PUBH 6915

Nutrition Assessment
Fall, 2019

COURSE & CONTACT INFORMATION
Credits: 2
Meeting Day(s): Mondays
Meeting Time: 10:10 am – 12:05 pm
Meeting Place: Mayo Building, Room 1250

Instructor: Lisa Harnack (Diet Assessment)
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Office Hours: By appointment
Office Location: WBOB 323

Instructor: Ellen W Demerath (Anthropometric Assessment, and Course Manager)
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Office Hours: by appointment
Office Location: WBOB 455

Instructor: Mark Pereira (Biochemical Assessment)
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Office Hours: by appointment
Office Location: WBOB 326

COURSE DESCRIPTION
Dietary, biochemical, and anthropometric methods for assessing nutritional status are discussed in this class with a focus on the public health application of each.

COURSE PREREQUISITES
Public health nutrition major or instructor consent

COURSE GOALS & OBJECTIVES
1. To become familiar with the current best practices in dietary, biochemical, and anthropometric assessment of nutritional status.
2. To know the rationales, advantages, and disadvantages of these various approaches to nutritional assessment, including comparison of the reliability and validity, cost, burden, and feasibility of different methods in research and clinical practice.
3. To apply this knowledge to select nutrition assessment methods for hypothetical clinical and research situations.

METHODS OF INSTRUCTION AND WORK EXPECTATIONS
Regular class periods will be in a lecture and discussion format. Students are expected to attend all classes, complete all assignments, and to participate in discussions. PubH 6915 is a 2 credit course. The University expects that for each credit, you will spend a minimum of three hours per week attending class or comparable online activity, reading, studying, completing assignments, etc. over the course of a 15-week term. Thus, this course requires approximately 90 hours of effort spread over the course of the term in order to earn an average grade.

Learning Community

School of Public Health courses ask students to discuss frameworks, theory, policy, and more, often in the context of past and current events and policy debates. Many of our courses also ask students to work in teams or discussion groups. We do not come to our courses with identical backgrounds and experiences and building on what we already know about collaborating, listening, and engaging is critical to successful professional, academic, and scientific engagement with topics.

In this course, students are expected to engage with each other in respectful and thoughtful ways.

In group work, this can mean:
- Setting expectations with your groups about communication and response time during the first week of the semester (or as soon as groups are assigned) and contacting the TA or instructor if scheduling problems cannot be overcome.
- Setting clear deadlines and holding yourself and each other accountable.
- Determining the roles group members need to fulfill to successfully complete the project on time.
- Developing a rapport prior to beginning the project (what prior experience are you bringing to the project, what are your strengths as they apply to the project, what do you like to work on?)

In group discussion, this can mean:
- Respecting the identities and experiences of your classmates.
- Avoid broad statements and generalizations. Group discussions are another form of academic communication and responses to instructor questions in a group discussion are evaluated. Apply the same rigor to crafting discussion posts as you would for a paper.
- Consider your tone and language, especially when communicating in text format, as the lack of other cues can lead to misinterpretation.

Like other work in the course, all student to student communication is covered by the Student Conduct Code (https://z.umn.edu/studentconduct).

COURSE TEXT & READINGS

TEXTBOOK*:*

None

OTHER REQUIRED READINGS:

The following supplemental required readings to augment the text will be posted on the course Moodle site. To access the course website, go to http://myu.umn.edu, log in with your ID/password, click on the "My Courses" tab, and select "PubH 6915".

Unit 1: Dietary Assessment

Eldridge AL, Piernas C, Illner AK, Gibney MJ, Gurinovic MA, de Vries JH, Cade J. Evaluation of new technology-based tools for dietary intake assessment- An ILSI Europe Dietaery Intake and Exposure Task Force Evaluation. Nutrients 2019;11(55): doi:10.3390/nu11010055.

McKinnon RA, Reedy J, Morrissette MA, Lytle LA, Yaroch AL. Measures of the food environment: A compilation of the literature, 1990-2007. *Am J Prev Med* 2009;36(4S): S124-S133.

Yuan C, Spiegelman D, Rimm EB, Rosner BA, Stampfer MJ, Barnett JB, Chavarro JE, Rood JC, Harnack LJ, Sampson LK, Willett WC. Relative validity of nutrient intakes assessed by questionnaire, 24-hour recalls, and diet records compared with urinary recovery and plasma concentration biomarkers: findings for women. *Am J Epidemiol* 2018; 187(5): 1051-1063

Unit 2: Anthropometric Assessment

Munoz N, Bernstein M. Nutrition Assessment: Clinical and Research Applications 1st Edition, Chapter 7: Anthropometry, pp 221-262.

National Health and Nutrition Examination Survey (NHANES) Anthropometric Procedure Manual. Centers for Disease Control (CDC) NHANES, January 2017.

WHO Growth Reference Study Group. Reliability of anthropometric measurements in the WHO Multicentre Growth Reference Study. *Acta Pædiatrica*, 2006; Suppl 450: 38-46.

Juonala M, Magnussen CG, Berenson GS, Venn A, Burns TL, Sabin MA, Srinivasan SR, Daniels SR, Davis PH, Chen W, Sun C, Cheung M, Viikari JS, Dwyer T, Raitakari OT. Childhood adiposity, adult adiposity, and cardiovascular risk factors. *N Engl J Med*. 2011 Nov 17;365(20):1876-85.

WHO Growth Charts website materials: https://www.who.int/childgrowth/en/

Fryar CD, Gu Q, Ogden CL, Flegal KM. Anthropometric reference data for children and adults: United States, 2011–2014. National Center for Health Statistics. *Vital Health Stat* 3(39). 2016.

Kelly TL, Wilson KE, Heymsfield SB. Dual energy X-Ray absorptiometry body composition reference values from NHANES. *PLoS One*. 2009 Sep 15;4(9):e7038. doi: 10.1371/journal.pone.0007038.

Madden A.M. & Smith S. (2016) Body composition and morphological assessment of nutritional status in adults: a review of anthropometric variables. *J Hum Nutr Diet* 29, 7–25

Smith S. & Madden A.M. (2016) Body composition and functional assessment of nutritional status in adults: a narrative review of imaging, impedance, strength and functional techniques. *J Hum Nutr Diet*. 29, 714–732 doi: 10.1111/jhn.12372.

Lee DH, Keum N, Hu FB, Orav EJ, Rimm EB, Sun Q, Willett WC, Giovannucci EL. Development and validation of anthropometric prediction equations for lean body mass, fat mass and percent fat in adults using the National Health and Nutrition Examination Survey (NHANES) 1999-2006. *Br J Nutr*. 2017 Nov;118(10):858-866. doi: 10.1017/S0007114517002665. Epub 2017 Nov 7.

Bombak A. Obesity, Health at Every Size, and Public Health Policy. *Am J Public Health*. 2014;104:e60–e67. doi:10.2105/AJPH.2013.301486

Penney TL and Kirk SFL. The Health at Every Size Paradigm and Obesity: Missing Empirical Evidence May Help Push the Reframing Obesity Debate Forward. *Am J Public Health*. 2015;105: e38–e42. doi:10.2105/AJPH.2015.302552.

Guo F and Garvey WT. Cardiometabolic Disease Risk in Metabolically Healthy and Unhealthy Obesity: Stability of Metabolic Health Status in Adults. *Obesity (Silver Spring)*. 2016 February ; 24(2): 516–525. doi:10.1002/oby.21344.

Unit 3: Biochemical Assessment

Munoz N, Bernstein M. *Nutrition Assessment: Clinical and Research Applications 1st Edition, Chapter 8: Biomarkers in Nutritional Assessment, pp 263-312*.

Arab L. Biomarkers of fat and fatty acid intake. *J Nutr*. 2003;133:925S-932S.

Drakesmith H. Next-generation biomarkers for iron status. In Baetge, Dhawan, and Prentice (eds): *Next-Generation Nutritional Biomarkers to Guide Better Health Care.* Nestle Nutr. Inst. Workshop Ser, vol 84:59-69. Nestec Ltd., Vevey/S. Karger AG., Basel, 2016.

Pfeiffer CM, Johnson CL, Jain RB, et al. Trends in blood folate and vitamin B-12 concentrations in the United States, 1988-2004. *Am J Clin Nutr*. 2007; 86:718-27.

Prentice A, Goldberg GR, Schoenmakers I. Vitamin D across the lifecycle: physiology and biomarkers. *Am J Clin Nutr.* 2008 Aug;88(2):500S-506S.

Walsh JS, Evans AL, Bowles S, Naylor KE, Jones KS, Schoenmakers I, Jacques RM, Eastell R. Free 25-hydroxyvitamin D is low in obesity, but there are no adverse associations with bone health. *Am J Clin Nutr*. 2016;103:1465–71.

COURSE OUTLINE/WEEKLY SCHEDULE

Week	Topic/Lectures	Text and Readings	Activities/Assignments
Week 1 (no class) **September 2**			
Week 2 **September 9**	• Overview of dietary assessment methods • Food record and dietary recalls • Under-reporting	• Dietary Assessment Profiles • 24-hour Dietary Recall at a Glance • Food Record at a Glance	**Activity:** Complete an online self-administered 24-hour dietary recall using the ASA24 (click 'launch demo ASA24-2018 demo'). Keep track of how long it takes you to complete the recall and any foods you ate that you couldn't enter.
Week 3 **September 16**	• Day-to-day variation in diet • Food frequency questionnaires	• Learn More About Usual Dietary Intake • Food Frequency Questionnaire at a Glance • Screeners at a Glance • Yuan et al., 2018	**Activity:** Complete a Food Frequency Questionnaire using the online NCI DHQ III. Keep track of how long it takes you to complete the FFQ and any foods you regularly eat that you were not asked about.
Week 4 **September 23**	• Practice choosing methods • Meal observation and plate waste • New methods under development	• Comparing Dietary Assessment Methods • Learn More About Observation and Feeding Studies • Illner et al., 2012	**Activity:** Using you cell phone, take 'before' and 'after' photos of all of the foods and beverages you consume over a day. Reflect on the experience- Was it easy or hard? Embarrassing in any way? Would it be easy for someone to determine what and how much you ate based on the photos?
Week 5 **September 30**	• Measure of the food environment • Practice choosing methods	• McKinnon et al., 2009	**Activity:** Complete the TREC Home Food Inventory. Keep track of how long it takes you to complete it. Reflect: How well does the inventory reflect the foods your household eats?
Week 6 **October 7**	• Dietary supplement use assessment • Food and nutrient database considerations • Quality assurance methods	• Considerations in selecting a food and nutrient database	**Assignment 1 Due** **Activity:** Using the International Nutrient Databank Directory, look up the percent completeness of zinc values for foods in the ESHA Database. What are the implications of this level of completeness on zinc intake estimates for food records analyzed using this database?

| Week 7
October 14	• Rationale for anthropometric assessment • Anthropometric techniques • Reliability and Measurement Error	• Munoz and Bernstein, Chapter 7 • NHANES Anthropometric Procedure Manual • WHO Growth Reference Study Group, 2006	**Activities:** 1) Students demonstrate anthropometric techniques (circumferences and skinfolds) for the class 2) (Laptop required): Students use a spreadsheet program to calculate reliability statistics for a sample dataset
Week 8
October 21	• Choosing Anthropometric Indicators for Nutritional Status in Children • Anthropometric Reference Data and Interpretation for Children	• Juonala et al., 2012 • Fryar et al., 2016 • Kelly et al., 2009	**Activity** (Laptop required): Students use online tools to interpret childhood anthropometric indicators for a sample dataset
Week 9
October 28	• Body Composition: Public Health Significance and Methods • Choosing and Interpreting Anthropometric Indicators for Nutritional Status and Body Composition in Adults	• Smith and Madden, 2016 • Madden and Smith, 2016 • Lee et al., 2017	**Activity** (Laptop required): Students create and use a calculator for determining adult body composition from anthropometric data using a sample dataset.
Week 10
November 4	• Current Issues in Anthropometric Assessment: Health at Every Size	• Bombak, 2014 • Penney and Kirk, 2015 • Guo and Garvey, 2016	**Activity** Class Discussion: What is the HAES paradigm and how is it different from the current obesity prevention and treatment paradigm? Is body weight important to measure? When, why, and for whom?
Week 11
November 11	• Biochemical Assessment 1a - Introduction to biochemical assessment • Biochemical Assessment 1b - Lipids	• Munoz & **Bernstein**, Chapter 8 • Arab	**Assignment 2 Due**
Week 12
November 18	• Biochemical Assessment 2a - Vitamin A • Biochemical Assessment 2b - Iron	• Munoz & Bernstein, Chapter 8 • Drakesmith	
Week 13
November 25	• Biochemical Assessment 3a - Folic acid and B_{12} • Biochemical Assessment 3b - Zinc and Iodine	• Munoz & Bernstein, Chapter 8 • Pfeiffer	
Week 14
December 2	• Biochemical Assessment 4a - Antioxidants: Carotenoids, vitamin E, vitamon C • Biochemical Assessments 4b - Vitamin D and calcium	• Munoz & Bernstein, Chapter 8 • Prentice • Walsh	**Assignment 3 Due**
Week 15
December 9	• Using and interpreting nutritional biomarkers		
December 18	**Final Exam (Take-Home)**		**Final Exam Due by Midnight**

ASSIGNMENTS / EXAMINATIONS

1. A take-home series of short essay questions designed to build students' skills in selecting dietary assessment methods for specific objectives and population groups **(due Oct 7)**. *Submit on the Canvas site*.

2. Create an anthropometric assessment plan for a hypothetical situation **(due Nov 11)**. *Submit on the Canvas site*.

3. A 3-page take-home evaluation of a journal article including biochemical/laboratory indicators **(due Dec 2)**. *Submit on the Canvas site*

4. A take-home final examination asking students to propose an integrated nutrition assessment plan, incorporating dietary, biochemical, and anthropometric methods in response to a hypothetical situation and problem **(due Wednesday, Dec. 18)**. The hypothetical situation will be provided to students on the last day of class. Scores on exams received after the due date will be reduced for each day late. No exams will be accepted more than three days late, and a zero will be assigned. *Submit on the Canvas site*.

SPH AND UNIVERSITY POLICIES & RESOURCES

The School of Public Health maintains up-to-date information about resources available to students, as well as formal course policies, on our website at www.sph.umn.edu/student-policies/. Students are expected to read and understand all policy information available at this link and are encouraged to make use of the resources available.

The University of Minnesota has official policies, including but not limited to the following:
- Grade definitions
- Scholastic dishonesty
- Makeup work for legitimate absences
- Student conduct code
- Sexual harassment, sexual assault, stalking and relationship violence
- Equity, diversity, equal employment opportunity, and affirmative action
- Disability services
- Academic freedom and responsibility

Resources available for students include:
- Confidential mental health services
- Disability accommodations
- Housing and financial instability resources
- Technology help
- Academic support

EVALUATION & GRADING

Evaluation
Grades for the three assignments for Units 1 – 3 will each comprise 20% of the final grade, and the final examination will be worth 40% toward the final grade.

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Assignment 1:    30 points
Assignment 2:    30 points
Assignment 3:    30 points
Final Exam:      60 points
TOTAL:          150 points
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Grading Scale
The University uses plus and minus grading on a 4.000 cumulative grade point scale in accordance with the following, and you can expect the grade lines to be drawn as follows:

% In Class	Grade	GPA
93 - 100%	A	4.000
90 - 92%	A-	3.667
87 - 89%	B+	3.333

83 - 86%	B	3.000
80 - 82%	B-	2.667
77 - 79%	C+	2.333
73 - 76%	C	2.000
70 - 72%	C-	1.667
67 - 69%	D+	1.333
63 - 66%	D	1.000
< 62%	F	

- A = achievement that is outstanding relative to the level necessary to meet course requirements.
- B = achievement that is significantly above the level necessary to meet course requirements.
- C = achievement that meets the course requirements in every respect.
- D = achievement that is worthy of credit even though it fails to meet fully the course requirements.
- F = failure because work was either (1) completed but at a level of achievement that is not worthy of credit or (2) was not completed and there was no agreement between the instructor and the student that the student would be awarded an I (Incomplete).
- S = achievement that is satisfactory, which is equivalent to a C- or better
- N = achievement that is not satisfactory and signifies that the work was either 1) completed but at a level that is not worthy of credit, or 2) not completed and there was no agreement between the instructor and student that the student would receive an I (Incomplete).

Evaluation/Grading Policy	Evaluation/Grading Policy Description
Scholastic Dishonesty, Plagiarism, Cheating, etc.	You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis (As defined in the Student Conduct Code). For additional information, please see https://z.umn.edu/dishonesty The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty: https://z.umn.edu/integrity. If you have additional questions, please clarify with your instructor. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class-e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam. Indiana University offers a clear description of plagiarism and an online quiz to check your understanding (http://z.umn.edu/iuplagiarism).
Late Assignments	Points are deducted for late assignments (10% reduced each day they are late)
Attendance Requirements	Attendance at all lectures is required; Absences require permission of the unit instructor
Extra Credit	No extra credit opportunities are provided

PUBLIC HEALTH NUTRITION (PROGRAM-SPECIFIC) COMPETENCIES

Competency	Learning Objectives	Assessment Strategies
Program Competency (PHN #2): Identify and apply current, evidence-based best practices for dietary, biochemical and/or anthropometric methods for assessing nutritional status.	1. To become familiar with the current best practices in dietary, biochemical, and anthropometric assessment of nutritional status. 2. To know the rationales, advantages, and disadvantages of these various approaches to nutritional assessment, including comparison of the reliability and validity, cost, burden, and feasibility of different methods in research and clinical practice.	Assignment #1: Short essay responses to compare alternative approaches to dietary assessment for specific objectives and population groups Assignment #2: Anthropometric assessment plan for a hypothetical situation. Assignment #3: Written evaluation of a journal article that describes biochemical/laboratory indicators of nutritional status
Program Competency (PHN #2): Identify and apply current, evidence-based best practices for dietary, biochemical and/or anthropometric methods for assessing nutritional status.	3. To apply this knowledge to select nutrition assessment methods for hypothetical clinical and research situations.	Final Exam: Proposal of an integrated nutrition assessment plan, incorporating dietary, biochemical, and anthropometric methods in response to a hypothetical situation and problem