


Lesson 20. Housing



Housing & Health

June 8, 2006

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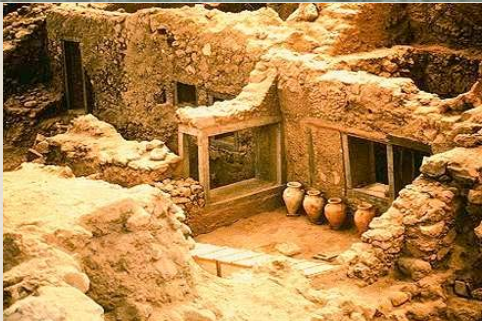
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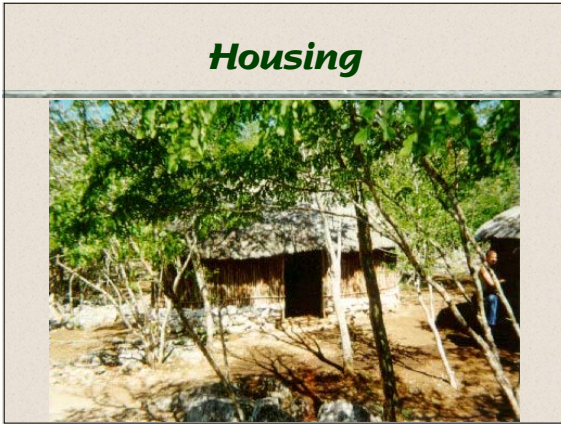
What's a house?

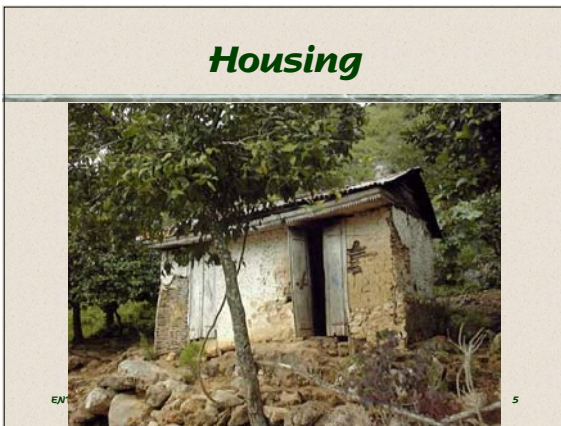


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Housing







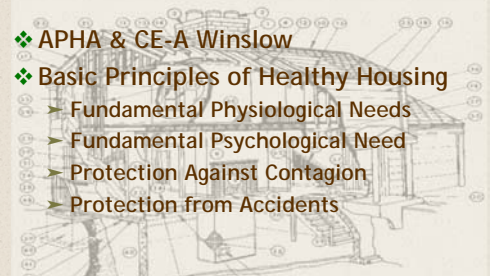


Why do we have houses?

- ❖ Shelter
 - What are the minimal requirements which must be met in order for it to adequately perform this function?
 - *Basic Principles of Healthful Housing, 1938*
 - American Public Health Assoc. Committee on the Hygiene of Housing, Dr. C.-E.A. Winslow, Chair

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Housing



- ❖ APHA & CE-A Winslow
- ❖ Basic Principles of Healthy Housing
 - Fundamental Physiological Needs
 - Fundamental Psychological Need
 - Protection Against Contagion
 - Protection from Accidents

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Physiological Needs

- ❖ Thermal Environment
- ❖ Indoor Air Quality
- ❖ Sunlight
- ❖ Adequate Illumination
- ❖ Protection Against Noise
- ❖ Adequate Space

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Psychological Needs

- ❖ Privacy
- ❖ Family Life
- ❖ Community Life
- ❖ Prevention of Physical and Mental Fatigue
- ❖ Maintenance of Cleanliness
- ❖ Aesthetic Satisfaction
- ❖ Concordance with Prevailing Social Values & Standards

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Protection Against Contagion

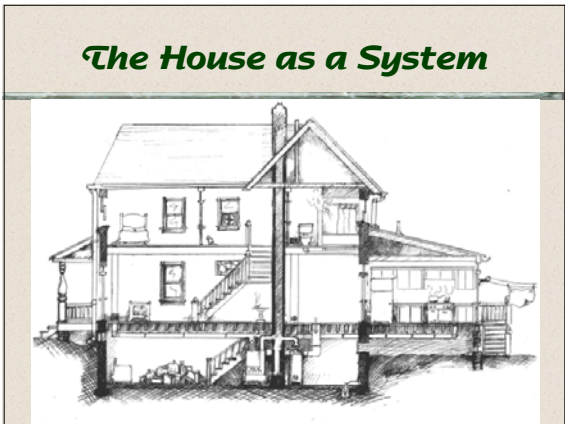
- ❖ Requires:
 - > Sanitary Water Supply
 - > Toilet Facilities
 - > Refrigeration of Foods
 - > Sufficient Space
- ❖ Requires Prevention of:
 - > Sewage Contamination
 - > Insanitary Conditions
 - > Vermin (Rats & Insects)

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Protection Against Accidents

- ❖ Requires:
 - > Proper Construction
 - > Fire Escapes
 - > Safe Electrical Wiring
 - > Safe Heating & Cooking Equipment
- ❖ Requires protection against:
 - > Fires and Electrical Shocks & Burns
 - > Gas Poisoning
 - > Falls
 - > Automobile Traffic

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Air

- ❖ Movement of Air in House
- ❖ Vacuum and Pressure Moves Air
- ❖ Controlling Flow
 - > Window Fan
 - > Whole House Fan
 - > Point Exhaust
- ❖ Power v. Natural

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Water

- ❖ Shed Away from Inside
- ❖ Drains
 - > Sump Pump
 - > Siding
 - > Flashing Exercise
- ❖ Dry
 - > Crawlspace
- ❖ Consequences of Moisture

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Fire

- ❖ Water Heater
- ❖ Furnace
- ❖ Space Heater
- ❖ Gap in Vent
- ❖ Teepee
- ❖ Access and Escape
- ❖ Fire Extinguisher / Smoke Alarm

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Earth

- ❖ Dust
- ❖ Storage Area
 - > Collect Moisture
 - > Organize It
 - > Air circulation helps
- ❖ Clean and Cleanable

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Houses Shelter us From:

- Animals and insects
- Wind
- Sun
- Rain (sleet, snow)
- Cold or hot air
- Dust

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Most of Us are Comfortable

- ❖ Air temperature:
 - > 65° F (active) - 80° F (bathing)
- ❖ Air relative humidity: 30% - 70%
- ❖ Air motion: 20 - 40 feet per minute
- ❖ Surrounding surface temperatures:
within 10 - 15° F of room air

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We have Systems to:

- ❖ Add heat
- ❖ Remove heat
- ❖ Ventilate
- ❖ Maybe add or remove humidity

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Heating Systems

- ❖ Fuel - gas, oil, wood, electric
- ❖ Distribution
 - > hot water, steam, warm air, space heaters
 - > Radiators, baseboard, ducts
 - > Radiant floors and ceilings
- ❖ Chimneys, sealed combustion, fan powered
- ❖ Controls - single stat, multiple stats

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Cooling Systems

- ❖ Fuel - electric
- ❖ Windows, fans and shades
- ❖ Distribution
 - Central air
 - Through the wall
 - Duct-less splits
- ❖ Dehumidification
 - Air conditioners/part-load
 - Dehumidifiers
- ❖ Control - thermostat, humidity

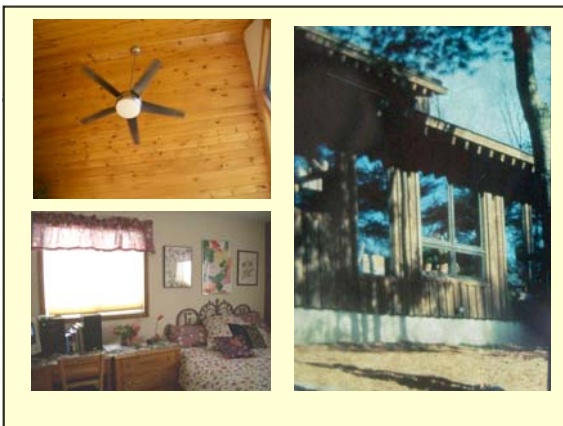
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Internal and solar gains:

- ❖ Good when cold out; bad when hot out
 - Heat from people (100-150 watts/ person)
 - Heat from electric and gas appliances
 - Solar in through windows
 - In average US house around 23% of heating is done by these gains and 59% of cooling is caused by these gains

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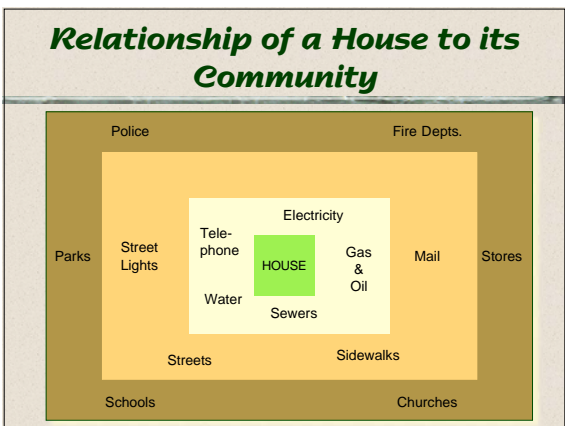




Other factors

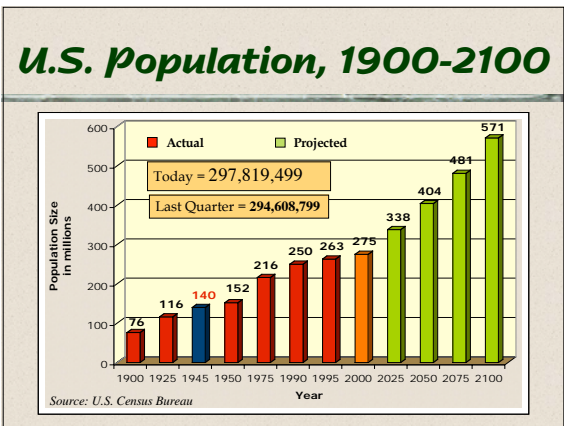
- Water (drinking, cooking, washing, toilets)
- Cooking and storing food
- Ventilating fans
- Lighting
- Computers, stereos, hair dryers, razors

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Cities in Early History

- ❖ Dense settlement
- ❖ Clear distinction between city and country
- ❖ Mixture of functions
- ❖ Short distance from home to work
- ❖ Most fashionable addresses at the center







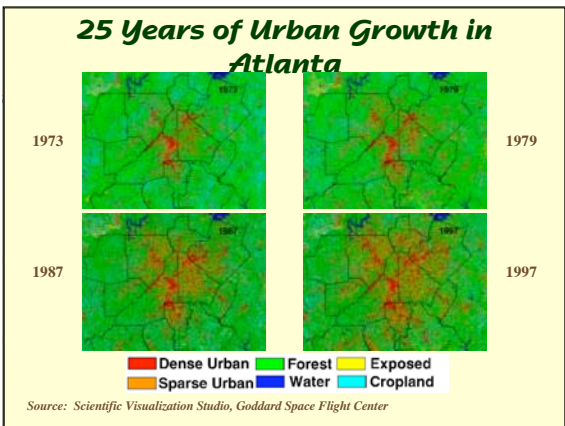














Leveling Atlanta

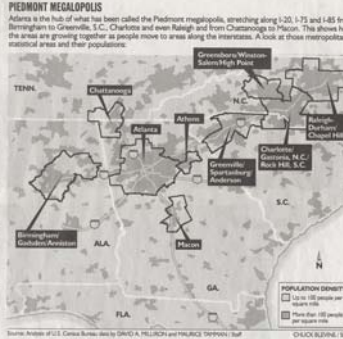



Metro Atlanta loses 50 acres of forested land a day to "development," according to the Georgia Department of Natural Resources.

Charlatingham: Welcome to the big city

By Phyllis Tammen
metromega.com

Charlatingham—over the past 40 years, Atlanta has become a city of 5 million people, occupying the same 498 square miles. It's a city that has grown so fast that it has become a city of cities. Atlanta is the hub of what has been called the Piedmont megalopolis, stretching along I-20, I-75 and I-85 from Birmingham to Greenville, S.C., Charlotte and even Raleigh and from Chattanooga to Macon. This shows how the areas are growing together as people move to areas along the interstate. A look at these metropolitan statistical areas and their populations:



Atlanta Journal-Constitution, April 15, 2001


What are the Consequences?

- ❖ Direct
 - Water pollution
 - Air pollution
 - Toxic exposures (e.g., lead)
- ❖ Less Direct
 - Accidents
 - Respiratory disease (asthma)
 - Obesity & Diabetes

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Childhood Lead Poisoning


A success story



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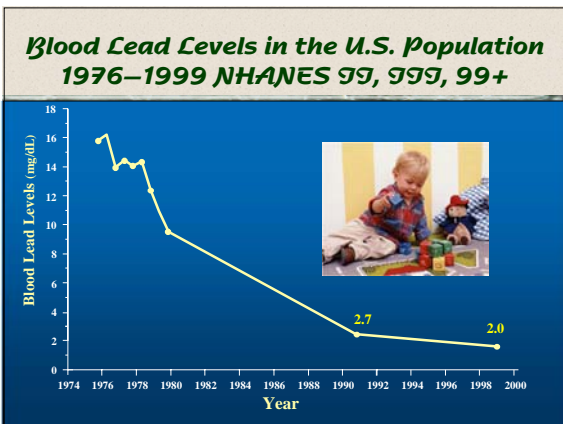
Lead-Based Paint in Housing

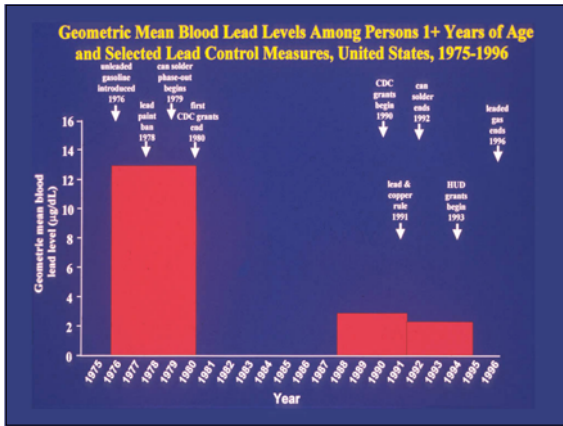
- ❖ Nearly 38 million housing units contain lead-based paint
- ❖ 24 million housing units (25% of the nation's housing) have significant lead-based paint hazards
- ❖ 1.2 million homes with significant lead-based paint hazards housed low income families with children < age of 6

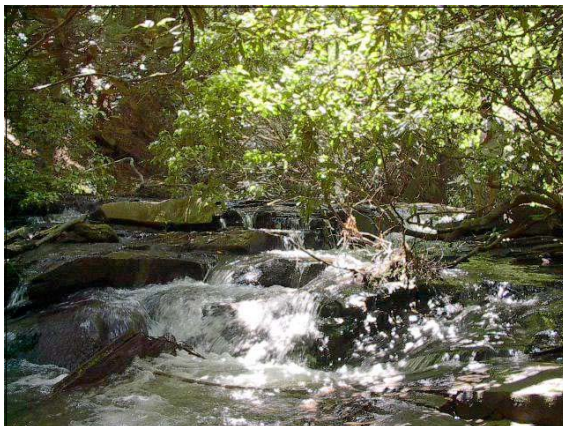


Source: National Lead-Based Paint Survey (1998-2000)

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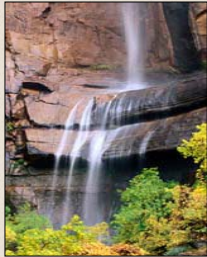






The Cleaner the Source Water, The Better

- ❖ Reduced need for disinfectants (e.g., less chlorine, ozone, chloramine).
- ❖ Inability of disinfection process to destroy certain cysts (e.g., cryptosporidium).
- ❖ Reduced "breakthrough" of infectious and noninfectious agents.




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Impervious Surfaces


- ❖ Surface run-off
- ❖ Lack of recharge



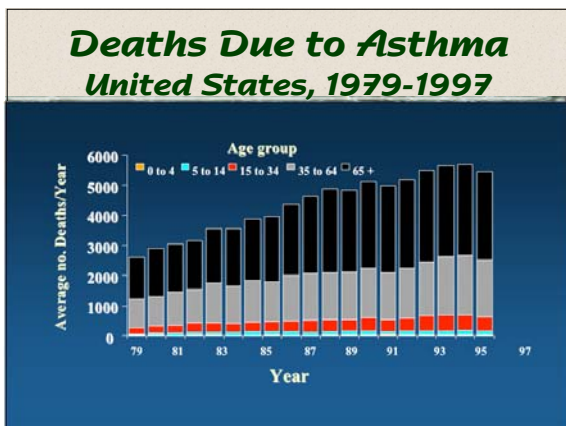
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Air Pollution

Asthma outbreak hits kids
RISKS OF THE 'RED ZONE'



The Atlanta Journal-Constitution SATURDAY, AUG. 19, 2006



Impact of Changes in Transportation and Commuting Behaviors During the 1996 Summer Olympic Games in Atlanta on Air Quality and Childhood Asthma

Richard J. Friedman, MD, PhD
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Background: Asthma is a chronic respiratory disease that affects approximately 10 million children in the United States. The incidence of asthma has increased significantly over the past several decades, and it is now the leading cause of chronic disability in children. The incidence of asthma is also increasing in developing countries, suggesting that environmental factors may play a role in the development of the disease.

Objective: To determine the impact of changes in transportation and commuting behaviors during the 1996 Summer Olympic Games in Atlanta on air quality and childhood asthma.

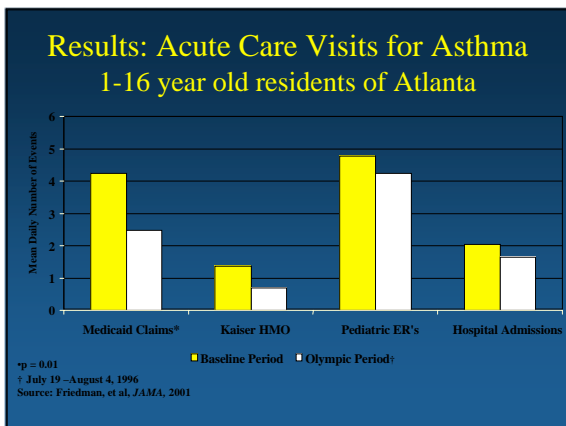
Design: A longitudinal study conducted during the 1996 Summer Olympic Games in Atlanta, Georgia. The study included 100 children with asthma who were followed up for 12 weeks before and 12 weeks after the games.

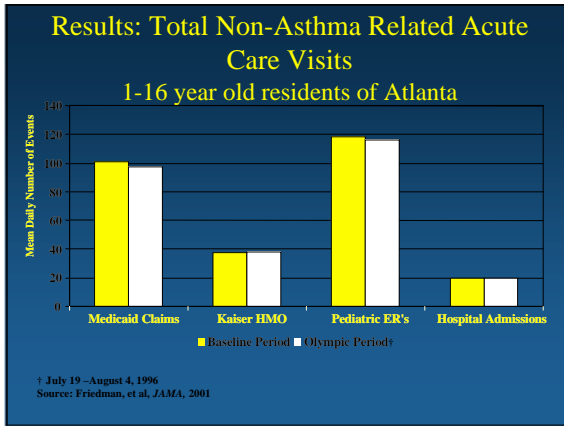
Setting and Subjects: The study was conducted in Atlanta, Georgia, during the 1996 Summer Olympic Games. The subjects were 100 children with asthma who were followed up for 12 weeks before and 12 weeks after the games.

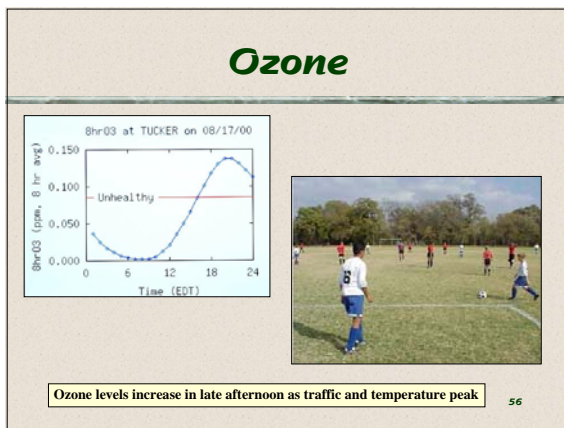
Main Results and Conclusions: The study found that there was a significant increase in air pollution during the Olympic Games. This increase in air pollution was associated with a significant increase in the number of acute care visits for asthma during the Olympic period. The study also found that there was a significant increase in the number of hospital admissions for asthma during the Olympic period.

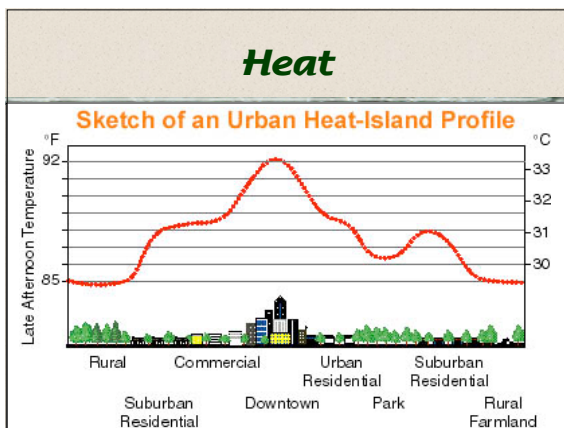
Conclusions: The study found that there was a significant increase in air pollution during the Olympic Games. This increase in air pollution was associated with a significant increase in the number of acute care visits for asthma during the Olympic period. The study also found that there was a significant increase in the number of hospital admissions for asthma during the Olympic period.

Source: Friedman, et al, JAMA, 2001









Urban Heat Islands

Affect Energy Use, the Environment, and Public Health

- ❖ Increased Smog Production
The incidence of smog events may increase by 10 percent or 5° increase in temperature
- ❖ Increased Electricity Demand
- ❖ Increased Emission of CO₂ and other pollutants

| Maximum Temperature (C°) | Percentage |
|--------------------------|------------|
| 10 | 10 |
| 15 | 20 |
| 20 | 30 |
| 25 | 40 |
| 30 | 50 |
| 35 | 60 |
| 40 | 70 |

Source: U. S. Environmental Protection Agency

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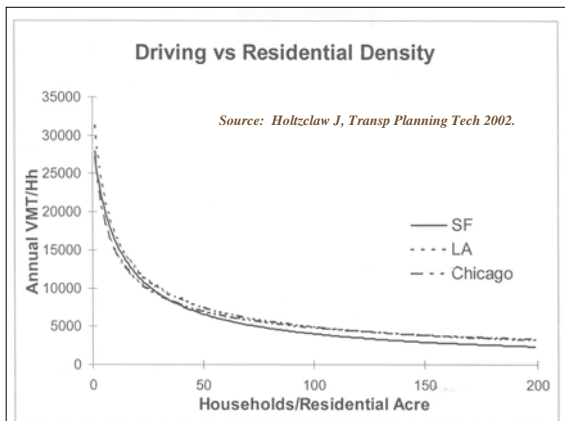
Death by Design or the lack thereof . . .

Driving

- ❖ From 1983-1995 —
 - > Average length of driver's trip to work increased by 37%.
 - > Average time it took to get to work went up by 14%.
 - > Average speed getting there (in mph) decreased by 20%.


Source: Federal Highway Administration. Nationwide Personal Transportation Study.

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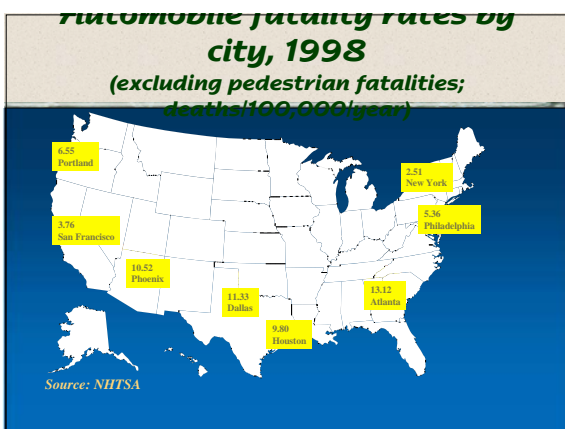
Motor Vehicle Crashes

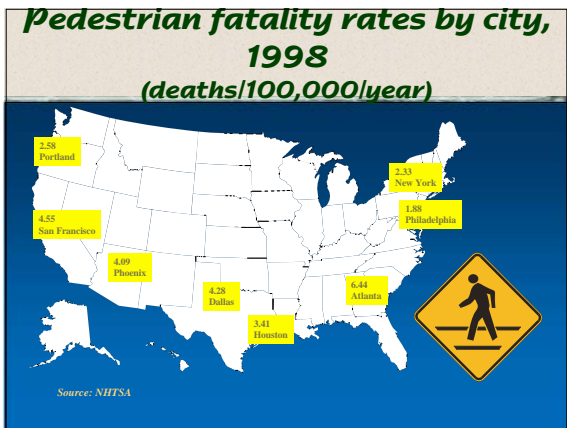
- ❖ Leading cause of deaths among persons 1-24 years old
- ❖ Each year in the United States, motor vehicle crashes account for:
 - > 42,000 deaths
 - > 3.4 million nonfatal injuries
 - > 24 million vehicles
 - > estimated \$200 billion in costs



Source: NHTSA

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Neglect for Pedestrian Safety

- ❖ Trips made on foot: 5.4%
- ❖ Traffic fatalities that are pedestrians: 13%
- ❖ Federal transportation spending for pedestrians: 0.6%

Surface Transportation Policy Project

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Obesity

- ❖ 2.5-fold risk of overall mortality*
- ❖ 4-fold risk of cardiovascular mortality*
- ❖ 5-fold risk of diabetes
- ❖ Risk of hypertension, gall bladder disease, and some cancers

(*30-44 age group, less at older ages)

Source: Willet et al., *New Eng J Med*, 1999

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67



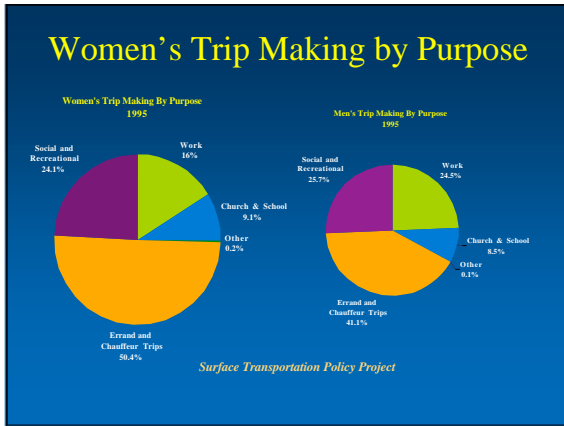
Mega-Mileage Moms

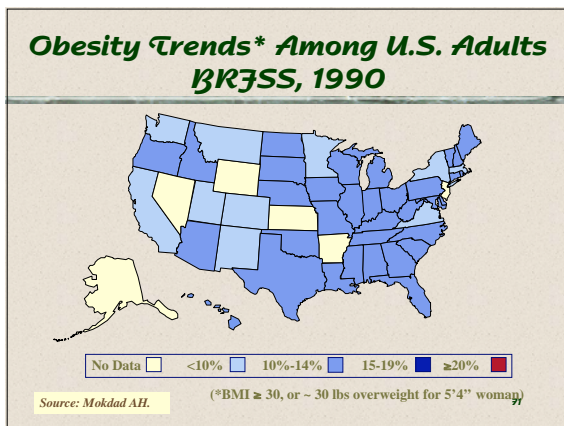
- ❖ Average minutes per day spent in car:
 - > Women overall: 64 minutes
 - > Single mothers: 75 minutes
 - > Married mothers with school-aged children: 66 minutes
- ❖ Equates to more than 15 days/year
- ❖ Family "chauffeur" for children/elderly parents
- ❖ By 2050, 20-25% of Americans will be >65 years old
- ❖ Compared to 1969, Americans drive farther:
 - > 88% farther to shop
 - > 137% farther for family/personal errands

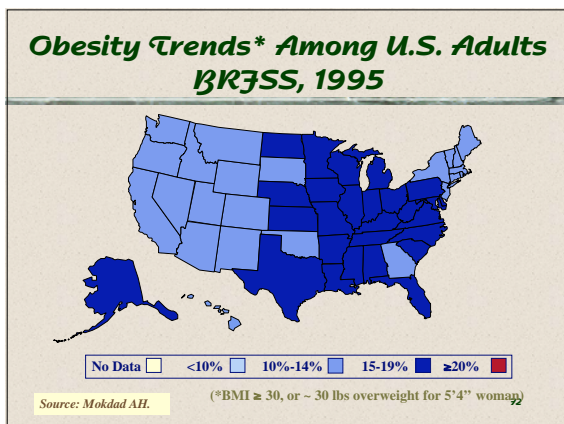
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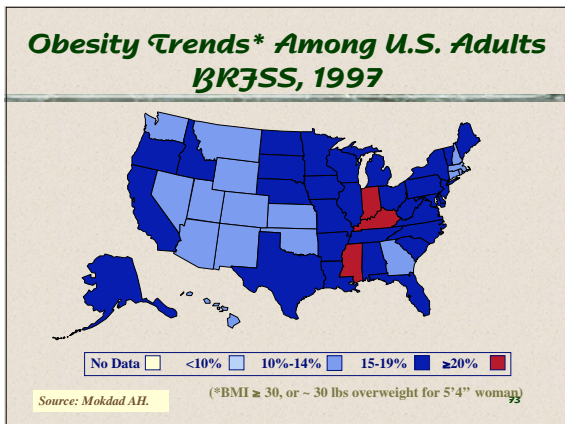


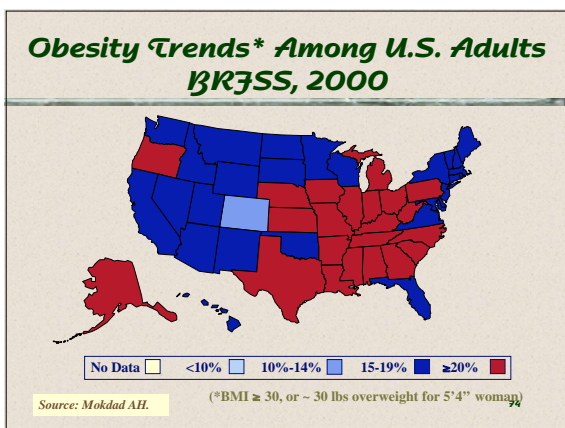
Surface Transportation Policy Project







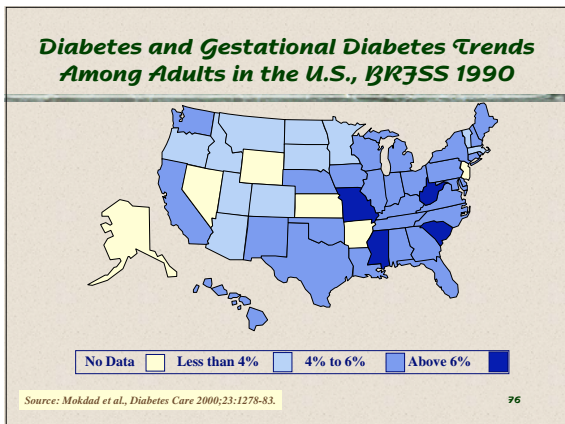


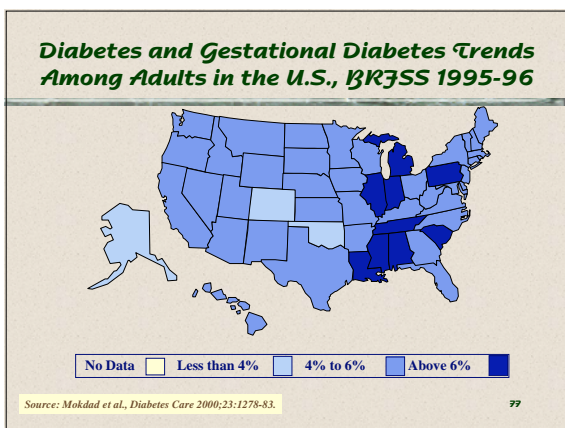


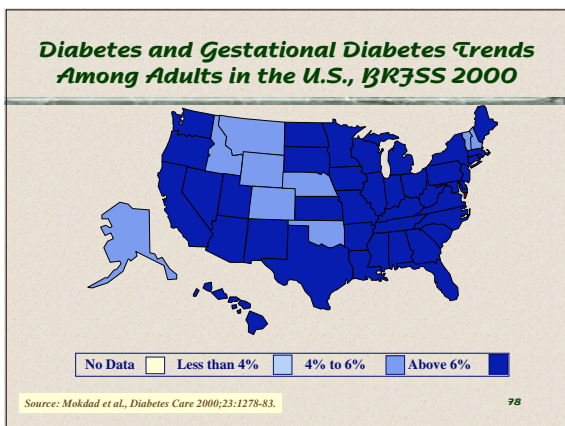
Diabetes Mellitus

- ❖ Afflicts close to 16 million people
- ❖ 7th leading cause of death in the U.S.
- ❖ One-third of cases are undiagnosed
- ❖ Type 2 diabetes accounts for approximately 90% to 95% of all diagnosed cases of diabetes
- ❖ Contributing factors are autoimmune, genetic and environmental influences
- ❖ Costs more than \$105 billion annually in direct and indirect costs (i.e. disability, work loss, and premature death)


Source: National Institute of Diabetes and Digestive and Kidney Disease (NIDDK), 2000







Mental Health




"We drive up and down the gruesome, tragic suburban boulevards of commerce, and we're overwhelmed at the fantastic, awesome, stupefying ugliness of absolutely everything in sight—the fry pits, the big-box stores, the office units, the lube joints, the carpet warehouses, the parking lagoons, the jive plastic townhouse clusters, the uproar of signs, the highway itself clogged with cars—as though the whole thing had been designed by some diabolical force bent on making human beings miserable. And naturally this experience can make us feel glum about the nature and future of civilization."

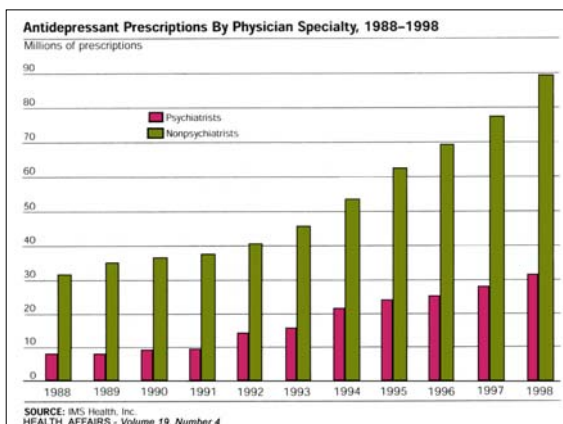
James Howard Kunstler, "Home from Nowhere"

Depression

- ❖ Depressive Disorders
 - > Affects approximately 19 million American adults
 - > Leading cause of disability in the U.S. and worldwide
 - > Nearly twice as many women as men are affected
 - > Often untreated or inadequately treated



Source: National Institute of Mental Health (NIMH), 2001 80




An Ounce of Prevention

Physical Activity and Health

A Report of the Surgeon General



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion
The President's Council on Physical Fitness and Sports



"The literature reported here supports a beneficial effect of physical activity on relieving symptoms of depression and anxiety and on improving mood."

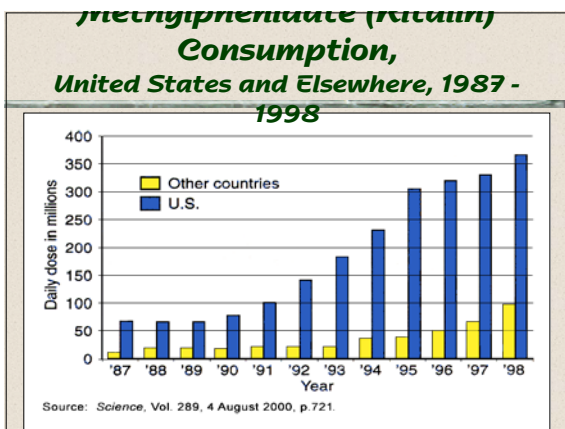
82

Isolated Schools

Credit: Constance E. Beaumont, NTHP

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83



Smart Schools

Credit: Mandeville Public School District
Credit: Hamann Architects, Boise, ID
Credit: Corbett, P. & Associates, S.F., CA

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How Not to Encourage Exercise

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Alternatives

Samaritaine Department Store – Lobby, Paris, France
Alcazaba Almeria, Spain


Brownfield Redevelopment



Source: *Smart Growth and Neighborhood Conservation, Maryland*

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New development in existing communities




Source: *Smart Growth and Neighborhood Conservation, Maryland*

Smart Growth

What it "Is" And "Is Not"

| | |
|---|---|
| More transportation choices and less traffic | Not against cars and roads |
| Vibrant cities, suburbs, and towns | Not anti-suburban |
| Wider variety of housing choices | Not about telling people where or how to live |
| Well-planned growth that improves quality-of-life | Not against growth |

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Envisioning Change



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91



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92



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93



A Need for Research

- ❖ Improved data sources
- ❖ Improved research methods
- ❖ Transportation choices
- ❖ Children and school transportation
- ❖ Walking, bicycling and physical activity
- ❖ Unintentional injuries
- ❖ Crime and neighborhood safety
- ❖ Health effects of air and water pollution
- ❖ Mental health and social capital
- ❖ Community disparities and social equity


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Acknowledgement

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Questions



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Next Lesson



**Group
Projects**

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