Public Health and Energy

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Definition of Human Health

“A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”

-WHO, 1948
Health and Environment

- Built environment
- Social environment
- Natural environment
Connections between Energy and Health
Environment/Risk Transition

Household and community exposures

Holden and Smith: WORLD ENERGY ASSESSMENT: ENERGY AND THE CHALLENGE OF SUSTAINABILITY, Chapter 3: Energy, the Environment, and Health
Energy Consumption & Infant Mortality

Graph showing the relationship between energy consumption (kg of oil equivalent per person per year) and infant mortality (number of deaths per 1000 live births).
Energy Consumption & Life Expectancy

![Scatter plot showing the relationship between energy consumption (kg of oil equivalent per person per year) and life expectancy (years).]
Energy Consumption by World Region
Air pollution morbidity and mortality

Von Schnirding, WHO, 2002
Energy Access and Health

• Rural biomass fuel still used by 2.4 billion people not only environmentally unsustainable but also costly in terms of indoor pollution, time and hazards associated with gathering fuel
• Pollutants from such fuel cause acute and chronic lung disease, infant mortality, lung cancer and cardiovascular disease
• Such fuels produce not only CO2 but other more powerful greenhouse gases (CO, methane, VOCs, black carbon)
• Agriculture, safe drinking water systems, health care all dependent on reliable supplies of energy mostly electrical
Transportation Fuels

• Europe:
  – Air pollution causes 6% of total mortality or more than 40,000 attributable cases per year.
  – About half of these deaths attributed to traffic emissions
  – Also, >25,000 new cases of chronic bronchitis (adults); more than 290,000 episodes of bronchitis (children); more than 500,000 asthma attacks; and more than 16 million person days of restricted activities.
Biofuels

• Recent workshop (2007) by IOM Environmental Health Roundtable

• Issues with “first generation” biofuels
  – Not carbon neutral
  – Displace agricultural land and negatively impact food prices/production in vulnerable countries
  – Displace conservation reserves in US
  – Produce air pollutants (aldehydes) which may have health impacts

• “Second generation” biofuels may hold the promise of more efficiently producing fuel on non-agricultural lands....
Climate change and health

Fuel sources: health and sustainability

Mountaintop Mining in Appalachia
Oil Sands Extraction in Alberta
Coal Carbon Capture & Sequestration

New York Times, 21 Sep 2009
Searching for Solutions

• Access to electricity for all; distribute clean energy resources to those in greatest need.
• Move to a low-carbon low-energy transportation system—increased walking, cycling, and public transport.
• Adopt nuclear energy technologies as a transition between fossil fuels and more renewable sources of energy.
• Search for clean and reliable renewables: solar, wind, possibly second generation biofuels; carefully assess health impacts of alternatives.
• Change our urban infrastructure. Build more efficiently heated, lit, and air-conditioned homes and retrofit older ones; include renewable energy technologies in new buildings.
• Reduce meat consumption.
• Make far stronger links between development, energy, and health.
• Recognize national security issues; energy requirements are sources of international tension, conflict and political instabilities that threaten health in every way.