BIOGRAPHICAL SKETCH

NAME: Rehkopf, David Harold

eRA COMMONS USER NAME: rehkdav

POSITION TITLE: Associate Professor

EDUCATION/TRAINING:

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
University of Puget Sound, Tacoma, WA	B.S.	12/1994	Biology
University of California, Berkeley, CA	M.P.H.	05/2001	Epidemiology/Biostatistics
Harvard School of Public Health, Boston, MA	Sc.D.	03/2006	Social Epidemiology
Robert Wood Johnson Foundation Health & Society Scholar, University of California, San Francisco/ Berkeley, CA		08/2008	Population Health

A. Personal Statement

I am currently an Associate Professor (with tenure) at the Stanford University School of Medicine, with a courtesy appointment in Health Research & Policy. I am a member of the Center on Poverty and Inequality, and the Center for Population Health. The aim of my research is to understand the importance of the mechanisms and processes linking socioeconomic disadvantage with adult chronic disease risk and aging. My work integrates statistical and conceptual strengths of public health, economics and advanced epidemiological methods with consideration of the underlying pathobiology of aging and chronic disease. T

I trained in epidemiology and biostatistics at UC Berkeley and Harvard, with a focus in my graduate studies on advanced longitudinal, non-linear and spatial methods of data analysis. The focus of my research fellowship at UC Berkeley and UC San Francisco was on data adaptive methods of analysis as well as fixed effect and instrumental variable models. I have just (2019) completed a five year career development award from the National Institute on Aging, with a focus on how social and physical exposures earlier in the life course impact chronic diseases related to aging.

I am currently Principal Investigator on an R01 from the National Institute on Aging titled *The long-term health effects of the New Deal: An 80 years follow-up of 4 cohorts***.** The goal of this project is to examine the effects of new deal employment policies on the long-term health of children whose households and regions benefited from those policies. I am also Principle Investigator on an R21 from the National Institute on Minority Health and Health Disparities titled *Using census data linkages to study long-term impacts on disparities in DNA methylation***.** The goal of this project is to examine the effects of new deal employment policies on DNA methylation, and how this may contribute as a biological mechanism underlying health disparities.

1. Adler NE, **Rehkopf DH**. (2008). U.S. disparities in health: descriptions, causes, and mechanisms. *Annual Rev Public Health*, 29: 235-52.
2. Dow WH, **Rehkopf DH**. (2010). Socioeconomic gradients in health in international and historical context. *Annals of the New York Academy of Science* 1186:24-36.
3. **Rehkopf DH**, Modrek S, Cantley L, Cullen M. (2017). Social, psychological, and physical aspects of the work environment could contribute to hypertension prevalence. *Health Affairs* 36: 258-265.
4. **Rehkopf DH**, Adler N, Rowe J. (2017). The impact of health and education on future labour force participation among individuals aged 55-74 in the United States of America: the MacArthur Foundation Research Network on an Aging Society. *Ageing & Society* 37:1313-1337.

B. Positions and Honors

Positions and Employment

2006 Research Fellow, Harvard School of Public Health, Boston, MA
2008-2010 Adjunct Assistant Professor, Epidemiology & Biostatistics, UC San Francisco
2011-2019 Assistant Professor, Stanford University School of Medicine
2019- Associate Professor (with tenure), Stanford University School of Medicine

Other Experience and Professional Measurements

2001- Member, American Public Health Association
2005- Member, Society for Epidemiologic Research
2006- Member, Population Association of America
2011- Affiliate Member, MacArthur Research Network on an Aging Society

Honors

2000 Public Health Trainee Fellowship, University of California, Berkeley
2003 Doctoral exam, pass with honors, Harvard School of Public Health

C. Contribution to Science

1. Data linking and socioeconomic disparities in health.

As a doctoral student I worked with a research group pioneering the use of area based socioeconomic measures for monitoring health disparities. The work of this group has formed the basis of a large body of work in academia and in the practice of state and county health departments. Within this project, I lead research examining the extent of measurement error of individual characteristics when using area as compared to individual socioeconomic measures. More recently I have extended this work to link contemporaneous cohorts to early life measures and have found small but meaningful relationships between the social and economic characteristics of where individuals live early in life and chronic disease outcomes later in life. This work has advanced science by guiding the use of area based socioeconomic measures for use in monitoring health disparities and in supplementing new area level data to ongoing cohort studies.

a. Krieger, N, Chen J, Watermen P, Rehkopf DH, Subramanian SV. (2003). Race/ethnicity, gender and monitoring socioeconomic gradients in health: a comparison of area-based socioeconomic measures--The Public Health Disparities Geocoding Project. *American Journal of Public Health* 93: 1655-1671.
b. Rehkopf DH, Haughton LT, Chen JT, Waterman PD, Subramanian SV, Krieger N. (2006). Monitoring socioeconomic disparities in death: comparing individual-level education and area-based socioeconomic measures. *American Journal of Public Health* 96: 2135-2138.
c. Chen, JT, Rehkopf DH, Waterman P, Subramanian SV, Coull B, Cohen B, Ostrom M, Krieger N. (2006). Mapping and measuring social disparities in premature mortality: the impact of census tract poverty within and across Boston neighborhoods, 1999-2001. *Journal of Urban Health* 83: 1063-1084.
d. Rehkopf DH, Eisen E, Modrek S, Mokyr Horner E, Goldstein B, Costello S, Cantley L, Slade M, Cullen M (2015). Early life state of residence characteristics and later life hypertension, diabetes and ischemic heart disease. *American Journal of Public Health* 105: 1689-1695.

2. Comprehensive descriptions of social inequalities in health.

I have lead work to describe in more detail the ways in which income is related to risk factors for disease, and applied novel machine learning methods to rank the importance of social, economic, behavioral and biological factors for predicting health risks. This work has two fundamental contributions to advancing our understanding of income differences in health. First, this work has clarified that these income differences are specific to time, place and outcome examined. The fact that not all risk factors for disease are associated with income differences helps to clarify which causes may be most responsible for income differences in health and which are not. Secondly, my work has clarified that complementary approaches to the use of traditional regression models examining one outcome at a time may be beneficial for understanding determinants of health. This includes models that account for higher order interactions between variables as well as approaches for accounting for examining multiple outcomes with a single exposure variable.

a. Rehkopf DH, Krieger N, Coull B, Berkman L. (2010). Biological Risk Markers for Coronary Heart Disease: Nonlinear Associations With Income. *Epidemiology* 21:38-46.
b. Rehkopf DH, Dow WH, Rosero-Bixby L. (2010). Differences in the association of cardiovascular risk factors with education: a comparison of Costa Rica (CRELES) and the United States (NHANES). *Journal of Epidemiology and Community Health* 64: 821-828.
c. Patel, C. J., Ioannidis, J. P., Cullen, M. R., & Rehkopf, D. H. (2015). Systematic Assessment of the Correlations of Household Income With Infectious, Biochemical, Physiological, and Environmental Factors in the United States, 1999–2006. *American journal of epidemiology*, kwu277.
d. Rehkopf DH, Laraia BA, Segal M, Braithwaite A, Eppel ES. (2011). The relative importance of predictors of BMI change, overweight and obesity in adolescent girls. *International Journal of Pediatric Obesity* 6:e233-42.

3. Income Policy and healthy aging.

I have lead approaches that use quasi-experimental approaches to understand the ways in which income and earnings affect health risks. First, I have lead a number of studies examining the impact of the Earned Income Tax Credit on health. This is the largest anti-poverty program in United States, but prior to my work there was very little examination of the health impacts of this program. My work in this area uses temporal and spatial differences in the generosity of the credit in order to identify the effects of the program and the effects of poverty reduction. The impact on science has been establishing stronger evidence that there is a causal connection between poverty and poor health, and that this relationship is not solely due to selection or the effects of health on earnings. I also am the co-lead of a study examining the effects of paying a living wage to factory workers in the Dominican Republic. Through new primary data collection we are evaluating the health effects of a factory that had a 3.5-fold increase in wages. This also represents an evaluation of an actual private sector policy, the results from which have clear implications for what actions can be taken to improve health through addressing social determinants of disease.

a. Landefeld, J. C., Burmaster, K. B., Rehkopf, D. H., Syme, S. L., Lahiff, M., Adler-Milstein, S., & Fernald, L. C. (2014). The association between a living wage and subjective social status and self-rated health: A quasi-experimental study in the Dominican Republic. *Social Science & Medicine*, *121*, 91-97.
b. Strully K, Rehkopf DH, Xuan Z. (2010). Liberal welfare state policies and health: the effect of the earned income tax credit on child well-being. *American Sociology Review* 75: 534-562.
c. Bruckner T, Rehkopf DH, Catalano R. (2013). Income Gains and Very Low Weight Birth among Low-income Black Mothers in California. *Biodemography and Social Biology* 59:141-56.
d. Rehkopf, D. H., Strully, K. W., & Dow, W. H. (2014). The short-term impacts of Earned Income Tax Credit disbursement on health. *International journal of epidemiology*, dyu172.

4. Life course determinants of chronic disease risk.

I have lead multiple analyses examining how early life social position and social position across generations effects long-term chronic disease. Much of this work has specifically focused on the weight gain during pregnancy as a potential mediator of maternal and offspring long term health. Work in this later domain was all done in close collaboration with Barbara Abrams. We have also added a survey instrument on Adverse Childhood Experiences (ACE) to the National Longitudinal Survey of Youth (NLSY) to examine how ACEs impact maternal health and the subsequent health of their children.

a. Chaffee, B. W., Abrams, B., Cohen, A. K., & Rehkopf, D. H. (2015). Socioeconomic disadvantage in childhood as a predictor of excessive gestational weight gain and obesity in midlife adulthood. *Emerging themes in epidemiology*, *12*(1), 4.
b. Robinson CA, Cohen AK, Rehkopf DH, Deardorff J, Ritchie L, Jayaweera RT, Coyle JR, Abrams B. (2014). Pregnancy and post-delivery maternal weight changes and overweight in preschool children. *Preventative Medicine*; 60:77-82.
c. Rehkopf DH, Headen I, Coyle J, Hubbard A, Deardorff J, Kesavan Y, Cohen A, Patil D, Ritchie L, Abrams B (2016). Adverse childhood experiences and later life adult obesity and smoking in the United States. *Annals of Epidemiology* 26: 488-492.
d. Zilko, C. E. M., Rehkopf, D., & Abrams, B. (2010). Association of maternal gestational weight gain with short-and long-term maternal and child health outcomes. *American journal of obstetrics and gynecology*, *202*(6), 574-e1.

5. Biological pathways of aging.

I have lead work to examine the underlying biological pathways of aging, and how these develop over the life course. Initially this work has focused on telomere length as an indicator of aging, with more recent ongoing work expanding into DNA methylation as a potential mechanism. The scientific contribution of this work is to understand how social environments and life course exposures become embodied to cause socioeconomic differentials in health in later life. The impact of this work is for gaining a more accurate estimate of the amount of health variation that is caused by differences in the environment, as well as to inform the approaches by which we can estimate these environmental impacts.

a. Rehkopf DH, Dow WH, Rosero-Bixby L, Lin J, Epel E, Blackburn EH. (2014). Seasonal variation of peripheral blood leukocyte telomere length in Costa Rica: a population based observational study. *American Journal of Human Biology* 26:367-75.
b. Rehkopf DH, Dow W, Rosero-Bixby L, Lin J, Epel E, Blackburn E. (2013). Longer leukocyte telomere length in Costa Rica's Nicoyan Penninsula: A population based study. *Experimental Gerontology* 48:1266-73.
c. Needham, B. L., Adler, N., Gregorich, S., Rehkopf, D., Lin, J., Blackburn, E. H., & Epel, E. S. (2013). Socioeconomic status, health behavior, and leukocyte telomere length in the National Health and Nutrition Examination Survey, 1999–2002. *Social science & medicine*, *85*, 1-8.
d. McEwen LM, Morin AM, Edgar RD, MacIsaac JL, Jones MJ, Dow WH, Rosero-Bixby L, Kobor M, Rehkopf DH (2017). Differential DNA methylation and lymphocyte proportions in a Costa Rican high longevity region. *Epigenetics Chromatin* 10:21.

Complete List of Published Work in MyBibliography:
http://www.ncbi.nlm.nih.gov/sites/myncbi/1XYn9nJx4605w/bibliography/47899074/public/?sort=date&direction=ascending

D. Research Support

U54 MD010724 Cullen/Maldonado (PI) 04/01/2016-03/31/2021
NIH/NIMHD
Stanford Precision Health for Ethnic and Racial Equality (SPHERE)
The Stanford Precision Health Equity in Race and Ethnicity (SPHERE) Center will explore how genetic and other biologic differences can be identified and applied to narrow enormous social and economic disparities at a time when more affluent members of society are increasingly taking advantage of advanced technologies.
Role: Co-Investigator

R01 AG026291 Cullen (PI) 07/01/2016-06/30/2021
NIH/NIA
Disease, disability and death in the aging workforce
The goal is to describe the covariance of chronic disease health outcomes with industrial plant and region specific social and economic exposures, and more precisely assess the association of contextual variables with health outcomes. I lead aspects of the project related to measuring social and economic exposures over the life course in relation to chronic disease outcomes.
Role: Co-Investigator

R01 MD011721 Needham/Rehkopf (PI) 08/16/2017-05/31/2022
NIH/NIMHD
Race/Ethnicity, DNA Methylation, and Disparities in Cardiovascular Mortality: NHANES 1999-2002
US blacks are more likely to die from cardiovascular disease (CVD) than US whites. This study will help determine whether black/white differences in DNA methylation help explain why blacks are more likely than whites to die from CVD. Because DNA methylation is potentially modifiable, results from this work could be used to develop interventions to improve cardiovascular health and reduce disparities in cardiovascular death.
Role: PI

R01 HD090014 Osypuk (PI) 09/19/2017-05/31/2021
NIH/NICHD
Health, Neighborhood Context, and Mobility
This project will test whether health-related barriers to employment mediate and moderate the effects of a social experiment of housing and neighborhood relocation on economic mobility, among adolescents, young adults, and their mothers. This knowledge will inform the next generation of social policy, e.g., to provide guidance on augmenting housing counseling assistance services to include health-related additional program supports and cross-sectoral services (e.g. health management or substance use treatment services) for vulnerable families.
Role: Co-Investigator

SLOAN 57424000 (Modrek, PI) 04/01/2018-08/31/2019
Alfred P. Sloan Foundation
The intergenerational effects of the Works Progress Administration on Disability and Retirement outcomes
The goal of this project is to understand the impact of the generosity of Works Progress Administration spending for households and how that impacted the later life disability and retirement outcomes for children living in those households
Role: Co-Investigator

HRTFRD (Rowe, PI) 01/01/2019 – 09/30/2019
Hartford Foundation/Columbia University
State based differences in the well-being of older persons and their relation to aging related supports and services
We will conduct a State based analysis of differences in the health of older persons as well as the policies and programs relevant to their well-being. The result will be an evidence-based metric of the relative degree to which individual States are prepared to support their current and future populations of older persons across a variety of domains including economic security, access and quality of health care, societal cohesion and social supports and engagement and productivity.
Role: Co-investigator

R21 MD013296-01 (Rehkopf/Assimes, PI) 07/01/2018-06/30/2020
NIH/NIMHD
Using census data linkages to study long-term impacts on disparities in DNA methylation
The goal of this project is to examine the effects of new deal employment policies on DNA methylation, and how this may contribute as a biological mechanism underlying health disparities.
Role: Principal Investigator

R01 AG05971 (Rehkopf/Modrek, PI) 04/01/2019-03/30/2024
NIH/NIA
The long-term health effects of the New Deal: An 80 years follow-up of 4 cohorts
The goal of this project is to examine the effects of new deal employment policies on the long-term health of children whose households and regions benefited from those policies.
Role: Principal Investigator

75917 (Singer, PI) 12/01/2018-11/30/2020
The Robert Wood Johnson Foundation
Corporations and Public Health
Major Goals: Collect information on all shareholder proposals submitted at publicly traded companies in the United States between 2013 and 2018 that are related to public health concerns and categorize whether these shareholder proposals were directed towards actions that primarily focused on benefits to (1) firm employees, (2) customers of the firm, or (3) the general public in order to stimulate ideas around innovative company responses to public health concerns
Role: Co-Investigator

SOCIAL SECURITY ADMINISTRATION (Rehkopf, PI) 05/04/2018-05/03/2019

Working trajectories, health, and patterns of disability and retirement.

The goal of this project is to investigate the role of health in the relationship between working trajectories and retirement age through the construction of detailed health trajectories of a cohort of workers over many years.
Role: Co-Investigator