CURRICULUM VITAE of Nicholas G. Reich 1

CONTACT

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Amherst, MA 01003-9304

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EDUCATION

Ph.D. in Biostatistics, Johns Hopkins Bloomberg School of Public Health, 2010
Thesis title: Statistical methods for incomplete data from infectious disease outbreaks
Thesis advisor: Ron Brookmeyer

B.A. in English, Carleton College, 2001, magna cum laude

HONORS AND AWARDS

2015	First place, Award for Outstanding Research Articles in Biosurveillance, International Society of Disease Surveillance
2015	Nominated for College Outstanding Teacher Award, UMass-Amherst SPHHS
2013	Honorable Mention for coarseDataTools R package, Open Source Software Initiative
2012	Open Education Initiative Award
	Provost's Office and the University Libraries at UMass-Amherst
2010	Statistics in Epidemiology Young Investigator Award
	American Statistical Association, Statistics in Epidemiology Section
2010	First prize, Student Research Competition
	American Public Health Association, Statistics Section
2009	Helen Abbey Award for excellence in teaching
	Department of Biostatistics, Johns Hopkins School of Public Health
2009	Distinguished Student Paper Travel Award
	International Biometric Society's Eastern North American Region
2009	Nominated for school-wide Teaching Assistant Recognition Award
	Johns Hopkins School of Public Health

PROFESSIONAL EXPERIENCE

2013 - present	Assistant Professor, Department of Biostatistics and Epidemiology
	University of Massachusetts, Amherst
2011 - 2013	Research Assistant Professor, Department of Biostatistics and Epidemiology
	University of Massachusetts, Amherst
2010 - 2011	Post-doctoral fellow, Department of Epidemiology & Department of Hospital
	Epidemiology and Infection Control, Johns Hopkins University
2006 - 2010	Research Assistant, Department of Biostatistics, Johns Hopkins University
2006-2008	Statistical Consultant, Maryland League of Conservation Voters
2005	Research Assistant, Framingham Heart Study, Boston, MA

 $^{^{1}\}text{Last}$ updated July 5, 2016

ORIGINAL RESEARCH

Under review, under revision, or submitted

____ = mentored student author

- 36. **Reich NG**, Lessler J, Varma JK, Vora NM. Reducing the Threat of Imported Infectious Disease Outbreaks with Active Monitoring.
- 35. Ray EL, Sakrejda K, Lauer SA, Reich NG. Infectious disease prediction with kernel conditional density estimation.
- 34. Johannson MA, **Reich NG**, Hota A, Brownstein JS, Santillana M. Evaluating the performance of infectious disease forecasts: A comparison of climate-driven and seasonal dengue forecasts for Mexico.

Accepted/in press

- 33. **Reich NG**, Lessler J, <u>Sakrejda K</u>, <u>Lauer SA</u>, lamsirithaworn S, Cummings DAT. Case studies in evaluating time series prediction models using the relative mean absolute error. *American Statistician*. [preprint pdf; html]
- 32. Lessler J, Ott CT, Carcelen AC, Konikoff JM, Williamson J, Bi Q, **Reich NG**, Cummings DAT, Kucirka LM, Chaisson LH. Time to Key Events in the Course of Zika Infection and their Implications for Surveillance: A Systematic Review and Pooled Analysis. *Bulletin of the World Health Organization*. [preprint pdf]
- 31. Silveira M, Wexler L, Chamberlain J, Straubaur KM, Spencer R, **Reich NG**, Bertone-Johnson ER. Seasonality of Suicide Behavior in Northwest Alaska: 1990-2009. *Public Health*. [html; pdf]

Published

- 30. **Reich NG**, <u>Lauer SA</u>, <u>Sakrejda K</u>, <u>Iamsirithaworn S</u>, Hinjoy S, Suangtho P, Suthachana S, Clapham H, Salje H, Cummings DAT, <u>Lessler J</u>. Challenges in real-time prediction of infectious disease: a case study of dengue in Thailand. *PLOS Neglected Tropical Diseases*. 2016, 10(6): e0004761. [html; pdf]
- 29. Radonovich LJ, Bessesen M, Cummings DAT, Eagan A, Gaydos C, Gibert C, Gorse G, Nyquist C, Reich NG, Rodriguez-Barradas M, Savor-Price C, Shaffer R, Simberkoff M, Perl TM. The Respiratory Protection Effectiveness Clinical Trial (ResPECT): A Cluster-Randomized Comparison of Respirator and Medical Mask Effectiveness against Respiratory Infections in Healthcare Personnel. *BMC Infectious Diseases*. 2016. 16:243. [html; pdf]
- 28. **Reich NG**, Cummings DAT, <u>Lauer SA</u>, Zorn M, Robinson C, Nyquist AC, Price CS, Simberkoff M, Radonovich LJ, Perl TM. Triggering Interventions for Influenza: The ALERT Algorithm. *Clinical Infectious Diseases*. 2015, 60(4): 499–504. [html; pdf]
- 27. <u>Lauer SA</u>, Kleinman KP, **Reich NG**. The Effect of Cluster Size Variability on Statistical Power in Cluster Randomized Trials. *PLoS ONE*. 2015, 10(4): e0119074 [html; pdf]
- 26. Hart V, Reeves KW, Sturgeon SR, **Reich NG**, Sievert LL, Kerlikowske K, Ma L, Shepherd J, Tice J, Sprague BL. The effect of weight change on volumetric measures of mammographic density. *Cancer Epidemiol Biomarkers Prev.* 2015, 24(4):761. [html]
- 25. Barney LE, Dandley EC, Jansen LE, **Reich NG**, Mercurio AM, Peyton SR. Integrin Expression and Phenotype Predict Breast Cancer Metastasis. *Integrative Biology.* 2015, 7: 198-212. [html; pdf]
- 24. Elfawal M, Towler MJ, **Reich NG**, Weathers PJ, Rich SM. Dried whole plant Artemisia annua slows evolution of malaria drug resistance and overcomes resistance to artemisinin. *PNAS*. 2015, 112(3): 821–826. [html; pdf]
- 23. Hart V, Reeves KW, Sturgeon SR, **Reich NG**, Sievert LL, Kerlikowske K, Ma L, Shepherd J, Tice J, Mahmoudzadeh AP, Malkov S, Sprague BL. The effect of change in body mass index on volumetric measures of mammographic density. *Cancer Epi Biomarkers Prev.* 2015, 24:1724-1730. [html; pdf]

- 22. **Reich NG**, Shrestha S, King AA, Rohani P, Lessler J, Kalayanarooj S, Yoon IK, Gibbons RV, Burke DS, Cummings DAT. Interactions between serotypes of dengue highlight epidemiological impact of cross-immunity. *Journal of the Royal Society Interface*. 2013, 10 (86), 20130414. [html; pdf]
- 21. Milstone AM, **Reich NG**, Advani S, <u>Yuan G</u>, Bryant K, Coffin SE, Huskins C, Livingston R, Saiman L, Smith PB, Song X. Catheter Dwell Time and CLABSIs in Neonates with PICCs: A Multicenter Cohort Study. *Pediatrics*. 2013, 132(6): 21609-e1615. [html; pdf]
- 20. Lee RM, Lessler J, Lee RA, Rudolph KE, **Reich NG**, Perl TM and Cummings DAT. Incubation periods of viral gastroenteritis: a systematic review. *BMC Infectious Diseases*. 2013, 13: 446. [html; pdf]
- 19. Milstone AM, Elward A, Song X, Zerr DM, Orscheln R, Speck K, Obeng D, **Reich NG**, Coffin SE, Perl TM for the Pediatric SCRUB Trial Study Group. Daily Chlorhexidine Bathing To Reduce Bacteremia in Critically III Children: a Multicenter, Cluster-Randomized, Two-Period Crossover Trial. *The Lancet*. 381 (9872), 1099-1106. [html; pdf]
- 18. Passaretti CL, Otter JA, **Reich NG**, Myers JA, Shepard J, Howard T, Carroll KC, Lipsett P, Perl TM. Environmental decontamination with hydrogen peroxide vapor reduces the risk of patient acquisition of multidrug-resistant organisms. *Clinical Infectious Diseases*. 2013, 56(1): 27-35. [html; pdf]
- 17. Jumani K, Advani S, **Reich NG**, Gosey L, Milstone AM. Complications Associated with Peripherally Inserted Central Venous Catheters in Children. *JAMA Pediatrics*. 2013, 167 (5): 429–435. [html; pdf]
- 16. Xu G, Wesker J, White C, Campbell J, **Reich NG**, Rich SM. Detection and heterogeneity of Borrelia burgdorferi in Ixodes ticks by culture-dependent and culture-independent methods. *Journal of Clinical Microbiology*. 2013, 51(2): 615-617. [html; pdf]
- Popoola V, Tamma P, Reich NG, Perl TM, Milstone AM. Risk Factors for Persistent MRSA Colonization in Children with Multiple Intensive Care Unit Admissions. *Infection Control and Hospital Epidemiology*. 2013, 34(7): 748–750.[html]
- Popoola VO, Carroll KC, Ross T, Reich NG, Perl TM and Milstone AM. Impact of Colonization Pressure and Strain Type on MRSA Transmission in Children. Clinical Infectious Diseases. 2013, 57(10): 1458– 1460. [html; pdf]
- 13. Rock C, Harris AD, **Reich NG**, Johnson JK, Thom KA. Is hand hygiene before donning non-sterile gloves in the ICU a waste of health care worker time? A randomized controlled trial. *American Journal of Infection Control*. 2013, 41(11): 994–996. [html; pdf]
- 12. **Reich NG**, Myers JA, Obeng D, Milstone AM, Perl TM. Empirical power and sample size calculations for cluster-randomized and cluster-randomized crossover studies. *PLoS ONE* 2012, 7(4): e35564. [html; pdf]
- 11. **Reich NG**, Lessler J, Cummings DAT, Brookmeyer R. Estimating absolute and relative case fatality ratios from infectious disease surveillance data. *Biometrics*. 2012, 68(2): 598-606. [html; pdf]
- 10. Elfawal M, Towler MJ, **Reich NG**, Golenbock D, Weathers PJ, Rich SM. Dried Whole Plant Artemisia annua as an Antimalarial Therapy. *PLoS ONE*. 2012, 7(12): e52746. [html; pdf]
- 9. Huntington I, Shrestha S, **Reich NG**, Hagopian A. Career intentions of Nepali medical students: A survey-based cross-sectional study. *Health Policy and Planning*. 2012, 27(5): 417-428. [html; pdf]
- 8. **Reich NG**, Lessler J, Perl TM, Cummings DAT. Visualizing clinical evidence: citation networks for the incubation periods of respiratory viral infections. *PLoS ONE*. 2011, 6(4): e19496. [html; pdf]
- 7. An M, **Reich NG**, Crawford SO, Brookmeyer R, Louis TA, Nelson KE. Stochastic simulation of a blood product donation environment with demand spikes and supply shocks. *PLoS ONE* 2011, 6(7): e21752. [html; pdf]

- Advani S, Reich NG, Sengupta A, Gosey L, Milstone AM. Central Line Associated Bloodstream Infections in Hospitalized Children with Peripherally Inserted Central Venous Catheters. Clinical Infectious Diseases. 2011, 52(9): 1108-1115. [html; pdf]
- 5. **Reich NG**, Lessler J, Cummings DAT, Brookmeyer R. Estimating incubation periods with coarse data. *Statistics in Medicine*. 2010, 28(22): 2769–2784. [html;pdf]
- Lessler J, Brookmeyer R, Reich NG, Nelson KE, Cummings DAT, Perl TM. Identifying Probable Sources of Infection for Respiratory Viruses. *Infection Control and Hospital Epidemiology*. 2010, 31(8): 809-15. [html;pdf]
- 3. Lessler J, **Reich NG**, Cummings DAT and The DOHMH Swine Influenza Investigation Team. Outbreak of 2009 Pandemic Influenza A (H1N1) at a New York City School. *New England Journal of Medicine*. 2009, 361(27): 2628-2636. [html;pdf]
- Lessler J, Reich NG, Brookmeyer R, Perl TM, Nelson KE, Cummings DAT. A systematic review of the incubation periods of acute respiratory viral infections. *Lancet Infectious Diseases*. 2009, 9(5): 291–300. [html;pdf]
- Crawford SO, Reich NG, An M, Brookmeyer R, Louis TA, Nelson KE, Notari EP, Trouern-Trend J, and Zou S. Regional and temporal variation in American Red Cross blood donations, 1995–2005. *Transfusion*. 2009, 48: 1576-1583. [html;pdf]

COMMENTARIES & REVIEWS

- 4. **Reich NG**, Milstone AM. Improving efficiency in cluster-randomized study design and implementation: taking advantage of a crossover. *Open Access Journal of Clinical Trials.* 2014, 6: 11-15. [pdf]
- 3. Shardell M, **Reich NG**, Perencevich EN. Commentary: Back to the future with Sir Bradford Hill: statistical analysis with hospital-acquired infections. *International Journal of Epidemiology*. 2013, 42(5): 1509-1510. [html; pdf]
- 2. Bessesen MT, Savor-Price C, Simberkoff M, **Reich NG**, Pavia AT, Radonovich LJ. 95 Respirators or Surgical Masks to Protect Healthcare Workers Against Respiratory Infections: Are We There Yet? *American Journal of Respiratory and Critical Care Medicine*. 2013, 187(9): 904-905. [html; pdf]
- 1. **Reich NG**, Lessler J, Chu H, Cole S. Commentary: Identification of the asymptomatic ratio. *Epidemiology*. 2011, 22(3): 333-335. [html]

PUBLISHED DATA RESOURCES

- CDCepi, Johansson MA, Reich NG, Rivers C, Yu Z, Chen D. zika: Data repository of publicly available Zika data. Zenodo. February 2016. 10.5281/zenodo.46717
- 1. **Reich NG**, Ray EL. Predictions from CDC influenza prediction competition, 2015-2016. Zenodo. March 2016. http://dx.doi.org/10.5281/zenodo.46840.

GRANTS AND CONTRACTS

NIH, R21 research grant (\$450K)

Dec 2014 - Nov 2016

Inference for interacting pathogens with mechanistic and phenomenological models.

PI: Reich

NIH, R01 research grant (\$2.5 million)

Feb 2013 - Jan 2018

Methods for reducing spatial uncertainty and bias in disease surveillance.

PI: Justin Lessler (JHSPH). Co-Is: Reich, Derek Cummings (JHSPH), Sopon Iamsirithaworn (Thailand MoPH). Lessler, Reich, and Cummings contribute equally to modeling efforts on this grant. Reich is PI of subcontract (\$650K, 25% of total).

NSF, PESO (\$590,000)

Sept 2012 - Aug 2015

Materials and Multivariable Models to Predict Tissue Tropism in Metastasis.

PI: Shelly Peyton, co-PI: Reich. Reich responsible for 100% of the statistical modeling effort (10% of award).

CDC/VA, IPA contract (\$200,000)

Sept 2011 - Aug 2015

The Respiratory Protection Effectiveness Clinical Trial (The ResPECT Study).

PIs of ResPECT: Trish Perl (Johns Hopkins) and Lew Radonovich (Gainesville VA).

PI of subcontract to VA: Reich. He serves as the Senior Biostatistician for this cluster-randomized trial.

NIH, R21 research grant (\$392,535)

Aug 2012 - May 2014

Premenstrual syndrome and subsequent hypertension.

PI: Dr. Elizabeth Bertone-Johnson. co-I: Reich.

CLASSROOM INSTRUCTION

Biostat Methods 2: Applied Regression Modeling (BIOSTATS 690NR)

Spring '14 - '16 Graduate-level course in linear regression (3 credits). Core requirement for Biostatistics graduate students. [course website]

Telling Stories with Data: Statistics, Modeling, and Visualization (PUBHLTH 490ST)

Spring '16 Undergraduate-level course in linear regression and data visualization (3 credits). [course website]

Introduction to Statistical Computing using R (BIOSTATS 597D)

Fall 2014 Graduate introductory course in statistical computing (1 credit).

Introduction to Statistical Computing and Data Visualization (BIOSTATS 590F)

Fall 2012

Sponsored by the Open Education Initiative at UMass, this course was being designed to introduce upper-level undergraduate and graduate students to the world of open-source computing for public health and other scientific research. This course was taught as a hands-on, project-based data analysis workshop.

STUDENT MENTORSHIP & ADVISING

Post-doctoral fellows

Alexandria Brown, 2015-present Evan Ray, 2015-present Krzysztof Sakrejda, 2015-present

PhD student advisees

Stephen Lauer, Biostatistics PhD, 2014-present Xi Meng, Biostatistics PhD, 2015-present

MS and PhD thesis committees

Jonviea Chamberlain, Epidemiology MS, 2011-2012
Nikki Nixon, Epidemiology MS, 2012-2013
Vicki McLaughlin, Epidemiology PhD, 2012-2014
Eric Cohen, Biostatistics MS, 2013-2014
Charlie Curtsinger, Computer Science PhD, 2014-present
David Arbour, Computer Science PhD, 2015-present
Sangsoo Park, Kinesiology PhD, 2015-present
Mark Hagemann, Civil and Environmental Engineering PhD, 2015-present

Graduate research assistants

Guoshu Yuan (2012-2013), Emily Ramos (fall 2014), Sangsoo Park (summer 2014), Krzysztof Sakrejda (2014-2015), Xi Meng (2015-present), Stephen Lauer (2013-present).

statsTeachR.org curriculum developers (2013-2014)

Eric Cohen, Harrel Blatt, Eric Reed, Sara Nuñez, Emily Ramos.

Undergraduate research assistants

Eric Doty (Spring 2012), Courtney Yannace (Fall 2014), Harley Jean (Summer 2016).

WORKSHOPS & DATAFESTS

Five College DataFest (Amherst, MA)

2014-16 UMass team coordinator: responsible for recruiting teams of undergraduate students to compete in weekend-long data competition. [datafest website]

HackEbola (UMass-Amherst)

November 2014 Co-organized three-day HackEbola hackathon/datafest at UMass with Graduate Researchers interested in Data student group.

Data Sciences for the Life Sciences in a High Performance Computing Environment (Holyoke, MA)

February 2014 Directed and taught a one-day hands-on high-performance statistical computing workshop for researchers. Workshop held at the MGHPCC.

Data Analysis and Visualization using R, Social and Demographic Research Institute (UMass)

July 2012 Designed and taught a two-day hands-on data analysis workshop for researchers.

Outbreak investigation workshops, Thai Ministry of Public Health (Bangkok, Thailand)

March 2009 and Designed and taught a three-day workshop on statistical modeling of outbreaks March 2012 for field epidemiologists with Justin Lessler from the Johns Hopkins Epidemiology Dept. The workshop was sponsored by the NIH Fogarty International Center.

SOFTWARE & COMPUTING

Software development: coarseDataTools and clusterPower, R packages (available on CRAN) Open source teaching curricula: Co-founder of statsTeachR.org

Platforms: Mac, Unix, Windows. Statistical programs: R, Stata.

Other languages: Perl, HTML, XML, PHP.

PRESS

"Letter to editor: critical of measles headline for down-playing risks" *Daily Hampshire Gazette*. 11 Feb 2015. "Flu Season Made Easy With New Tool." *New England Public Radio*. 24 Nov 2014.

"HackEbola at UMass aids fight against West African epidemic" Daily Hampshire Gazette. 22 Nov 2014.

INVITED TALKS

- 1. "New Approaches for Predicting Outbreaks." Pandemic Prediction and Forecasting Working Group, White House Office of Science and Technology Policy, Washington DC. 9 February 2016.
- 2. "Estimating Population Susceptibility in Dynamic Models of Infectious Disease." Boston University Biostatistics Seminar Series, Boston, MA. 14 May 2015.
- 3. "Estimating Population Susceptibility in Dynamic Models of Infectious Disease." New England Statistics Symposium. University of Connecticut, Storrs, CT. 25 April 2015.
- 4. **Keynote address**: "Predicting Dengue Fever Outbreaks in Thailand." Massachusetts Undergraduate Research Conference. Amherst, MA. 24 April 2015.
- 5. "Estimating Population Susceptibility in Dynamic Models of Infectious Disease." Computational Social Science Institute Seminar Series, UMass-Amherst. Amherst, MA. 17 April 2015.
- 6. "Statistical Challenges in Real-Time Infectious Disease Forecasting." Quantitative Methods Core Methods Seminar, UMass-Worcester Medical School. Worcester, MA. 7 April 2015.
- 7. "statsTeachR: Open Resources for Teaching Statistics." New England Statistics Symposium. Boston, MA. 26 April 2014.
- 8. "Open Resources for Teaching Statistics." Department of Mathematics and Statistics, University of Massachusetts. Amherst, MA. 7 April 2014.
- 9. "Estimating case fatality ratios from infectious disease surveillance data." American Public Health Association Annual Conference. Boston, MA. 4 November 2013.
- 10. "Estimating case fatality ratios from infectious disease surveillance data." Joint Conference by the International Chinese Statistical Association and the International Society for Biopharmaceutical Statistics (ICSA-ISBS), Washington DC. 10 June 2013.
- 11. "Social coding with RStudio and GitHub." Pioneer Valley and Five College R Statistical Meetup. 13 February 2013.
- 12. "Drawing inference about interactions between pathogens in infectious disease systems." Department of Mathematics and Statistics, University of Massachusetts. 26 March 2012.
- 13. "Making inferences about infection using the incubation period." Center for Quality of Care Research, Baystate Medical Center. Springfield, MA. 16 November 2011.
- 14. "Making inferences about infection using the incubation period." Department of Epidemiology and Public Health Seminar Series, University of Maryland. 21 April 2011.

[&]quot;Understanding the Protective Side of Dengue Virus." New York Times. 9 July 2013.

GRANT REVIEW ACTIVITIES

NIH ad hoc Study Section Member

June 2016 Infectious, Reproductive, Asthma and Pulmonary Conditions Study Section (IRAP)
Nov 2015 NEI Clinical and Epidemiological Applications: Uveitis, Cornea and Refractive Error

MEMBERSHIPS

American Statistical Association, International Biometric Society (ENAR), Foundation for Open Access Statistics, UMass Center for Clinical and Translational Science, American Society for Tropical Medicine and Hygiene.

EDITORIAL ACTIVITIES

Statistical Advisory Board Member, *PLOS Medicine*, 2016-present Review Board Member, *PLOS Currents: Outbreaks*, 2015-present Editorial Board Member, *PLOS ONE*, 2013-present

Reviewer

Statistics in Medicine American Statistician American Journal of Epidemiology PLOS Medicine PLOS Computational Biology The Lancet Infectious Diseases Epidemiology

British Medical Journal PLoS Currents: Outbreaks

Epidemics

American Journal of Tropical Medicine and Hygiene

Clinical Trials

Emerging Infectious Diseases

Proceedings of the Royal Society B: Biological Sciences

BMC Public Health

PLOS ONE

Scientific Reports

Demography

Medical Decision Making

Influenza and Other Respiratory Viruses

Environmental Health

International Journal of Health Geographics

SERVICE

Graduate Researchers interested in Data (GRiD) student group

2014- Faculty advisor

Western Mass Data Science, Stats, and R Meetup

2013-2014 Co-organizer 2014- Organizer

Department of Biostatistics and Epidemiology, UMass School of Public Health and Health Sciences 2011-2013 Co-organizer for Department's seminar series			
2012-2013	Chair, Biostatistics Curriculum Committee		
2013-	Member, Biostatistics Curriculum Committee		
2013-	Chair, Biostatistics Admissions Committee		
2013-	Chair, Biostatistics Student Outreach Committee		
2013-	UMass Biostatistics representative, Five College Statistics Program		
2014	Member, Assistant Lecturer Search Committee		
2014	Member, Open-rank Tenure Track Search Committee		
2014	Chair, Assistant/Associate Tenure Track Search Committee		
Department of Biostatistics, Johns Hopkins Bloomberg School of Public Health 2008 Student representative to the school's Strategic Planning Committee 2006-2007 Coordinator of student computing club			
Community 2011-2012 2003-2004	Coach for high school ultimate frisbee (Amherst, MA) Assistant coach with the North Oakland Little League (Oakland, CA)		