Nicholas Williams

Department of Epidemiology   e: ntw2117@cumc.columbia.edu
Mailman School of Public Health, Columbia University   p: +1 719 650 1307
New York, New York, USA   w: nicholastwilliams.com

EDUCATION

M.P.H.   Biostatistics, Columbia University, 2019

B.A.   Psychology, University of Colorado at Boulder, 2017

PROFESSIONAL

2021-   Columbia University, Mailman School of Public Health
          Senior Data Analyst
          Department of Epidemiology

2021   Bayer AG, Independent Statistical Consultant

2019-21   Weill Cornell Medical College
          Research Biostatistician I
          Division of Biostatistics, Department of Population Health Sciences

2018   Columbia University, Mailman School of Public Health
          Research Assistant for Christine Mauro, Ph.D.
          Department of Biostatistics

RESEARCH INTERESTS

Nonparametric causal inference.

Open source statistical software development.

PUBLICATIONS

Research in statistics

2024   **Williams, N.T.**, Liu, R., Hoffman, K.E., Forrest, S., Rudolph, K.E., and Díaz, I. "Two-step
          targeted minimum-loss based estimation for non-negative two-part outcomes." Under
          review at *Statistical Methods in Medical Research*. Available on arXiv.

2024   **Williams, N.**, Hoffman, K, Rudolph, K.E., and Díaz, I. "Learning optimal dynamic treatment
          regimes from longitudinal data." *American Journal of Epidemiology*. DOI:
          10.1093/aje/kwae122.

2024   Vo, T., **Williams, N.**, Liu, R., Rudolph, K.E., Díaz, I. "Recanting twins: addressing
          intermediate confounding in mediation analysis". Available on arXiv.

2024   Liu, R., **Williams, N.T.**, Rudolph, K.E., and Díaz, I., "General targeted machine learning for modern causal mediation analysis". Available on arXiv.

2024   Rudolph, K.E., **Williams, N.**, and Díaz, I. "Practical causal mediation analysis: extending nonparametric estimators to accommodate multiple mediators and multiple intermediate confounders." *Biostatistics*. DOI: 10.1093/biostatistics/kxae012.

2024   Rudolph, K.E., **Williams, N.** and Díaz, I. "Using instrumental variables to address unmeasured confounding in causal mediation analysis." *Biometrics*. DOI: 10.1093/biomtc/ujad037.

2024   Gilbert, B., Hoffman, K.L., **Williams, N.**, Rudolph, K.E., Schenck, E.J., and Díaz, I. "Identification and estimation of mediational effects of longitudinal modified treatment policies". Available on arXiv.

2024   Hoffman, K.L., Salazar-Barreto, D., **Williams, N.T.**, Rudolph, K.E., and Díaz, I. "Studying Continuous, Time-varying, and/or Complex Exposures Using Longitudinal Modified Treatment Policies." *Epidemiology*. DOI: 10.1097/EDE.0000000000001764.

2023   Rudolph, K.E., **Williams, N.**, Miles, C.H., Antonelli, J., and Díaz, I. "All models are wrong, but which are useful? Comparing parametric and nonparametric estimation of causal effects in finite samples." In press at *Journal of Causal Inference*. DOI: 10.48550/arXiv.2211.10310.

2023   Rudolph, K.E., **Williams, N.**, Stuart, E.A., and Díaz, I. "Efficiently transporting average treatment effects using a sufficient subset of effect modifiers". Available on arXiv.

2023   Díaz, I., **Williams, N.**, and Rudolph, K.E. "Efficient and flexible causal mediation with time-varying mediators, treatments, and confounders." *Journal of Causal Inference* DOI: 10.1515/jci-2022-0077.

2023   Rudolph, K.E., **Williams, N.**, and Díaz, I. "Efficient and flexible estimation of natural direct and indirect effects under intermediate confounding and monotonicity constraints." *Biometrics*. DOI: 10.1111/biom.13850

2022   **Williams, N.**, Rosenblum, M. and Díaz, I. "Optimizing Precision and Power by Machine Learning in Randomized Trials, with an Application to COVID-19." *Journal of the Royal Statistical Society: Series A*. DOI: 10.1111/rssa.12915

2021   Díaz, I., **Williams, N.**, Hoffman, K. and Schenck, E. "Non-parametric causal effects based on longitudinal modified treatment policies." *Journal of the American Statistical Association - Theory and Methods*. DOI: 10.1080/01621459.2021.1955691

Software

2024   **Williams, N.** and Rudolph, K.E. "A drug classification pipeline for Medicaid claims using RxNorm." Available on arXiv.

2023   **Williams, N.** and Díaz, I. "lmtp: An R package for estimating the causal effects of modified treatment policies." *Observational Studies*. `https://muse.jhu.edu/article/883479`

Applied Epidemiology

2024 Hoffman, K.L., Milazzo, F., **Williams, N.T.**, Samples, H., Olfson, M., Díaz, I., Doan, L., Cerda, M., Crystal, S., and Rudolph, K.E. "Independent and joint contributions of physical disability

and chronic pain to incident opioid use disorder and opioid overdose among Medicaid patients". *Psychological Medicine*. DOI: 10.1017/S003329172300332X.

2024   Rudolph, K.E., **Williams, N.T.**, Díaz, I., Forrest, S., Hoffman, K.L., Samples, H., Olfson, M., Doan, L., Cerda, M., and Ross, R.K. "Pain management treatments and opioid use disorder risk in Medicaid patients." *American Journal of Preventive Medicine*. DOI: 10.1016/j.amepre.2024.07.006.

2023   Rudolph, K.E., **Williams, N.T.**, Milazzo, F., Venkataramani, A., and O'Brien, R. "Has the opening of Amazon fulfillment centers affected demand for disability insurance?" *Plos one*. DOI: 10.1371/journal.pone.0294453.

2022   Hoffman, K.L., Schenck, E.J., Satlin, M.J., Whalen, W., Pan, D., **Williams, N.** and Díaz, I. "Comparison of a target trial emulation framework to Cox regression to estimate the effect of corticosteroids on COVID-19 mortality." *JAMA Network Open*. DOI: 10.1001/jamanetworkopen.2022.34425

2022   Rudolph, K.E., **Williams, N.**, Singham-Goodwin, A.T., Shulman, M., Fishman, M., Díaz, I., Hu, M., Luo, S.X, Rotrosen, J. and Nunes, E. "Buprenorphine & methadone dosing strategies to reduce risk of relapse in the treatment of opioid use disorder." *Drug and Alcohol Dependence*. DOI: https://doi.org/10.1016/j.drugalcdep.2022.109609

2022   Rudolph, K.E., **Williams, N.**, Díaz, I., Luo, S.X., Rotrosen, J. and Nunes, E.V. "Optimally choosing medication type for patients with opioid use disorder." In press at *American Journal of Epidemiology*.

2022   Min. J.Y., Simmons, W., Banerjee, S., Wang, F., **Williams, N.**, Zhang, Y., Reese, A.B., Mushlin, A.I. and Flory, J.H. "Association between antidiabetic drug use and the risk of COVID-19 hospitalization in the INSIGHT Clinical Research Network in New York City." *Diabetes, Obesity and Metabolism*. DOI: 10.1111/dom.14704

2022   Min, J.Y., **Williams, N.**, Simmons, W., Banerjee, S., Wang, F., Zhang, Y., Reese, A.B., Mushlin, A.I. and Flory, J.H. "Baselin Haemoglobin A1c and the Risk of COVID-19 Hospitalization Among Patients with Diabetes in the INSIGHT Clinical Research Network." *Diabetic Medicine*. DOI: 10.1111/dme.14815

2022   Hoffman, J.W., Bitar, R.C., **Williams, N.**, Steineman, B.D., Sturnick, D.R., Garrison, G.W., Demetracopoulos, C.A., Drakos, M.C. and O'Malley, M.J. "Orthosis and foot structure affect the fifth metatarsal principal strains during simulated level walking." *The American Journal of Sports Medicine*. DOI: 10.1177/03635465221079652

2022   Punjani, N., Alawamlh, O.H., Kim, S.J., Salter, C.A., Wald, G., Feliciano, M., **Williams, N.**, Dudley, V., and Goldstein, M. "Changes in semen analysis over time: A temporal trend analysis of 20 years of subfertile non-azoospermic men." *World Journal of Mens Health*. DOI: 10.5534/wjmh.210201

2021   Winston, G., Guadix, S., Lavieri, M., Uribe-Cardenas, R., Kocharian, G., **Williams, N.**, Sholle, E., Grinspan, Z., and Hoffman, C. "Closed-Loop Vagal Nerve Stimulation for Intractable Epilepsy: A Single-Center Experience." *Seizure: European Journal of Epilepsy*. DOI: 10.1016/j.seizure.2021.03.030

2021   Goel, A.R., Bruce, H.A, **Williams, N.** and Alexiades, G. "Long-Term Effects of Hearing Aids on Hearing Ability in Patients with Sensorineural Hearing Loss." *Journal of the American*

Academy of Audiology.

2020 Thiesmeyer, J.W., Ullmann, T.M., Greenberg, J., **Williams, N.T.**, Limberg, J., Stefanova, D., Beninato, T., Finnerty, B.M., Vignaud, T., Leclerc, J., Fahey III, T.J., Mirallie, E.M., Brunaud, L. and Zarnegar, R.."Hypertension resolution after adrenalectomy for primary hyperaldosteronism: Which is the best predictive model?" *Surgery*. DOI: 10.1016/j.surg.2020.04.017

2020 Riley, C.A., Zheng, Z., **Williams, N.**, Smith, T.L., Orlandi, R.R. and Tabaee, A. "Concordance of self-reported practice patterns of American Rhinologic Society members with the International Consensus Statement of Allergy and Rhinology: Rhinosinusitis" *International Forum of Allergy and Rhinology*. DOI: 10.1002/alr.22533

2020 Day, J., Conti, M.S., **Williams, N.**, Ellis, S.J., Deland, J.T. and Cody, E.A. "Contribution of First-Tarsometatarsal Joint Fusion to Deformity Correction in the Treatment of Adult-Acquired Flatfoot Deformity." *Foot and Ankle Orthopaedics*. DOI: 10.1177/2473011420927321

2020 Day, J., Kim, J., Conti, M.S., **Williams, N.**, Deland, J.T. and Ellis, S.J. "Outcomes of Idiopathic Flexible Flatfoot Deformity Reconstruction in the Young Patient." *Foot and Ankle Orthopaedics*. DOI: 10.1177/2473011420937985

2020 Cronin, S., Conti, M., **Williams, N.** and Ellis., S.J. "Relationship Between Demographic and Radiographic Characteristics and Second Ray Pathology in Hallux Valgus Patients." *Foot and Ankle Orthopaedics*. DOI: https://doi.org/10.1177/2473011420909088

2019 Hussain, I., Winston, G.M., Goldberg, J., Curri, C., **Williams, N.**, Chazen, J.L., Greenfield, J.P. and Baaj, A.A. "Impact of imaging modality, age, and gender on craniocervical junction angles in adults without structural pathology." *Journal of Craniovertebral Junction and Spine*. PMID: 32089618

INVITED TALKS

2020 "An Introduction to Answering Causal Questions with the lmtp R package." Weill Cornell Biostatistics Computing Club. New York, NY. July 14.

SOFTWARE

Maintainer

`lmtp` R: Non-Parametric Causal Effects of Feasible Interventions Based on Modified Treatment Policies

`crumble` R: Mediation Analysis Using Modified Treatment Policies, Recanting Twins, and Riesz Representers

`mlr3superlearner` R: Super learner fitting and prediction using mlr3

`adjrct` R: Doubly-Robust and Efficient Estimators for Survival and Ordinal Outcomes in RCTs Without Proportional Hazards or Odds Assumptions

Contributer

`broom`   R: Convert Statistical Objects into Tidy Tibbles

CONFERENCE ACTIVITY

Workshops

2024   **Williams, N.T.**, Rudolph, K.E., and Díaz, I. "Beyond the ATE" Society for Epidemiologic Research, Austin, TX. Materials available at beyondtheate.com.

Conference Presentations

2024   **Williams, N.T.**, Liu, R., Hoffman, K.E., Forrest, S., Rudolph, K.E., and Díaz, I. "Two-step targeted minimum-loss based estimation for non-negative two-part outcomes." American Causal Inference Conference, Seattle, WA.

SERVICE

Academic Journal Peer Review

The R Journal

GRANTS AND AWARDS

Awards and Honors

2017   Graduate with Distinction, University of Colorado at Boulder

Grants and Fellowships

2015   Virginia Summer Undergraduate Research Initiative. Project: "The relationship between cognitively oriented verbs and affect."

TEACHING

Weill Cornell Medicine

Data Science I – Teaching Assistant

Columbia University

Categorical Data Analysis – Lead Teaching Assistant
Research Methods, Quantitative Foundations – Teaching Assistant

PROFESSIONAL AFFILIATIONS

2020–   American Statistical Association
2023–   American Mountain Guides Association – Certified Single Pitch Instructor

TECHNICAL SKILLS

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R        expert
Julia    intermediate
SAS
SQL
C++      novice
Ruby
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