UNLV

University of Nevada, Las Vegas

Impact of UNLV Funding on the PhD Student Graduation Rate and graduate Time within STEM Fields

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OVERVIEW

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INTRODUCTION

UNLV's central mission as R1 Research Institution with MSI, HSRU and AANAPISI designations

02
DATA & MODEL ANALYSIS

Analysis of College of Engineering and College of Sciences PhD graduation times and modeling effects of funding

03
CHALLENGES AND NEXT STEPS

Technical and institutional challenges with Time to Degree analysis and further steps

01
INTRODUCTION

UNIVERSITY OF NEVADA, LAS VEGAS

UNLV OVERVIEW

- R1 public, urban research institution

- 31k undergraduate enrollment - 69% of students are minorities

- #2 campus for ethnic & racial diversity*

- 250 research doctorate degrees awarded in Fall 2023

- Large number of first gen & low income graduate students who have competing responsibilities (at home and at school)

*According to U.S. News & World Report

IMPORTANCE OF RESEARCHING FUNDING FOR UNLV DOCTORATES

CHALLENGES:

- FIRST GENERATION (GRADUATE) STUDENTS

- DIVERSITY - MSI, AANAPISI DESIGNATIONS

- DIVERSITY - RESEARCH STEM FIELDS AND GRADUATE PATHWAYS
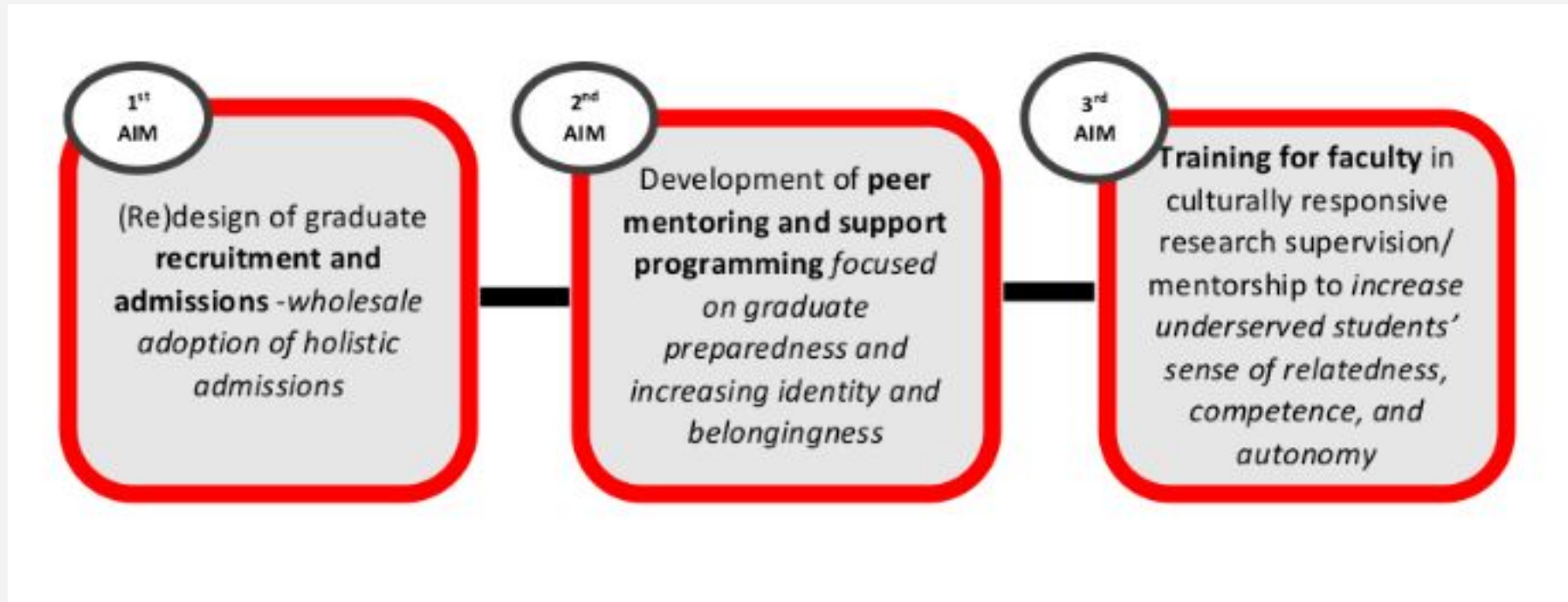
- NATIONALLY COMPETITIVE

SLOAN GRANT

Recently UNLV has been awarded SLOAN Grant for Systematic change in STEM fields – looking to better understand some of the unique challenges of UNLV Graduate students

ALFRED P. SLOAN
FOUNDATION

To catalyze and deepen systemic change activities in STEM doctoral programs nationwide to close persistent equity gaps and see all students thrive

SLOAN GRANT AIMS & OBJECTIVES

1st AIM

(Re)design of graduate **recruitment and admissions** -*wholesale adoption of holistic admissions*

2nd AIM

Development of **peer mentoring and support programming** *focused on graduate preparedness and increasing identity and belongingness*

3rd AIM

Training for faculty in culturally responsive research supervision/ mentorship to *increase underserved students' sense of relatedness, competence, and autonomy*

Alliance of Hispanic Serving Research Universities (HSRU)

A voluntary association of universities that are both Hispanic-Serving Institutions and in the top 5% of universities in the country for research.

HSRU goals are, by 2030, to:
Double the number of Hispanic doctoral students enrolled at participating universities
Increase the Hispanic professoriate by 20% at participating universities

02
DATA &
MODEL ANALYSIS

SUMMARY STATISTICS

- 751 PhD Students – AY 2005 to 2022

- College of Sciences and College of Engineering – 12 PhD programs

- 360 Students Degree Conferred, 216 Dropped out of Program, 175 Currently Enrolled

- 490 PostBaccs (230 Conferred), 261 PostMasters (130 Conferred) – add PostBaccs (embedded Masters degree)

- 631 Funded, 120 not Funded

- Graduate Assistant (GA) is a teaching or research position funded by the state

TIME TO DEGREE DEFINITION

- Time to Degree Definition*

  Time-to-Doctorate. There are two standard, published measures of time-to-doctorate.

  The first measures the total elapsed time between bachelor's degree receipt and doctorate degree receipt and can only be computed if baccalaureate year is known.

  The second time-to-doctorate variable gauges the time between entry into graduate school (in any program or capacity, and in any university) and doctoral award. Both of these measures are computed from items in the educational history section of the questionnaire.

  *Source: National Center for Education Statistics - https://nces.ed.gov/statprog/handbook/sed_keyconcepts.asp

MODEL

SUBDISTRIBUTION HAZARD FUNCTION

INTRODUCED BY FINE AND GRAY (1999)

- Frequently used to estimate subject-specific probabilities of the occurrence of an event of interest over time in the presence of competing risks

- Allows for use of observations that have not experienced any event in the model e.g. completing PhD, dropping out or taking a break

- The model looks to estimate probabilities of specific variables supporting our hypothesis – e.g. funding reduces time to degree

DATA SPECS

Variables analyzed – Funding (Research or Teaching Assistantships), Gender, Ethnicity, Age

Initial data set & analysis did include PostMasters degrees

Split the data into PostMasters and PostBachelors to better understand effects of funding

Time variable – corresponds with status variable

RESULTS: POST-MASTERS

- Engineering programs (Electrical Engineering, Mechanical Engineering, Civil Engineering) have shorter Time to Degree

- No statistical significance of Gender and Age

- Impact:
  - Being unfunded and a member of a historically underrepresented ethnic/racial category leads to longer Time to Degree

SUMMARY OF FINDINGS
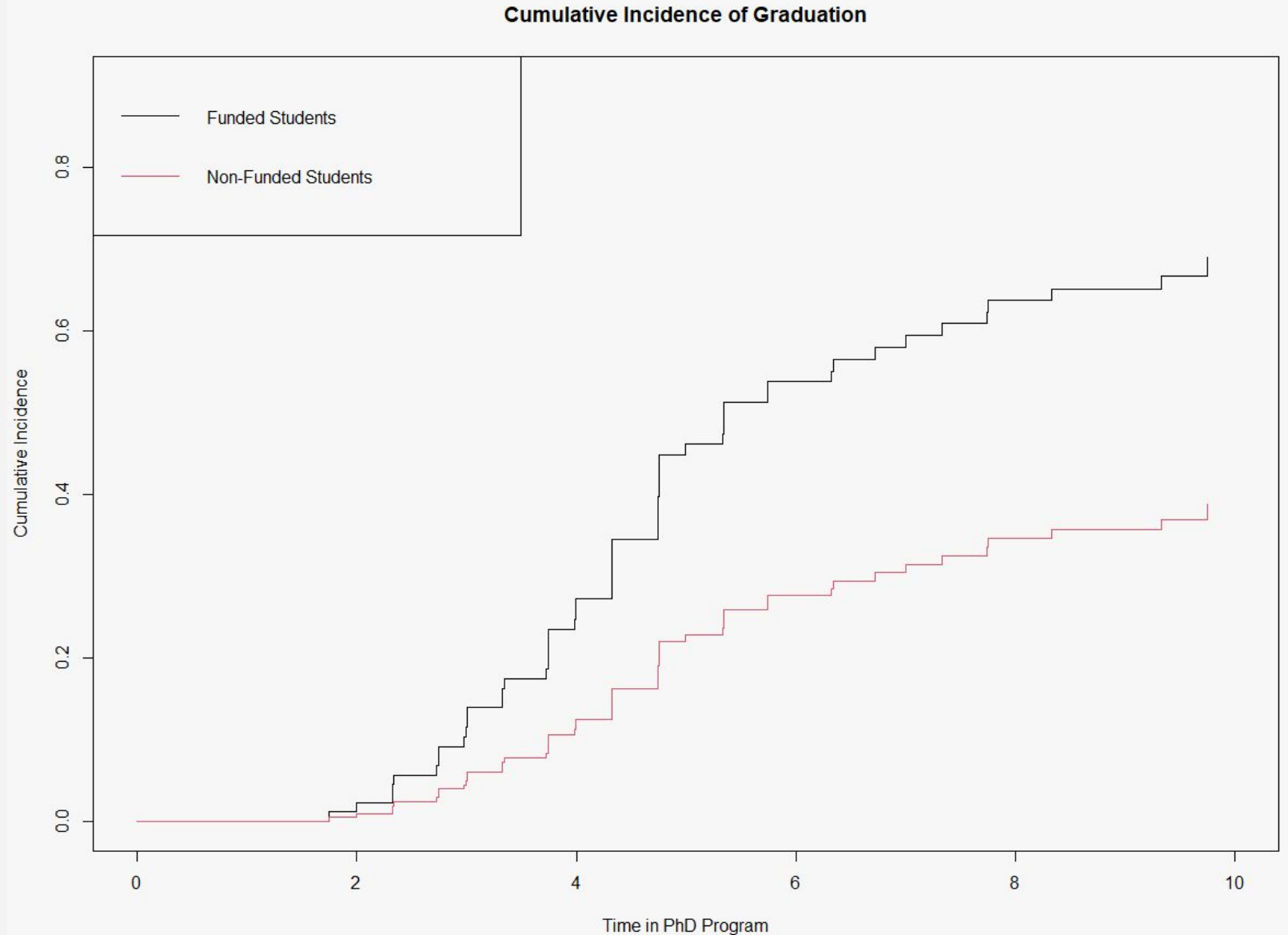
POSTMASTERS & POSTBACHELORS

Variables	Post Master Engineering Model	Post Master Science Model	Post Bachelor Engineering Model	Post Bachelor Science Model
GA Funded	2.391** (0.36)	0.683 (0.33)	1.380 (0.38)	0.910 (0.24)
Female	0.869 (0.32)	0.802 (0.24)	0.734 (0.26)	0.733* (0.17)
Underrepresented Minority	0.279** (0.57)	0.618 (0.38)	1.020 (0.31)	0.872 (0.24)
Under 30 Years of Age	1.082 (0.30)	1.453 (0.24)	0.815 (0.22)	1.796** (0.24)
Log Pseudo Likelihood	-214	-291	-412	-682
Number of Cases	99	138	181	309

Coefficients over 1 means the explanatory variable leads to a positive impact on graduation rate and graduation time, while coefficients under 1 mean the explanatory variable has a negative impact on graduation rate and graduation time. Standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1.

CUMULATIVE INCIDENCE OF GRADUATION (POSTMASTERS)
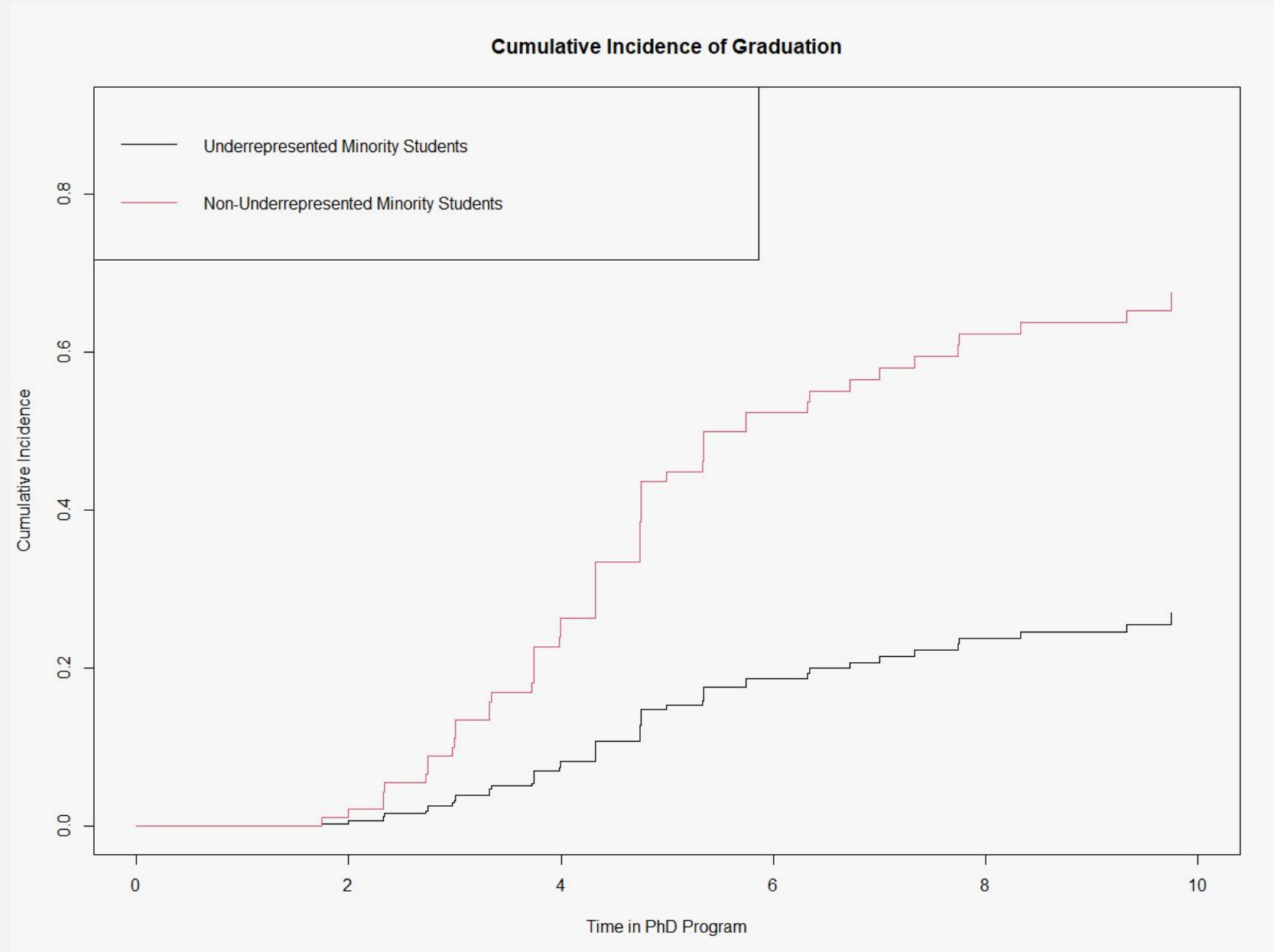
COLLEGE OF ENGINEERING – FUNDING

Differences in graduation due to UNLV funding while holding gender, ethnicity, and age at their mean value.

CUMULATIVE INCIDENCE OF STOPPING – FUNDING (POSTMASTERS)
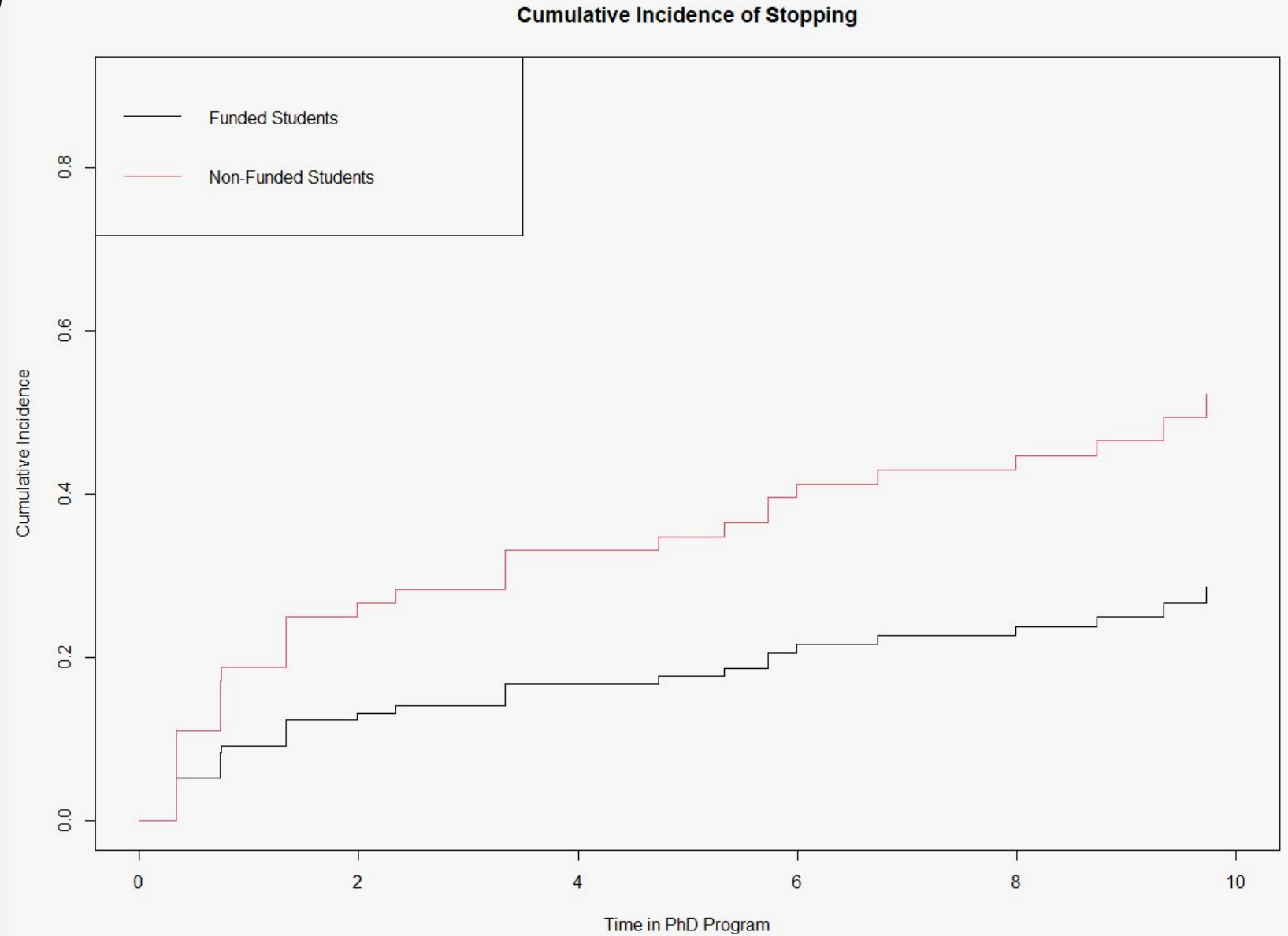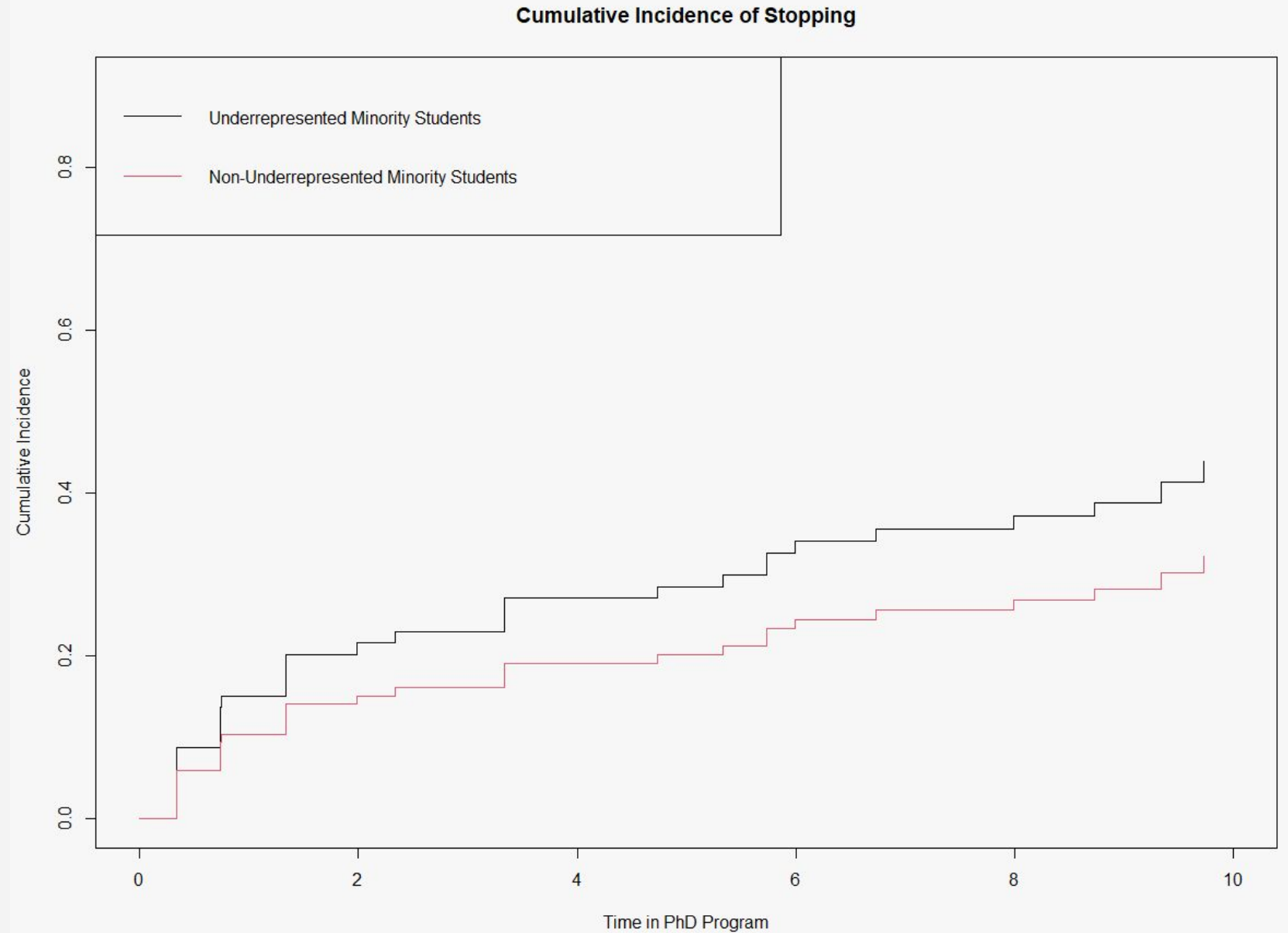
COLLEGE OF ENGINEERING - FUNDING

Differences in stopping out of program due to UNLV funding while holding gender, ethnicity, and age at their mean value.

Cumulative Incidence of Stopping

CUMULATIVE INCIDENCE OF STOPPING – ETHNICITY

COLLEGE OF ENGINEERING - FUNDING

Differences in stopping out of program by ethnicity while holding gender, UNLV funding, and age at their mean value.

Cumulative Incidence of Stopping

CUMULATIVE INCIDENCE SUMMARY

- Funded students in College of Engineering at a 4 year mark have 20% higher chance of graduating vs. non-funded students. At a 6 year graduation mark funded students have 40% higher chance of graduating.

- URM (Underrepresented Minority) students in College of Engineering at 4 year mark have 10% less chance of graduating while at 6 year mark they have 30% less chance of graduating vs. Non-Underrepresented Minority students

- Funded and Non-URM students in College of Engineering have lower incidence of Stopping out

03

CHALLENGES AND NEXT STEPS

NEXT STEPS

CONTINUE COLLECTING RELEVANT DATA

ANALYZE QUALITATIVE DATA

REVISE TIME TO DEGREE ANALYSIS – CONTINUOUS CYCLE

1

3

5

2

4

GATHER MORE DATA ON POSTGRADUATE CAREER PATHWAYS

IMPACT OF SLOAN GRANT

THANK YOU!
Questions?

*SUPPLEMENT - OBSERVATIONS BY PROGRAM & AVERAGE GRADUATION TIME

Program	Number of Total Observations	# of PhD Graduates	PostMasters				PostBachelors			
			# of Observations PM Funded	Avg Graduation Time PM Funded	# of Observations PM Non-Funded	Avg Graduation Time PM Non-Funded	# of Observations PB Funded	Avg Graduation Time PB Funded	# of Observations PB Non-Funded	Avg Graduation Time PB Non-Funded
Electrical Engineering	49	29	8	3.42	1	9.75	19	4.96	1	2.98
Mechanical Engineering	103	54	22	4.33	2	7.54	26	4.83	4	3.45
Physics	29	15	9	4.99		NA	5	4.90	1	4.34
Radiochemistry	6	40	3	5.88	4	4.37	19	5.91	14	4.71
Geosciences	57	29	11	5.98	2	5.54	14	5.80	2	4.88
Civil & Env Engineer	95	57	15	4.62	6	5.54	31	4.61	5	4.88
Biological Sciences	102	36	7	5.09	3	3.35	23	6.79	3	5.47
Chemistry	66	30	4	5.87	1	1.73	24	6.19	1	9.33
Astronomy	23	14	5	4.18	1	2.73	8	4.13		NA
Computer Science	50	12	5	4.10	2	9.50	5	6.76		NA
Informatics	7	1		NA		NA	1	6.00		NA
Mathematical Sciences	102	43	18	5.38	1	7.75	24	6.09		NA