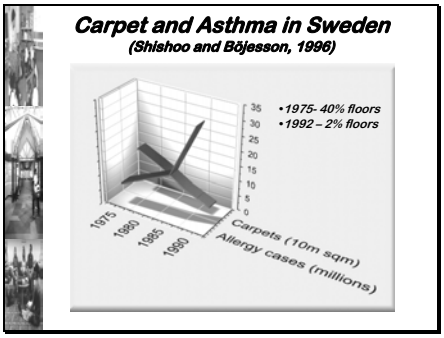

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Swedish Schools
(Wålinder et al., 2000, Indoor Air, 11, 2-9)

- 234 primary school personnel in 12 elementary schools in mid-Sweden.
- Measured nasal symptoms using:
  - Acoustic rhinometry
  - Nasal lavage
- 50% reported at least one nasal symptom per week.
- Nasal symptoms significantly higher in classrooms with:
  - Mechanical ventilation
  - Higher settled dust levels
  - Lower cleaning frequency
  - Use of wet mopping
  - Use of PVC floor covering
  - Signs of water damage

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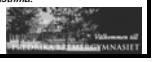
Swedish Schools
(Smedje & Norbäck, 2000 Indoor Air, 11, 127-133)

- 1,476 pupils surveyed in 1993 and 1995 from 39 randomly selected elementary through high schools in Sweden.
- Between 1993 to 1995 there were significant increases in:
  - Pollen/pet allergy (14.2% to 17.1%)
  - Doctor diagnosed asthma (6.3% to 8.3%)
  - Current asthma (5.1% to 6.3%)
  - >1 asthmatic symptom (6.4% to 8.5%)
  - No significant change in any asthmatic symptoms (16.7% to 18.4%)
- New ventilation systems had been installed in 12% of classrooms. Results showed:
  - Improved air exchange, relative humidity and IAQ
  - Decrease in any asthmatic symptom (11.1% to 3.4%)
  - No effects on the prevalence of allergy or asthma.



Slide 33

Childhood asthma risks
(Annapolis Center, 2001 - http://www.annapoliscenter.org/asthmaframe.htm)

- Asthma risks in infancy and childhood :
  - Gender (males vs. females)
  - Maternal asthma
  - Maternal smoking
  - Atopy - Hay fever, eczema
  - Ethnicity (Caucasian, African American)
  - Early respiratory infection (RSV)

(Image source: http://www.childasthma.com/)

- Sensitizers:
  - Molds and fungi
  - Allergens – cockroaches, cats, dogs, dust mites
  - High fat diet
  - Inactivity; Exercise
  - Cold air
  - PVC and plasticizers
  - Acetaminophen, antibiotics
  - Air pollutants (e.g. NO_2, O_3)

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Managing Biocontaminants

(Washington + Florida AQS Studies)

- *Floor surface biologicals are similar to airborne biologicals for carpet and hard surfaces.*
- *Airborne indoor biologicals track levels in outdoor air.*
- *Replacing carpet does not reduce indoor airborne biologicals.*
- *Even after considerable mechanical disturbance of carpet, airborne allergen levels are short-lived.*
- *Contaminants in carpet can be removed with simple, effective maintenance.*

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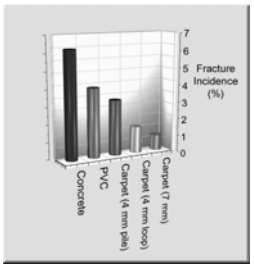
School Safety: Floors and Falls

(Booth et al., 1996, Br Orth Res Soc Proc., Sept.)

- *Studied relationship between the type of floor covering and the incidence of hip fractures in proportion to the percentage of falls (864 falls, 18 hip fractures).*



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School Safety: Floors and Falls

(Gardner et al., 1997, Med. Eng. & Physics, 20, 57-65)

- *Peak impact force of a body dropping onto the floor varies by 23% from a soft to a hard surface.*
- *Thicker floor covering decrease impact force by at least 7%.*

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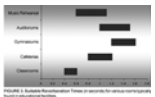
Classroom Acoustics

(Technical Committee on Architectural Acoustics of the Acoustical Society of America , 2000)

- A long reverberation time (RT) creates poor classroom acoustics.
- Classrooms should have RTs in the range of 0.4-0.6 seconds.
- "Soft" materials, such as carpet and acoustical ceiling tiles , increase sound absorption and decrease the RT.
- Carpet alone decreases classroom RT by 0.1 second (Myrhvold, 1997)
- Carpet absorbs sound, reduces surface noise (e.g. footsteps and furniture movement), and helps block sound transmission.



Sources: http://www.nonoise.org/quietnet/qc/booklet.htm (http://www.schooldesigns.com/constr_Sounddecisions.html)

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School Floor Coverings Issues

- Choice of school floor coverings should be based on considerations of many issues, including:
  - Indoor air quality.
  - Acoustics.
  - Cleaning and maintenance.
  - Safety (slips, trips, falls).
  - Comfort (sitting surface).
  - Appearance - color, softness, texture, quality.

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Our Responsibility

- To create safe learning environments for our nation's most important asset, our children.

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