Harvard School of Public ID 539 Spring 1
"Built Environment, Human Energy Expenditure and Public Health"
Built Envir and Human Energy
HSPH Kresge Room 203 Mondays and Wednesdays 3:30-5:20
January 26th – March 13th, 2015

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Course Objectives

At the completion of this course, students will have an understanding of different built environments and human energy expenditure in those environments. As two examples, parks provide mental and social benefits but many park users have low human energy expenditure (sports spectators, slow walkers, park bench sitters, etc.). In contrast to parks, bicyclists in bicycle environments have higher energy expenditure. During this course, measures such as Health Impact Assessments (HIA) and policies such as Complete Streets will be studied to assess whether high human energy expenditure, climate change, ethnic-diversity, and women/children/seniors were considered. Through the students' understanding of the built environment and human energy expenditure measures such as METs, students will explore translating information on obesity, physical activity, and health into practice effectively. The course is intended for undergraduate students, graduate students, and individuals interested in the design of the built environment. Those enrolled may be interested in environmental health, landscape architecture, park design, exercise physiology, public health, urban planning, government, engineering, METs, human energy expenditure measures, HIA, and walking and bicycling in all populations. The focus will be on creating urban forms with high human energy expenditure to lessen obesity, diabetes, stroke, Alzheimer's disease, and cancer in all populations and to respond to climate change. This course is intended to fully address health through the built environment in more ways than only recommending that individuals engage in 30 minutes of routine physical activity.

By the end of the course, the students will have demonstrated competencies in the following:

1) Describe and compare the *design guidelines, policies, laws, measures, populations served, and health implications* of the built environments in the U.S.

2) Critically analyze 3 self-selected *public health-associated built environments in the U.S. or abroad to 3 other built environments and compare the human energy expenditure (METs, etc.) and populations using each environment.* These same 3 built environments compared with 3 built environments would further be studied for any of the following associations: *policy ⇨ environment ⇨ physical activity behavior ⇨ health outcomes ⇨ costs* or, more specifically, *climate change, ethnic-diversity, or women/children/seniors*. (For example, the METs achieved by a certain number of adults per square foot in Paley Park in New York City could be compared to the METs achieved by a certain number of adults per square foot on cycle tracks in New York City. The policy to create the Paley Park environment could also be compared to the policy to create the cycle track environments in New York City. As another example, the defense of creating cycle tracks in locations where there are already many bicyclists, who primarily are white males, versus the health logic of creating cycle tracks in minority locations where currently there are fewer bicyclists but more individuals have consequences from obesity, diabetes, stroke, and cancer.)

3) Learn how to write a journal article using the IMRAD style.

4) Recommend *policies, especially green policies,* for built environments in the U.S. that reflect a scientific understanding of the issues in regard to public health, climate change, ethnic-diversity, and women/seniors/children.

5) Synthesize data on *multiple design guidelines, policies, laws, measures, populations served, and health implications* to concisely present this information orally and in written form to effect change related to built environments.

Course Objectives Based on the Course Format

At the completion of this course format, students will be able to:

1) Deliver a short "fast pitch" Power Point (three slides and 5 minute elevator talk).

2) Propose a policy which could be initiated on the local, state, or national level to improve the built environment and better address obesity control by giving all populations access to environments that can result in higher energy expenditure.

3) Participate in a design charrette (designs are drawn quickly using trace overlay paper on aerial views to design higher energy-expenditure built environments).

4) Write peer reviewed journal articles due to the written assignments being based on the peer reviewed journal article format and each paper evaluation being given in the format of typed journal reviewer comments.

Outcome Measures

Class participation and answering class questions

Active learning through class participation and discussion are an important component of the course. Students are expected to attend and participate in all classes. This includes attending all classes, being prepared by having read and analyzed the assignments ahead of class time, listening carefully to others,

and offering analyses, insights, and creative suggestions. (Grading – up to 200 points) ***This grade will also include the submission and answering, with short answers, the questions for the weekly readings.***

Total for class participation and answering the weekly short questions will be 200 points.

Written Assignments

Homework

Three 3 Page Double-spaced Papers - Students must demonstrate the ability to apply conceptual material (readings and lectures) to their chosen area of interest associated with the built environment and human energy expenditure. Papers must be well organized and written succinctly and directly, addressing clearly the issues raised and the resolution. Students would prepare three (3) three page double-spaced written assignments (with an additional page/s for references) that critically evaluate and compare 3 self-selected *public health-associated built environments in the U.S. or abroad to 3 other built environments and compare the human energy expenditure (METs, etc.) and populations using each environment.* These same 3 built environments with 3 built environments would further be studied for any of the following associations: *policy ⇨ environment ⇨ physical activity behavior ⇨ health outcomes ⇨ costs* or, more specifically, *climate change, ethnic-diversity, or women/children/seniors*. The papers will follow the scientific IMRAD structure (Introduction, Methods, Results, and Discussion) http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=442179 (The method would be briefly list the PubMed search words and describe the reasons for selection of the reference materials, etc. No personal research would be required due to short timing of the course.) Students would select their own built environments, their own populations studied in those environments (adults, men, women, children, seniors, etc.) and their own association (policy to resulting environment physical activity in the environment related to health outcomes, etc).

There is no requirement for margins on this paper but make the font no smaller than 11.

Total for each paper will be 100 points for a total of 300 points.

Final Paper

One Final 10 Page Double-spaced Paper - The students would then write a final paper that would summarize all of their findings from the 3 papers in one ten page paper. The students would conclude with a policy recommendation associated with improving public health and the foundational findings for this policy for the U.S. (The final paper will be graded up to 200 points. The policy recommendation to improve public health through the built environment will be graded up to 100 points.)

Total for the final paper will be 200 points plus the 100 points for the policy recommendation.

The assignment is due at the start of a class on the date due. If students miss a class, the assignment is due before the class. No assignment may be handed in late. Assignments can be emailed to AnneLusk@hsph.harvard.edu

Students must individually write their own papers. Students may, and are encouraged, to work together in groups to discuss papers.

Design Charrette

Prepare designs with other students using trace overlay of ideal bicycle environments. This design charrette will take place during one of the classes.

Total for the design charrette drawing will be to 100 points for drawings which will be turned in at the end of the design charrette class.

Oral Presentation

Deliver a "Fast Pitch"

Students will deliver a 5 minute "Fast Pitch" in which they are allowed 3 Power Point slides. This talk will be the equivalent to the "elevator explanation" for the student's topic area. Students will turn in their 10 page paper.

Total for the Fast Pitch is 100 points.

Grading Criteria

Grades are based on a total of 1000 points.

The grade would be based on three (3) homework assignments (up to 100 points for each paper – total 300 points), class participation including short questions for the reading assignments (up to 200 points), design charrette drawing completed during class (up to100 points), Fast Pitch oral presentation (up to 100 points), final written paper (up to 200 points) and the policy recommendation that is embedded in the final paper (up to 100 points). Students are also expected to read the materials for each class.

Class Assignments

- (Class 1) January 26th *No reading questions due*
- (Class 2) January 28th *Turn in answers to reading questions**
- (Class 3) February 2nd *Turn in answers to reading questions**
- (Class 4) February 4th **Three page paper #1 due (100 points**)
- (Class 5) February 9th *Turn in answers to reading questions**
- (Class 6) February 11th *Turn in answers to reading questions**
  February 16th Holiday – President's Day
- (Class 7) February 18th **Three page paper #2 due (100 points**)
- (Class 8) February 23rd *Turn in answers to reading questions**
- (Class 9) February 25th **Three page paper #3 due(100 points)**
- (Class 10) March 2nd *Turn in answers to reading questions**
- (Class 11) March 4th *Turn in answers to reading questions**
- (Class 12) March 9th *Turn in answers to reading questions**
- (Class 13) March 11th **Students deliver Fast Pitch (100 points) and all turn in final paper (200 points) with policy recommendations (100 points)**

* Note – Class participation – including knowledge of readings and answering questions (200 points) and a design charrette held during one class (100 points)

Course reading materials:

Though all built environments will be studied, guidelines for bicycle environments can provide useful guidance. The majority of the class readings will be peer reviewed journal articles. Readings and assignments will be available on the class web site with links to the readings from the Harvard library sources or from the web. The Power Point presentations will also be available on the web site. Both will be available in advance of the class.

Optional readings include:

1. **NACTO Guide** – available for free. http://nacto.org/cities-for-cycling/design-guide/

2. Steven Fleming's book **"Cycle Space: Architecture and Urban Design in the Age of the Bicycle" –** available for loan – Anne Lusk has copies to borrow**.**

3. ***Design Manual for Bicycle Traffic*** **CROW 2006.** This 388 page book covers the bicycle engineering standards for the Netherlands ($127). [*This book is not required*.] http://www.crow.nl/shop/subwebshopResults.aspx?category=90

If you wish to purchase this latest newest CROW book, here are more complete directions with translations:
Click on add to your shopping cart (winkelwagen)
On the next page you will find quantity (Bijwerken) or buy (Bestellen).
After clicking on Bestellen, on the next page you fill in the cells with your personal information.
On the bottom of that page are two words back (Terug) and next (Verder).
If you click on Verder, on the next page you will find Versturen at the bottom. Click on this and you will definitely have sent them the order. Then, you wait until you receive a letter with an invoice. Once you receive the invoice, you can decide to send them the money by bank transfer (but this was found to be very costly) or pay by credit card. This does mean you are faxing them your charge card number and your signature but Dr. Lusk had no problem and received the book shortly thereafter.

Some helpful tips:

You may want to join the **Association of Pedestrian and Bicycle Professionals (apbp)** *($30 for students)* and be placed on the listserve. Many students have said this provided an excellent education about the issues in the U.S. associated with bicycling. http://www.apbp.org/website/

For additional data searching, you can look on the web site of **Fietsberaard** (www.fietsberaad.org) or http://www.fietsberaad.nl/index.cfm?lang=en This web site is being organized by Hans Voerknecht, International Director of Fietsberaard.

Lecture Themes

All lectures by the speakers will cover, in some way:

a. METs (human energy expenditure)
b. climate change
c. ethnic-diversity
d. inclusion of women/children/seniors

The lectures will additionally cover this range of built environment/human energy expenditure/public health topics:

1. **Built environments for high energy expenditure**
   - Travel routes that enable high METs (streets, bike environments, green waves, hallways, stairs)
   - Route design and climate change mitigation and adaptation
   - Route design and safety (low crashes – no cars, really slow cars, or separated-from-cars)
   - Route design for health (little or no pollution exposure)
   - Route designed for ethnic-diversity and women/children/seniors
   - Routine physical activity provider (cycle track) or discretionary physical activity provider (park)

2. **Ancillary built environments necessary for the high energy expenditure in the travel routes**
   - Bicycle parking (new criteria based on green guidelines - LEED and European BREEAM)
   - Destinations that serve human needs along the travel routes (bathrooms, benches, coffee/bike shops, grocery stores, etc.)
   - Visual positives – trees, building fronts, etc. versus negatives – parked cars, route obstructions

3. **People using the built environments**
   - Self-identity (as a bicyclist, as an athlete, etc.)

- Injury
- Pollution exposure
- Income (developing nations included)
- Ethnic-diversity
- Women/children/seniors

4. **Measures of built environments**
   - METs (pedometers, accelerometers, accelerometers/GPS, GPS-based Map My Ride, Strava and Wahoo)
   - HIA (health impact assessment)
   - General health measures – obesity control, diabetes reduction, etc.
   - Climate change mitigation and adaptation
   - Pollution levels
   - Injury and crash numbers
   - People using the environments (ethnic-diversity and women/children/seniors)
   - Economic development – especially in developing nations
   - Social Bridges
   - Side-by-side riding and conversations (parent able to bicycle beside a child)
   - Joy

5. **Ways to get the environments built or defend the inclusion of these environments**
   - Complete Streets/Safe Routes to School, etc. – not thoroughly effective
   - Power Points presented by citizens instead of only Power Points presented by engineers
   - Research findings about economic development, climate change response, health benefits, lowered pollution, lowered injury/crash, wide population inclusion, aesthetics, convenience
   - Green sustainable guidelines - LEED/BREEAM and new building codes – additional points/credits
   - Show value to political leaders for re-election or their popular vote

Class #1 Introduction – Anne Lusk, Ph.D.

January 26th Built environments, human energy expenditure measures, populations, and user counts per square foot or square mile. CDC and U.S. policies on built environments and if the resulting built environments are achieving the health goals, especially associated with obesity reduction and all populations. Discussion about discretionary time for physical activity versus routine physical activity (walking and bicycling). Introduction of students to each other and discussion about built environment issues they might want to consider. Explanation of the class assignments and expectations. (see #1 above)

Class #2 - History of transportation, built environments, places for physical activity, and populations and history of ancillary environments - Anne Lusk, Ph.D.

January 28th Showing of movie "Contested Streets," brief videos about history of environments, and discussion about populations served in these historic environments and METs. (see #1 and #2 above)

Class #3 Occupational and Environmental Health Exposures – U.S. – Jack Dennerlein, Ph.D.

February 2nd Urban Design to Mitigate Hazards and Improve Public Health. Research on injuries sustained by bicycle messengers in traffic: Traffic pattern and urban design solutions. (see #3 and #4 above)

Class #4 –Cycle Space book, Functionalist/Modernist design theory, imagining Velotopia and overlaying it upon cities - Steven Fleming, Ph.D. (University of Tasmania – Skype)
February 4th This lecture will begin with an overview of the concept of cycle-space followed by a summary of Fleming's more recent work under the following headings: 1. An American dream for the third-world; 2. Designing to do more with less; 3. Apartment blocks that generate bike trips; 4. Historical background to utopias and urban design; 5 The touchstone notion of Velotopia; 6. Velotopias in the real world. (see #2 and #5) (First paper due.)

Class #5 Ancillary environments and people – Anne Lusk, Ph.D.
February 9th Ancillary built environments (see #2 above) and people using the built environment (see #3 above)

Class #6 Measures of the built environment – Anne Lusk, Ph.D.
February 11th Measures (see #4 above)

Holiday – February 16th **President's Day**

Class #7 Effecting Change to the Built Environment on the Local and State Level – Steve Miller (Founding board member of Livable Streets Alliance who also directs the Healthy Weight Initiative at the HSPH Nutrition Department)
February 18th Recent history of Boston bike/ped struggles with three overlapping stories – 1. Boston Bike Program out of the Hub on Wheels effort; 2. Growth and development of Livable Streets; and 3. Evolution of MassDOT policy around healthy transportation. (see # 5 above) **(Second paper due.)**

Class #8 Obesity/Public Health – Walter Willett, MD, Dr. P.H.
February 23rd Built environments, physical activity, human energy expenditure, and the prevention of obesity and chronic disease. (see #1 and #4 above)

Class #9 Built Environment Policies in Other Countries – Enrique Cifuentes, MD.
February 25th The built environments in other countries and the policies that create these environments. (see #3 and #4 above) (**Third paper due.)**

Class #10 Transportation Environment and Health – Wig Zamore (Community Researcher – STEP, MVTF, MoveMass, Logan CAC, MBTA ROC and CAFEH)
March 2nd Transportation modes – energy use and emissions contributions at global to regional scale – practice and opportunity. Transportation choices – local pollution exposures and public health impacts – implications for bicycle route planning. (see #3 and #4 above)

Class #11 Ways to get the environment built and design charrette – Anne Lusk, Ph.D.
March 4th Ways to get environments built or defend their inclusion. Will hold a design charrette and focus on Gateway East in Brookline. Students will design route in class. (see #5 above)

Class #12 Transportation and Health – Marc Chase (Tufts University)
March 9th Will also hold a design exercise (see #1 and #5 above)

Class #13 Student Presentations (Fast Pitch)
March 11th Students present final projects – Students turn in **final papers** which include their **policy recommendation.**