UEP 224/PH 288
Public Health and the Built Environment

Instructor
Prof Mary Davis
Office: 72 Professor's Row, 2nd Floor
Phone: 617-627-4719
Email: mary.davis@tufts.edu
Office hours: Wednesdays 9-11am

Class Meeting Schedule and Location
Tuesdays and Thursdays, 10:30-11:45am @ 97 Talbot Ave (Brown House)

Course Description
The epidemics of asthma, diabetes, and obesity have focused new attention on the role played by suburban sprawl, transportation, and other built environment features on human health. This course will explore the linkages between the built environment and human health from a policy and planning perspective, with a particular focus on the U.S. urban health context. We will review a range of public health topics, including the benefits of nature, the negative effects of air and noise pollution, water and food systems challenges, and climate change. Guest lectures from UEP alums and practitioners will provide valuable insight into the application of these varied topics to the real-world. We will learn mapping skills to understand the spatial context of these built environment challenges, as well as develop a proposal for a health impact assessment to evaluate the effects of a built environment policy or project. During the second half of the course, we will focus more specifically on active transportation topics, with particular attention to the needs of susceptible sub-populations such as the elderly, disabled, and children. We will review the scientific literature on active transportation, and cover topics related to design and planning, walkability, bikeability, safety, along with perceived and objective measures of the built environment. As part of the final design challenge project, students will develop and present a basic proposal to redesign a location of their choice for active transportation.

Upon completion of this course, students will have developed important analytical skills necessary to evaluate modern day public health and built environment challenges, including mapping tools, health impact assessments, and the basics of healthy planning and design. Furthermore, students will leave this course with a strong understanding of urban design features that promote or impede active transportation. In addition to the textbook readings, we will critique a wide range of articles drawn from the academic literature, and students will practice valuable literature review and project development skills. Students will also have the opportunity to self-design certain aspects of the course to focus specifically on real-world applications relevant to their own interests.

Prerequisites
This is a graduate level course, but upper level undergraduates may take this course with instructor permission. Some of the assigned readings will be quantitative in nature, so a basic knowledge of introductory statistics is strongly suggested (UEP 254/PH 205 or equivalent).

Knowledge of ArcGIS is also a plus but not required. The mapping tools discussed in class and applied in the weekly tasks will focus largely on accessible web-based tools for understanding the spatial context of public health and the built environment. The use of ArcGIS to complete the weekly tasks and design challenge is encouraged for students that possess the relevant software skills but not required.

Textbook and Required Readings

Environmental Health: From Global to Local, 3rd edition (2016), by Howard Frumkin is the required textbook for this course. A copy of this textbook is on reserve in the student lounge at the White House, and is also available for purchase on Amazon (~$80). This textbook was chosen because it provides a broad overview of the topics covered in this course as well as many other public health topics relevant to policy and planning practitioners. Additional non-textbook required readings will be drawn from the academic and practitioner literature, and have been chosen to represent a well-rounded view of each week's topics. All readings and additional course material will be made available on the Trunk course site.

The course reading expectations are two readings (as either textbook chapters and/or journal articles) per one hour and 15 minute class period. An optional reading list is provided in the detailed outline for students interested in learning more about a given topic outside the context of the course requirements.

Class participation

The class format will be discussion-based and it is essential that you come to class prepared and willing to actively participate. All students are expected to do the required readings posted each week. Please let me know in advance if you will not be able to attend class.

Student Assessment and Grading Policy

Graded Component	Score Allotted	Score Description
Homework tasks	50%	5% for each of 10 tasks
HIA Project	25%	5% draft 15% final
Design Challenge	25%	5% draft 5% presentation 10% final

Homework Tasks

A series of written tasks will be posted online roughly each week that require students to apply a topic covered in class to a real-world setting. Although some of these tasks will be written responses to topic-specific questions, others are intended to bring you out into your neighborhood to explore the public health challenges and opportunities of the built environment around you. These tasks will require you to think about the built environment from multiple perspectives, such as from the viewpoint of a child, disabled, or elderly person. In some cases, the task will consist of a diary of observations, and in others you will collect basic data on built environment infrastructure (or lack thereof) or groundtruth existing data. A grading rubric will be posted to help guide your weekly task assignments.

Students are responsible for posting their homework tasks to the discussion thread on Trunk by the start of class on due dates noted on the course outline. All peer responses must be posted online by the start of the next class (i.e., if a task is due on a Tuesday, peer responses should be posted by class time on Thursday of that same week).

Under no circumstances should excerpts or passages submitted for the homework tasks be exact duplicates of material derived from another source. This is **plagiarism** when not properly cited. It is ok to paraphrase and quote from passages retrieved from other sources, but it is not ok to use this information directly without proper citation, even for small homework tasks. Please review the Tufts Academic Integrity Policy online for more details about university policy.

Health Impact Assessment Proposal

During the first half of the semester, students will develop a proposal for a health impact assessment (HIA). The HIA project is intended to provide you a broad understanding of the HIA process as it relates to a specific area or application of interest to you. The three parts of the HIA proposal project are as follows:

Introduction: Introduce your topic. Describe a policy or project where you believe a health impact assessment might be informative and useful. Provide the underlying rationale for your proposal choice and describe why this issue or project is important (approximately 1 double-spaced page).

Background: Describe the science. Explore the scientific literature surrounding your topic, including the results of similar HIAs. Write a short literature review (properly cited) that provides the context and background for your policy question or project (approximately 5 double-spaced pages).

Methods: Describe the process. Outline an approach to develop and execute an HIA for your chosen policy or project question, which is essentially a Methods section outlining your strategy for doing this work. The approach should provide detail on every step of the health impact assessment process (approximately 5 double-spaced pages).

Design Challenge

During the latter half of the course, students will participate in a Design Challenge to propose active transportation infrastructure in a location of their choice. Specific details related to the output of the design challenge will be provided mid-semester. Briefly, students will be required to produce a written product that clearly identifies, articulates, and documents the need for active transportation in their chosen location. Projects will apply the tools and information from the class readings, discussions, and tasks to replicate an existing design from the literature to their location that meets the needs of the population of users. Students will identify the public health benefits and costs, as well as the scale and feasibility of such a project in that location. Students interested in receiving optional feedback on the final written product must submit their drafts by the due date noted on the course outline.

In addition to the written document, students will present their ideas to the class in a 10 minute Power Point presentation. After the presentations, students will evaluate the designs of their

fellow classmates and provide written feedback on the public health benefits, feasibility, creativity, and likely success of each proposed active transportation project.

Students with Disabilities
Students with disabilities are assured that the Student Accessibility Services (SAS) office will work with each student individually to create access to all aspects of student life. Tufts is committed to providing equal access and support to all qualified students through the provision of reasonable accommodations so that each student may fully participate in the Tufts experience. If you have a disability that requires reasonable accommodations, please contact the Student Accessibility Services office at accessibility@tufts.edu or 617-627-4539 to make an appointment with an SAS representative to determine appropriate accommodations. Please be aware that accommodations cannot be enacted retroactively, making timeliness a critical aspect for their provision.

Preferred Pronouns
You can now make a note of your preferred name on SIS, although there is currently no similar process available on Trunk. If you have any specific pronoun preferences, please let me know on the first day of class. My personal preferred pronouns are 'she, her, and hers.'

Plagiarism
This course follows university policy with respect to plagiarism, which will not be tolerated. Proper citation of material derived from other sources is essential to academic integrity, and under no circumstances should students pull material directly from other sources without proper citation. In other words, cutting and pasting is never appropriate without the use of quotations and proper citation. This is **plagiarism**. It is ok to paraphrase and quote from passages retrieved from other sources, but it is not ok to use this information directly without proper citation, even for small homework tasks. Please review the Tufts Academic Integrity Policy online for more details about university policy.

Citation Style
All students should use the APA citation style to reference their written work submitted for this class, including in-text citations and end reference lists for the homework tasks, HIA mini-project, and Design Challenge. Detail on appropriate referencing using the APA citation style is readily available online.

Spring Course Outline

Date	Topic	Assignment Due	Required Readings
Jan. 19	Introduction to Public Health and Built Environment		Frumkin Chapter 1 and 15
Jan. 24	Science, Risk, and Methods		Frumkin Chapter 4 and 6 Schmidt 2013 Research and data handout
Jan. 26	Science, Risk, and Methods contd.	Task #1	
Jan. 31	Health Impact Assessment		APA 2016 Dannenberg et al. 2008 HIP 2011 Mueller et al. 2017
Feb. 2	Health Impact Assessment contd.	Task #2	
Feb. 7	Benefits of Nature Contact	Task #3	Frumkin Chapter 9 and 25 James et al. 2016 Mitchell and Popham 2008
Feb. 9	Benefits of Nature Contact contd.	HIA Intro draft	
Feb. 14	Noise Pollution *Guest speaker Erica Walker, Harvard doctoral candidate and UEP alum*	Task #4	Hammer et al. 2014 Holt 2016
Feb. 16	GIS/Mapping Tools: Part I *Guest speaker Kevin Lane, post-doctoral researcher at BU and UEP alum*		Frumkin Chapter 5 Seltenrich 2014
Feb. 21	GIS/Mapping Tools: Part II *Guest tutorial on Policy Map and Social Explorer by Tufts librarian Josh Quan*		
Feb. 23	NO CLASS – Monday schedule	HIA Lit Review draft	
Feb. 28	NO CLASS – Professor away	Task #5	
March 2	Water Pollution		Frumkin Chapter 16 *One additional reading TBD*
March 7	Food Systems	HIA Process draft	Frumkin Chapter 19 Caspi et al. 2012 Larson et al. 2009 Saelens et al. 2012
March 9	Food Systems contd.		
March 14	Air Pollution	Task #6	Frumkin Chapter 13 CAFEH 2015 Trasande et al. 2016 Rich et al. 2015
March 16	Air Pollution contd.		
Spring Break	NO CLASS – SPRING BREAK	HIA project final due Tuesday 3/21	

March 28	Introduction to Active Transportation	Task #7	Brownson et al.2005 Ewing and Cervero 2010 Zhang 2004 *One additional reading TBD*
March 30	Introduction to Active Transportation contd.		
April 4	Walking and Walkability	Task #8	Marshall et al. 2009 Duncan et al. 2014
April 6	Walking and Walkability contd. *Guest speaker Stacey Beuttell, Program Director for WalkBoston*		
April 11	Biking and Bikeability	Task #9	de Hartog et al. 2010 Pucher and Buehler 2008 Reynolds et al. 2009 Zuurbier et al. 2010
April 13	Biking and Bikeability contd.		
April 18	Design for Active Transportation *Guest speaker Mark Chase, UEP lecturer and alum*	Task #10	Schlossberg et al. 2013 AARP 2009 (Chapter 4)
April 20	Design for Active Transportation contd.	Design Challenge draft *optional*	
April 25	Climate Change		Frumkin Chapter 12 Lake et al. 2012 Stone et al. 2010 Younger et al. 2008
April 27	Climate Change contd.		
May 2 **or** 4, 9-noon	Design Challenge Presentations	Design Challenge final	

Detailed Course Outline (all non-textbook required readings available on Trunk)

Introduction to Public Health and the Built Environment
In this class we will review the syllabus and course expectations, and provide a brief introduction to the topics that will be covered in this course. We will lay the foundation for understanding public health challenges related to the built environment, including a discussion of trends in inactivity across the U.S. population and globally.

Required Readings
Frumkin H. 2016. Textbook Chapters 1 and 15.

Additional Readings
Frumkin H. 2016. Textbook Chapters 2 and 3.

Hamilton MT, Healy GN, Dunstan DW, Zderic TW, Owen N. 2008. Too Little Exercise and Too Much Sitting: Inactivity Physiology and the Need for New Recommendations on Sedentary Behavior. *Current Cardiovascular Risk Reports* 2:292-298.

Lee I-M, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT. 2012. Effect of Physical Inactivity on Major Non-communicable Diseases Worldwide: An Analysis of Burden of Disease and Life Expectancy. *Lancet* 380:219-229.

Pucher J, Buehler R, Bassett DR, Dannenberg AL. 2010a. Walking and Cycling to Health: A Comparative Analysis of City, State, and International Data. *American Journal of Public Health* 100(10):1986-1992.

U.S. Department of Health and Human Services. 2008. Physical Activity Guidelines for Americans. Available at: http://health.gov/paguidelines/pdf/paguide.pdf

World Health Organization. 2010. Global Recommendations on Physical Activity for Health. Available at: http://apps.who.int/iris/bitstream/10665/44399/1/9789241599979_eng.pdf

Science, Risk, and Methods
In this class, we will lay the groundwork for the basic concepts of epidemiology, exposure assessment, and biostatistics critical to understanding and evaluating the research papers discussed in this class. We will also explore particular data and design challenges related to studies of the built environment, and will briefly discuss the role of epigenetics in understanding environmental health hazards.

Required Readings
Frumkin H. 2016. Textbook Chapters 4 and 6.

Schmidt, C.W. 2013. Uncertain Inheritance: Transgenerational Effects of Environmental Exposures. *Environmental Health Perspectives* 121(10):A288-303.

Issues Related to Research Design and Data (posted handout)

Additional Readings

Frumkin H. 2016. Textbook Chapters 8 and 27-28.

Health Impact Assessment

In this class we will discuss the goals of health impact assessment, and the general methodology and rationale for conducting such applied analyses in practice. We will review existing HIAs, and discuss how to develop and plan these efforts for the purposes of the midterm class project.

Required Readings

American Planning Association. 2016. Health Impact Assessment Toolkit for Planners. Available at: https://planning-org-uploaded-media.s3.amazonaws.com/document/HIA-Toolkit.pdf

Dannenberg AL, Bhatia R, Cole BL, et al. 2008. Use of Health Impact Assessment in the U.S.: 27 Case Studies, 1999-2007. *American Journal of Preventative Medicine* 34(3):241-256.

Human Impact Partners. 2011. A Health Impact Assessment Toolkit. Available at: http://www.humanimpact.org/wp-content/uploads/A-HIA-Toolkit_February-2011_Rev.pdf

Mueller N, Rojas-Rueda D, Basagaña X, Cirach M, et al. 2017. Urban and transport planning related exposures and mortality: a health impact assessment for cities. *Environmental Health Perspectives* 125:89–96.

Additional readings

Cole BL and JE Fielding. 2007. Health Impact Assessment: A Tool to Help Policy Makers Understand Health Beyond Health Care. *Annual Review of Public Health* 28:393-412.

World Health Organization. 2011. Health Economic Assessment Tools (HEAT) for Walking and for Cycling.

Benefits of Nature Contact

The week's required readings consist of two journal articles and two textbook chapters that summarize the literature supporting the health benefits of human contact with nature. We will explore the environmental psychology literature, and provide an overview of the public health implications of access to nature and green space on mental and physical health, as well as attention and focus. We will identify the physiological and emotional basis for these health benefits, and understand how they impact health inequalities.

Required Readings

Frumkin H. 2016. Textbook Chapters 9 and 25.

Mitchell R, Popham F. 2008. Effect of Exposure to Natural Environment on Health Inequalities: An Observational Population Study. *Lancet* 372:1655-1660.

James P, Hart JE, Banay RF, Laden F. 2016. Exposure to Greenness and Mortality in a Nationwide Prospective Cohort Study of Women. *Environmental Health Perspectives* 124:1344–1352.

Additional Readings

Amoly E, Dadvand P, Forns J, López-Vicente M, Basagaña X, Julvez J, Alvarez- Pedrerol M, Nieuwenhuijsen MJ, Sunyer J. 2014. Green and Blue Spaces and Behavioral Development in Barcelona Schoolchildren: the BREATHE Project. *Environmental Health Perspectives* 122:1351–1358.

Bell JF, Wilson JS, Liu GC. 2008. Neighborhood Greenness and 2-Year Changes in Body Mass Index of Children and Youth. *American Journal of Preventative Medicine* 35(6):547-553.

Evans GW. 2003. The Built Environment and Mental Health. *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 80(4):536-555.

Kuo FE, Taylor AF. 2004. A Potential Natural Treatment for Attention-Deficit/Hyperactivity Disorder: Evidence from a National Study. *American Journal of Public Health* 94(9):1580-1586.

Lee J, Park BJ, Tsunetsugu Y, Ohira T, Kagawa T, Miyazaki Y. 2011. Effect of Forest Bathing on Physiological and Psychological Responses in Young Japanese Male Subjects. *Public Health* 125:93-100.

Wolf KL, Robbins AS. 2015. Metro Nature, Environmental Health, and Economic Value. *Environmental Health Perspectives* 123:390–398.

Noise Pollution

During this guest lecture, we will explore noise as an environmental health hazard, and the impact the built environment has on generating or mitigating these hazards.

Required Readings

Holt, S. 2016. How City Noise Affects Residents' Health. The Atlantic. Available at: http://www.theatlantic.com/health/archive/2016/03/how-urban-noise-impacts-residents-health/471465/

Hammer MS, Swinburn TK, Neitzel RL. 2014. Environmental Noise pollution in the United States: Developing an Effective Public Health Response. *Environmental Health Perspectives* 122:115–119.

Additional Readings

Christensen JS, Raaschou-Nielsen O, Tjonneland A, et al. 2016. Road Traffic and Railway Noise Exposures and Adiposity in Adults: A Cross-Sectional Analysis of the Danish Diet, Cancer, and Health Cohort. *Environmental Health Perspectives* 124:329-335.

GIS/Mapping Tools and Gene-Environment Interactions
In this class we will review basic online mapping tools for understanding the built environment, including Policy Map and Social Explorer. Students will be provided with a tutorial and handout that will allow them to access these tools for use in their homework tasks and class project. Students are encouraged to substitute GIS software if they possess the relevant skill set. In the second part of this class, we will discuss the growing literature on the relationship between genetics and the environment, and explore how genetic differences within a population make some individuals more susceptible than others to built environment risk factors.

Required Readings
Frumkin H. 2016. Textbook Chapter 5.
Seltenrich N. 2014. Remote Sensing Applications for Environmental Health Research. Environmental Health Perspectives 122(10), A268-275.

Additional Readings
Frumkin H. 2016. Textbook Chapter 11.

Water Pollution
This lecture was added in response to student interest in the topic of water pollution and the built environment. The required reading for the day broadly explores the topic of water quality and public health, but the focus of this lecture may adapt somewhat to meet student interests.

Required readings
Frumkin H. 2016. Textbook Chapter 16.

One additional required reading TBD

Food Systems
During this week, we will explore built environment challenges related to food systems, including access to healthy food, perceived vs objective measures of access, and environmental justice concerns related to food desserts.

Required Readings
Frumkin H. 2016. Textbook Chapter 19.

Caspi CE, Kawachi I, Subramanian SV, Adamkiewicz G, Sorensen G. 2012. The Relationship Between Diet and Perceived and Objective Access to Supermarkets Among Low-Income Housing Residents. *Social Science and Medicine* 75:1254-1262.

Larson NI, Story MT, Nelson MC. 2009. Neighborhood Environments: Disparities in Acccess to Healthy Foods in the U.S. *American Journal of Preventative Medicine* 36(1):74-81.

Saelens BE, Sallis JF, Frank LD, et al. 2012. Obesogenic Neighborhood Environments, Child and Parent Obesity: The Neighborhood Impact on Kids Study. *American Journal of Preventative Medicine* 42(5):e57-364.

Additional Readings

Frumkin H. 2016. Textbook Chapter 18.

Dannefer R, Williams DA, Baronberg S, Silver L. 2012. Health Bodegas: Increasing and Promoting Healthy Foods at Corner Stores in New York City. *American Journal of Public Health* 102:e27-e31.

Gordon C, Purciel-Hill M, Ghai NR, Kaufman L, Graham R, Van Wye G. 2011. Measuring Food Deserts in New York City's Low-Income Neighborhoods. *Health and Place* 17:696-700.

Jiao J, Moudon AV, Ulmer J, Hurvitz PM, Drewnowski A. 2012. How to Identify Food Deserts: Measuring Physical and Economic Access to Supermarkets in King County, Washington. *American Journal of Public Health* 102:e32-339.

McCann B. 2006. Community Design for Healthy Eating: How Land Use and Transportation Solutions Can Help. Robert Wood Johnson Foundation. Available at: https://folio.iupui.edu/bitstream/handle/10244/561/communitydesignhealthyeating.pdf

Air Pollution

During this week, we will explore the relationship between transportation and mobile source-related air and noise pollution on human health. We will discuss the wide range of health outcomes attributed to transportation-related pollution, with a particular focus on susceptible sub-populations.

Required Readings

Frumkin H. 2016. Textbook Chapter 13.

CAFEH. 2015. Improving Health in Communities Near Highways. Community Assessment of Freeway Exposure and Health. Available at: https://sites.tufts.edu/cafeh/files/2011/10/CAFEH-Report-Final-2-26-15-hi-res1.pdf

Trasande L, Malecha P, Attina TM. 2016. Particulate Matter Exposure and Preterm Birth: Estimates of U.S. Attributable Burden and Economic Costs. *Environmental Health Perspectives* 124:1913–1918.

Rich DQ, Liu K, Zhang J, Thurston SW, et al. 2015. Differences in Birth Weight Associated with the 2008 Beijing Olympics Air Pollution Reduction: Results from a Natural Experiment. *Environmental Health Perspectives* 123:880–887.

Additional Readings

Cloughtery JE, Kubzansky LD. 2009. A Framework for Examining Social Stress and Susceptibility to Air Pollution in Respiratory Health. *Environmental Health Perspectives* 117:1351-1358.

Hudda N, Simon MC, Zamore W, Brugge D, Durant JL. 2016. Aviation Emissions Impact Ambient Ultrafine Particle Concentrations in the Greater Boston Area. *Environmental Science and Technology,* forthcoming.

McEntee JC, Ogneva-Himmelberger Y. 2008. Diesel Particulate Matter, Lung Cancer, and Asthma Incidences along Major Traffic Corridors in MA, USA: A GIS Analysis. Health and Place 14:817-828.

Schmidt CW. 2016. Beyond a One-Time Scandal: Europe's Ongoing Diesel Pollution Problem. *Environmental Health Perspectives* 124(1).

Volk HE, Hertz-Picciotto I, Delwiche L, Lurmann F, McConnell R. 2011. Residential Proximity to Freeways and Autism in the CHARGE Study. *Environmental Health Perspectives* 119:873-877.

Introduction to Active Transportation

The required readings explore built environment features that encourage or impede active transportation. We will identify the strength of the evidence supporting various design features, as well as how these variables are identified and measured in the scientific literature. This background material will allow us to develop and explore walking and biking as separate modes of transportation in the subsequent lectures.

Required Readings

Brownson RC, Boehmer TK, Luke DA. 2005. Declining Rates of Physical Activity in the United States: What Are the Contributors? *Annual Review of Public Health* 26:421-443.

Ewing R, Cervero R. 2010. Travel and the Built Environment: A Meta-Analysis. Journal of the American Planning Association 76(3):265-294.

Zhang, M. 2004. The Role of Land Use in Travel Mode Choice: Evidence from Boston and Hong Kong. *Journal of the American Planning Association* 70(3):344-360.

Additional Required Reading TBD

Additional Readings

AARP Public Policy Institute. 2009. Chapter 2 in "Planning Complete Streets for an Aging America." Available at: http://assets.aarp.org/rgcenter/ppi/liv-com/2009-12-streets.pdf

Asabere, P. K., & Huffman, F. E. 2009. The Relative Impacts of Trails and Greenbelts on Home Price. *Journal of Real Estate Finance and Economics*, 38(4), 408-419.

Bauman AE, Reis RS, Sallis JF, Wells JC, Loos RJ, Martin BW. 2012. Correlates of Physical Activity: Why Are Some People Physically Active and Others Not? *Lancet* 380:258-271.

Brownson RC, Hoehner CM, Day K, Forsyth A, Sallis JF. 2009. Measuring the Built Environment for Physical Activity: State of the Science. *American Journal of Preventative Medicine* 36(4S):S99-S123.

Clarke P, Ailshire JA, Bader M, Morenoff JD, House JS. 2008. Mobility Disability and the Urban Built Environment. *American Journal of Epidemiology* 168(5):506-513.

Ding D, Sallis JF, Kerr J, Lee S, Rosenberg DE. 2011. Neighborhood Environment and Physical Activity Among Youth. *American Journal of Preventative Medicine* 41(4)442-455.

Krizek KJ. 2003. Residential Relocation and Changes in Urban Travel: Does Neighborhood-Scale Urban Form Matter? *Journal of the American Planning Association* 69(3):265-281.

Krizek KJ, Johnson PJ. 2006. Proximity to Trails and Retail: Effects on Urban Cycling and Walking. *Journal of the American Planning Association* 72(1):33-42.

Li F, Harmer PA, Cardinal BJ, Bosworth M, Acock A, Johnson-Shelton, Moore JM. 2008. Built Environment, Adiposity, and Physical Activity in Adults Aged 50-75. *American Journal of Preventative Medicine* 35(1):38-46.

Lindsey, G., Man, J., Payton, S., & Dickson, K. (2004). Property Values, Recreation Values, and Urban Greenways. *Journal of Park and Recreation Administration*, 22(3).

McDonald NC. 2007. Active Transportation to School: Trends among U.S. Schoolchildren, 1969-2001. *American Journal of Preventative Medicine* 32(6):509-516.

Walking and Walkability

We will build upon the previous readings and lectures to focus explicitly on walking and measures of 'walkability'. We will explore built environment features and land uses relevant to walking, and identify how they are captured and measured in the current literature. We will explore the costs and benefits of walking as a form of active transportation, and its relationship to other modes of transportation as well as air quality.

Required Readings

Marshall JD, Brauer M, Frank LD. 2009. Healthy Neighborhoods: Walkability and Air Pollution. *Environmental Health Perspectives* 117:1752-1759.

Duncan DT, Sharifi M, Melly SJ, Marshall R, Sequist TD, Rifas-Shiman SL, Taveras EM. 2014. Characteristics of Walkable Built Environments and BMI Z-scores in Children: Evidence from a Large Electronic Health Record Database. *Environmental Health Perspectives* 122:1359–1365.

Additional Readings

Chiu M, Rezai MR, Maclagan LC, Austin PC, Shah BR, Redelmeier DA, Tu JV. 2016. Moving to a Highly Walkable Neighborhood and Incidence of Hypertension: A Propensity-score Matched Cohort Study. *Environmental Health Perspectives* 124:754–760;

Frank LD, Sallis JF, Conway TL, Chapman JE, Saelens BE, Backman W. 2006. Many Pathways from Land Use to Health. *Journal of the American Planning Association* 72(1):75-87.

Biking and Bikeability

We will build upon the previous readings and lectures to focus explicitly on biking and measures of 'bikeability'. We will explore built environment features and land uses relevant to biking, and identify how they are captured and measured in the current literature. We will explore the costs and benefits of walking as a form of active transportation, and focus specifically on safety and infrastructure challenges as they relate to increasing the bike modeshare.

Required Readings

de Hartog JJ, Boogaard H, Nijland H, Hoek G. 2010. Do the Health Benefits of Cycling Outweigh the Risks? *Environmental Health Perspectives* 118:1109-1116.

Pucher J, Buehler R. 2008. Making Cycling Irresistible: Lessons from The Netherlands, Denmark, and Germany. *Transport Reviews* 28(4):495-528.

Reynolds CC, Harris MA, Teschke K, Cripton PA, Winters M. 2009. The Impact of Transportation Infrastructure on Bicycling Injuries and Crashes: A Review of the Literature. *Environmental Health* 8:47.

Zuurbier M, Hoek G, Oldenwening M, et al. 2010. Commuters' Exposure to Particulate Matter Air Pollution Is Affected by Mode of Transport, Fuel Type, and Route. *Environmental Health Perspectives* 118:783-789.

Additional Readings

City of Boston. 2013. Boston Cyclist Safety Report. Available at: http://www.cityofboston.gov/news/uploads/16776_49_15_27.pdf

City of Cambridge, Bicycle Master Plan, Chapter 3: Bicycle Data. Available at: http://www.cambridgema.gov/~/media/Files/CDD/Transportation/Bike/bikeplan/finalplan2015/3%20BICYCLE%20DATA_20151006.pdf?la=en

Gu J, Mohit B, and PA Muennig. 2016. The Cost-effectiveness of Bike Lanes in New York City. *Injury Prevention*.

Kerr J, Edmond JA, Badland H, et al. 2016. Perceived Neighborhood Environmental Attributes Associated with Walking and Cycling for Transport among Adult Residents of 17 Cities in 12 Countries: The IPEN Study. *Environmental Health Perspectives* 124:290-298.

Lusk, AC, Furth PG, et al. 2011. Risk of Injury for Bicycling on Cycle Tracks versus in the Street. *Injury Prevention.*

Schneider RJ, Stefanich J. 2016. Neighborhood Characteristics that Support Bicycle Commuting: Analysis of the Top 100 United States Census Tracts. *Transportation Research Record* forthcoming.

Teschke K, Harris A, Reynolds CC, et al. 2012. Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study. *American Journal of Public Health* 102(12):2336-2343.

Tilahun, N. Y., Levinson, D. M., & Krizek, K. J. 2007. Trails, lanes, or traffic: Valuing bicycle facilities with an adaptive stated preference survey. *Transportation Research Part A: Policy and Practice*, 41(4), 287-301.

Winters M, Teschke K. 2010. Route Preferences Among Adults in the Near Market for Bicycling: Findings of the Cycling in Cities Study. *American Journal of Health Promotion* 25(1):40-47.

Winters M, Davidson G, Kao D, Teschke K. 2011. Motivators and Deterrents of Bicycling: Comparing Influences on Decisions to Ride. *Transportation* 38:153-168.

Winters M, Brauer M, Setton EM, Teschke K. 2010. Built Enviornment Influences on Healthy Transportation Choices: Bicycling versus Driving. *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 87(6):969-993.

Design for Active Transportation

In the guest lecture by Mark Chase, we will review the principles of design for active transportation. We will follow up during the second lecture with design-related topics for susceptible sub-populations.

Required Readings

Schlossberg M, Rowell J, Amos D, and K Sanford. 2013. Rethinking Streets: An Evidence-Based Guide to 25 Complete Street Transformations. Available at: http://rethinkingstreets.com/

AARP Public Policy Institute. 2009. Chapter 4 in "Planning Complete Streets for an Aging America." Available at: http://assets.aarp.org/rgcenter/ppi/liv-com/2009-12-streets.pdf

Additional Readings

National Association of City Transportation Officials. 2013. Urban Street Design Guide. Island Press.

National Association of City Transportation Officials. 2014. Urban Bikeway Design Guide. Island Press.

Climate Change

During this week we will look at how global warming and climate variability impacts public health through changes to the built environment, including food security, heat, extreme weather events, etc., with a specific focus on vulnerable urban populations.

Required Readings

Frumkin H. 2016. Textbook Chapter 12.

Lake IR, Hooper L, Abdelhamid A, et al. 2012. Climate Change and Food Security: Health Impacts in Developed Countries. *Environmental Health Perspectives* 120:1520-1526.

Stone B, Hess JJ, Frumkin H. 2010. Urban Form and Extreme Heat Events: Are Spraling Cities More Vulnerable to Climate Change than Compact Cities? *Environmental Health Perspectives* 118:1425-1429.

Younger M, Morrow-Almeida HR, Vindigni SM, Dannenberg AL. 2008. The Built Environment, Climate Change, and Health: Opportunities for Co-Benefits. *American Journal of Preventative Medicine* 35(5):517-526.

Additional Readings

Frumkin H. 2016. Textbook Chapter 14.