

RACHEL A. SILVERMAN

rsilverman@vt.edu * Blacksburg/Roanoke, VA

EDUCATION & TRAINING

- University of Washington School of Public Health**, Seattle, WA 2013-2018
Doctor of Philosophy (PhD), Epidemiology
Dissertation Title: Informing Strategies for Effective HIV Treatment and Prevention
- Johns Hopkins Bloomberg School of Public Health**, Baltimore, MD 2009-2011
Master of Science (ScM), Epidemiology, Infectious Disease Concentration
Thesis Title: Evaluation of Anemia as an Indicator of Malaria Disease Burden in a Region of Declining Malaria Transmission in Southern Zambia
- Oberlin College**, Oberlin, OH 2004-2008
Bachelor of Arts (BA), Biochemistry
- Clinic on Meaningful Modeling of Epidemiological Data**, Muizenberg, South Africa June 2016
International Clinics on Infectious Disease Dynamics and Data Program (ICI3D)

SOFTWARE

Proficient with Stata, SAS, SPSS, R, ArcGIS, STELLA, EndNote, & Microsoft Office.

RESEARCH & APPLIED EXPERIENCE

- Research Scientist**, Center for Biostatistics and Health Data Science (CBHDS), Mar 2023-present
Department of Statistics, College of Science, Virginia Tech, Blacksburg & Roanoke, VA
- Collaborate with researchers at Virginia Tech and Virginia Tech Carilion School of Medicine (VTCOM), focusing on quantitative epidemiologic methods, study design and implementation, statistical analyses, interpretation, and communication.
 - Independent research on SARS-CoV-2/COVID-19 collaborating with the Virginia Department of Health and the Fralin Biomedical Research Institute.
 - Serve on graduate program dissertation committees and mentor students.
- Research Scientist**, Center for Public Health Practice and Research (CPHPR), Aug 2019-Mar 2023
Department of Population Health Sciences, Virginia-Maryland College of Veterinary Medicine, Virginia Tech, Blacksburg, VA
- Contributed to research and evaluation to support local health departments and other community partners. Focused on quantitative methods including statistical analyses, survey design, and presentations for CPHPR clients.
 - Developed innovative original research, including original peer reviewed scientific manuscripts and internal and extramural funding applications. Research focus on SARS-CoV-2/COVID-19 and reproductive/maternal health.
 - Advised PHS graduate students on research methods and practicums and served on Translational Biology, Medicine, & Health (TBMH) dissertation committees.
- Research Scientist 2**, International Clinical Research Center (ICRC), Department of Mar 2018-Dec 2018
Global Health, University of Washington, Seattle, WA
- Designed data collection tools and analyzed and presented costing and time study data related to STD Partner Services (PS) in Washington State (WA).
 - Designed dynamic compartmental mathematical models investigating the population level impact and cost-effectiveness of enhanced STD PS on HIV and bacterial STD outcomes, using data from King County, WA.
- Research Assistant** (Dr. Ruanne Barnabas), International Clinical Research Center Jan 2016-Mar 2018
(ICRC), Department of Global Health, University of Washington, Seattle, WA
- Conducted time and motion studies of local health department staff involved with STD partner services (PS) for use in cost-effectiveness analyses.
 - Designed and parametrized a dynamic compartmental mathematical model integrating HIV and gonorrhea infections to investigate the population level impact of STD PS on HIV and STD outcomes, using data from King County, WA.

- Student Epidemic Action Leaders (SEAL) Team Member**, Department of Epidemiology, University of Washington, Seattle, WA Sep 2016-Jan 2017
- Outbreak response volunteer with the Department of Public Health - Seattle/King Co.
 - Zika Virus Response. Advised clinicians on testing guidelines and prevention recommendations. Approved/denied test requests based on exposure and risk criteria. Verified sample testing was conducted appropriately. Answered general questions. Followed-up with providers regarding negative results and recommendations.
 - Mumps Outbreak Response. Conducted case interviews via phone. Followed-up with healthcare providers and WA State Department of Health regarding approvals for cases meeting criteria for state funded mumps testing.
- Research Assistant/Assistant Study Coordinator** (Dr. Michael Chung), Department of Global Health, University of Washington, Seattle, WA Oct 2013-Oct 2015
- Assistant with study coordination for a randomized clinical trial investigating use of a point-of-clinical-care oligonucleotide ligation assay (OLA) to detect drug resistant HIV in patients initiating HAART at three clinics in Kenya.
 - Developed data cleaning & quality assurance syntax and protocols.
 - Conducted data analysis and contributed to posters and manuscripts.
 - Worked on-site in Nairobi (Summer 2014).
 - Assisted with IRB document preparation for institutions in Seattle and Kenya.
 - Prepared Data Safety Monitoring Board (DSMB) reports.
 - Conducted data analyses using datasets from multiple studies investigating medication adherence in HIV positive patients in Nairobi.
 - Conducted data analysis to evaluate HIV treatment and monitoring using data from the Coptic Hospital Hope Center HIV treatment clinics in Kenya.
 - Modified SPSS syntax as needed to clean, merge, and organize datasets used by Hope Center staff and other researchers.
- Consultant**, EpiMetrix, Inc., Sunnyvale, CA [remote] Aug 2011-Oct 2013
- Conducted comprehensive searches and reviews of epidemiologic literature.
 - Synthesized literature and prepared summary reports as requested by clients.
 - Prepared manuscripts for publication submission.
- Epidemiologist I**, Center for HIV Surveillance, Epidemiology and Evaluation, Maryland Department of Health and Mental Hygiene, Baltimore, MD Sep 2011-Aug 2013
- Analyzed HIV/AIDS surveillance data and presented results for use in fact sheets, periodic reports, and customized data requests.
 - Combined multiple data sources and conducted data analyses to better inform HIV prevention and surveillance programs.
 - Spatially presented HIV/AIDS surveillance and other project data using ArcGIS.
 - Developed and implemented integrated security and confidentiality guidelines to facilitate data sharing across Maryland State and local health department centers.
- Research Assistant** (Dr. William Moss), Epidemiology Department, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD Jun 2010-Sep 2011
- Cleaned, analyzed, and interpreted data for a multi-year, community-based malaria study in Southern Zambia.
- Research Assistant** (Dr. Peter Lees), Environmental Health Sciences Department, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD Aug 2010-Aug 2011
- Collaborated with health departments in the Chesapeake Bay region to investigate the underreporting of *Vibrio vulnificus* infections.
- Study Interviewer**, Behavioral Surveillance Research (BESURE) study, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD Aug-Dec 2010
- Administered questionnaire for the BESURE study investigating health behaviors of heterosexuals at high-risk for HIV infection in Baltimore, MD, part of the National HIV Behavioral Surveillance (NHBS) study.

Junior Specialist, Trimmer Lab, Neurobiology, Physiology, & Behavior Department, University of California, Davis, CA Nov 2008-Aug 2009

- Performed lab research to better understand the effects of seizures on neurophysiology by inducing seizures in rats and analyzing brain samples using protein concentration assays, SDS PAGE, and Western blotting.
- Trained new lab members, ordered supplies, and presented research.

Research Assistant (Dr. Yolanda Cruz), Biology Department, Oberlin College, Oberlin, OH Jan-May 2008; Jun-Aug 2006

- Performed dissections and immuno-histochemistry on embryos of *Monodelphis domestica* to identify protein expression during embryonic development.
- Collected, analyzed, and presented data regarding growth trends of small opossums, *Monodelphis domestica*. Animal husbandry of mice and small opossums.

TEACHING EXPERIENCE

Primary/Lead Instructor

- **Epidemiology** (Research Domain Block II), VTC School of Medicine, Roanoke, VA Fall 2022
- **Epidemiologic Concepts of Health & Disease** (PHS/HNFE 3634), Department of Population Health Sciences, Virginia Tech, Blacksburg, VA Fall 2020-2021; Spring 2021

Guest lecturer

- **Statistics Guest Discussion**, Scientific Logic and Analysis (TBMH 5404), Translational Biology, Medicine and Health, Virginia Tech, Roanoke, VA. Fall 2023
- **Presenting Your Research**, Research Series Tier II, Carilion Clinic & VTCSOM, Office of Continuing Professional Development, Roanoke, VA Spring 2023
- **Methods for Working with Human Subjects Data in Research**, Problem Solving in Biomedical Engineering (BMSE 3184), Biomedical Systems Engineering, Virginia Tech, Blacksburg, VA Spring 2023
- **Survey Design**, Preparation for Public Health Practice (PHS 5936), Population Health Sciences, Virginia Tech, Blacksburg, VA Spring 2020-2021
- **Presenting Data**, Preparation for Public Health Practice (PHS 5936), Population Health Sciences, Virginia Tech, Blacksburg, VA Spring 2020-2021

Discussion Facilitator

- **Methods in Logic**, Research Domain, VTCSOM, Roanoke, VA 2023-present

Presentation Reviewer

- Research Domain, VTCSOM, Roanoke, VA 2023-present

Teaching Assistant

- **Introduction to Epidemic Modeling for Infectious Diseases** (EPI 554), Department of Epidemiology, University of Washington, Seattle, WA. Fall 2015-2016
- **Design and Analysis of Medical Studies** (PHARM 592), Department of Pharmacy, University of Washington, Seattle, WA Fall 2015
- **Principles of Epidemiology**, Epidemiology Department (EPI 340.601), Johns Hopkins Bloomberg School of Public Health, Baltimore, MD Summer 2010

MENTORING

Graduate Committee Co-Chair

- Jasmine Johnson (PhD, Translational Biology, Medicine, & Health, Virginia Tech) 2022-2023

Graduate Committee Member

- Addie Hayes (PhD, Translational Biology, Medicine, & Health, Virginia Tech) 2021-present
- Sonal Sathe (PhD, Individual PhD, Virginia Tech) 2023-present
- Asrar Qari (MS, Human Nutrition, Foods, & Exercise, Virginia Tech) 2023-present

Co-Mentor

- VTCSOM medical students 2023-present

FUNDING

- **National Institutes of Health [CO-I]**. A Collaborative Undergraduate Biostatistics Experience (CUBE) to Diversify and Bring Awareness to the Field of Collaborative Biostatistics. [5/01/2022 – 3/31/2028]
- **CeZAP Interdisciplinary Team-building Pilot Grant [PI]**. Enhancing evidence-based COVID-19 mitigation strategies by expediting epidemiologic research using data from Southwest Virginia. [9/22/2022 – 6/30/2023]
- **The Thomas F & Kate Miller Jeffress Memorial Trust [Co-PI]**. Mobility-based Outbreaks in Virginia Early Response System (MOVERS): Using real-time mobility data to develop an infectious disease outbreak early warning system for Virginia. [7/01/2021-6/30/2022]
- **Piedmont Community Services [Co-PI]**. Evaluation of the Piedmont Community Services Community Recovery Program vocational program. [1/01/2022 – 12/31/2023]

PUBLICATIONS

- Johnson J, Howell BR, **Silverman RA**. Trends in Low Acuity Emergency Department Visits Among Women in Southwestern Virginia During the COVID-19 Pandemic. *[In preparation]*
- Johnson J, **Silverman RA**, Howell BR, Motley M. Healthcare Utilization and Barriers to Care Among Black Appalachian Women: A Qualitative Study. *[Under review at J Appalachian Studies]*
- Silverman RA**, Short D, Wenzel S, Friesen MA, Cook NE. COVID-19 related messaging, beliefs, information sources, and mitigation behaviors in Virginia: a cross-sectional survey in the summer of 2020. *PeerJ*. 2023; 11:e16714. doi: 10.7717/peerj.16714.
- Cook NE, Wenzel S, **Silverman RA**, Short D, Markwalter T, Jiles K, Friesen MA. A mixed methods investigation of how young adults in Virginia received, evaluated, and responded to COVID-19 public health messaging. *Virginia Journal of Public Health*. 2022 Aug;7(1):46-67. <https://commons.lib.jmu.edu/vjph/vol7/iss1/6>.
- Silverman RA**, Ceci A, Cohen A, Helmick M, Short E, Bordwine P, Friedlander MJ, Finkielstein CV. Vaccine Effectiveness during Outbreak of COVID-19 Alpha (B.1.1.7) Variant in Men's Correctional Facility, United States. *Emerg Infect Dis*. 2022;28(7):1313-20. doi: 10.3201/eid2807.220091.
- Silverman RA**, Katz DA, Levin C, Bell TR, Spellman D, St John L, Manley Rodriguez E, Golden MR, Barnabas RV. Sexually Transmitted Disease Partner Services Costs, Other Resources, and Strategies Across Jurisdictions to Address Unique Epidemic Characteristics and Increased Incidence. *Sex Transm Dis*. 2019;46(8):493-501. doi: 10.1097/OLQ.0000000000001010.
- Silverman RA**, John-Stewart GC, Beck IA, Milne R, Kiptinness C, McGrath CJ, Richardson BA, Chohan B, Sakr SR, Frenkel LM, Chung MH. Predictors of mortality within the first year of initiating antiretroviral therapy in urban and rural Kenya: A prospective cohort study. *PLoS One*. 2019;14(10):e0223411. Epub 20191004. doi: 10.1371/journal.pone.0223411.
- Milne RS, **Silverman RA**, Beck IA, McKernan-Mullin J, Deng W, Sibley TR, Dross S, Kiarie JN, Sakr SR, Coombs RW, Chung MH, Frenkel LM. Minority and majority pretreatment HIV-1 drug resistance associated with failure of first-line nonnucleoside reverse-transcriptase inhibitor antiretroviral therapy in Kenyan women. *AIDS*. 2019;33(6):941-51. doi: 10.1097/QAD.0000000000002134.
- Silverman RA**, Beck IA, Kiptinness C, Levine M, Milne R, McGrath CJ, Bii S, Richardson BA, John-Stewart G, Chohan B, Sakr SR, Kiarie JN, Frenkel LM, Chung MH. Prevalence of Pre-antiretroviral-Treatment Drug Resistance by Gender, Age, and Other Factors in HIV-Infected Individuals Initiating Therapy in Kenya, 2013-2014. *J Infect Dis*. 2017;216(12):1569-78. doi: 10.1093/infdis/jix544.
- Kanthula R, Rossouw TM, Feucht UD, van Dyk G, Beck IA, **Silverman R**, Olson S, Salyer C, Cassol S, Frenkel LM. Persistence of HIV drug resistance among South African children given nevirapine to prevent mother-to-child-transmission. *AIDS*. 2017;31(8):1143-8. doi: 10.1097/QAD.0000000000001446.
- Chung MH, **Silverman R**, Beck IA, Yatich N, Dross S, McKernan-Mullin J, Bii S, Tapia K, Stern J, Chohan B, Sakr SR, Kiarie JN, Frenkel LM. Increasing HIV-1 pretreatment drug resistance among antiretroviral-naive adults initiating treatment between 2006 and 2014 in Nairobi, Kenya. *AIDS*. 2016;30(10):1680-2. doi: 10.1097/QAD.0000000000001110.
- Rousmaniere H, **Silverman R**, White RA, Sasaki MM, Wilson SD, Morrison JT, Cruz YP. Husbandry of *Monodelphis domestica* in the study of mammalian embryogenesis. *Lab Anim (NY)*. 2010;39(7):219-26. doi: 10.1038/labon0710-219.

PRESENTATIONS & ABSTRACTS

- Rachel Silverman.** Using routinely collected public health data for epidemiologic research during the evolving covid-19 pandemic: Challenges, lessons, & next steps in estimating vaccine effectiveness using surveillance data from the Virginia Department of Health. [Oral, Morning General Session] Center for Emerging, Zoonotic, and Arthropod-borne Pathogens (CeZAP) Infectious Diseases Symposium. October 2023.
- Rachel Silverman.** Using routinely collected public health data for epidemiologic research during the evolving COVID-19 pandemic. [Oral] Distinguished Speaker Seminar Series in Infectious Disease. Center for Emerging, Zoonotic, and Arthropod-borne Pathogens (CeZAP). February 2023.
- Kerry Redican, David Sallee, Nancy Hans, and **Rachel Silverman.** Violence-related behaviors and prevention strategies: 12 year trends among Roanoke county, Virginia 7-12th grade students. [Oral] American Public Health Association (APHA) Annual Meeting & Expo, October 2020.
- Natalie E. Cook, Sophie Wenzel, Mary Ann Friesen, **Rachel Silverman**, Emily Wells. Exploring Influences of COVID-19 Messaging on Behavior in Virginia. [Oral Plenary] 10th Annual Appalachian Translational Research Network Health Summit, September 2020.
- Gui Liu, Cara Broshkevitch, **Rachel Silverman**, David Katz, Matthew Golden, Ruanne Barnabas. Partner Services for Gonorrhea Can Decrease New HIV Among MSM In King County, WA: A Math Modeling Study. [Oral] Joint meeting of the International Society for STD Research (ISSTDR) & International Union Against Sexually Transmitted Infections (IUSTI) in Vancouver, Canada, July 2019.
- Rachel Silverman**, David Katz, Matthew Golden, Teal Bell, Dawn Spellman, Carol Levin, Ruanne Barnabas. Epidemic Characteristics Drive Costs of STD Partner Services in Washington State. [Oral] STD Prevention Conference in Washington, DC, August 2018.
- Rachel Silverman**, David Katz, Matthew Golden, Teal Bell, Dawn Spellman, Carol Levin, Ruanne Barnabas. Cost and Impact of STI Partner Services (PS) in Seattle, WA. 2017. [Poster] IUSTI in Helsinki, Finland, September 2017.
- Chambers LC, Manhart LE, **Silverman RA**, Barnabas RV. Potential Impact of Testing for Mycoplasma genitalium Infection and Macrolide Resistance: A Mathematical Modeling Analysis. [Poster] ISSTDR in Rio de Janeiro, Brazil, July 2017.
- Roberts ST, Katz DA, Golden MR, **Silverman RA**, Bell TR, Barnabas RV. Population-Level Effectiveness and Cost-Effectiveness of Enhanced Partner Services for Curable Sexually Transmitted Infections: A Systematic Review. 2016. [Poster] IUSTI in Marrakesh, Morocco, May 2016.
- Michael Chung, Ingrid Beck, Molly Levine, Catherine Kiptiness, James Munyao, **Rachel Silverman**, Christine McGrath, Bhavna Chohan, Samah Rafie Sakr, Lisa Frenkel. 2016. Prospective randomized HIV drug resistance testing of Kenyans before 1st-line ART. [Poster] Conference on Retroviruses and Opportunistic Infections (CROI) in Boston, MA, February 2016.
- Rachel Silverman**, Michael Chung, James Kiarie, Nelly Yatich, Julia Njoroge, Catherine Kiptiness, Samah Sakr, Grace John-Stewart, Lisa Frenkel. 2015. Mortality Across Two ART Trials Enrolling at ≤ 200 versus ≤ 350 CD4 cells/uL in Kenya. [Poster] CROI in Seattle, WA, February 2015.
- Rachel Silverman**, Lisa Frenkel, Nelly Yatich, Ingrid Beck, Catherine Kiptiness, Julia Njoroge, James Kiarie, Michael Chung. 2015. Higher Risk of Pre-Treatment HIV Drug Resistance among Younger ART-Naïve Adults in Kenya. [Poster] International HIV Drug Resistance Workshop in Seattle, WA, February 2015.

PEER REVIEW

Journal Reviewer for Healthcare (MDPI) – 2021

Journal Reviewer for BMC Medicine – 2017

Journal Reviewer for Wellcome Open Research – 2020

Journal Reviewer for PLOS ONE – 2016

Journal Reviewer for JIAS – 2018

INTERVIEWS & MEDIA ATTENTION

Silverman, Rachel. WFXR (television). Topic: COVID-19 vaccination during pregnancy. Interview with Kianna Price on Living Local (aired 5 October 2021). wfxrtv.com; vtx.vt.edu; augustafreepress.com

Silverman, Rachel. WSLs (television), Interview with Lindsey Kennet: Pregnant? Looking to get the COVID vaccine? Here's what you need to know. Local health experts, mothers weigh in. (2 March 2021). wsls.com

Silverman, Rachel. Medscape (print), Interview with Lexi Krupp: How Scientists Predict How Many People Will Get COVID-19 (1 April 2020). https://www.medscape.com/viewarticle/927949#vp_1

Liji Thomas. COVID-19 in Virginia: Beliefs drive behavior. News Medical Life Sciences. August 29, 2021. <https://www.news-medical.net/news/20210829/COVID-19-in-Virginia-Beliefs-drive-behavior.aspx>