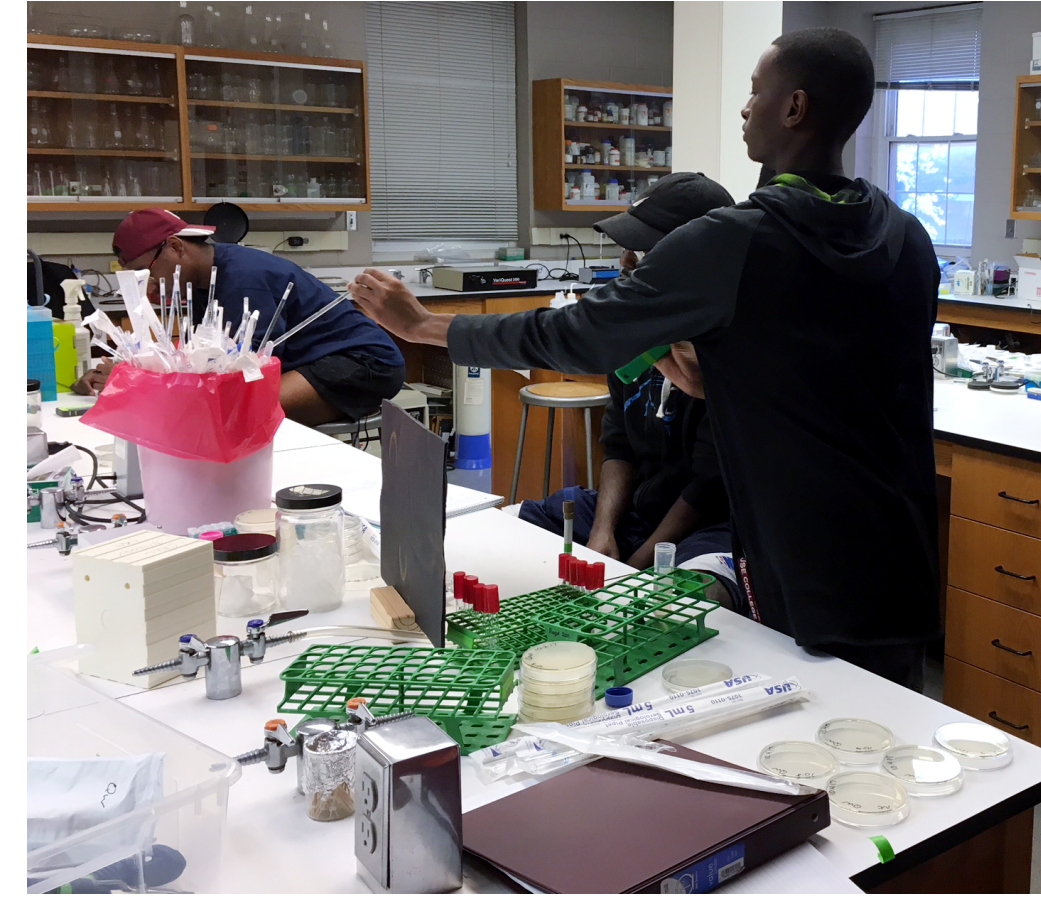


Research Immersion Improves Outcomes for Underprepared Freshmen



Alexandra Peister and Lawrence S. Blumer
Department of Biology, Morehouse College, Atlanta



Introduction

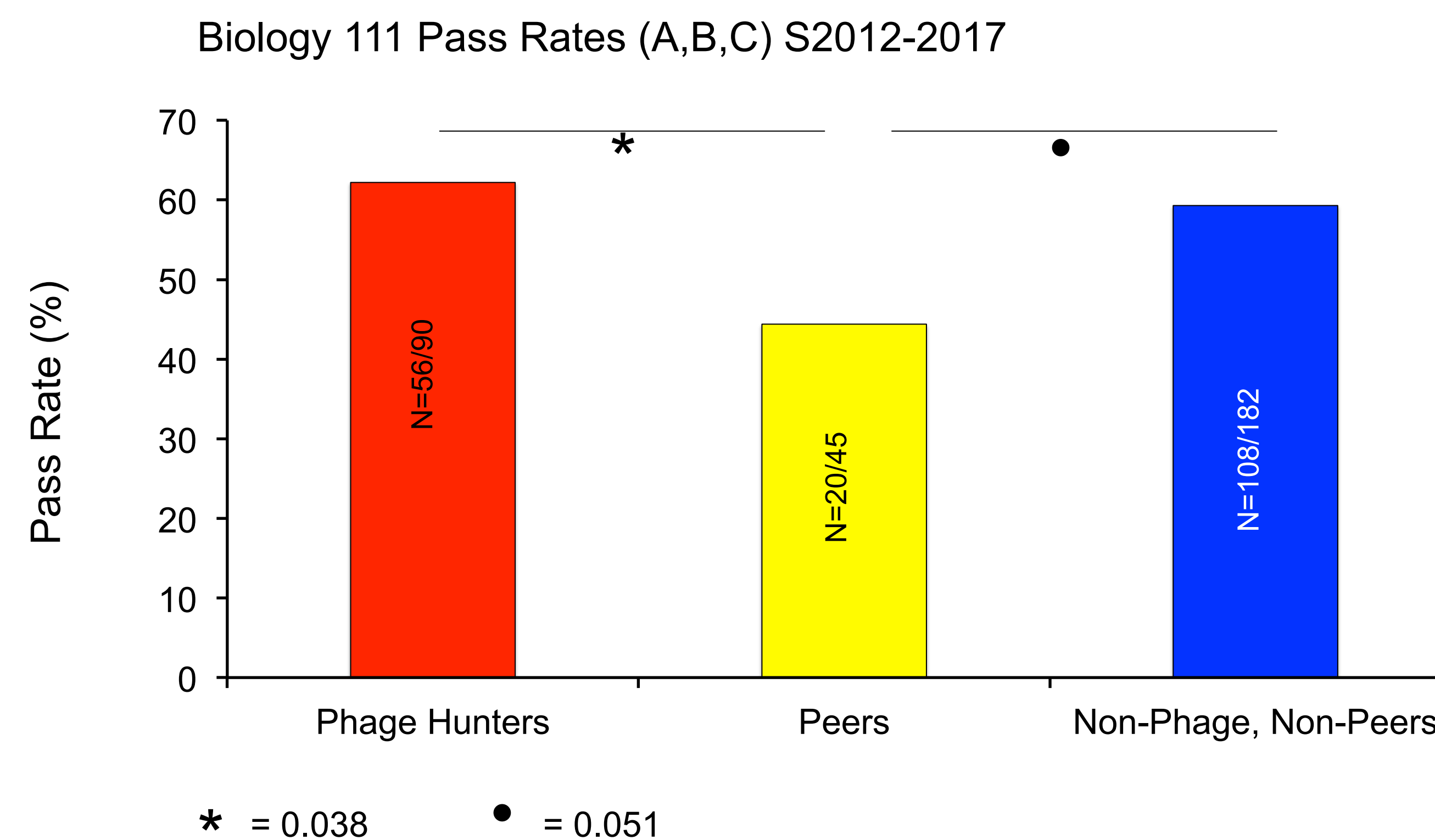
The Howard Hughes Medical Institute, Science Education Alliance – Phages program (Phage Hunters) has been successfully implemented at more than 100 colleges and universities in which freshmen conduct original research by discovering and characterizing mycobacteriophages new to science. These Phage Hunter implementations have generally involved students who are well prepared to begin college-level science training, and in many cases, honors program students. At Morehouse College, we implemented a Phage Hunters curriculum specifically targeting freshmen who were underprepared for college-level work, students who were placed in pre-college reading or pre-college mathematics for their first semester at college. In this study, we address the question, **does a semester of research immersion in the Phage Hunters course subsequently improve outcomes for students once they begin the regular Biology majors introductory course.**

Methods

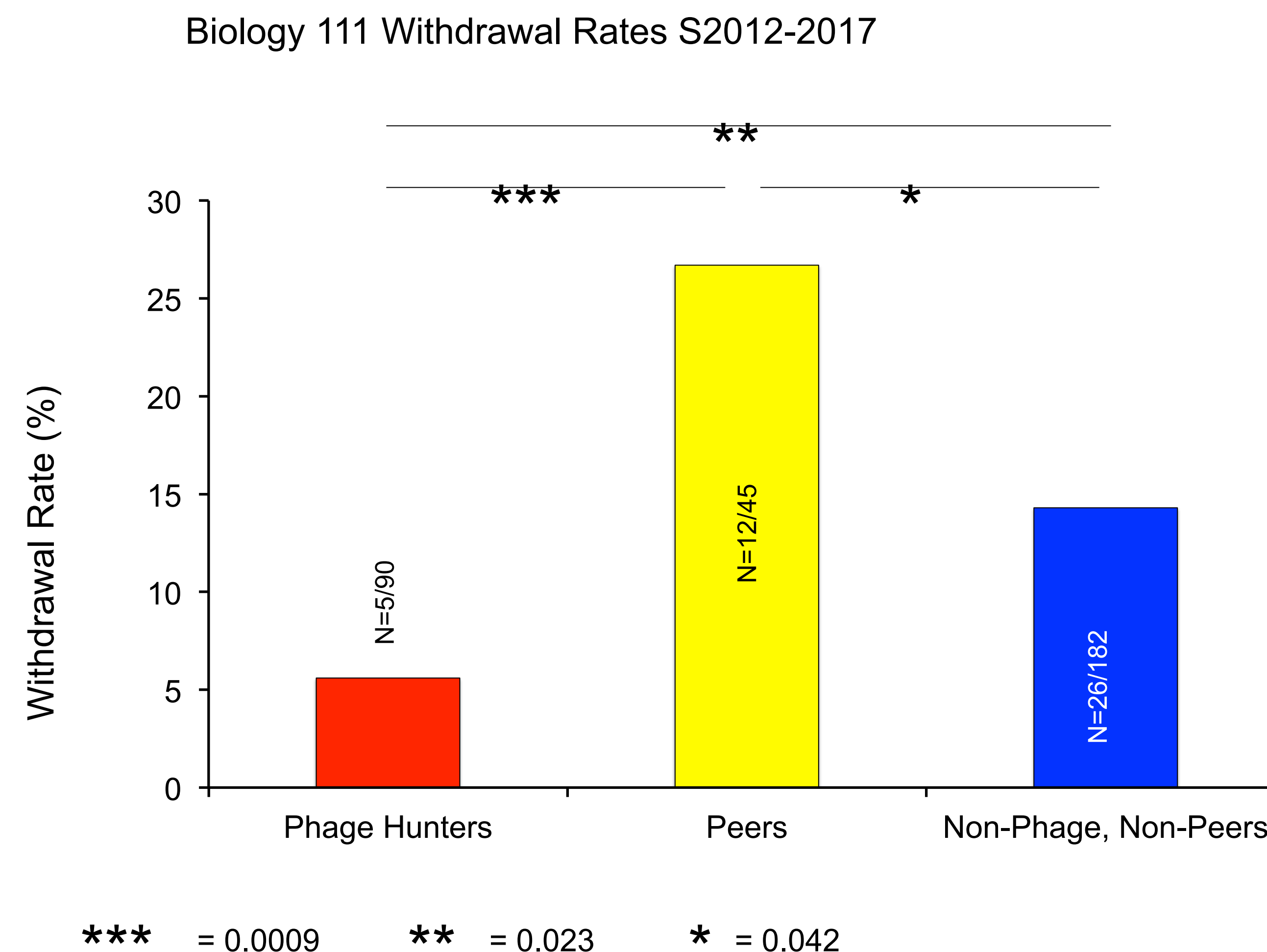
Starting in 2011, and every fall for the past 7-years, first time freshmen who declared as Biology majors but who were required to take a pre-college developmental course (reading or mathematics), were invited to apply to take an elective Phage Hunters research immersion course. Freshmen taking a developmental course are not permitted to start the regular Biology majors introductory course (BIO 111) but may do so in their second semester. We compared the performance of Phage Hunters students to their peers and non-peers in BIO 111.

Results

Phage Hunters students had a significantly greater **pass rate** than their peers (students who were not Phage Hunters but were required to take a developmental course in the first semester) but were not significantly different from non-phage non-peers.



Withdrawal rates from BIO 111 for Phage Hunters was significantly smaller than those of peers and non-phage, non-peers.



Conclusions

An authentic research immersion experience such as the Phage Hunters curriculum can significantly improve students outcomes for individuals whose college preparation requires remediation. These students are not only capable of successfully performing quality research but their subsequent success in the gateway biology majors course is significantly improved.

The full benefit of implementing a research immersion curriculum will only be realized by making these opportunities available all students, not just the very best prepared students, and particularly those students whose preparation is less than ideal.

Targeting underprepared incoming freshmen for participation in a research immersion program will improve retention in major and should be the focus of efforts to increase the success of students who have historically not fared well in STEM majors.

Acknowledgments

We thank the Department of Biology at Morehouse College for continuing to support our Phage Hunters course. This work would not have been possible without the the support of the HHMI SEA PHAGES program (www.seaphages.org).