

PROMOTION RECOMMENDATION
The University of Michigan
School of Public Health
Department of Epidemiology

Belinda Needham, assistant professor of epidemiology, Department of Epidemiology, School of Public Health, is recommended for promotion to associate professor of epidemiology, with tenure, Department of Epidemiology, School of Public Health.

Academic Degrees:

Ph.D.	2006	The University of Texas at Utah
M.A.	2002	The University of Texas at Utah
B.S.	1999	Texas A&M University

Professional Record:

2018 – Present	Co-Director, Center for Social Epidemiology and Population Health, University of Michigan, Ann Arbor
2014 – Present	Assistant Professor, Department of Epidemiology, University of Michigan
2012 – 2014	Research Assistant Professor, Department of Epidemiology, University of Michigan
2008 – 2012	Assistant Professor, Department of Sociology, University of Alabama at Birmingham

Summary of Evaluation:

Teaching: Professor Needham's teaching record is excellent as evident from her teaching scores. During her tenure at the University of Michigan, Professor Needham has taught four courses. Introduction to Social Epidemiology (EPID 514) provides a broad overview of current theoretical, methodological, and empirical work in the field of social epidemiology. Strategies and Uses of Epidemiology (EPID 503) is the department's core course for non-epidemiology students. Professor Needham has developed two of the courses she has taught. Contemporary Methods (EPID 644) is a required course that offers M.P.H. students an introduction to advanced methodologic topics in epidemiology. Race and Ethnicity in Epidemiology (EPID 804) explores theoretical and methodological issues in conducting epidemiologic research on race and ethnicity. She is also developing a new undergraduate course on racial and ethnic health disparities for winter 2019.

Professor Needham is currently the primary mentor for two doctoral students. Over the past four years, she has served on seven dissertation committees and one master's thesis committee and has supervised 12 master's capstone projects. In addition, she has mentored 13 M.P.H. students, three Dean's Research Award students, and one student in the Michigan Institute for Clinical and Health Research Summer Immersion Program. To date, her students have published eight first-authored manuscripts in peer-reviewed journals.

Research: Professor Needham is a leading scholar in the underlying biological mechanisms that link social status to chronic, age-related disease. Identifying these mechanisms is essential to advancing the field of social epidemiology. It is well accepted that members of socially

disadvantaged groups have worse mental and physical health than those who have higher social status. Professor Needham addresses this question by examining the social determinants of telomere length, a biomarker of cell aging and DNA methylation, an epigenetic mechanism that controls gene expression. In 2012, she published the first-ever study to document the association between parental socioeconomic status and telomere length in children. Building on this work, she received a pilot grant from the Michigan Bloodspot Environmental Epidemiology Program to use dried bloodspots from the Michigan Neonatal Biobank linked to birth certificate data to examine markers of maternal social disadvantage as predictors of telomere length at birth. In her recently awarded R01, Professor Needham will use National Health and Nutrition Examination Survey data to examine the relationship between DNA methylation patterns, disparities and cardiovascular mortality. Professor Needham is also involved in several projects examining DNA methylation and gene expression in the Multi-ethnic Study of Atherosclerosis. In total, Professor Needham has been the PI or MPI on grants totaling more than \$7 million. Since being appointed to her current rank, Professor Needham has been the MPI on an R01, co-PI on an NSF grant, co-investigator on one R01s and two R21 funded projects, co-investigator on an NSF RAISE award, co-investigator on a contract from the Center for Medicare and Medicaid Studies, and PI of a subcontract to an R01 awarded to MPIs at Brown University.

Professor Needham has published an impressive 52 peer-reviewed journal articles (21 first authored, 11 second authored, and 10 senior authored) and four book chapters (two first authored and two second authored). Since being appointed to her current rank in 2014, she has published 34 peer-reviewed journal articles (ten first authored, six second authored, and five senior authored) and two book chapters (one first authored and one second authored). As of March 2018, her papers have been cited 2,449 times, including eight papers that have been cited more than 100 times each. In recognition of her contributions to the field of telomere epidemiology, Professor Needham was invited to give a talk at the 2017 National Institute of Environmental Health Sciences Exploring Telomeres as Sentinels for Environmental and Psychosocial Stress and Susceptibility Workshop. She was also invited to give talks in the fall of 2018 at National Human Genome Research Institute and at the National Center for Health Statistics at the Center for Disease Control.

Recent and Significant Publications:

- Needham, Belinda L., Margaret T. Hicken, Ishtar O. Govia, Colter Mitchell, and Cleopatra M. Abdou. (2017) Maternal Social Disadvantage and Newborn Telomere Length in Archived Dried Blood Spots from the Michigan Neonatal Biobank. *Biodemography and Social Biology* 63:221-235.
- Needham, Belinda L., Briana Mezuk, Natalie Bareis, Jue Lin, Elizabeth H. Blackburn, and Elissa S. Epel. (2015) Depression, Anxiety, and Telomere Length in Young Adults: Evidence from the National Health and Nutrition Examination Survey. *Molecular Psychiatry* 20:520-528.
- Needham, Belinda L., Jennifer A. Smith, Wei Zhao, Xu Wang, Bhramar Mukherjee, Sharon L.R. Kardia, Carol A. Shively, Teresa E. Seeman, Yongmei Liu, and Ana V. Diez Roux. (2015) Life Course Socioeconomic Status and DNA Methylation in Genes Related to Stress Reactivity and Inflammation: The Multi-Ethnic Study of Atherosclerosis. *Epigenetics* 10:958-969.

Needham, Belinda L., David Rehkopf, Nancy Adler, Steven Gregorich, Jue Lin, Elizabeth H. Blackburn, and Elissa S. Epel. (2015) Leukocyte Telomere Length and Mortality in the National Health and Nutrition Examination Survey, 1999-2002. *Epidemiology* 26:528-535.

Needham, Belinda L., Ana Diez Roux, Chloe Bird, Ryan Bradley, Annette Fitzpatrick, David Jacobs, Pamela Ouyang, Teresa Seeman, Rebecca Thurston, Dhananjay Vaidya, and Steven Wang. (2014) A Test of Biological and Behavioral Explanations for Gender Differences in Telomere Length: The Multi-Ethnic Study of Atherosclerosis. *Biodemography and Social Biology* 60:156-173.

Service: Within the Department of Epidemiology, Professor Needham co-directs the Center for Social Epidemiology and Population Health (CSEPH), and is currently a member of the Recruitment Committee and the Diversity, Equity, and Inclusion Committee. At the school level, Professor Needham has served as a panelist in the Showcase on Minority Health Research and a judge for the Students Engaged in Global Health Case Competition. At the university level, she has served as a faculty representative for the Wolverine Express. Professor Needham is also a member of the Board of Directors of Hands Across the Water. She has been highly active in a wide variety of national level organizations. She is a member of the Program Committee for the 2018 Annual Meeting of the Interdisciplinary Association for Population Health Science and a session organizer and discussant for the Recent Trends in Biodemography session of the 2017 Annual Meeting of the Population Association of America. Professor Needham served as a reviewer for the 2014 Society for Epidemiologic Research Annual Meeting, and in 2015, she served as a peer reviewer for the Center for Disease Control Agency for Toxic Substances and Disease Registry. She has also served as a reviewer for the University of Washington National Institute of Environmental Health Science Interdisciplinary Center for Exposures, Diseases, Genomics and Environment Pilot Grant Program, the Robert Wood Johnson Foundation Health Policy Research Scholars Program, and the University of Michigan Older Americans Independence Center Research Education Core Scholars Program. Professor Needham's external service also includes peer reviewing for high impact journals such as the *Proceedings of the National Academy of Sciences of the United States of America*, *American Journal of Epidemiology*, *International Journal of Epidemiology*, and *American Journal of Public Health*.

External Reviewers:

Reviewer A: "I am writing to express my enthusiastic and unconditional support of the promotion of Assistant Professor Belinda Needham to the rank of Associate Professor with tenure. Professor Needham's work is some of the very best in the social demography of adolescent health, the role of gender, and detailing the biological pathways."

Reviewer B: "Dr. Needham's scholarship indicates an impressive bridge of health sociology and social epidemiology. She has explored the role of telomeres as mechanisms linking stressful life experiences to health, addressing the hypothesis that alterations in telomere length contribute to accelerated aging of disadvantaged groups. Dr. Needham led some of the earliest population based work in this domain ...She is working in a 'hot' field...I would heartily recommend her for promotion to tenured Associate Professor."

Reviewer C: “Dr. Needham has identified her niche in the important area that links health disparities with biological markers of stress. She is sort of a ‘go to’ person in this area. I believe you have an exceptional scholar at your school and hope that you can offer her the promotion she is being considered for.”

Reviewer D: “I think Professor Needham is an incredibly gifted and prolific scholar, conducting novel and sophisticated research with wide-spread social and health implications...I enthusiastically and without hesitation recommend Professor Needham for promotion to Associate Professor with tenure.”

Reviewer E: “Dr. Needham’s research centers on understanding the effect of social factors on telomere length...and DNA methylation, both of which are promising mechanisms for social disparities in health, but pose many methodological challenges. Dr. Needham has been part of some of the earliest studies in this emerging area of research. She has benefitted from the mentorship of many leading researchers, but has been successful in building on and leveraging existing high-quality data and research sources to develop her independent lines of research....Dr. Needham meets criteria for promotion to Associate Professor with tenure.”

Summary of Recommendation: Professor Needham is a productive contributor to the field of social epidemiology, finding her niche in the study of molecular biomarkers as possible mechanisms for social disparities in health. She has distinguished herself through her excellent teaching record in social epidemiology at the masters and doctoral level. She has had notable service commitments both internally, for the department, school, and university, as well as externally, at the regional and national level. It is with the support of the School of Public Health Executive Committee that I recommend Belinda Needham for promotion to associate professor of epidemiology, with tenure, Department of Epidemiology, School of Public Health.



F. DuBois Bowman, Ph.D.
Dean, School of Public Health

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