## Guidance on Modifying Classroom Teaching and Course Materials to Reflect EDI and Anti-Racism Principles for Biostatistics Courses

### Introduction

The purpose of this document is to provide guidance to teaching faculty in the Department of Biostatistics on incorporating principles of EDI and anti-racism in the classroom.

This is not meant to be an exhaustive list of suggestions nor is it suggested that faculty implement all these suggested ideas; rather we provide several options with the hopes that a few will be appropriate for most of our teaching faculty.

We recognize that good teaching and equitable teaching are fundamentally intertwined. While many aspects of good and equitable teaching may be out of our control due to University constraints (i.e. student-to-faculty ratio and the traditional 4.0 grading scale), we hope that the options provided will move us towards more equitable and good teaching as a department.

We believe that implementing these suggestions will not in and of itself lead us to more equitable teaching, but rather may serve as a starting point for faculty members in their continual journey toward more equitable teaching. While this document provides a template that artificially simplifies the work that must go into equitable and good teaching, we hope it provides a framework for assisting instructors in their rethinking on equitable teaching.

Additionally, this is intended to be an evolving document which changes over time, and we gratefully welcome feedback and suggestions from faculty, staff, students, and others who view this document either in the Biostatistics department or more broadly. We encourage anonymous feedback to be submitted via this <u>form</u>.

This guidance is divided into three sections: (1) Modifying Course Materials, (2) Modifying Classroom Teaching, and (3) Long-term Strategies towards an Anti-Racist Pedagogy. In section (4), we include references for further reading and learning.

# *Please complete the accompanying Course Development Plan (CDP) which documents the changes you made/intend to make in your courses.*

### Acknowledgements

This guide is largely based on the University of Washington Department of Epidemiology Guidance on Modifying Classroom Teaching and Course Materials to Reflect EDI and Anti-Racism Principles document, and as such much of the work that went into creating this document was done by members of the UW Department of Epidemiology. We also drew from several existing teaching practices in the UW Department of Biostatistics and are grateful to the instructors who demonstrate these practices.

## **Section 1. Modifying Course Materials**

We suggest that faculty evaluate the examples and datasets used in class, homework problems, and assigned readings. Some new examples, datasets, and/or readings could be introduced to ensure greater representation of authors and PIs from different identities and to make course material more relevant to students from a variety of backgrounds. Course materials should also be modified to meet accessibility guidelines. Some suggestions for modifying course materials are listed below.

# Align course material with course prerequisites and actual levels of student preparation when possible, and support students when material is beyond their preparation, including providing references to review material.

- If the course requires knowledge of a concept or subject not all students are familiar with (for example: advanced linear algebra, measure theory) explain the basics in class or provide references to resources where students can learn for themselves.
  - \* Example: The Matrix cookbook (<u>https://www.math.uwaterloo.ca/~hwolkowi/matrixcookbook.pdf</u>) was used as a resource in Biost 571 taught by Michael Wu, which requires knowledge of matrix algebra
  - \* Example: <u>This slide deck</u>, taught by Edward Zhao as a TA, was used to review math concepts, R, and R markdown during a discussion section at the beginning of Biost 536
- If there are students with different preparations in the course (for example electives intended for both biostatistics and other School of Public Health graduate students) make some material optional and clearly mark it as such.
  - \*Example: here are a <u>set of slides</u> from PHI 512 course taught by Lurdes Inoue which include optional material as a "detour"
  - \*Example: Here are a <u>set of slides</u> from BIOST 514 taught by Ken Rice, where optional material going further into the mathematics of a topic is starred to indicate it is optional and not tested
- Do not assume that students have not taken the prerequisites. There is considerable variety in how instructors cover content and something that you think should have been taught in a previous course may have not been taught well or the student may need to hear it from another perspective.

# Place course materials in the historical context of how statistical or epidemiologic methods were developed or how theories and/or knowledge were generated.

- For example, the development of statistics in the 20th century was intertwined with the development of Eugenics, and many prominent statisticians advocated for racist beliefs and policies.
  - Francis Galton coined the term "eugenics" and believed people from Africa constituted an inferior race.

- Karl Pearson, who founded Biometrika along with Galton and Raphael Weldon, praised the genocide of Native Americans in the US from a eugenics perspective and claimed to use statistical methods to objectively predict that the immigration of Jewish people into Britain would create a parasitic race.
- RA Fisher advocated sterilization for Eugenics purposes and claimed that scientific evidence proved that races differed "in their innate capacity for intellectual and emotional development."
- These examples also demonstrate how statistics can be used to promote racism and other ideological claims by obscuring analytic choices and assumptions as "objective" analysis. For more information about this argument, read <u>How Eugenics Shaped</u> <u>Statistics</u>.
- As another example, epidemiologic methods were developed within the positivist and other traditions of western/European thought. There is little influence of eastern or southern ideological traditions visible in standard epidemiologic methods. Community based participatory research (CBPR), which is rooted in critical theory and began in Latin America, provides one example of an approach to research that takes a non-European approach.
- \* For an example of including some of this information in course content, see slides 35-42 in <u>this set of slides</u> from a PH 512 course taught by Noah Simon

# Be explicit in the classroom about how race and gender are defined and why they are included in readings and examples (e.g., Is race meant to be a proxy for racism or genetic ancestry or something else?).

- This <u>Boyd et al.</u> post and this paper by <u>VanderWeele and Robinson</u> 2014 may be helpful in learning more about these ideas.
- When using example datasets, consider whether it would be more appropriate to use binary covariates besides gender, or create binary covariates from continuous ones
  - While analyzing data which includes sex and/or gender is clearly an important aspect of public health and medical research, the use of gender and/or sex is complicated and should be treated as such. See <u>this article</u> from a public health perspective and <u>this</u> <u>article</u> for statistical practitioners.
  - Using binary gender data without proper context and discussion risks further marginalizing transgender and nonbinary students.
- One idea to engage students with the complexity of race/ethnicity data is to have students turn raw race/ethnicity data into a cleaned version and discuss the choices they made and how they felt during the activity (see section 4.5 of Baumer, B. S., Garcia, R. L., Kim, A. Y., Kinnaird, K. M., & Ott, M. Q. (2020)).

Use intentional language around identities such as race, gender and ethnicity and health conditions and health behaviors. More details can be found in our department <u>intentional</u> <u>language</u> document.

• \* Example: <u>This presentation</u> about course language was used in an EPI 530 course taught by Carey Farquhar

# Incorporate contributions to statistical theory, methodology, applied analyses, and/or datasets (e.g., PIs on a study) from statisticians and researchers of color as well as those from non-western backgrounds, into in-class examples and readings.

- When using a dataset, show a picture of the PI of the study and try to find datasets which highlight PIs of color and those working in places besides the US, especially in low and middle income countries. This may be more applicable to people doing applied work or work that utilizes the dataset. It may not be appropriate for theoretical settings.
- If you are unable to identify any authors of color, discuss with other colleagues in the field or try a literature review with some additional Google searches.

# Incorporate examples that will be relevant to students from a variety of backgrounds, and include datasets that don't come from the United States (e.g., datasets from global health research).

When using datasets, consider the context in which data was collected. If there are ethical issues
with how the data was collected or in applying the data to a new context, consider using a
different data set, or, if using the data is necessary or appropriate, discuss the context and any
ethical issues with students. Examples of scenarios when data collection or subsequent use can
be unethical or exploitative include the use of DNA from people of Roma heritage, blood
samples from the Havasupai people, and the San people's code of research ethics.

# Incorporate examples of work that deal with racism or other systemic issues. There is an emerging body of evidence that suggests that equity based/social justice examples support student engagement (Lesser 2007).

- When considering these examples it may be helpful to consider these equity related questions:
  - o Who conducted and funded the research, and how was the research question decided?
  - o Which researchers had contact with the participants?
  - o What populations were studied, and how were they selected?
  - o What types of measures were of interest?
  - What are the differences between the groups being compared (cases vs controls, exposed vs unexposed)?
  - o What is the size of the effect?
  - o Who appears to benefit and who appears to suffer?
  - o Whose values may be implicitly represented or excluded?
  - o Does this data offer a vehicle or tool that could be used to help understand or improve social conditions in our present world?

#### Ensure that course materials meet accessibility guidelines.

- The University of Washington's <u>Disability Resources for Students</u> and <u>Accessible Technology</u> offices have many resources available including:
  - o <u>Disability Resources for Students FAQ</u>
  - o Faculty Resource List
  - o <u>Getting Started with Accessibility</u>
  - o <u>Online Course Accessibility Checklist</u>
  - Hosting Accessible Online Meetings
- <u>See this accessible presentation guide (to be created)</u>

### Section 2: Modifying Classroom Teaching

There are several evidence-based practices that enhance inclusivity in the classroom. The UW <u>Center</u> <u>for Teaching and Learning</u> has a number of excellent tips and resources on inclusive teaching. Below are a few suggestions for ways to enhance inclusivity in the classroom.

#### Learn about students at the beginning of the quarter.

Using an index card, online survey, private chat on Zoom, or a paper questionnaire on the first day of class, faculty can collect information about students' prior knowledge of the course content, relevant educational experiences, and personal experiences that might impact their learning in the course. Don't forget to ask about pronouns or ask students to indicate their pronouns on their Zoom name display. Lastly, try to pronounce names correctly. Ask students to provide a recording of their name or write it out phonetically if needed.

#### Gather feedback from students about their experience in the class.

Using a paper or online survey, faculty can conduct a brief survey (which could be optional and anonymous) at various points during the quarter to gauge student learning and perceptions of class climate.

A popular method is the **Stop-Start-Continue** method which includes just 3 questions:

- 1. What you (the instructor) should start doing.
- 2. What you (the instructor) should stop doing.
- 3. What you (the instructor) should continue doing.

#### Establish community norms or ground rules.

Community norms constitute an agreement that all students agree upon. Deviating from these norms means disrespecting everyone in the class. Have a copy of the norms on hand so that you can refer to it if anyone deviates from the norms, and to show appreciation for adherence to them. You may be surprised at how well students respond to having community norms for the duration of the course.

You can create these norms:

- 1. By yourself, with minimal input from students (e.g., putting them in your syllabus).
- 2. By yourself, with considerable participation from students (e.g., getting input from students on the first day of class).
- 3. With students ask them to create community norms collaboratively (e.g. by asking them what they need from their fellow students and instructor(s) in order to learn effectively).
- \* <u>Here</u> are a few examples of community norms documents which included student input from courses taught by Amy Willis.
- \* <u>Here</u> is an example of ground rule like axioms from a mathematics context

#### Address microaggressions in the classroom.

It is important to review strategies for dealing with microaggressions in your online, hybrid, or face-to-face classroom. The <u>Center for Teaching and Learning</u> offers resources (including short videos) on this topic. There are also several resources on the attached resources page of this document. Part of being able to recognize and address microaggressions in the classroom is for faculty to recognize and reflect on their own biases, interactions, and behaviors.

#### Give students enough time to process questions asked during class.

A suggestion from the literature is 3-5s, whereas waiting only 1.5s can be the norm in practice (Tanner, 2013). This will allow more students to participate and give students more confidence when participating (Tanner, 2013).

#### Provide multiple means for students to meet the learning objectives.

Incorporating active learning techniques is one strategy that can be used to enhance achievement of the learning objectives. These are evidence-based techniques that have been demonstrated to improve learning for all students, but specifically for students marginalized due to their race and/or gender. Including participation in these active learning techniques as part of the students' grades is important (e.g., attach points to participation).

Below are a few examples of active learning techniques:

- **PollEv or Zoom Poll**:Period polls throughout lecture are a quick way to engage students throughout a lecture. They are a good option when courses are required to be lecture-based. However, unless written very carefully, they typically do not gauge students' ability to synthesize the material (for that, we suggest *Written Synthesis of the Material*). Faculty can include participation points tied to these polls (e.g., points for participating in the poll, not necessarily the right answer).
- **Think-pair-share**: Pose a question and ask students to think about their response for 1 minute, then turn to the person sitting next to them and discuss for 1 minute, then return to the large group and share. This also works well in Zoom breakout rooms.
- **Random Call**: It is important to note that <u>random call</u> can cause anxiety for many students. There are ways to mitigate this. Instructors can make it clear that "passing" is an appropriate response. Instructors can also allow for students to opt-out of the random call list. Alternatively, instructors can utilize random call only after a "think-pair-share" activity or another activity where students have the opportunity to talk to a classmate before sharing to the larger group. In this model, when an instructor randomly calls on a student, the question can be framed as "what did you and [classmate] think about this question". Regardless of the random call approach, it is important to be systematic by preparing a random list of students' names for each class period, so that the call is truly random.

- Small group activities or discussions. Include these small group discussions as an opportunity for students' to share with one another and learn from one another. For example, if there is a reading assigned for a given lecture, faculty can have small groups discuss the paper and come up with a list of the key takeaways from the paper as well as unanswered questions. Small groups also work well for case study examples or working on exercises/problems.
- Written Synthesis of the Material. At the end of class, it is useful for students to have the opportunity to synthesize material. This might involve some type of journaling ("minute-papers"), like writing down the most significant [central, useful, meaningful, etc.] thing you learned during the session, what questions remain, and whether there is anything you did not understand. For small class sizes, it can be particularly effective if instructors (including TAs) engage in a written back-and-forth with the student about their journaling as the quarter goes on, where the student and instructors can ask questions of each other in the journal ("dialogue journals"). This way, it is apparent to the instructor early on in the quarter if a student is struggling to understand the material (as opposed to waiting until midterm results or final exam results).

### Section 3: Long-term strategies towards an anti-racist pedagogy

Scholars of anti-racist pedagogy have noted that moving toward anti-racism is a process that requires continual self-reflection and action (Kishimoto 2018). We do not envision that faculty will make a few changes to their courses and be "done." For those interested in considering long-term change to their teaching styles, here are some suggestions.

#### Faculty self-reflection: How well do you understand anti-racist principles and positionality?

- Review readings and webinars on the resource list below. Faculty are also encouraged to attend Biostatistics EDI Committee events such as book discussion groups and EDI sponsored seminars.
- We recommend starting with the article by Kishimoto (2018), which informs many of the suggestions in this section.

#### Develop awareness of social positions, both in and out of the classroom.

• Instructors should consider and describe their intersectional positionality during a class introduction, with a specific focus on how those identities may shape their understanding of biostatistics, public health practice, and other class-specific topics.

### Develop an understanding of the difference between assessment and evaluation, and how the latter may reinforce racism and classism. Consider alternate forms of grading such as mastery based grading or contract grading.

- Assessment is an important educational tool for understanding how students are learning. Assessment may involve homework assignments, exams, papers, etc. Assessment is an important tool for students to refine their own understanding and for instructors to modify course strategies.
- Evaluation determines how students are graded or scored on assessments.
  - Grades are reflections of many factors beyond a students understanding and mastery of material, including existing inequities: "a growing body of evidence suggests that grades may be best described as a reflection of a students' circumstances, the time and resources they currently or historically have had to devote to their studies [46], [47]... Inequities in grades may be explained by the accumulation of disparities in the lead up to these evaluation points (Ko 2021)"
  - Traditional grading can disempower students and remove their agency in their own education, in a way that counteracts other efforts to decent the authority of the instructor (Ko 2021):
  - Traditional grading can provide an opportunity for discrimination against marginalized students based on instructor's unconscious biases (Ko 2021)

- One way to grade more equitably may be mastery based grading. With mastery grading students are evaluated based on their eventual mastery of identified course objectives, and have multiple opportunities to attempt assignments and receive feedback. See <u>here</u>, <u>here</u>, and <u>here</u>.
- Another way to grade more equitably may be contract grading, where students obtain grades based on the labor they complete in a course and know in advance what amount of labor will lead to what grade. See section 4.1 of <u>this paper</u>, and this <u>wikipedia article</u>.

# Decenter authority in the classroom and have students take responsibility for their learning process.

- Involve students in crafting the syllabus, learning objectives, assignments, assessments, and other portions of the class.
- Challenge the harmful components of the power differential created in the professor-student dynamic by explicitly acknowledging when you are confused or unsure about something; acknowledge that learning is mutual by including racial content in courses even if you are not fully ready to teach them in the traditional sense.

#### Create a sense of community in the classroom through collaborative learning.

• Some active learning techniques can move the class towards collaborative learning, e.g., small group work, "think-pair-share," etc.

#### **Section 4. Resources**

#### **Teaching and Learning**

#### **Recommended Reading**

- Kyoko Kishimoto (2018) Anti-racist pedagogy: from faculty's self-reflection to organizing within and beyond the classroom, Race Ethnicity and Education, 21:4, 540-554, DOI: 10.1080/13613324.2016.1248824
- Tanner, K. D. (2013). Structure matters: twenty-one teaching strategies to promote student engagement and cultivate classroom equity. *CBE—Life Sciences Education*, *12*(3), 322-331.

#### Additional Materials

- Lawrence M. Lesser (2007) Critical Values and Transforming Data: Teaching Statistics with Social Justice, Journal of Statistics Education, 15:1
- Baumer, B. S., Garcia, R. L., Kim, A. Y., Kinnaird, K. M., & Ott, M. Q. (2020). Integrating data science ethics into an undergraduate major. *arXiv preprint arXiv:2001.07649*.
- Article: How to Respond to Racial Microaggressions When They Occur

https://www.nytimes.com/2020/03/03/smarter-living/how-to-respond-to-microaggressions.ht ml

- UW Center for Teaching and Learning website: <u>https://www.washington.edu/teaching/topics/inclusive-teaching/inclusive-teaching-strategie</u> <u>s/</u>
- <u>What Does Trauma Informed Teaching Look Like?</u> <u>https://www.chronicle.com/article/What-Does-Trauma-Informed/248917</u>
- NPR story featuring UW Biology faculty members Scott Freeman and Mary Pat Wenderoth: "<u>Are</u> <u>Lectures Racist?</u>"
- Ko, M. E. (2021, July), Revolutionizing Grading: Implications on Power, Agency, and Equity Paper presented at 2021 ASEE Virtual Annual Conference Content Access, Virtual Conference. <u>https://peer.asee.org/37687</u>
- Article: how to hold a better class discussion https://www.chronicle.com/interactives/20190523-ClassDiscussion#2
- Black Minds Matter Public Course (10 session course) Please see the recording below for a Webinar on Anti-Blackness in Education. There is also an online course by Luke Wood and colleagues for which you can register at:

https://jlukewood.com/black-minds-matter/ Readings, discussion questions etc here.

- CORA Webinars: <u>https://coralearning.org/webinars/</u>.
  - CORA (Center for Organizational Responsibility and Advancement) is founded by Dr. J. Luke Wood, Dr. Bridget Herrin, and Frank Harris III in response to President Obama's call to improve the lives of boys and men of color facing educational disparities. We are a professional educational organization committed to training faculty, staff, and administrators to enhance their skills to better serve historically underrepresented and underserved students. We provide professional development training for all educators to advance their teaching skills and enhance the learning experience of boys and college men of color with an explicit focus on racial equity in education.

There are several webinars available here including:

- Addressing Anti-Blackness on Campus: Implications for Educators and Institutions
- <u>Responding Racial Bias and Microaggressions in the Online Environment</u>
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#### Using Race/Ethnicity in Research

- Boyd RW, Lindo EG, Weeks LD, McLemore MR. On Racism: A New Standard For Publishing On Racial Health Inequities. Health Affairs Blog, July 2, 2020. <u>https://www.healthaffairs.org/do/10.1377/hblog20200630.939347/full/?utm\_medium=social&utm\_source=twitter&utm\_campaign=blog&utm\_content=Boyd</u>
- VanderWeele TJ & Robinson WR. On the causal interpretation of race in regressions adjusting for confounding and mediating variables. Epidemiology 25, 473-484, doi:10.1097/EDE.0000000000105 (2014
  - o Response Letter: Krieger, N. (2014). On the causal interpretation of race. *Epidemiology*, *25*(6), 937. doi: 10.1097/EDE.0000000000185
- Kaufman JS, Cooper RS. Commentary: considerations for use of racial/ethnic classification in etiologic research. Am J Epidemiol. 2001 Aug 15;154(4):291-8.
- Roth WD. The multiple dimensions of race. *Ethnic and Racial Studies*. 2016;39(8):1310-1338.
- Gravlee CC. How race becomes biology: embodiment of social inequality. *American Journal of Physical Anthropology*. 2009;139:47-57
- Jones CP, Truman BI, Elam-Evans LD, Jones CA, Jones CY, Jiles R, Rumisha SF, Perry GS. Using "socially assigned race" to probe white advantages in health status. Ethn Dis. 2008 Autumn;18(4):496-504. PubMed PMID: 19157256.
- Karlsen S and Nazroo JY. Measuring and Analyzing "Race", Racism and Racial Discrimination. In Methods in Social Epidemiology (Second ed.) 2017. Oakes J & Kaufman Jay S (editors).

- Kaplan JB, Bennett T. Use of race and ethnicity in biomedical publication [published correction appears in JAMA. 2004 Sep 1;292(9):1022]. *JAMA*. 2003;289(20):2709-2716. doi:10.1001/jama.289.20.2709
- Vyas DA, Eisenstein LG, Jones DS. Hidden in Plain Sight Reconsidering the Use of Race Correction in Clinical Algorithms. NEJM. 2020 Jun 17; doi: 10.1056/NEJMms2004740.
- Book: O'neil, C. (2016). Weapons of math destruction: How big data increases inequality and threatens democracy. Crown. <u>https://weaponsofmathdestructionbook.com/</u>

#### Using Sex and Gender in Research

- Short, S. E., Yang, Y. C., & Jenkins, T. M. (2013). Sex, gender, genetics, and health. *American journal of public health*, *103 Suppl 1*(Suppl 1), S93–S101. <u>https://doi.org/10.2105/AJPH.2013.301229</u>
- Thornton, S., Roy, D., Parry, S., LaLonde, D., Martinez, W., Ellis, R., & Corliss, D. (2021). Best Practices for Collecting Gender and Sex Data. *arXiv preprint arXiv:2103.09647*.<u>https://arxiv.org/abs/2103.09647</u>

#### Historical Intersection of Statistics, Eugenics, and Racism

#### Recommended Reading

 Article: Clayton, A. (2020, October 28). How Eugenics Shaped Statistics: Exposing the damned lies of three science pioneers. Nautilus. <u>https://nautil.us/issue/92/frontiers/how-eugenics-shaped-statistics</u>

#### Additional Materials

- Book: Roberts, D. (2011). Fatal invention: How science, politics, and big business re-create race in the twenty-first century. New Press/ORIM. <u>https://thenewpress.com/books/fatal-invention</u>
- Article: Evans, R. J. (202, July 28). RA Fisher and the Science of Hatred. New Statesman. <u>https://www.newstatesman.com/international/science-tech/2020/07/ra-fisher-and-science-ha</u> <u>tred</u>