March 22, 2019

MAYA B. MATHUR, PhD

Department of Epidemiology
Harvard University
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RESEARCH INTERESTS – Statistics

Evidence synthesis, reproducibility, missing data, causal inference, epidemiology

RESEARCH INTERESTS – Substantive

Psychosocial and behavioral correlates of health, evidence-based behavior interventions, experimental cognitive sciences

ACADEMIC POSITIONS

2018 - present Postdoctoral fellow
Department of Epidemiology
Harvard University
Advisor: Dr. Tyler VanderWeele

EDUCATION

2015 - 2018 PhD Biostatistics
Harvard University
Advisor: Dr. Tyler VanderWeele
Dissertation: "Statistical methods for evidence synthesis"

2011 - 2013 MS Statistics
Stanford University
(Graduation with Distinction)

2009 - 2013 BA Psychology
Stanford University
(Phi Beta Kappa)

SELECTED HONORS AND AWARDS

(Additional honors for specific papers and proceedings appear under "Publications". Grants appear under "Research and Travel Grants".)

2018 Young Investigator Award, ASA Section on Statistics in Epidemiology

2017 Distinction in Teaching, Harvard University

2016 *Science Magazine* Editor's Choice – for Mathur & Reichling (2016)

2015 National Defense Science & Engineering Graduate Fellowship
($102K + graduate tuition)

2013 Psychology One Research Scholar, Stanford University

2012 Excellence in Undergraduate Teaching, Stanford University

EXPERIENCE

Biostatistician — Quantitative Sciences Unit, Stanford University School of Medicine, Supervisor: Dr. Manisha Desai — 6/14 - present

Provided statistical collaboration to principal investigators in the Stanford University School of Medicine, advising on study design, statistical analysis, and interpretation of results. Areas of research included oncology, nutrition, preventive health, infectious diseases, and cardiovascular disease with diverse study designs. Mentored the Stanford Intensive Course in Clinical Research. Collaborated on original statistical research to evaluate and extend imputation methods for longitudinal data with missing data in both time-varying and fixed correlated covariates.

Biostatistician — Pulmonary & Critical Care Medicine, Stanford University School of Medicine, PI: Dr. Nayer Khazeni — 6/13-6/14

Was the sole statistician for the research lab of Dr. Nayer Khazeni. Conducted epidemiologic and experimental studies on pandemic influenza (A) H5N1, psychological determinants of health and health behavior, etc. Conceived research questions, designed experimental and observational studies, planned and conducted statistical analyses, and led or coauthored publications.

TEACHING

Spring 2017-19 — Harvard University
TA for "Quantitative Methods in Population Health Sciences" for first-year doctoral students
Distinction in Teaching Award (2017)

Summer 2014 — Stanford University
Biostatistics mentor for "Intensive Course for Clinical Research" for clinical investigators

2013 - 2017 — Directed work of undergraduate and graduate research assistants on multiple research projects

Spring 2012 — Stanford University
TA for "Introduction to Statistical Methods (Precalculus)" for undergraduates
Excellence in Undergraduate Teaching Award

PROFESSIONAL SERVICE – Service Positions

2018-present — Animal Help Now (national wildlife emergency response system)
Statistical advisor (volunteer)

2016-present — Center for Open Science
Ambassador

PROFESSIONAL SERVICE – Peer Reviewing

Ad hoc reviewer for:

1. *American Journal of Epidemiology*
2. *Annals of Internal Medicine*
3. *Biological Psychiatry*
4. *BMJ*
5. *Epidemiology*
6. *Journal of Internal Medicine*
7. *Journal of Psychology & Psychotherapy*
8. *International Journal of Human-Computer Studies*
9. *Liver International*
10. *Medical Decision-Making*
11. *Open Forum Infectious Diseases*
12. *PLOS One*
13. *Psychological Science*
14. *Psychoneuroendocrinology*
15. *Research Synthesis Methods*
16. *Royal Society Open Science*

RESEARCH AND TRAVEL GRANTS

2017 — Harvard University
Mind, Brain, & Behavior Graduate Student Award
For human-robot interaction research

2017 — Harvard University
Mind, Brain, & Behavior Graduate Student Award
For conference attendance

2012 — Stanford University
Undergraduate Research Grant
For influenza A(H5N1) research

2012 — Stanford University
Undergraduate Conference Grant

2011 — Stanford University
Psych-Summer Research Grant
For developmental psychology research

SOFTWARE AND PROGRAMMING SKILLS

- Fluent in R.
- Proficient with Shiny, Qualtrics, REDCap, DistillerSR, JavaScript, SQL.
- Proficient at using Amazon Mechanical Turk as a research platform.
- Basic skills in SPSS, SAS, Python.

STATISTICAL SOFTWARE DEVELOPED

1. R package `MetaUtility`
   Contains functions to estimate the proportion of effects stronger than a threshold of scientific importance, to make various effect size conversions, and to compute and format inference in a meta-analysis.
   Contributors: **Mathur MB** & VanderWeele TJ.
2. Stata module `EVALUE`
   Conducts sensitivity analyses for unmeasured confounding in observational studies.
   Contributors: Linden A, **Mathur MB**, VanderWeele TJ.
3. R package `NRejections`
   Computes metrics of outcome-wide evidence strength for studies testing multiple correlated outcomes.
   Contributors: **Mathur MB** & VanderWeele TJ.
4. R package `EValue`
   Conducts sensitivity analyses for unmeasured confounding in observational studies and meta-analyses.
   Contributors: **Mathur MB**, Ding P, & VanderWeele TJ.
   GUIs: `https://evalue.hmdc.harvard.edu/`,
   `https://mmathur.shinyapps.io/meta_gui_2/`
5. R package `Replicate`
   Conducts statistical analyses for multisite replication projects.
   Contributors: **Mathur MB** & VanderWeele TJ.
6. R package `SimTimeVar`
   Simulates a longitudinal dataset with time-varying covariates with user-specified correlation structures across and within clusters.
   Contributors: **Mathur MB**, Kapphahn K, Garcia A, Desai M, Montez-Rath M.

ORGANIZED CONFERENCE SESSIONS

2019 (planned) Joint Statistical Meetings (Denver, CO)
Organizer and chair: "Causal inference with non-traditional designs"

INVITED TALKS AND SEMINARS

2019 (planned) 12^{th} Annual FDA/AdvaMed Medical Devices and Diagnostics Statistical Issues Conference (Washington, DC)
"Confounding and methods for sensitivity analysis in observational studies"

2019 (planned) University of Copenhagen (Copenhagen, DK)
"The E-value: Practical sensitivity analysis and technical considerations"

2019 (planned) Danish Epidemiology Society (Copenhagen, DK)
"Sensitivity analysis for unmeasured confounding in studies and meta-analyses"

2019 University of Alabama at Birmingham biostatistics seminar (Birmingham, AL)
"Sensitivity analysis for unmeasured confounding in studies and meta-analyses"

2018 Joint Statistical Meetings (Vancouver, BC)
"The E-value: Sensitivity analysis, software, and implementation"

2017 University of Massachusetts at Amherst epidemiology seminar (Amherst, MA)
"The E-value: Sensitivity analysis, software, and implementation"

2009 Centers for Disease Control National Immunization Conference (Dallas, TX)
"Predictors of human papillomavirus vaccination and participation in vaccine decision-making among high school girls"
(`http://cdc.confex.com/cdc/nic2009/webprogram/Session9420.html`)

2008 American Public Health Association National Meeting (San Diego, CA)
"Inspiring a new generation to address global health"

2008 California Medical Association Foundation HPV Vaccine Summit Meeting (Sacramento, CA)
"Predictors of human papillomavirus vaccination and participation in vaccine decision-making among high school girls"

2005 NASA Jet Propulsion Laboratories Mars Mission Control Team (Pasadena, CA)
"Exploring the Uncanny Valley: Quantitative test of a theory on emotional responses to humanoid robotic faces"

OTHER TALKS

2019 Harvard University Applied Statistics Workshop (Boston, MA)
"Sensitivity analysis for publication bias and selective reporting in meta-analyses"

2018 Joint Statistical Meetings (Vancouver, BC)
"Multiple imputation strategies for handling missing data when generalizing randomized clinical trial findings through propensity score-based methodologies"

2018 Joint Statistical Meetings (Vancouver, BC)
"Sensitivity analysis for unmeasured confounding in meta-analysis"

2017 Berkeley Institute for Transparency in the Social Sciences Annual Meeting (Berkeley, CA)
"New statistical metrics for multisite replications"
`https://www.youtube.com/watch?v=xhexCDRKKW4`

PEER-REVIEWED PUBLICATIONS

⋆: Describes contribution to a many-author or consortium paper.

First-authored

1. **Mathur MB** & VanderWeele TJ (in press). Finding common ground in meta-analysis "wars" on violent video games. *Perspectives on Psychological Science.*
2. **Mathur MB** & VanderWeele TJ (2018). New metrics for meta-analyses of heterogeneous effects. *Statistics in Medicine*, 38, 13361342.
3. **Mathur MB** & VanderWeele TJ (in press). Sensitivity analysis for unmeasured confounding in meta-analyses. *Journal of the American Statistical Association.*
4. **Mathur MB**, Bart-Plange DJ, Aczel B, Bernstein MH, Ciunci A, Ebersole CR, et al. (in press). Many Labs 5: Registered multisite replication of tempting-fate effects in Risen & Gilovich. *Advances in Methods and Practices in Psychological Science.*
5. **Mathur MB**, Ding P, Riddell CA, VanderWeele TJ (2018). Web site and R package for computing E-values. *Epidemiology*, 29(5), e45-e47. [Research Letter]
6. **Mathur MB** & VanderWeele TJ (2018). R function for additive interaction measures. *Epidemiology*, 29(1), e5-e6. [Research Letter]
7. **Mathur MB**, Gould M, Khazeni N (2016). Direct-to-consumer drug advertisements can paradoxically increase intentions to adopt lifestyle changes. *Frontiers in Psychology*, 7(1533).
8. **Mathur MB**, Epel E, Kind S, Desai M, Parks CG, Sandler, DP, Khazeni N (2016b). Toward a mechanistic understanding of psychosocial factors in telomere degradation. *Brain, Behavior, and Immunity* 56(413). [Invited commentary]
9. **Mathur MB**, Epel E, Kind S, Desai M, Parks CG, Sandler DP, Khazeni N. (2016a). Perceived stress and telomere length: A systematic review, meta-analysis, and methodologic considerations for advancing the field. *Brain, Behavior, and Immunity* 56(413).
10. **Mathur MB** & Reichling DB (2016). Navigating a social world with robot partners: a quantitative cartography of the Uncanny Valley. *Cognition*, 146, 22-32.
    - Selected as Editors' Choice by *Science Magazine*, 350(6260)
    - Covered in *Slate*, *The Guardian*, *Discover*, *Psychology Today*, *NY Magazine*, *New Scientist*, *Rolling Stone*, etc.
11. **Mathur MB**†, Patel RB†, Gould M, Uyeki TM, Bhattacharya J, Xiao Y, et al. (2014). Seasonal patterns in human (A) H5N1 virus infection: analysis of global cases. *PLOS ONE* 9(9): e106171. doi:10.1371/journal.pone.0106171
    †: Joint first authors
12. **Mathur MB**, Mathur VS, Reichling DB. (2010) Participation in the decision to become vaccinated against human papillomavirus by California high school girls and the predictors of vaccine status. *Journal of Pediatric Health Care* 24(1): 14-24.
    - Covered in the *Centers for Disease Control Newsletter*

Co-authored

1. Desai M, Montez-Rath M, Kapphahn K, Joyce V, **Mathur MB**, Garcia A, et al (provisionally accepted). Missing data strategies for time-varying confounders in comparative effectiveness studies of non-missing time-varying exposures and right-censored outcomes. *Statistics in Medicine.*
2. VanderWeele TJ, Ding P, **Mathur MB** (in press). Technical considerations in the use of the E-value. *Journal of Causal Inference.* [Preprint link]

3. VanderWeele TJ, **Mathur MB**, Ding P (2019). Correcting misinterpretations of the E-value. *Annals of Internal Medicine* 170 (2). [Invited commentary]
4. VanderWeele TJ & **Mathur MB** (2019). Some desirable properties of the Bonferroni correction: Is the Bonferroni correction really so bad? *American Journal of Epidemiology* 188 (3). [Research Letter]
5. Hardwicke TE, **Mathur MB***, MacDonald K, Nilsonne G, Banks GC, Kidwell MC, et al. (2018). Data availability, reusability, and analytic reproducibility: Evaluating the impact of a mandatory open data policy at the journal *Cognition*. *Royal Society Open Science* 5 (180448).
   *: Co-led design and statistical analyses; collected data.
6. Boehm JK, Chen Y, Koga H, **Mathur MB**, Vie LL, & Kubzansky LD (2018). Is optimism associated with healthier cardiovascular-related behavior? Meta-analyses of three health behaviors. *Circulation Research* 122 (8), 1119-1134.
7. Afghahi A, Purington N, Han S, Desai M, Pierson E, **Mathur MB**, et al. (2018). Higher absolute lymphocyte counts predict lower mortality from early-stage triple-negative breast cancer. *Clinical Cancer Research*, clincanres-1323.
8. Mummah S, Robinson TN, **Mathur MB**, Farzinkhou S, Sutton S, Gardner CD (2017). Effect of a mobile app intervention on vegetable consumption in overweight adults: a randomized controlled trial. *International Journal of Behavioral Nutrition and Physical Activity* 14(1), 125.
9. Montez-Rath ME, Kapphahn K, **Mathur MB**, Mitani AA, Hendry DJ, Desai M (2017). Guidelines for generating right-censored outcomes from a Cox model extended to accommodate time-varying covariates. *Journal of Modern Applied Statistical Methods* 16(1), 86-106.
10. Low YS, Daugherty AC, Schroeder EA, Chen W, Seto T, Weber S, et al., including **Mathur MB** (2016). Synergistic drug combinations from electronic health records and gene expression. *Journal of the American Medical Informatics Association* 24 (3).
11. Afghahi A†, **Mathur MB**†, Thompson C, Mitani A, Rigdon J, Desai M, et al. (2016). Use and impact of gene expression profiling in early-stage breast cancer: a study of linked electronic medical record, cancer registry and genomic data across two healthcare systems. *Journal of Oncology Practice* 12 (6).
    †: Joint first authors
12. Charytan DM, Desai M, **Mathur MB**, Stern NM, Brooks MM, Krzych LJ, et al. (2016). Coronary artery bypass grafting compared with percutaneous coronary intervention in chronic kidney disease: an individual patient meta-analysis of randomized trials. *Kidney International* 90 (2).
13. Mummah S, **Mathur MB**, King AC, Gardner CD, Sutton S (2016). Mobile technology for vegetable consumption: a randomized controlled pilot study in overweight adults. *Journal of Medical Internet Research: mHealth and uHealth* 4 (2).
14. Open Science Collaboration, including **Mathur MB*** (2015). Estimating the reproducibility of psychological science. *Science* 349 (6251), aac4716.
    *: Designed and conducted one of the replication studies.

    - Runner-up for Breakthrough of the Year, *Science Magazine*
    - Top 100 Stories of the Year, *Discover Magazine*
    - Top Science Stories of the Year, *Nature Magazine*
    - #5 in Altmetric100

15. Pless E, Queirolo J, Pinter-Wollman N, Crow S, Allen K, **Mathur MB**, Gordon DM (2015). Interactions increase forager availability and activity in harvester ants. *PLOS ONE* 10(11), e0141971.
16. Pargaonkar VS, Perez MV, Jindal A, **Mathur MB**, Myers J, Froelicher VF. (2015). Long-term prognosis of early repolarization with J-wave and QRS slur patterns on the resting electrocardiogram: a cohort study. *Annals of Internal Medicine* 163(10), 747-755.
17. De Jesus Perez VA, Yuan K, Lyuksyutova MA, Dewey F, Orcholski ME, Shuffle EM, et al., including **Mathur MB** (2014). Whole exome sequencing reveals TopBP1 as a novel gene in idiopathic pulmonary arterial hypertension. *American Journal of Respiratory and Critical Care Medicine* 189 (10): 1260-1272.
18. Patel RB†, **Mathur MB**†, Gould M, Uyeki TM, Bhattacharya J, Xiao Y, Khazeni N. (2014) Demographic and clinical predictors of mortality from highly pathogenic avian influenza A (H5N1) virus infection: CART analysis of international cases. *PLOS ONE* 9(3): e91630. doi:10.1371/journal.pone.0091630
†: Joint first authors

PEER-REVIEWED CONFERENCE PROCEEDINGS

(Proceedings corresponding to work appearing under "Publications" or "Papers Under Review" are omitted.)

1. Ling A, **Mathur MB**, Kapphahn K, Montez-Rath ME, Desai M (2018). Multiple imputation strategies for handling missing data when generalizing randomized clinical trial findings through propensity score-based methodologies *Proceedings of the Joint Statistical Meetings.*
2. Montez-Rath ME, Kapphahn K, **Mathur MB**, Purington N, Joyce V, Desai M (2017). Simulating real-world data with time-varying variables. *American Statistical Association Conference on Statistical Practice.*
3. Pargaonkar V, Kobayashi Y, Tanaka S, **Mathur MB**, Nguyen P, Lee D, Fearon W, Yeung A, Tremmel J (2015). Sex differences in coronary pathophysiology in patients with angina in the absence of obstructive coronary artery disease. *Proceedings of the American College of Cardiology 2015.*
4. Ha LD, **Mathur MB**, Pargaonkar V, Pickham D, Tremmel J, Froelicher V, Khandelwal A (2015). Sex differences in the prevalence and prognostic value of risk parameters on resting electrocardiogram. *Proceedings of the American College of Cardiology 2015.*
5. Kapphahn K, Montez-Rath M, **Mathur MB**, Desai M (2015). Feasibility of reformatting data for multiple imputation of clustered data. *Joint Statistical Meetings 2015.*
6. **Mathur M** and Reichling D (2008). A critical analysis of the efficacy of equine joint supplements. *Veterinary Orthopedic Society 35th Annual Conference Proceedings 2008: 81* and *Veterinary and Comparative Orthopaedics & Traumatology 2008.*