Throughout the State and Across the Life Course: Studies of Health and Aging in Wisconsin

Michal Engelman
Institute on Aging Colloquium
September 27, 2023
The WLS Cohort
The 1957 Graduates
Longitudinal Follow Up


**Sample:** 10,317 graduates, randomly selected 9,571 siblings
Unique Features

- Longest running cohort study in the United States
- Committed Participants: 80-90% respond each time we ask
- Breadth and depth of data
The Power of Longitudinal Data

Long-Term Effects of Local-Area New Deal Work Relief in Childhood on Educational, Economic, and Health Outcomes Over the Life Course: Evidence From the Wisconsin Longitudinal Study
Sepideh Modrek, Evan Roberts, John Robert Warren, and David Rehkopf

Health, Wealth, and Voting Trajectories in Later Life
Michal Engelman, PhD, Won-tak Joo, MA, Jason Fletcher, PhD, and Barry Burden, PhD

School Context in Adolescence and Cognitive Functioning 50 Years Later
Sara M. Moorman, Emily A. Greenfield, and Sarah Garcia

Effect of childhood proximity to lead mining on late life cognition
Mark Lee, Haena Lee, John Robert Warren, Pamela Herd
WLS first asked participants to identify their race/ethnicity in 2004.

Nearly 99% checked “White.”

The second most frequent answer, American-Indian or Alaska Native, was chosen by 0.5%.

The remaining half-percent described themselves as Black, Asian, Hispanic, or other.
Diversity, Inclusion, and Aging in the Midwest: Opportunities for New Directions (DIAMOND)

Buscamos Latinos de 65 años o más para participar en una entrevista en el marco de un proyecto de investigación.

¿Sabías que?: A pesar del rápido crecimiento de la comunidad Latina en Wisconsin, se sabe muy poco sobre sus historias de vida, salud, experiencias de envejecimiento y necesidades.

Si tú tienes:
- 65 años o más
- Te consideras Latino
¡Queremos aprender de ti!

Te invitamos a participar en una entrevista presencial, telefónica o virtual para el proyecto “Nuestras Experiencias en Wisconsin: aprendiendo sobre los Latinos de 65 años o más”, que forma parte de la Encuesta Longitudinal de Wisconsin.

Center for Demography of Health and Aging
University of Wisconsin-Madison
The Hmong Population

- During the Vietnam War, recruited by U.S. CIA to fight a “Secret War” in Laos
- After US retreat, Hmong were persecuted and escaped from Laos to Thai refugee camps.
- 1975-2000: Resettled as refugees by US, primarily in CA, MN, and Wisconsin
- Wisconsin’s 58,000 Hmong comprise its largest Asian population

Source: Wisconsin Historical Society
Challenges and Barriers to Research Participation

- National surveys rarely identify Hmong as distinct subgroup
- Limited English speaking proficiency and limited translation resources
- Low literacy rates in English and Hmong (oral culture) – written surveys require support from helpers
- SES disadvantage (53% High School or less; 20.3% in poverty)
- Lack of familiarity with and mistrust of research

Sources: Ledesma (2016); Pew Research Center (2021); Lor & Bowers (2018); Lor et al. (2020)
Hmoob Lub Neej (Hmong People’s Lives)

Goal: To increase the representation of Wisconsin’s Hmong community in health research

Outcomes:
- To develop knowledge for and about the Hmong community
- To produce data using a collaborative process that centers Hmong voices

Methods: Life history interviews, followed by survey
Life History Interviews

“When We Arrived in this Country, We Were Already Very Old”: Health and Aging in Wisconsin’s Hmong Refugee Community

Abstract

[...] Participants’ narratives link life-course hardships with physical and mental health challenges, generating a historically and culturally-specific delineation of trauma as both individual and collective experiences. Our analysis situates individual trauma within broader geopolitical and institutional circumstances and demonstrates that familial and communal ties – and their absence – are sources of both tension and resilience in this population.

The goal of this qualitative analysis isn’t just to diversify the WLS: It’s to more accurately capture what Wisconsin – and its aging populations – now looks like.
Wisconsin No Longer Looks Like It Did in 1957: Survey of the Health of Wisconsin (SHOW)
SHOW Sample

- Representative sample of urban and rural Wisconsin residents. Oversampling of Black young adults in Milwaukee via extensive community partnerships
- Includes physical measurements and biorepository with whole blood samples.
The Life Course of People and Places

Exposure to neighborhood (dis)advantage accumulates over time, a function of both individual residential histories and changes in neighborhood characteristics including composition and the physical, built, and social environment.

Neighborhoods may impact health inequities via a process of “weathering,” whereby poor environmental conditions, accumulated stresses, and lack of resources render individuals and sub-populations vulnerable to disease and mortality.
Weathering and Epigenetic Clocks

- The weathering hypothesis posits that health inequities result from the biological embodiment of exposure to economic hardships, discrimination, and social marginalization.

- Epigenetic markers – and particularly clocks measuring accelerated biological aging via DNA methylation – are the newest frontier in this field of research.
Research on Epigenetics, Weathering, and Residential Disadvantage (REWARD)

Goal: Understand whether and how exposure to cumulative contextual (dis)advantage shapes health inequities via epigenetic mechanisms.

Specifically, REWARD focuses on

- Characterizing cumulative contextual exposures by constructing long-term residential histories and linking them to indicators of neighborhood (dis)advantage
- Measuring accelerated biological aging via multiple DNA methylation (DNAm) clocks
- Exploring linkages between contextual exposures and biological outcomes for insight into potential mechanism of weathering.
Number of Residences by Race/Ethnicity
Moves and Durations

- NH White
- NH Black
- Hispanic
- NH Other
Typologies of Residential Disadvantage Sequences

Majority Advantaged

Majority Mid-Advantaged

Majority Mid-Disadvantaged

Majority Disadvantaged

Frequent Movers/Short Add.
Trajectories of Residential Disadvantage, by Cohort & Race

Trajectories analysis by Christina Kamis
GrimAge: A 40 year old urban Black urban resident in Wisconsin has the biological age profile of a 44 year old white Wisconsinite.

The Black-White gap in epigenetic age increases across age/cohorts.
Significant difference in accelerated biological aging across levels of cumulative neighborhood disadvantage in multiple Epigenetic clocks

Compared to the 1st quintile (least disadvantage) those in the 5th quintile of neighborhood disadvantaged on average aged 1.78 years faster using PhenoAge clock, and 1.90 years faster using GrimAge clock.

Preliminary results suggestive of differences in epigenetic aging across racial groups and residential environments.

Further research needed to help us understand how our bodies respond to physical and social environments.
The WLS Team

**Principal Investigators**
Pamela Herd, PhD  
Sanjay Asthana, MD  
Michal Engelman, PhD

**WLS Staff**
Carol Roan, PhD  
Stan Howald  
Joe Savard  
Kamil Sicinski, PhD

**Collaborators**
Sara Moorman, PhD  
Yue Qin, MA

**UW Survey Center**
Kerryann DiLoreto & entire staff

**DIAMOND-Hmong**
Maichou Lor, PhD (co-PI)  
Lisa Vang  
Mai Zoua Xiong  
Interviewers and Translators

**DIAMOND-NEW**
Sabrina Sanchez, MPH  
Johanna Nunez

**Funding**
NIA R01 AG060737; R24 AG077012  
UW-Madison OVCRGE and WARF
The REWARD Team

Principal Investigators
Michal Engelman, PhD
Kristen Malecki, PhD

Researchers
Joseph Clark, PhD
Christina Kamis, PhD
Wei Xu, PhD

Graduate Students
Megan Agnew, MPH
Rachel Pomazal
Sarah Salas, MA

SHOW Staff
Andy Bersch, MS
Maria Nikodemova, PhD
Amy Schultz, PhD

Consultants
Reid Alisch, PhD
Steve Horvath, PhD
Thomas McDade, PhD

Funding
PERC 233 AAG9971 (SHOW)
NIA R01 AG061080 (REWARD)
NIA P30 AG017266 (CDHA)
NIA 5T32 AG000129 (Training)
Thank you

Questions? mengelman@wisc.edu

To learn more about the Wisconsin Longitudinal Study: 
https://wls.wisc.edu/

To learn more about the Survey of the Health of Wisconsin: 
https://show.wisc.edu/