VICTORIA KNUTSON

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EDUCATION

University of Washington, Seattle, WA *September 20 - December 25*
PhD, Biostatistics

St. Olaf College, Northfield, MN *September 16 - May 20*
Major: Mathematics, Concentration: Statistics

RESEARCH EXPERIENCE

Postdoctoral Scholar *January 26 - Present*
Gates Foundation
Advisor: Dr. Jon Wakefield

- Developer on the sae4health R Shiny app for Small Area Estimation of health indicators in Africa, enabling non-statisticians to create subnational estimates and inform policy.
- Worked on Small Area Estimation model development toward the reliable estimation of health and mortality indicators in low- and middle-income countries (LMICs) using Demographic Health Survey (DHS) data

Research Consultant *June 21 - December 25*
World Health Organization
Advisor: Dr. Jon Wakefield

- Worked in collaboration with World Health Organization (WHO) Technical Advisory Group on COVID-19 Excess Mortality Estimation
- Created and implemented a modeling framework incorporating different types of global mortality data, with varying patterns of missingness and temporal granularity, toward the estimation of excess mortality during the COVID-19 pandemic period of 2020-2023
- Managed the continuously updating global dataset of mortality data using SQL and proper database management and security principles
- Used small area estimation methods of survey analysis and spatial statistics to estimate under-5 mortality (U5MR) globally using Demographic Health Survey (DHS) data for the United Nations

Research Assistant *January 23 - May 23*
Supervisor: Dr. Emily Godfrey, Department of Family Medicine

- Outlined and implemented the clinical trial statistical analysis plan (SAP) regarding the longitudinal effect of anticipatory counseling on early discontinuation of intrauterine devices (IUDs)
- Clinical trial database management in REDCap

Research Assistant *January 21 - December 22*
MESA Air Lab
Supervisor: Dr. Joel Kaufman, Department of Environmental & Occupational Health Sciences

- Developed and implemented models for national particulate matter 2.5 species concentrations for use in PRESTO birth outcomes study
- Developed constraint-based clustering algorithms and other machine learning techniques in PyTorch for the detection of unique clusters of air pollutant exposures in their association with health outcomes

– Implemented code updates and maintenance on the *SpatioTemporal* R package as co-author

Center for Interdisciplinary Research Fellow, St. Olaf College *September 19 - May 20*
Project: Doctor Behavior around End-Of-Life Counseling
Faculty Advisors: Dr. Sharon Lane-Getaz and Ashley Hodgson

– Identified influential factors in doctor's recommending Medicare patients to hospice care

– Used electronic health records (EHR) and Medicare claims data to identify influential factors in doctor's recommendation of patients to hospice care

– Managed and cleaned EHR data for analysis, performed quality checks, and ran exploratory analyses of unstructured text using natural language processing (NLP)

Mathematics Practicum, St. Olaf College *January 20*
Project: Developing a Continuous Liver Transplant Allocation System
Domain Advisor: Dr. Jon Snyder, Faculty Advisors: Dr. Matthew Richey and Matthew Wright

– Researched models for a liver transplant allocation system without geographic boundaries, guided by influential factors contributing to waitlist and post-transpant patient outcomes

– Used geographically weighted regression to analyze the relationships between liver health severity scores at transplant, time on the waitlist, and mortality on the waitlist across the continental US

NSF funded REU, Dordt University, Sioux Center, IA *May 19 - August 19*
Project: Impact of Parental Dysfunction and Support in Adult Psychopathology in Ukraine (manuscript pending)
Faculty Advisors: Dr. Nathan Tintle and Dr. Luralyn Helming

– Collaborated with faculty and peer researchers to study mental health in Ukraine using cross-sectional survey study data from WHO's World Mental Health CIDI Questionnaire

– Employed causal methods to study the moderating and mediating effects of parental dysfunction and emotional support in the development of mental health disorders

– Traveled to Ukraine to meet with study directors at Kiev International Institute of Sociology

NSF funded REU, Valparaiso University, Valparaiso, IN *May 18 - August 18*
Project: Optimizing the Creditworthiness Threshold of a Bivariate Distribution
Faculty Advisor: Dr. Hui Gong

– Optimized creditworthiness thresholds based on standard loan profit function given various bivariate distributional assumptions

– Approximated realistic values of creditworthiness threshold for mixture distributions using simulations in R

– Presented findings at the 2018 Indiana Undergraduate REU Conference in Bloomington, IN and the 2019 Joint Mathematics Meeting in Baltimore, MD.

RESEARCH SPECIALIZATIONS

Bayesian statistics, hierarchical modeling, demographic statistics, infectious disease modeling, spatial analysis and statistics, global health, linear models, survival analysis, clinical trial design and analysis, data visualization, predictive modeling

PUBLICATIONS

ACCEPTED

1. **Knutson, V.E.**, Aleshin-Guendel S., Karlinsky A., Msemburi W., Wakefield J. (2022). Estimating Global and Country-Specific Excess Mortality during the COVID-19 Pandemic. *Ann. Appl. Stat.* 17 (2) 1353 - 1374, June 2023. https://doi.org/10.1214/22-AOAS1673
2. Msemburi W., Karlinsky A., **Knutson, V.E.**, Aleshin-Guendel S., Chatterji S., Wakefield J. (2022). The WHO estimates of excess mortality associated with the COVID-19 pandemic. *Nature* 613, 130–137 (2023). https://doi.org/10.1038/s41586-022-05522-2
3. Sack C., Wang M., **Knutson V.**, Gassett A., Hoffman E.A., Sheppard L., Barr R.G., Kaufman J.D., Smith B. Airway Tree Caliber and Susceptibility to Pollution-associated Emphysema: MESA Air and Lung Studies. Am J Respir Crit Care Med. 2024 Jan 16. doi: 10.1164/rccm.202307-1248OC
4. Wakefield, J., & **Knutson, V.**(2024). Excess mortality estimation. Annual Review of Statistics and Its Application. https://doi.org/10.1146/annurev-statistics-112723-034236
5. Godfrey, E., **Knutson, V.**, Guijosa, L., Shimkin, G., Patel, A., Benson, L., Rible, R. (2025). Anticipatory counseling of hormonal IUDs via video in ambulatory care settings: A quasi-experimental controlled study. American Journal of Obstetrics & Gynecology.

DISSERTATION

Knutson, V. (2025). Statistical methods for excess mortality estimation with variable data availability and completeness [University of Washington: Doctoral Thesis]. https://digital.lib.washington.edu/researchworks/collections/f241a304-4fb0-423b-93a6-31c597c8784a

TEACHING EXPERIENCE

UW Pre-Doctoral Instructor for Biostatistics 504 *September 24 - December 24*
Foundations of Public Health

– Lead classes and prepared course materials on the foundational concepts of research in public health

UW Teaching Assistant for Biostatistics 555 *January 24 - March 24*
Statistical Methods for Spatial Epidemiology *Faculty: Dr. Jon Wakefield*

– Graded homework, held office hours, and taught auxiliary classes

UW Teaching Assistant for Biostatistics 310 *September 20 - December 20*
Biostatistics for Health Sciences *Faculty: Dr. Lloyd Mancl*

– Graded homework and hosted biweekly discussion sessions

OPEN-SOURCE CODE

Wu, Y., Li, R., Xu, J., **Knutson, V .**, Wakefield, J. (2025). sae4health: Small Area Estimation for Key Health and Demographic Indicators from Household Surveys. GitHub. `https://github.com/wu-thomas/sae4health`

Knutson, V ., Biondi, N. (2025). Estimating WHO age- and sex- disaggregated excess mortality associated with the COVID-19 pandemic. GitHub. `https://github.com/WorldHealthOrganization/Excess_mortality_COVID19`

Knutson, V. (2023). WHO COVID-19 Excess Mortality Estimates Code and Data. GitHub. `https://github.com/WHOexcessc19/Codebase`

Knutson, V., Lindstrom, J., Szpiro, A., Sampson, P.D., Bergen, S., Oron, A.P. (2022). `https://github.com/cran/SpatioTemporal`

GRANTS, FELLOWSHIPS, AND HONORS

University of Washington

- 2020-2022 Biostatistics, Epidemiologic and Bioinformatic Training in Environmental Health Training Grant

St. Olaf College

- 2020 Senior Distinction in Mathematics
- 2016-2020 Buntrock Scholar

MinneAnalytics

- 2019 MinneMUDAC Data Science Challenge Finalist

Joint Mathematics Meeting

- 2019 Outstanding Poster Award

National Science Foundation

- 2019 NSF Dordt College REU
- 2018 Valparaiso University REU

RESEARCH PRESENTED

A Statistical Approach to Death Distribution Methods for Estimating Completeness of Adult Vital Registration Data. Conference talk. Presented to the Population Association of America 2026 Conference, New Orleans, USA (8 May 2026).

Keynote address. Presented to the "Bridging methods to measure excess, One epidemic, many estimates (1EME)" Conference, London School of Economics, UK (21-22 May 2026).

Methods for WHO Age-Sex Excess Mortality Estimates. Webinar. Presented to the WHO Technical Advisory Group on COVID-19 Excess Mortality, online (16 January 2025).

COVID-19 Longitudinal Excess Mortality Model. Webinar. Presented to the WHO Technical Advisory Group on COVID-19 Excess Mortality, online (19 August 2021).

Parental Dysfunction and Support in Ukraine. Conference talk. Presented at the National Conference on Undergraduate Research, Alexandria, VA (28 October 2019).

Optimizing the Creditworthiness Threshold of a Bivariate Distribution. Conference poster. Presented at the Joint Mathematics Meeting, Baltimore, MD (19 January 2019).

PROFESSIONAL SERVICE

Reviewer of manuscripts for:

- Demographic Research (2025)
- Annals of Applied Statistics (2025)
- Population Health Metrics (2025)
- BMJ Global Health (2024-2026)

– PLOS Global Public Health (2024-2026)

External collaboration:

Agincourt South Africa Health and Socio-Demographic Surveillance System

– Data and code sharing of age- and sex- disaggregated excess mortality estimates

– Consulted on methods for expected mortality modeling and survey design

Washington Sea Grant

– Consulted on time series methods for change point detection in order for early detection of harmful algal blooms

Public Health Foundation of India

– Data sharing and custom analysis of excess mortality estimates, 2020-2021

SKILLS

Programming Languages and Systems

– R, Python, Git, Stan, SAS, Stata, MATLAB, SQL, PyTorch, TensorFlow, Spark, Hadoop, AWS, Tableau, Power BI, ArcGIS, REDCap, Microsoft Office

Certifications

– IRB Certification, CITI Human Subjects Research Certification

Languages

– English, Chinese (Conversational), Spanish (Conversational)

PROFESSIONAL AFFILIATIONS

American Statistical Association
International Union for the Scientific Study of Population
Population Association of America
Association for Women in Mathematics
Phi Mu Epsilon
Phi Beta Kappa