

Graduate School of Public Health
Department of Human Genetics
APPLICATIONS IN PUBLIC HEALTH GENETICS & GENOMICS
HUGEN 2053
Thursday 9:30-11:30am
Room 2121C Public Health
Credit Hours: 2.0
Fall Semester 2019

Instructors

Andrea Durst, MS, DrPH, LCGC
Room: 3129 Public Health
Phone: 412-624-3190 (office) 502-974-3014 (cell)
E-Mail: adurst@pitt.edu
Office Hours: By appointment

Candy Kammerer, PhD
Room: 3120 Public Health
Phone: 412-624-7265 (work)
E-Mail: cmk3@pitt.edu
Office hours: Before and after class and by appointment

Course Description

This graduate level course builds on the basic components of public health genetics and genomics and provides students with the opportunity to discuss and apply these concepts to public health. The goal of this course is for students to apply knowledge and skills learned across public health disciplines, especially the use of genetic principles, in a public health practice setting. Using current issues in public health genetics, students will also demonstrate mastery of essential competencies through data analysis, and oral and written communication.

Pre-requisites: HUGEN 2049 (may be taken concurrently); BOST 2041 or BOST 2011 or equivalent

Learning Objectives

After completion of this course, the student will be able to:

1. Analyze data to answer questions important to the field of public health genetics and genomics.
2. Communicate genetic and genomic principles to the general public as part of current public health initiatives.
3. Communicate both orally and in writing how public health genetics and genomics can be incorporated into public health.
4. Discuss the precision medicine initiative and its impact on the public, healthcare, and the field of public health.
5. Assess the ethics of the application of genetic technologies to public health.
6. Apply skills in statistics, epidemiology, and health policy to determine the impact of public health genetics initiatives.
7. Evaluate how genetic principles/technologies apply to diagnosis, screening, and interventions for disease prevention and health promotion programs.

These learning objectives will be measured via student participation in in-class discussions and during the written and oral presentation projects throughout the semester.

Required Text

None Required

Additional articles and handouts will be posted on CourseWeb or handed out in class.

Teaching Philosophy

The professors for this course emphasize active participation, critical thinking, and applied learning in helping students to develop the skills that they have learned in public health genetics and genomics as well as other areas of public health. Public health genetics and genomics is a new and quickly developing field, and our goal is to prepare students to be at the forefront of this field in the future. Because we all have different perspectives and have experienced different events, all questions and viewpoints are encouraged and respected in the classroom and within groups.

Academic Integrity:

All students are expected to adhere to the school's standards of academic honesty. Cheating/plagiarism will not be tolerated. The Graduate School of Public Health's policy on academic integrity, which is based on the University policy, is available online in the Pitt Public Health Academic Handbook www.publichealth.pitt.edu/home/academics/academic-requirements. The policy includes obligations for faculty and students, procedures for adjudicating violations, and other critical information. Please take the time to read this policy.

Plagiarism

University of Pittsburgh policy: "Integrity of the academic process requires that credit be given where credit is due. Accordingly, it is unethical to present as one's own work the ideas, representations, words of another, or to permit another to present one's own work without customary and proper acknowledgement of sources.

A student has an obligation to exhibit honesty and to respect the ethical standards of the profession in carrying out his or her academic assignments. Without limiting the application of this principle, a student may be found to have violated this obligation if he or she:*

- Presents as one's own, for academic evaluation, the ideas, representations, or words of another person or persons without customary and proper acknowledgment of sources.
- Submits the work of another person in a manner which represents the work to be one's own."

Source: <http://www.bc.pitt.edu/policies/policy/02/02-03-02.html>

Therefore, you must clearly indicate which thoughts are yours and which thoughts belong to others by citing your sources. If you are uncertain, please contact the instructor. Plagiarism detection software will be used in this course. If plagiarism is detected, you will automatically receive a grade of zero for that assignment.

Accommodation for Students with Disabilities:

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services, 140 William Pitt Union, 412-648-7890 as early as possible in the term.

A comprehensive description of the services of that office can be obtained at www.drs.pitt.edu.

Sexual Misconduct, Required Reporting and Title IX Statement

The University is committed to combatting sexual misconduct. As a result, you should know that University faculty and staff members are required to report any instances of sexual misconduct, including harassment and sexual violence, to the University's Title IX office so that the victim may be provided appropriate resources and support options. What this means is that as your professor, I am required to report any incidents of sexual misconduct that are directly reported to me, or of which I am somehow made aware.

There are two important exceptions to this requirement about which you should be aware:

A list of the designated University employees who, as counselors and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here:

www.titleix.pitt.edu/report/confidentiality

An important exception to the reporting requirement exists for academic work. Disclosures about sexual misconduct that are shared as part of an academic project, classroom discussion, or course assignment, are not required to be disclosed to the University's Title IX office.

If you are the victim of sexual misconduct, Pitt encourages you to reach out to these resources:

- Title IX Office: 412-648-7860
- SHARE @ the University Counseling Center: 412-648-7930 (8:30 A.M. TO 5 P.M. M-F) and 412-648-7856 (AFTER BUSINESS HOURS)

If you have a safety concern, please contact the University of Pittsburgh Police, 412-624-2121.

Other reporting information is available here: www.titleix.pitt.edu/report-0

Statement from the Department of Gender, Sexuality, and Women's Studies

[This statement was developed by Katie Pope, Title IX Coordinator, in conjunction with GSWS instructors.]

Diversity Statement:

The University of Pittsburgh Graduate School of Public Health considers the diversity of its students, faculty, and staff to be a strength and critical to its educational mission. Pitt Public Health is committed to creating and fostering inclusive learning environments that value human dignity and equity. Every member of our community is expected to be respectful of the individual perspectives, experiences, behaviors, worldviews, and backgrounds of others. While intellectual disagreement may be constructive, no derogatory statements, or demeaning or discriminatory behavior will be permitted.

If you feel uncomfortable or would like to discuss a situation, please contact any of the following:

- the course instructor;
- the Pitt Public Health Associate Dean for Diversity at 412-624-3506 or nam137@pitt.edu;

the University's Office of Diversity and Inclusion at 412-648-7860

or <https://www.diversity.pitt.edu/make-report/report-form> (anonymous reporting form).

Grading

The grading for this course is based on four main projects completed over the course of the semester. Your grade for the course is based upon your work as follows:

<u>Project Title</u>	<u>Points</u>
Local Health Department Experience	50
Preliminary Data Analysis	180
Health Literacy Project	70
<u>Public Health Genetics Initiative Case Study</u>	<u>75</u>
Total	375

Students may help each other to achieve the best work you are capable of producing. Working with one another to achieve mastery will help you learn the material with greater ease and enjoyment.

Grading scale:

94- 100% = A	80-83% = B-
90-93% = A-	70-79% = C
87-89% = B+	Below 70% = F
84-86% = B	

Late Work Policy

Work that is turned in late without prior approval from the instructor(s) will result in 5% of the points for the assignment being deducted for each day (or fraction thereof) the assignment is late. Students with extenuating or emergency situations should contact the instructor(s) as soon as possible, and preferably before the due date to make arrangements for assignments.

Attendance

Attendance is not taken for this class; however, ongoing and active participation in class discussions and projects is important for student learning, and students are encouraged to attend all class sessions unless excused by the course instructor(s).

Projects (Please see included chart and class schedule for all project due dates)

Project #1: Public Health Meeting Experience (50 points)

Learning Objective #3: Communicate both orally and in writing how public health genetics and genomics can be incorporated into public health.

Learning Objective #7: Evaluate how genetic principles/technologies apply to diagnosis, screening, and interventions for disease prevention and health promotion programs.

The goal of this project is to help students understand current issues in local public health and explore how genetics and genomics may be important to already existing programs. For this project, students will identify and attend a public meeting related to public health. A list of meetings in Pittsburgh has been provided, but students may also identify a public meeting not on the list.

Students are required to observe one public meeting and write a 4-5 page paper that includes a summary of the meeting, the student's thoughts/comments on the meeting (was it run well, what were some interesting components/interactions, etc.), how their skill sets and/or genomics/genetics may play a role or be important to topics covered during the meeting, and how this experience will impact their future career as a public health professional.

Project #2: Preliminary Data Analysis

Learning Objective #1: Analyze data to answer questions important to the field of public health genetics and genomics.

Learning Objective #3: Communicate both orally and in writing how public health genetics and genomics can be incorporated into public health.

Learning Objective #6: Apply skills in statistics, epidemiology, and health policy to determine the impact of public health genetics initiatives.

Students will independently obtain access to a data set for the completion of this project. Students may choose to use data that they will be using for the completion of their public health essay and/or Master's thesis project, a publicly available data set, or a data set made available to them via a work position or practicum.

Part 1: Data Description, Demographics and Research Question Presentation (40 points)

After a data set is obtained, students will give a 15 minute presentation that contains the following:

- A description of the data set and the population from which it was obtained
- A description of how the data were collected
- Demographic information from the data set, including descriptive statistics
- Limitations of the data set and/or data collection method
- Presentation slides should be emailed to instructors prior to class
- A minimum of three research questions that can be answered with the chosen data set.

Part 2: Preliminary Data Analysis Presentation (40 points)

Students will give a 15 minute presentation on a date assigned by the instructors on their preliminary data analysis. Slides for this presentation should be sent to the instructors by 5pm on the day prior to the presentations.

Part 3: Preliminary Data Analysis Paper (100 points)

Students will perform statistical analyses on their selected data set to answer their finalized research questions. A brief introduction to the project, the description of the data set, methods, results, and conclusions will be written up in a preliminary data analysis document with references and submitted to the course instructors.

Project #3: Health Literacy Project

Learning Objective #2: Communicate genetic and genomic principles to the general public as part of current public health initiatives.

Learning Objective #3: Communicate both orally and in writing how public health genetics and genomics can be incorporated into public health.

For this project, students will work in groups to assess a written resource related to public health genetics and genomics that was developed for the general population.

Part 1: (40 points)

In their groups, students will re-write their assigned pieces taking into consideration the health and genetic literacy of the general population.

Part 2: (30 points)

Each group will give a 10 minute presentation on their process for editing the written resource and the changes that were made to their assigned written resource.

Project #4: Public Health Genetics Initiative Case Study (75 points)

Learning Objective #1: Analyze data to answer questions important to the field of public health genetics and genomics.

Learning Objective #3: Communicate both orally and in writing how public health genetics and genomics can be incorporated into public health.

Learning Objective #4: Discuss the precision medicine initiative and its impact on the public, healthcare, and the field of public health.

Learning Objective #5: Assess the ethics of the application of genetic technologies to public health.

Learning Objective #6: Apply skills in statistics, epidemiology, and health policy to determine the impact of public health genetics initiatives.

Learning Objective #7: Evaluate how genetic principles/technologies apply to diagnosis, screening, and interventions for disease prevention and health promotion programs.

Students will be given a scenario that outlines a new public health genetics testing and/or screening initiative that is being proposed for implementation. Students will assess the initiative and write up this assessment and their opinion on whether the initiative should move forward (with references).

The written document will include the following (Maximum 10 pages):

- A brief introduction and background of the initiative (maximum 2 pages)
- A brief discussion of the genetic information important to the initiative (maximum 2 pages)
- The sensitivity, specificity, positive predictive value, and negative predictive value of the proposed testing/screening method
- An estimate of the cost of implementing this initiative with a comparison to the cost of doing nothing
- A discussion of barriers to implementation and the alternatives to implementation
- A discussion of the social, ethical and legal issues with implementation
- A recommendation on whether the initiative should move forward.

Students will be asked to turn in two sections of the case study prior to the final due date to receive feedback and discuss in class. These will be the sensitivity, specificity, PPV, NPV analysis (Number 3 in the instructions) and part of the cost analysis (Numbers 4a-d in the instructions). Students will receive 5 points for Number 3 and 15 points for 4a-d (these count as part of the 75 total points for the project). Students who turn in these parts early can earn back up to half of any deducted points by changing their analyses in the final document.

Project Due Date Summary

Project	Due Date
Project 4, Number 3 Public Health Initiative Case Study	9/12/2019 by midnight
Project 4, Number 4a-d Public Health Initiative Case Study	9/19/2019 by midnight
Project 2, Part 1 Preliminary Data Analysis: Data Description, Demographics & Research Questions Presentation	10/10/2019 and 10/17/2019 (All slides due by 5pm on 10/9/2019)
Project 3, Part 1 Health Literacy: Revised Patient Resource	10/24/2019 by midnight
Project 3, Part 2 Health Literacy: Presentation	10/31/2019 (all slides are due 10/30/2019 by 5pm)
Project 4 Public Health Genetics Initiative Case Study	10/17/2019 by midnight
Project 2, Part 2 Preliminary Data Analysis: Final Presentation	11/21/2019 and 12/5/2019 (All slides are due by 5pm on 11/20/19)
Project 1 Public Health Meeting Paper	12/5/2019 by midnight
Project 2, Part 3 Preliminary Data Analysis: Paper	12/12/2019 by midnight

Class Schedule

Class #	Date	Topic	Instructor
1	8/29/19	Intro/Syllabus Review Discussion of Student Projects/ Preliminary Data Analysis Public Health Genetics in the News	Andrea Durst & Candy Kammerer
2	9/5/19	Allegheny County Health Department: Plan for Healthier Allegheny Specificity/Sensitivity/PPV/NPV In-class exercise	Jamie Sokol, MPH Andrea Durst
3	9/12/19	Advanced Health/Genetic Literacy Social Justice/Social Costs/Disparities (Discussion of Examples)	Andrea Durst Candy Kammerer
Project 4, Number 3 (Calculation of PPV and NPV) due 9/12/19 by midnight			
4	9/19/19	Precision Medicine Overview Institute for Precision Medicine and All of Us PA-Program Assessment	Candy Kammerer Margaret Palumbo, MPH
Project 4, Numbers 4a-d: Public Health Initiative Case Study due 9/19/19 by midnight			
5	9/26/19	ACMG Actionable Gene List	Andrea Durst
6	10/3/19	Implementation Science Review of Case Study Sections	Alanna Rahm, PhD, MS, LGC Andrea Durst & Candy Kammerer
7	10/10/19	Project 2, Part 1: Data Description, Demographics, and Research Questions Student Presentations Public Health Genetics in the News	Students

8	10/17/19	Project 2, Part 1 (Cont): Data Description, Demographics, and Research Questions Student Presentations Public Health Genetics in the News	Students
Project 4: Public Health Initiative Case Study due 10/17/19 by midnight			
9	10/24/19	Return of Results Population Screening	Andrea Durst
Project 3, Part 1: Health Literacy Revised Patient Resource due 10/24/19 by midnight			
10	10/31/19	Project 3, Part 2: Health Literacy Group Presentations	Students
11	11/7/19	Salary negotiation In class question and work session	Joan Anson Candy Kammerer
12	11/14/19 (Class will start at 10:00 AM)	Direct-to-Consumer Genetic Testing and Examples	Candy Kammerer
13	11/21/19	Project 2, Part 2: Preliminary Data Analysis Presentations (Slides due by 5pm on 11/20/19)	Students
14	11/28/19	Thanksgiving: No Class	
15	12/5/19	Project 2, Part 2: Preliminary Data Analysis Presentations Preliminary Data Analysis Work Session	Students
Project 1: Public Health Meeting Paper due 12/5/19 by midnight			
16	12/12/19	Activity: Regional Genetics Network Projects Mind-Mapping	Andrea Durst
Project 2, Part 3: Preliminary Data Analysis Paper due 12/12/19 by midnight			

Assigned Reading List (Reading List May Change)

8/29/19: Intro/Syllabus Review and Discussion of Student Projects/Preliminary Data Analysis

No assigned readings

9/5/19: Plan for a Healthier Allegheny and Sensitivity/Sensitivity/PPV/NPV

2019 Allegheny County Strategic Plan

https://alleghenycounty.us/uploadedFiles/Allegheny_Home/Health_Department/Resources/Data_and_Reporting/Chronic_Disease_Epidemiology/2019-ACHD-Strategic-Plan.pdf

Epidemiology, 4th edition (2009) or 5th edition (2014), Gordis, Elsevier/Saunders Company (Chapters 5 and 18).

*Students should have this text from their Epidemiology Core Course. Students without access to this text book should see a course instructor for a copy.

Kroese M, Zimmern RL, and Sanderson S. (2004). Genetic tests and their evaluation: Can we answer the key questions? *Genetics in Medicine*, 6(6): 475-480

9/12/19: Advanced Health/Genetic Literacy and Social Justice/Social Costs/Disparities

Brach C, Keller D, Hernandez LM, et al. (2012) *Ten Attributes of Health Literate Health Care Organizations*. Institute of Medicine. <https://nam.edu/perspectives-2012-ten-attributes-of-health-literate-health-care-organizations/>

Complete the following online CDC training module prior to class (you will need to do a free registration):

https://www.train.org/cdctrain/training_plan/2304

Two Guides that may be helpful for the Health Literacy Project (not required reading for class):

- CDC (April 2009). Simply Put. https://www.cdc.gov/healthliteracy/pdf/Simply_Put.pdf
- AHRQ (August 2014). The Patient Education Materials Assessment Tool (PEMAT) and User's Guide. https://www.ahrq.gov/sites/default/files/publications/files/pemat_guide.pdf

Tedeschi, Bob (October 18, 2017). 6 in 10 doctors report abusive remarks from patients, and may get little help coping with the wounds. STAT News, <https://www.statnews.com/2017/10/18/patient-prejudice-wounds-doctors/>.

Adaeze, Jennifer (September 21, 2017). My medical school lesson was tinged with racism. Did that affect how I treated a sickle cell patient years later? STAT News, <https://www.statnews.com/2017/09/21/sickle-cell-racism-doctors/>.

Bentley AR, Callier S, Rotimi CN. (2017). Diversity and inclusion in genomic research: why the uneven progress? *Journal of Community Genetics*; 8: 255-266.

West KM, Blacksher E, Burke W. (2017). Genomics, Health Disparities, and Missed Opportunities for the Nation's Research Agenda. *JAMA*; 317(18): 1831-32.

Smith CE, Fullerton SM, Dookeran KA, et al. (2016). Using Genetic Technologies to Reduce, Rather Than Widen, Health Disparities. *Health Affairs*; 35(8): 1367-73.

9/19/19: Precision Medicine Overview and All of Us PA Program Assessment

Will Precision Medicine Improve Public Health (Webinar)

<https://www.youtube.com/watch?v=3qjTfpCiT9o>

National Institutes of Health: All of Us Research Program. <https://allofus.nih.gov/>
Explore the "About" section of this website to learn more about the All of Us Precision Medicine Initiative

Phillips KA, Deverka PA, Sox HC, et al. (2017). Making genomic medicine evidence-based and patient-centered: a structured review and landscape analysis of comparative effectiveness research. *Genetics in Medicine*, e-published 4/13/17.

Sankar PL and Parker LS. (2016). The Precision Medicine Initiative's All of Us Research Program: an agenda for research on its ethical, legal, and social issues. *Genetics in Medicine*, published online 12/8/16.

9/26/19: ACMG Actionable Gene List

Kalia SS, Adelman K, Bale SJ, et al. (2016). Recommendations for reporting of secondary findings in clinical exome and genome sequencing, 2016 update (ACMG SF v2.0): a policy statement of the American College of Medical Genetics and Genomics. *Genetics in Medicine*; 19(2): 249-255.

Berg JS, Foreman AM, O'Daniel JM, et al. (2016). A semiquantitative metric for evaluating clinical actionability of incidental or secondary findings from genome-scale sequencing. *Genetics in Medicine*; 18(5): 467-475.

Grosse SD, Gurrin LC, Bertalli NA, and Allen KJ. (2018). Clinical penetrance in hereditary hemochromatosis: estimates of the cumulative incidence of severe liver disease among HFE C282Y homozygotes. *Genetics in Medicine*; 20(4): 383-389.

Laberge, AM (2018). Recommending inclusion of HFE C282Y homozygotes in the ACMG actionable gene list: cop-out or stealth move toward population screening? *Genetics in Medicine*, 20 (4): 400-402.

Please listen to the following podcast: New Estimates of the Penetrance of Hemochromatosis: Time to re-think screening? https://media.nature.com/original/nature-assets/multimedia/podcast/gim/gim_11012017.mp3

10/3/19: Implementation Science and Review of Case Study Sections

TBD

10/10/19: Data Description, Demographics and Research Questions Student Presentations
No readings

10/17/19: Data Description, Demographics and Research Questions Student Presentations
No readings

10/24/19: Return of Results and Population Screening

Gabai-Kapara E, Lahad A, Kaufman B, et al. (2014). Population-based screening for breast and ovarian cancer risk due to BRCA1 and BRCA2. *Proceedings of the National Academies of Sciences of the United States of America*; 111(39): 14205-14210.

Cogswell, ME, McDonnell SM, Khoury MJ, et al. (1998). Iron overload, public health, and genetics: Evaluating the evidence for hemochromatosis screening. *Annals of Internal Medicine*; 129(11 Part 2): 971-979.

USPSTF (2006). Screening for Hemochromatosis: Recommendation Statement. *Annals of Internal Medicine*; 145(3):204-208.

Dimmock DP. (2017). Should we implement population screening for fragile X? *Genetics in Medicine*; 19(12): 1295-1299.

10/31/19: Health Literacy Group Presentations
No Readings

11/7/19: Salary Negotiation and In-Class Work Section
No Readings, bring your preliminary data analysis project questions

11/14/19: Direct-to-Consumer Genetic Testing and Examples

TBD

11/21/19: Preliminary Data Analysis Presentations
No Readings

11/28/19: NO CLASS: Thanksgiving

12/5/19: Preliminary Data Analysis Project Presentations
No Readings

12/12/19: Regional Genetics Network Project Mind Mapping & Discussion of AGHD Experiences

Please review the slides on Canvas

The new RFA for the Regional Genetics Networks is expected in November, and a link to this will be provided for you to review before class. We will be developing a plan for implementation based on the goals outlined in the new RFA.