What is the built environment?

all buildings, spaces, and products that are created or modified by people
How does built environment impact health?

- Physical activity (obesity)
- Driving (air pollution, injuries)
- Heat stress (stroke, death)
- Water quality (infections)
- Access to healthy food (nutrition)
- Access to nature (mental health)
- Social capital (mental health)
- Disparities

“We’ve built America not for human beings, but for cars.”

Los Angeles Image: http://www.examiner.com/women_final_health_in_los_angeles/new_freeway_health_hazard_needs_flare-up
A Whole Lotta Driving Goin’ On...

- 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) increased by 20%

Source: Federal Highway Administration. Nationwide Personal Transportation Study.
Two houses, adjoining back yards

(http://usa.streetsblog.org/2013/02/28/sprawl-madness-two-houses-share-backyard-separated-by-7-miles-of-roads/)

Street design and walkability

Driving-only transportation pattern
Walkable connected transportation network
% of children who walk or bike to school

- Percent of children 5 to 14 years of age usually walked or bicycled to school (The National Center for Safe Routes to School, 2011)
  - 1969: 48%
  - 2009: 13%
- Percent of children in grades K–8 lived within one mile of school
  - 1969: 41%
  - 2009: 31%
How did this happen?

Sprawl (vs traditional design)

- Private spaces
- Low density
- Low connectivity
- Beyond infrastructure
- Inadequate tax base
- Designed for cars
- Single use
- Separates where people live, work, shop, study & play
Public Health Impact of Physical Inactivity

- Primary risk factor in cardiovascular disease, stroke & all causes of death

- 200,000 deaths attributed to inactivity in US vs:
  - 76,488 linked to diabetes
  - 100,000 linked to alcohol
  - 360,000 linked to hypertension

- 6% of medical costs in Canada, Australia, Switzerland, Netherlands, US
  - Comparable to costs due to tobacco
Built Environment & Health

- Physical activity
- Driving (air pollution, injuries)
- Heat stress
- Water quality
- Access to healthy food
- Access to nature
- Social capital
- Disparities

Air Pollution

- Aggravates asthma symptoms
- Diminishes lung function
- Triggers heart attacks
- Causes adverse birth outcomes
- Increases risk of childhood cancer


Carmageddon, 2011

'Carmaheaven': Closure of 405 in 2011 improved air quality up to 83 percent

By Alison Hewitt | September 28, 2012

Take the time to enjoy a deep breath this weekend when the 405 freeway closes for Carmageddon II. It's anything like last year, the air quality is about to get amazing.

In study findings announced Sept. 28, UCLA researchers report that they measured air pollutants during last year's Carmageddon (July 15–17) and found that when 10 miles of the 405 closed, air quality near the shuttered portion improved within minutes, reaching levels 83 percent better than on comparable weekends.

Motor Vehicle Crashes

- Leading cause of deaths among persons aged 1-24

- 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.
**Built Environment & Health**

- Physical activity
- Driving
- Physical Hazards (heat, noise, radiation)
- Water quality
- Access to healthy food
- Access to nature
- Social capital
- Disparities

**U.S. Agents in Chicago Track a Subtle Health Hazard: Heat**

Federal health agents are in Chicago trying to determine the contributing factors to the more than 500 deaths related to the heat in July. Coffins containing the bodies of unclaimed victims were loaded on a truck by a Cook County morgue worker this summer for a mass burial.

1995 Chicago Heat Wave: Coffins in Freezer Truck: 700 Deaths
Exposure leads to:
- Annoyance
- Disturbed sleep
- Daytime sleepiness
- Different patient outcomes
- Decreased staff performance
- Increases hypertension & cardiovascular disease
- Impaired cognitive performance in children


### Chemicals in buildings

- **KITCHEN**
- **WORKSHOP**
- **GARAGE**
- **FURNITURE**
- **CARPETS**
- **PAINT**
Health impacts of moisture & mold

- upper respiratory symptoms, cough, and wheeze in otherwise healthy people
- asthma symptoms in people with asthma
- hypersensitivity pneumonitis in susceptible people

http://www.cdc.gov/mold/stachy.htm

Built Environment & Health

- Physical activity
- Driving
- Physical Hazards
- Water quality
- Access to healthy food
- Access to nature
- Social capital
- Disparities
Water Quality

Water-resistant surfaces lead to urban & agricultural runoff
- Increases flooding potential
- Pollutes water supplies
- Increases sewage overflows

Built Environment & Health
- Physical activity
- Driving
- Physical Hazards
- Water quality
- Access to healthy food
- Access to nature
- Social capital
- Disparities
Healthy Food Access

- Healthy foods may not be readily available
- Low-income/underserved communities have limited access to healthy foods
  - Food Desert Locator (http://www.ers.usda.gov/data/fooddesert/index.htm)

Built Environment & Health

- Physical activity
- Driving
- Physical Hazards
- Water quality
- Access to healthy food
- Access to nature
- Social capital
- Disparities
Health benefits of nature contact

- Reduced stress
- Improved sleep
- Reduced depression and anxiety
- Greater happiness
- Reduced aggression
- Reduced ADHD symptoms
- Reduced diabetes
- Prosocial behavior
- Lower blood pressure
- Lower asthma & allergy
- Better general health
- Smoother post-surgical recovery
- Better birth outcomes
- Improved pain control
- Less obesity
- Longer life expectancy

Built Environment & Health

- Physical activity
- Driving
- Physical Hazards
- Water quality
- Access to healthy food
- Access to nature
- Social capital
- Disparities
Social Capital

- The fabric of a community
- Community pool of human resources available
- Time & energy available for:
  - Community improvement
  - Social networking
  - Civic engagement
  - Personal recreation, et al.
- Affects mental & physical health

Built Environment & Health

- Physical activity
- Driving
- Physical Hazards
- Water quality
- Access to healthy food
- Social capital
- Disparities
Racism by Design

- 293 studies between 1983 & 2013
- Negative effects on
  - Mental health
    - Depression
    - Anxiety
    - Psychological stress
  - General health
  - Physical health
- Age, sex, birthplace & education level did not moderate the effects
- Ethnicity did


Healthy Community Design

- Involves planning communities that make it easier for people to live healthy lives
- Links destinations that promote health via a transportation network that facilitates safe travel
- Makes healthy lifestyle choices easily available
Evidence-Based Recommendations

1. Incorporate a mix of land uses
2. Design well-connected street networks at the human scale
3. Provide sidewalks and enticing, pedestrian-oriented streetscapes
4. Provide infrastructure to support biking
5. Design visible, enticing stairs to encourage everyday use
6. Install stair prompts and signage
7. Provide high-quality spaces for multigenerational play and recreation
8. Build play spaces for children

http://www.uli.org/toolkit

Evidence-Based Recommendations

9. Accommodate a grocery store
10. Host a farmers market
11. Promote healthy food retail
12. Support on-site gardening and farming
13. Enhance access to drinking water
14. Ban smoking
15. Use materials and products that support healthy indoor air quality
16. Facilitate proper ventilation and airflow
17. Maximize indoor lighting quality
18. Minimize noise pollution
19. Increase access to nature
20. Facilitate social engagement
21. Adopt pet-friendly policies

http://www.uli.org/toolkit
Efforts to tackle environmental challenges will target ways to **design healthier communities** through the links between public health and:

- urban planning
- transportation
- landscape architecture
- architecture
- environmental design & assessment
- agronomy
- food systems
- civil engineering

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**Bloomberg American Health Initiative**

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**Key Competencies**

- Define built environment.
- Discuss health impacts of the built environment.
- Compare traditional communities to sprawling ones.
- Explain healthy community design principles.
- List ways to design healthy communities.
- Connect this systems issue to the EH paradigm.
- Discuss top ideas for improving our built environment.
Thank you! Questions?

Many thanks to Drs. Brian Schwartz, Dick Jackson & Howie Frumkin, for many of these slides were adapted from lectures given by them.

Miami Cool Roofs
Suburban Community Compost