Fall 2018: UEP 224/PH 288
Public Health and the Built Environment

Instructors
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Class Meeting Schedule and Location
Four Saturdays 10am-2pm, 97 Talbot Ave (Brown House)
September 15, September 29, October 13, December 8

Class expectations
You are expected to be on time and attend all Saturday class sessions and should come prepared to actively discuss the assigned readings for the day. During the second half of the semester, you are expected to stay actively engaged in the online discussions related to the weekly tasks, including posting your own task responses and commenting on the postings of others. You will also be responsible for connecting with your assigned instructor outside of class for guidance and preparation of your class project and presentation, which will be due at the end of the semester. Because of the hybrid online and on-campus format of this course, your continued participation is required throughout the semester. Detailed rubrics for assessing participation, project, and homework tasks are available.

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, climate change, and active transportation, with a particular focus on susceptible sub-populations such as the elderly, disabled, and children. Students will learn mapping skills to understand the spatial context of these built environment challenges, as well as develop a health impact assessment to evaluate a built environment policy or project.

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.

Students will leave this course with an 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 project 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) and from the Tufts bookstore (https://tinyurl.com/F18-UEP-0224). 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 literatures 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 course Canvas site. 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.

Student Assessment and Grading Policy

Graded Component	**% of Grade**
HW Tasks (5 total)	50% (10% each)
Final project	30% (first draft 10%, final draft 20%)
Final presentation	20%
Class attendance	Attendance at ALL four class sessions is **required**; each unexcused absence will result in a letter grade drop of 10%

Class attendance

The in-class format will be lecture and discussion-based, and it is essential that you come to class prepared and willing to actively participate. **Please note that you must be able to attend all four Saturday sessions to take this course.**

Homework Tasks

A series of five written tasks will be posted online during the second half of the semester that will require students to apply topics discussed previously in class to a real-world setting. These task assignments are intended to bring you out into your neighborhoods 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. A grading rubric for the homework tasks will be posted on Canvas to help guide your submissions. Students are responsible for participating in the online class discussion, including reading the task responses of their peers and providing substantive feedback in the form of comments within the discussion thread. All HW tasks should be uploaded to Canvas by the posted date, and peer responses are due within a week of the original deadline.

Project

Each student will identify an important public health challenge facing a local community and develop a proposal for a health impact assessment (HIA) of a policy or project to address that challenge. After settling on an HIA project idea, students will identify at least one community partner invested in the policy or project to interview. The goal of the interview is to provide real-world context on your project and to understand the implications of your HIA proposal to deal with the public health challenge. The written project will consist of the following main components, and a grading rubric is posted on Canvas to help guide your writing.

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

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

Summary of Community Partner Interview: Identify your community partner and describe what you learned from your conversation with them about the particular public health challenge you're addressing with the HIA (approximately 1-2 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 describing your proposed strategy for doing this work. The approach should provide detail on every step of the HIA process, including screening, scoping, assessment, recommendations, reporting, and monitoring (approximately 5 double-spaced pages). Note: you will not actually complete this work as part of the class project, but your proposed methods should be reasonable given the data and resources available.

Presentation

In addition to the written document, students will present their ideas to the class in a 10-15 minute PowerPoint presentation. After the presentations, students will evaluate the proposed HIAs of their fellow classmates and provide written feedback on the public health benefits, feasibility, creativity, and likely success of each proposed HIA.

Citation Style
All students should use the APA or a similar citation style to reference their written work submitted for this class, including in-text citations and end reference lists for the task assignments and final 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 Canvas. If you have any specific pronoun preferences, please let me know on the first day of class.

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. **Please be aware that the plagiarism policy applies to all written products for this class, including the homework tasks and final project.**

Fall Course Outline

Class Schedule	**Topics Covered**
Sept. 15	• Introduction to Public Health and Built Environment • Science, Risk and Methods • Health Impact Assessment • Community Engaged Research
Sept. 29	• Nature Contact • Noise and Air Pollution • Water and Food • Climate Change
Oct. 13	• Introduction to Active Transportation • Walking and Walkability • Biking and Bikeability • Design for Active Transportation
Dec. 8	• Project Presentations • Concluding thoughts, lessons learned
Homework Tasks (due date)	**Description**
1 (Oct. 20)	Mapping exercise
2 (Oct. 27)	TBD from 9/29 class session
3 (Nov. 3)	TBD from 9/29 class session
4 (Nov. 10)	Active transportation part I
5 (Dec. 1)	Active transportation part II
Project Milestones (due date)	**Description**
Sept. 24	Draft idea
Oct. 8	Identify community partner(s) to contact for project
Nov. 19	First draft
Dec. 8	Final draft

September 15

Introduction to Public Health and the Built Environment

During this discussion, we will lay the foundation for understanding public health challenges related to the built environment, including a discussion of trends 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

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.

Issues Related to Research Design and Data (posted handout)

Additional Readings

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

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

Health Impact Assessment
In this session 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 HIAs in practice.

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

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.

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

Community-Engaged Public Health Research
In this section, we will discuss the community-based participatory research (CBPR) framework, a promising alternative method to traditional biomedical research practices. We will discuss its guiding principles, its challenges and opportunities, and examine case-studies to see the adoption of this methodology in three cities in the United States.

Required Readings
Metzler, MM, Higgins, DL, Beeker, CG, Freudenberg, N, Lantz, PM, Senturia, KD., Eisinger, AA, Viruell-Fuentes, EA, Gheisar, B, Palermo, AG, Softley, D. 2003. Addressing urban health in Detroit, New York City, and Seattle through community-based participatory research partnerships. American Journal of Public Health, 93(5), 803-811.

O'Fallon, LR, & Dearry, A. 2002. Community-based participatory research as a tool to advance environmental health sciences. Environmental health perspectives, 110(Suppl 2), 155. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3389435/.

Additional readings
Leung, MW, Yen, IH, & Minkler, M. 2004. Community based participatory research: a promising approach for increasing epidemiology's relevance in the 21st century. International journal of epidemiology, 33(3), 499-506.

Minkler, M. 2005. Community-based research partnerships: challenges and opportunities. Journal of Urban Health, 82(2), ii3-ii12.

Shalowitz, MU, Isacco, A, Barquin, N, Clark-Kauffman, E, Delger, P, Nelson, D, Quinn, A, Wagenaar, KA. 2009. Community-based participatory research: a review of the literature with strategies for community engagement. Journal of Developmental & Behavioral Pediatrics, 30(4), 350-361.

September 29

Benefits of Nature Contact

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.

De Leon E, Schilling J. 2017. Urban Blight and Public Health. Available at: https://www.urban.org/sites/default/files/publication/89491/2017.04.03_urban_blight_and_public_health_vprn_report_finalized.pdf. {**Read pages 6-7 only**}

Additional Readings

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.

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.

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.

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

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

Noise and Air Pollution
During this session, we will explore air and noise pollution as environmental health hazards, and the impact the built environment has on generating and/or mitigating these hazards. 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.

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/

Additional Readings
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

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.

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.

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.

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.

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.

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.

Water and Food
We will broadly explore the topic of water quality and public health, as well as built environment challenges related to food systems, including access to healthy food, perceived vs objective measures of access, and environmental justice concerns related to water and food.

Required readings

Frumkin H. 2016. Textbook Chapter 16 and 19.

Stephens D. 2018. The Flint Water Crisis: A Loss of Trust. Available at: https://www.cbsnews.com/news/the-flint-water-crisis-a-loss-of-trust/

Additional Readings

Frumkin H. 2016. Textbook Chapter 18.

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.

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.

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.

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

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.

Climate Change

During this session 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.

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.

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.

The Centers for Disease Control and Prevention (CDC). 2010. Climate Effects on Health. Available at: https://www.cdc.gov/climateandhealth/effects/default.htm. {Download and read all CDC and APHA Fact Sheets}

October 13

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

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

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, 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.

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.

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.

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

Hankey S, Lindsey G, Marshall JD. 2017. Population-level Exposure to Particulate Air Pollution During Active Travel: Planning for Low-exposure, Health-promoting Cities. Environmental Health Perspectives 125:527-534.

Additional Readings

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.

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.

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

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 review the costs and benefits of biking 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.

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.

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.*

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

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.

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.

Design for Active Transportation
We will review the principles of design for active transportation, including those targeting 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.