

Environmental Exposures Causing Risk to Human Health

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Environmental Exposures- “The Landscape”

■ Air Pollution

- Ambient Air
- Indoor Air Quality

■ Water Pollution

- Source water: Surface Water, Groundwater
- Home drinking water

Ambient (Outdoor) Air Pollution

- Can be serious problem causing respiratory and cardiovascular problems
- Many sources of pollution
- Can be a problem if visible or not visible
- North Carolina has areas of air pollution causing concern
 - For example, during summertime ozone levels often exceed EPA standards in central part of the state

Ambient Air Pollution

Priority (Criteria) pollutants- regulated by
Clean Air Act

Feds set standards, states develop
methods to attain these levels

State regulates other “air toxics” by
Ambient Air Level (AAL) rules

NC State agency- Division of Air Quality
(DENR) -tasked with overseeing air quality
issues

Ambient Air Pollution

- Criteria pollutants addressed by Federal rules (such as Clean Air Act) and improvements have been made
- Emerging issues of global warming (such as CO₂ emissions) not covered in Clean Air Act
- Many sources of pollution make compliance difficult
 - Fixed sources- factories, power plants
 - Mobile sources – autos, buses, trucks
 - Emerging sources not well characterized

Particulates as an air pollutant

- Example of primary pollutant of concern:
“Particulates”
- Fixed sources-power plants, factories
- Mobile sources- vehicles, construction equipment
- Diesel engines a large contributor
- Fed rules require best available technology for engines built beginning 2007 but not for older engines

Emerging sources of air pollution including particulates

- Poultry manure incineration
- Waste to energy incineration
- “Clean Coal” technology
- Medical waste incineration

- Emissions often not well characterized or controlled
- Some (e.g. poultry manure) can be worse than existing sources of energy (coal)

Health effects of particulates (PM10)

<u>Health effect</u>	<u>Estimated NC cases</u>
■ Premature deaths	3,000
■ Respiratory hospital admissions	2,000
■ Cardiovascular Hosp. admissions	2,000
■ Asthma attacks	200,000
■ Missed work days	500,000
■ Restricted activity days	5 million

- Ref: Air Pollution and Public Health in NC, Environment North Carolina, Feb 2006

Indoor Air Pollution

“Indoor Air Quality” or IAQ

- Many indoor compounds can cause health problems: mold, allergens, Radon, volatile organic compounds (VOC's), CO₂, Carbon monoxide, humidity, odors
- Many possible human health effects: asthma, allergic reactions, ability to concentrate and learn, lung cancer from Radon
- Can occur in all types of buildings
- Many compounds difficult to regulate-no current regulations and none expected soon
- OEEB staff devote considerable time to assisting property owners or residents and school systems in how to address these issues
- Some programs useful: e.g. “Tools for Schools”

Water pollution

- Sources:
- 1) Human activities: pharmaceuticals, organic compounds (benzene, MBTE), pesticides, biosolids, lead, mercury, nitrates, PCB's, dioxins
- 2) Naturally occurring: arsenic, algal toxins
- Standards exist for some but not all; often standards are set with economic issues influencing standard level
- Safety levels not known for all (e.g. pharmaceuticals, algal toxins)
- Testing at treatment plants is not done for all pollutants
- New well testing rule recently enacted in NC but this does not require routine testing of existing wells and no rule exists for existing wells

Examples of health effects of water pollution that have occurred in North Carolina

■ Source Water:

- Arsenic poisoning – usually groundwater
- Mercury poisoning from eating contaminated fish
- Methemoglobinemia in infants from elevated nitrates
- Pesticide poisoning from chemicals which get into source water from agricultural applications
- MBTE and Benzene poisoning from leaking underground gasoline storage tanks

■ Home drinking water:

- Lead poisoning-leaching from old plumbing

Policy recommendations – 1

Ambient air pollution

- 1. Pursue all possible means to decrease emissions of pollutants (“Primary Prevention”)
 - Increase state-wide use of alternative energy as means of decreasing pollutants such as CO₂ and Mercury
 - Strengthen vehicle emission standards to be in line with other stringent states (eg NY, MA, NJ, CA) and require all diesel engines regardless of age to be retrofitted with particulate filtration systems and use low sulfur fuel

Policy recommendations – 2

Water Pollution

- 2. Pursue all possible methods to decrease release of pollutants into water sources (“Primary Prevention”)
 - Source reduction- develop state of the art methods of minimizing and applying or disposing of waste products such as biosolids and animal waste, pesticides, fertilizer, pharmaceuticals and monitor whenever possible

Policy recommendations – 3

Water Pollution-

- 3. Improve methods to detect or treat contaminated drinking water (“Secondary prevention”)
 - Invest in water treatment facilities to increase capacity to remove contaminants such as arsenic, pharmaceuticals, and algal toxins and not leach lead from plumbing in residences

Policy Recommendations- 4

Indoor air quality

- 4. Combine legislation and education to detect and decrease indoor air pollutants
 - Increase funding to school systems to perform adequate maintenance and improvement of their facilities to prevent sources of indoor air pollution