WPI

Interactive Qualifying Project

A preliminary analysis of healthcare disparities curriculum at WPI

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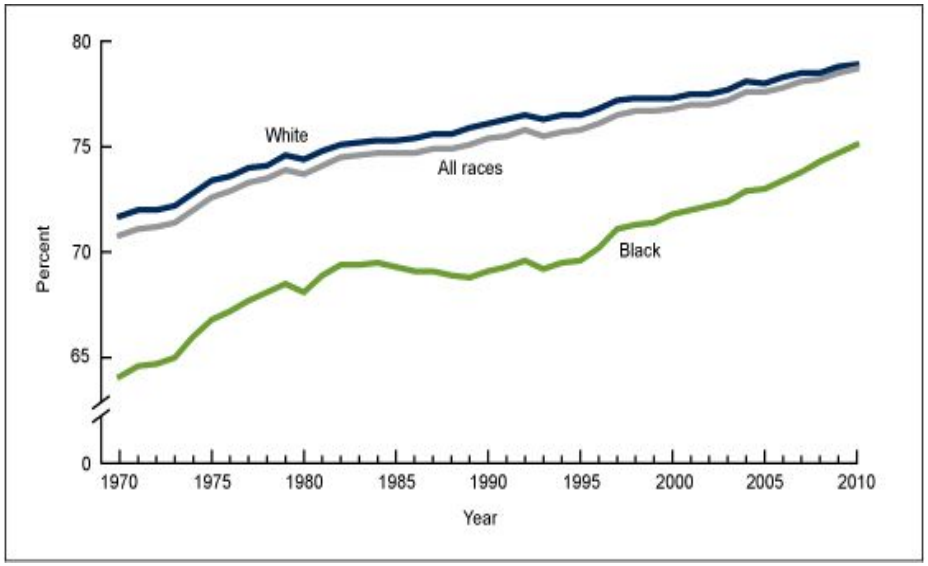
Healthcare Disparities in the US

- Varying qualities of treatment and care
- Persistent disparities in life expectancy [1]
- Minimal increases in awareness [2]



[1] Kochanek, K.D. (2013)
[2] Benz (2011)

Problems with Online Media Sources

- Leading source of health information [1]
- Hard to find credible sources [1]
- Bias in online healthcare reporting [2]

[1] Budak, C. et al., 2014, SSRN Electronic Journal
[2] Library Home: News Literacy, n.d.

Current Ethics Education Elsewhere

- Formal structural racism curriculum [1]
- Pre-medical education [1]

- 2017 study of 400 institutions [2]
- Ethical and social impacts in engineering [2]
- Integration vs. standalone ethics course [2]

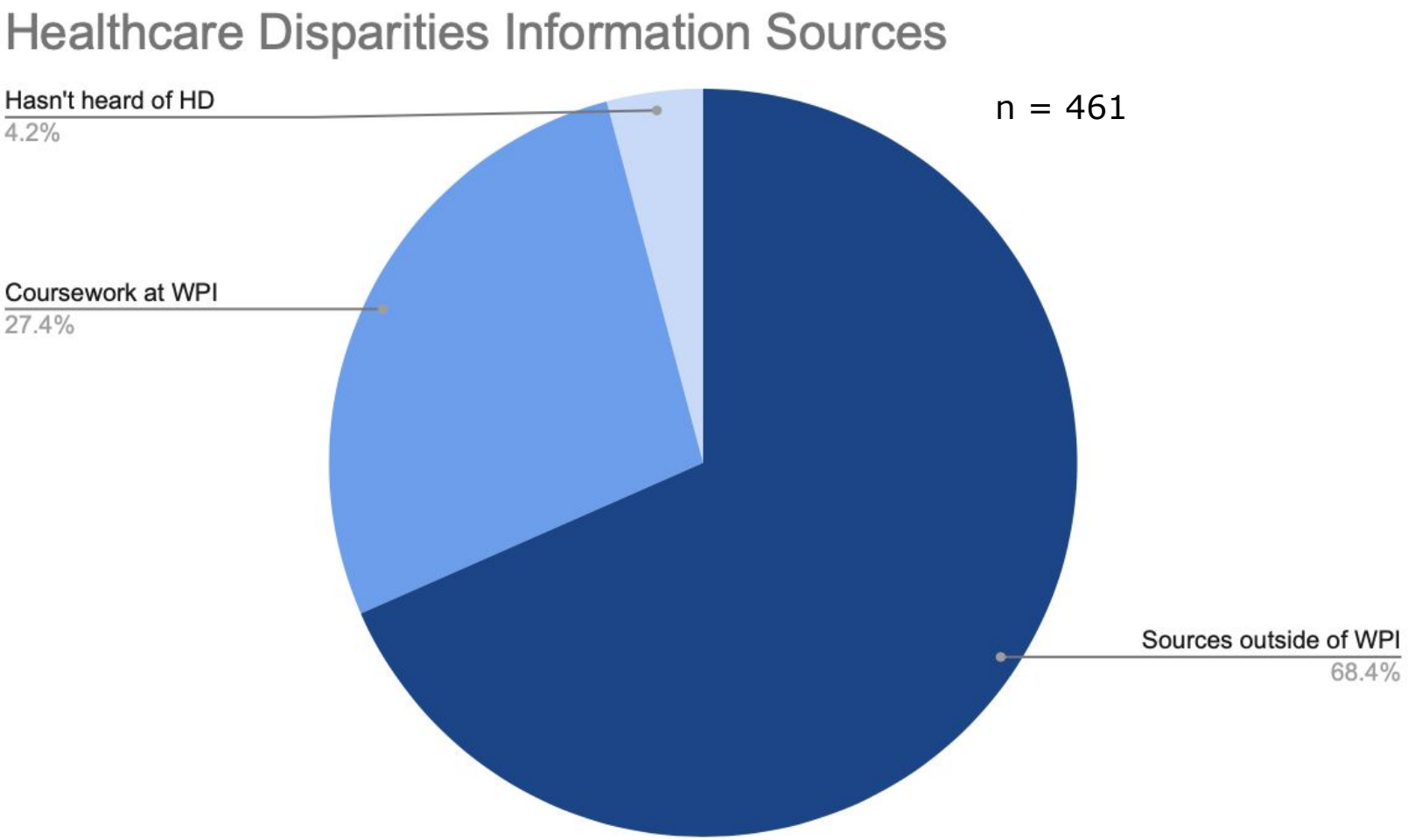
[1] Metzl, J., Petty, J., & Olowojoba, O. 2017.
[2] Bielefeldt, A., Polmear, M., Knight, D., Swan, C. (2017).

Project Goals

1. Research status of healthcare disparities in WPI curriculum

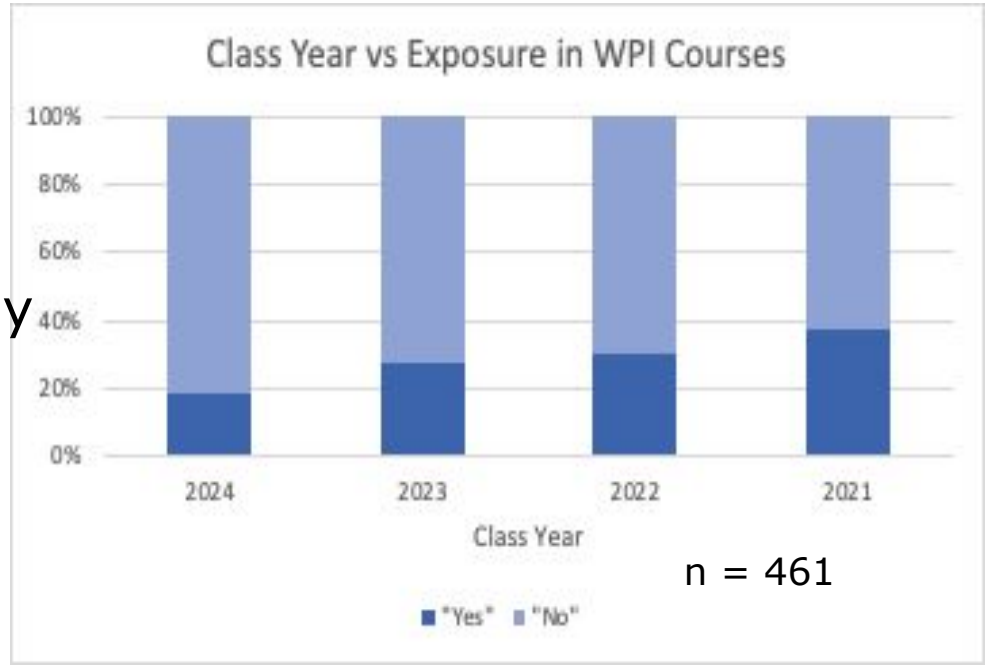
2. Develop an educational module for WPI undergraduates to increase awareness and understanding of healthcare disparities

Healthcare Disparities Coverage in Undergraduate Curriculum



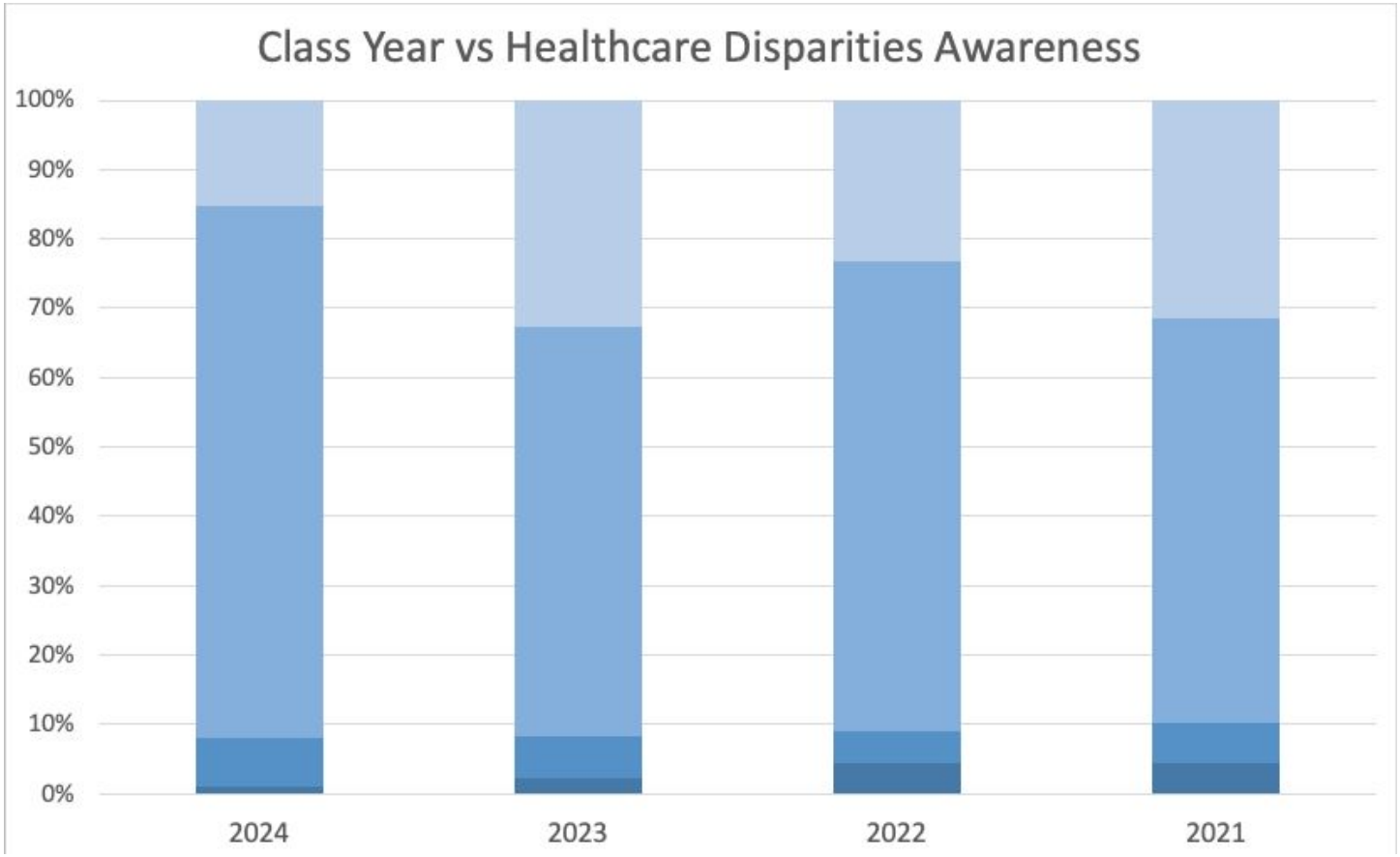
Outcomes of Lack of Education

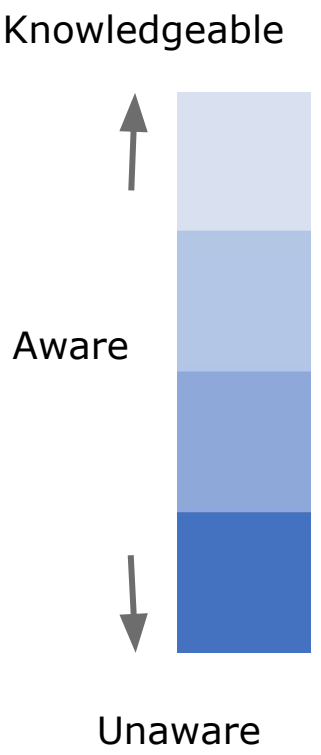
- Consistent education for a "lasting learning opportunity" [1]
- Association between training and patients they consider at risk [2]
- Overestimate of the quality of education [1]



[1] Dupras, D. et al., 2020, *JAMA Network Open*
[2] PatientEngagementHIT, 2020

Students' understanding of healthcare disparities do not increase with class year





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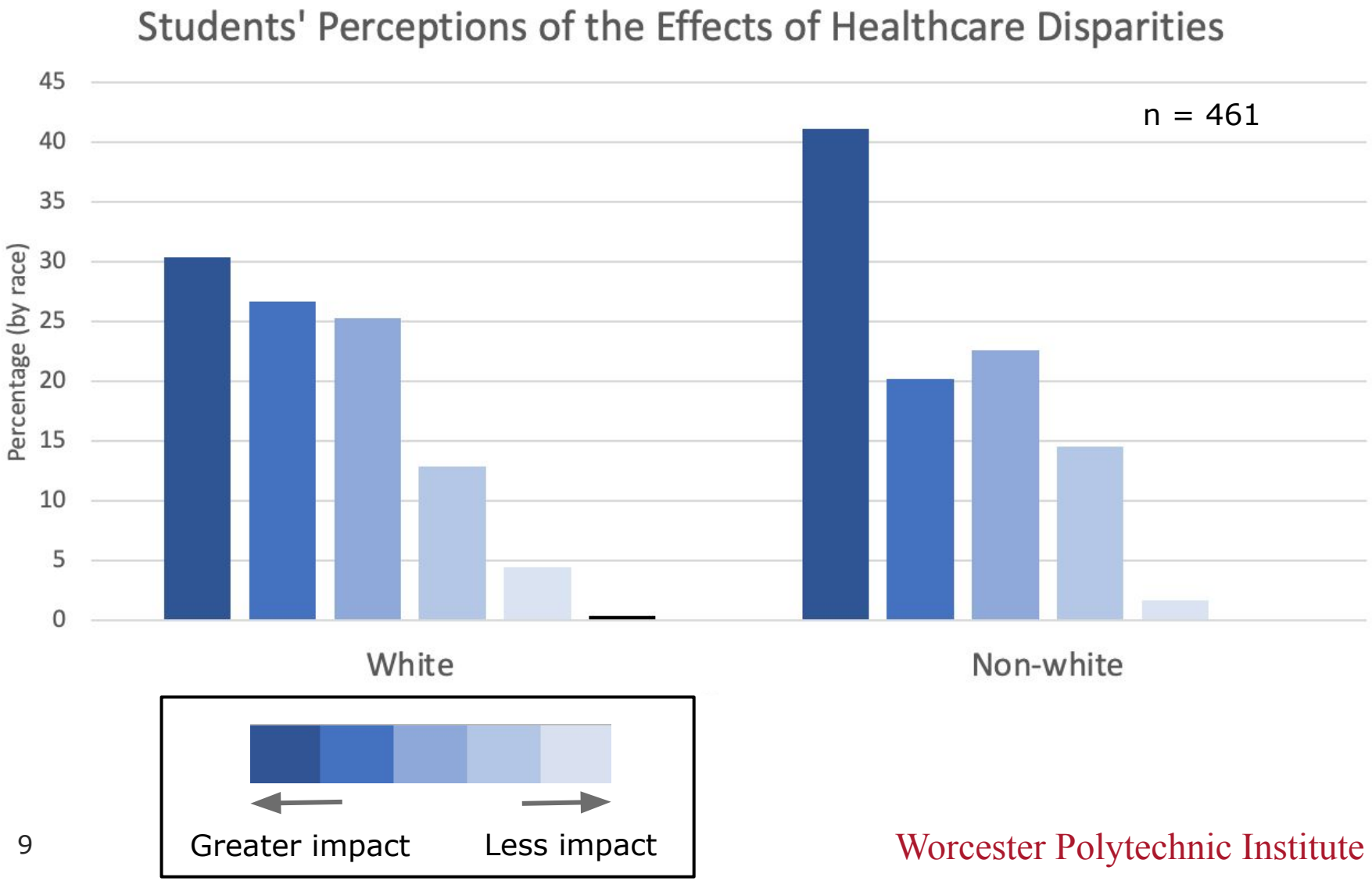
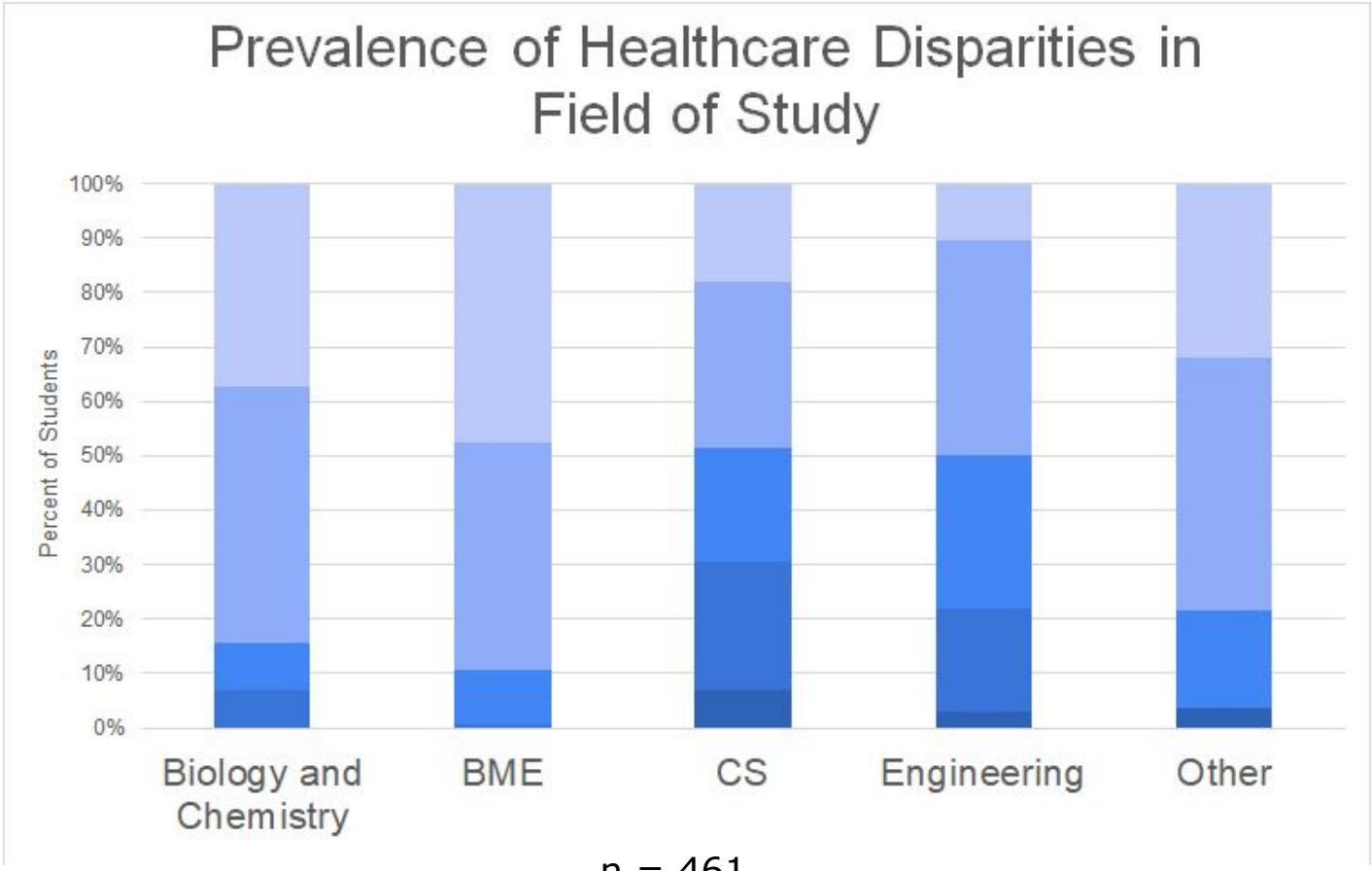
WPI Students' Perception of Impact



Students' Perception of Healthcare Disparities



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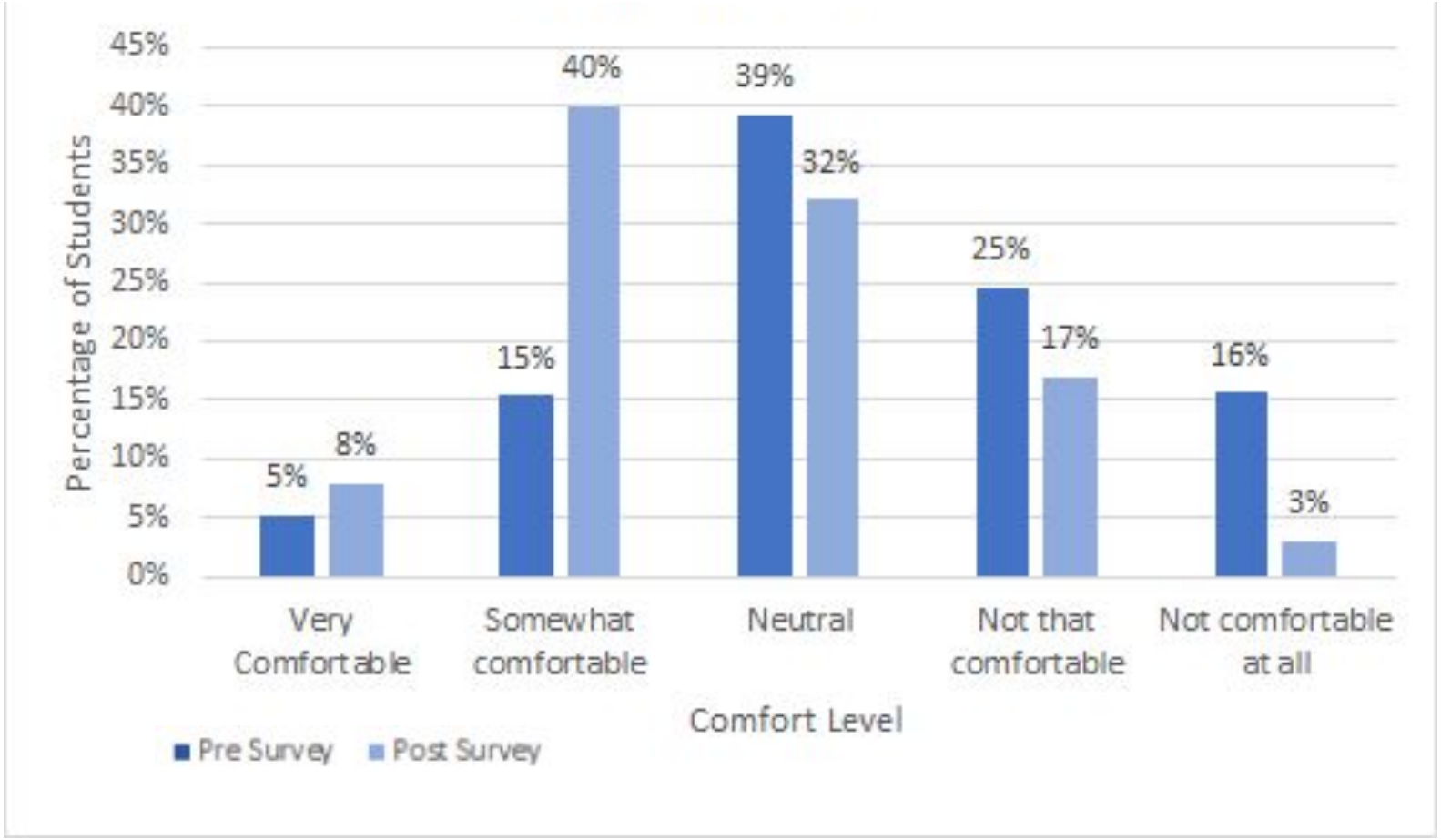
Educational Module Breakdown

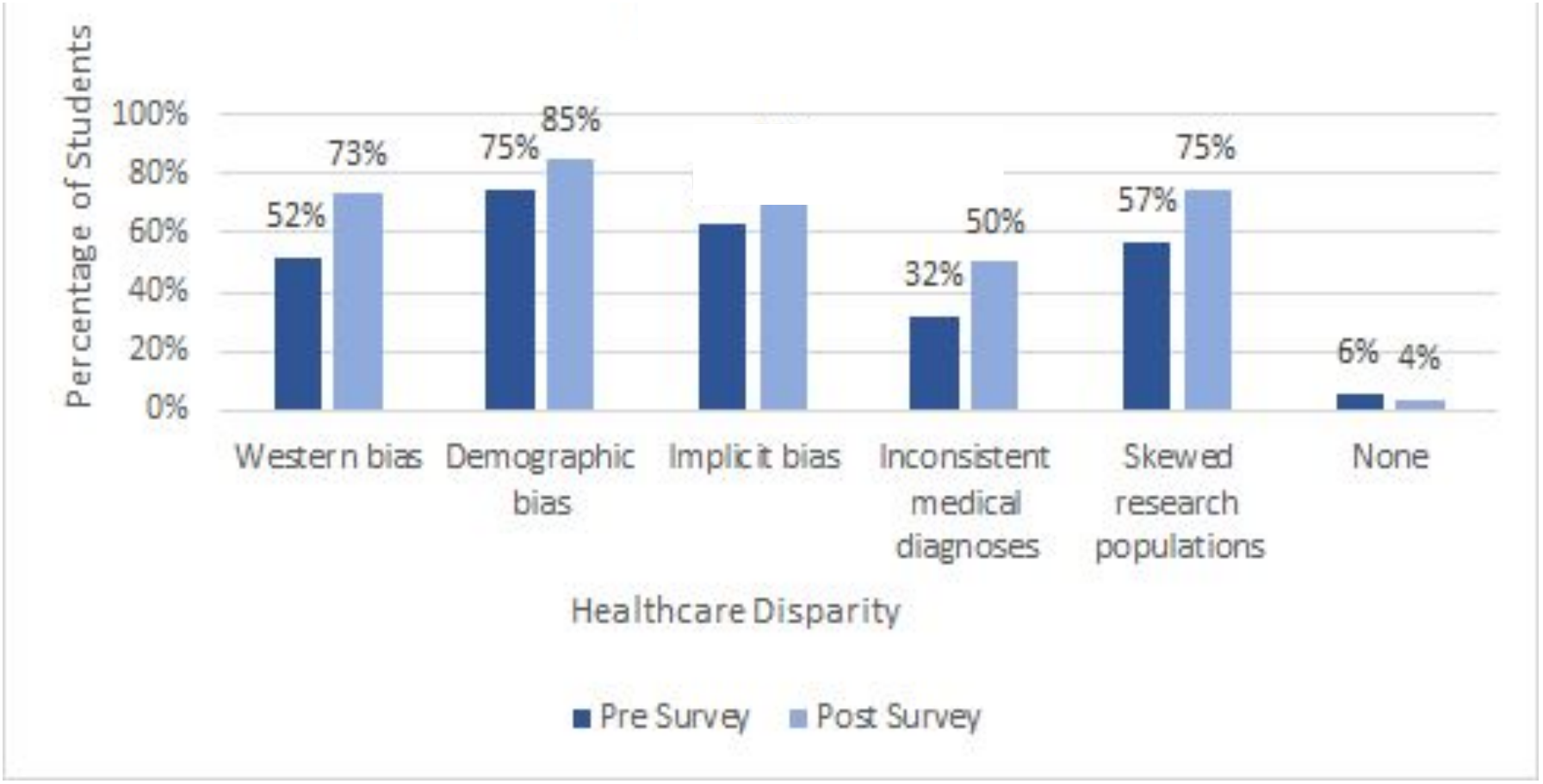
- Addressing the issue
- In depth breakdown of healthcare disparities
- Five major problems
  - Western bias
  - Implicit bias
  - Demographic bias
  - Inconsistent medical diagnoses
  - Clinical trial populations
- Course selection [1]

[1] Brendan Murphy News Writer. "Which Undergrad Majors Are Best for Med School?"

Understanding of ethical theories will improve with participation



Understanding of healthcare disparities will improve with participation



Limitations and Future Work

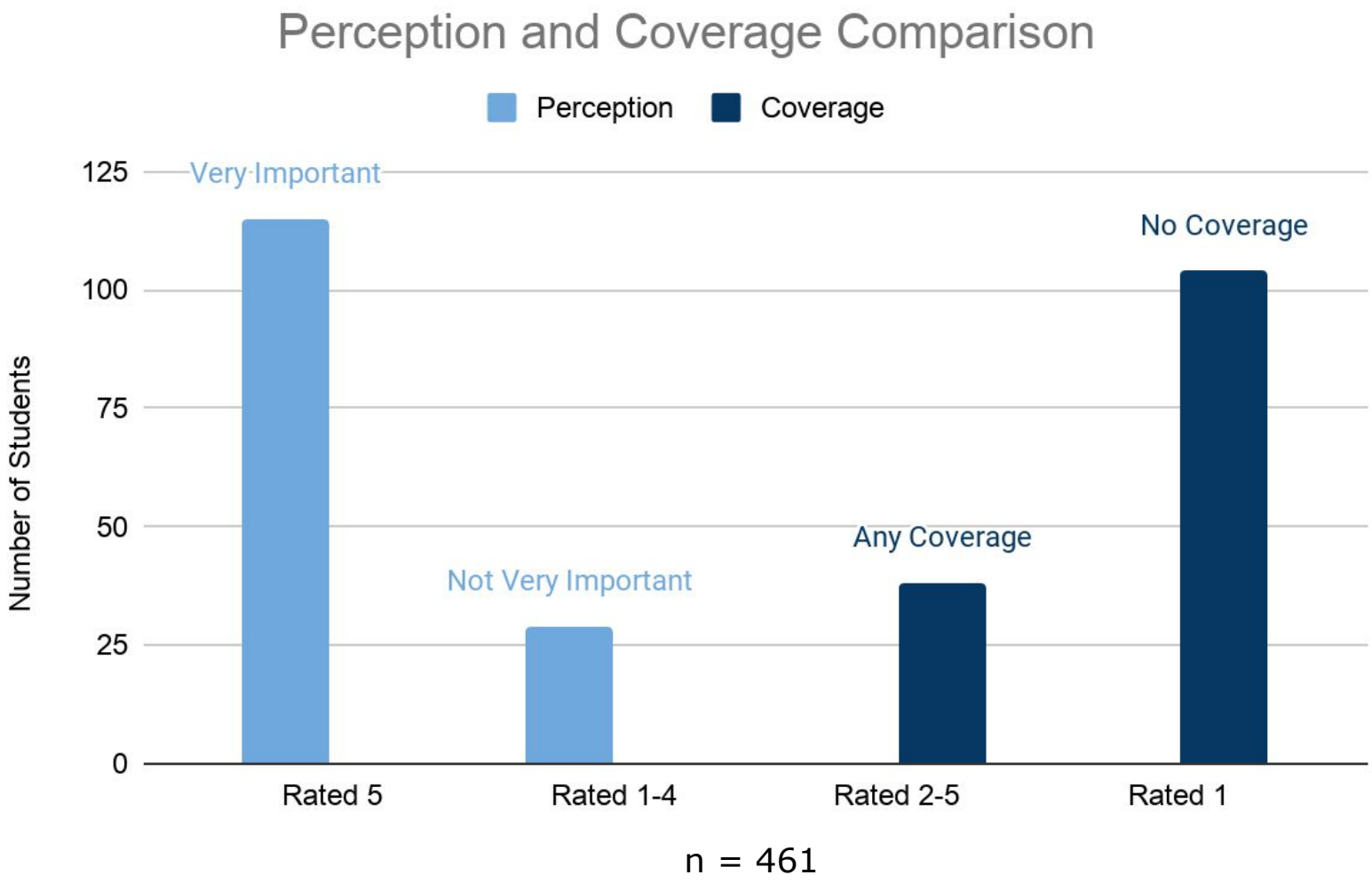
Limitations

- Biased self-reported survey responses
- Varied engagement with material among disciplines and class year
- Time constraints

Future Work

- Integrate healthcare disparities education throughout 7-week term
- Work with more non-biomedical engineering or life science courses

Comparing Perception and Coverage



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Conclusion

- Actively fight healthcare disparities through education
- Disparity between coverage and care
- Explicitly outlining students' needs to address social problems
- A consistent educational module is necessary
  - Supported by WPI Professors

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- Geoffrey Pfeifer, PhD

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Image References

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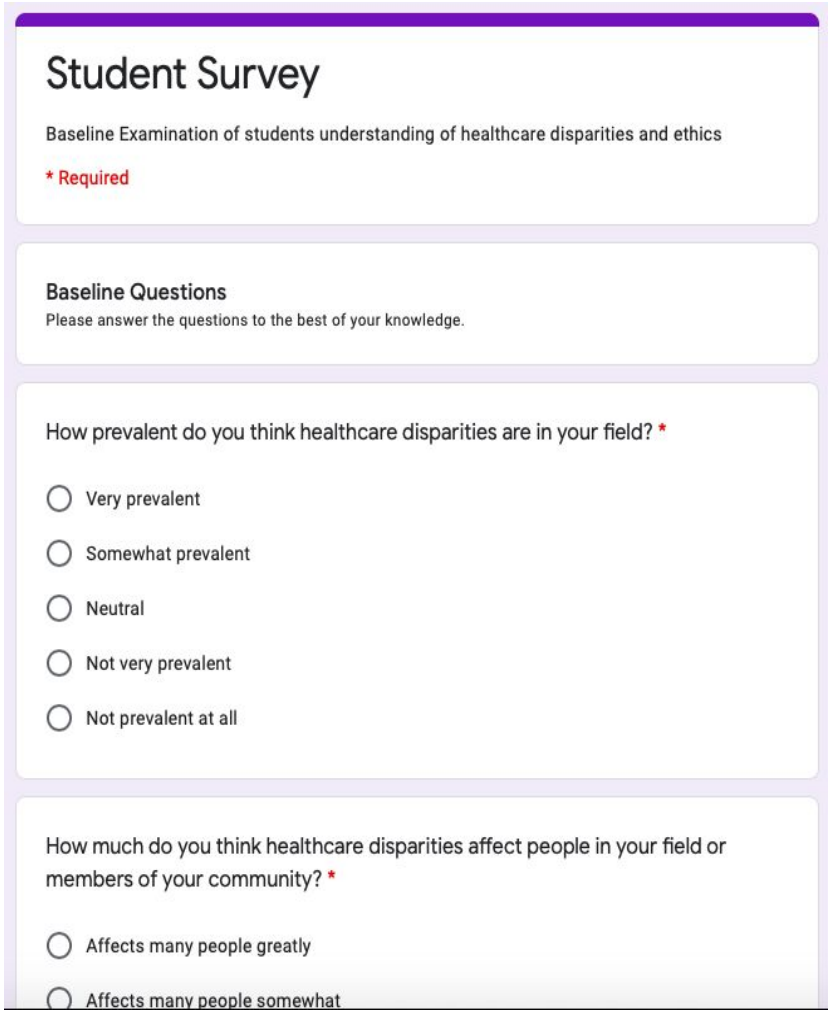
WPI

Thank you!

Questions?

Student Pre-Survey



Student Survey

Baseline Examination of students understanding of healthcare disparities and ethics

* Required

Baseline Questions

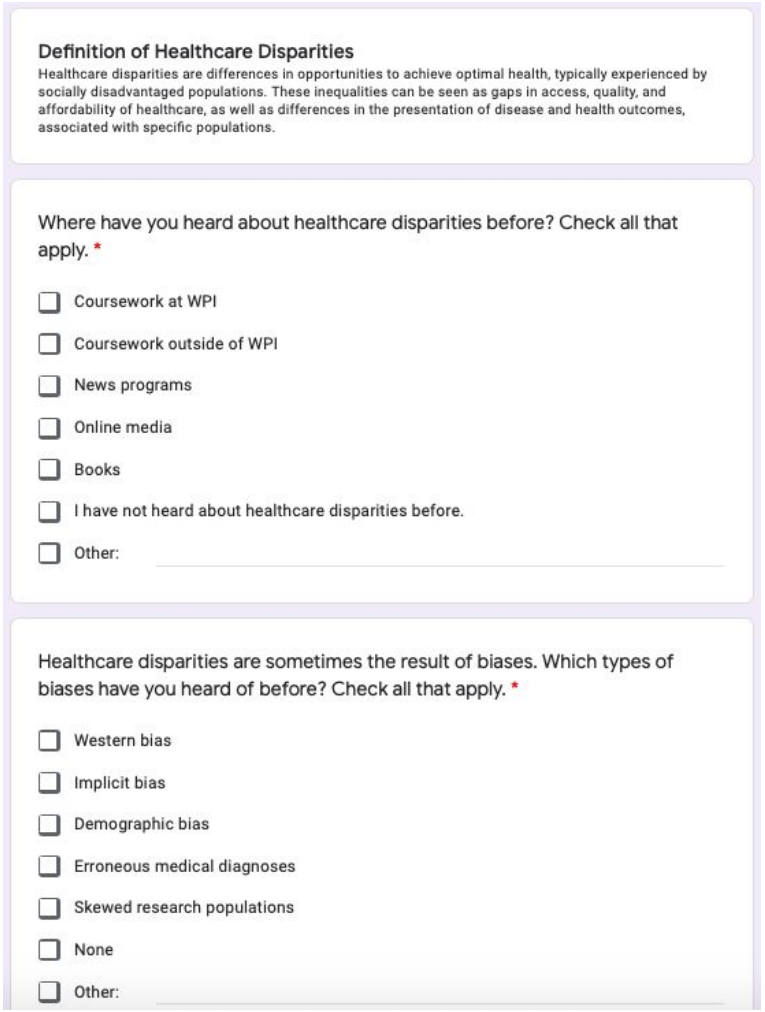
Please answer the questions to the best of your knowledge.

How prevalent do you think healthcare disparities are in your field? *

- ○ Very prevalent
- ○ Somewhat prevalent
- ○ Neutral
- ○ Not very prevalent
- ○ Not prevalent at all

How much do you think healthcare disparities affect people in your field or members of your community? *

- ○ Affects many people greatly
- ○ Affects many people somewhat



Definition of Healthcare Disparities

Healthcare disparities are differences in opportunities to achieve optimal health, typically experienced by socially disadvantaged populations. These inequalities can be seen as gaps in access, quality, and affordability of healthcare, as well as differences in the presentation of disease and health outcomes, associated with specific populations.

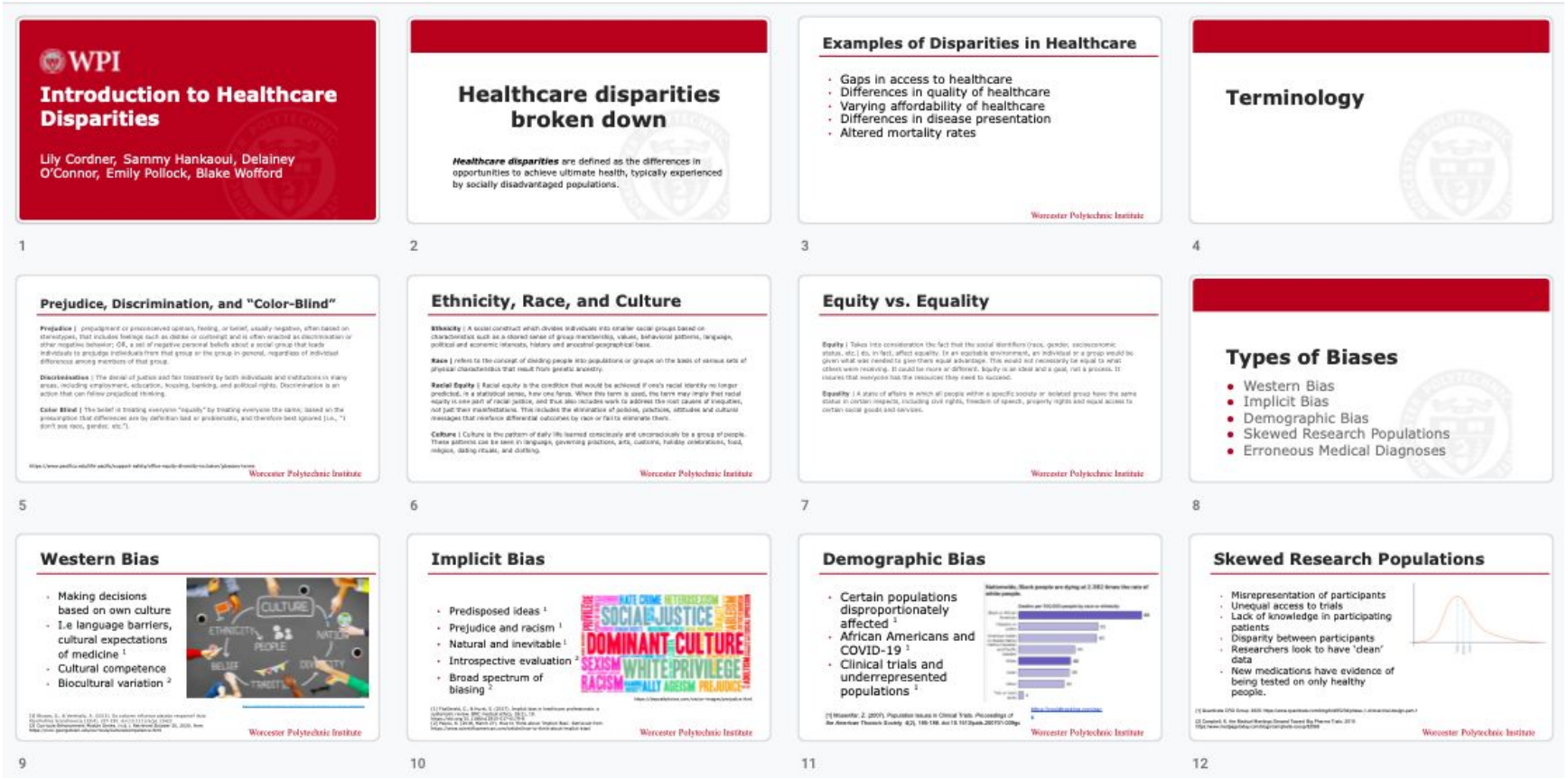
Where have you heard about healthcare disparities before? Check all that apply. *

- ☐ Coursework at WPI
- ☐ Coursework outside of WPI
- ☐ News programs
- ☐ Online media
- ☐ Books
- ☐ I have not heard about healthcare disparities before.
- ☐ Other:

Healthcare disparities are sometimes the result of biases. Which types of biases have you heard of before? Check all that apply. *

- ☐ Western bias
- ☐ Implicit bias
- ☐ Demographic bias
- ☐ Erroneous medical diagnoses
- ☐ Skewed research populations
- ☐ None
- ☐ Other:

Lecture Material



Example Case Study

Scenario:

SARS COVID-19 is a viral infection that affects different people in various ways. A common symptom of this virus is respiratory distress. This has led to a large number of Americans purchasing small medical devices for their homes. Along with a thermometer to monitor for fever or chills, many Americans have purchased pulse oximeter devices.

Case Study Discussion:

What kinds of healthcare disparities can you identify from the information given in this case study? Can you identify where these disparities are apparent in this scenario.

Can you identify any ethical theories that would have contributed to the original design process?

Imagine you are designing a device to replace the pulse oximeter. How would you account for different biases and prevent them with your design? What would the process be in creating the device and testing it?

Other than the pulse oximeter, can you think of another medical device that could have the same or similar presented issues? Think of accessibility, overall cost, location, and design process? Was it designed for equal populations?

Importance of Implementing Healthcare Disparities Education

- Lack of education leads to biases
- Counteract their own implicit biases
- Ethics in engineering [1]
- Role Playing [2]
- Pilot educational module
  - Break down complex topic

[1] 2015 IQP by Jackson et al.
[2] 2017 IQP by Hajjar et al.