

Nicholas Williams

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EDUCATION

Ph.D. Biostatistics, University of California, Berkeley 2025-Ongoing
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.
Research software engineering.

PUBLICATIONS

Research in statistics

2025 **Williams, N.**, Liu, R., Hoffman, K., Forrest, S., Rudolph, K. and Díaz, I. “Two-stage targeted minimum-loss based estimation for non-negative two-part outcomes.” *Statistical Methods in Medical Research*. DOI: 10.1177/09622802251340245
2025 Díaz, I., **Williams, N.**, Hoffman, K. L. and Hejazi, N. S. “Author correction to: ‘Causal survival analysis under competing risks using longitudinal modified treatment policies.’” *Lifetime Data Analysis*.
2025 Rudolph, K. E., **Williams, N. T.**, Stuart, E. A. and Díaz, I. “Improving efficiency in transporting average treatment effects.” *Biometrika*.

- 2024 Rudolph, K. E., **Williams, N. T.** and Díaz, I. “Practical causal mediation analysis: Extending nonparametric estimators to accommodate multiple mediators and multiple intermediate confounders.” *Biostatistics*.
- 2024 Rudolph, K. E., **Williams, N.** and Díaz, I. “Using instrumental variables to address unmeasured confounding in causal mediation analysis.” *Biometrics*.
- 2023 Díaz, I., **Williams, N.** and Rudolph, K. E. “Efficient and flexible mediation analysis with time-varying mediators, treatments, and confounders.” *Journal of Causal Inference*.
- 2023 Rudolph, K. E., **Williams, N. T.**, 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.” *Journal of Causal Inference*.
- 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*.
- 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. “Imtp: An R package for estimating the causal effects of modified treatment policies.” *Observational Studies*. <https://muse.jhu.edu/article/883479>

Applied Epidemiology

- 2025 Rudolph, K.E., Inose, S., **Williams, N.T.**, Hoffman, K.L., Forrest, S.E., Ross, R.K., Milazzo, F., Díaz, I., Doan, L., Samples, H., Olfson, M., Crystal, S., Cerda, M. and Gao, Y.N. “Mediation of chronic pain and disability on opioid use disorder risk by pain management practices among adult Medicaid patients, 2016-2019.” *American Journal of Epidemiology*.
- 2024 Rudolph, K. E., **Williams, N. T.**, Díaz, I., Forrest, S., Hoffman, K. L., Samples, H., Olfson, M., Doan, L., Cerdá, M. and Ross, R. K. “Pain management treatments and opioid use disorder risk in Medicaid patients.” *American Journal of Preventive Medicine*.
- 2024 Hoffman, K. L., Milazzo, F., **Williams, N. T.**, Samples, H., Olfson, M., Díaz, I., Doan, L., Cerdá, 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*.
- 2023 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.” *American Journal of Epidemiology*. DOI: 10.1093/aje/kwac217

- 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*.
- 2022 Rudolph, K. E., **Williams, N. T.**, Goodwin, A. T. S., Shulman, M., Fishman, M., Díaz, I., Luo, S., Rotrosen, J. and Nunes, E. V. "Buprenorphine & methadone dosing strategies to reduce risk of relapse in the treatment of opioid use disorder." *Drug and Alcohol Dependence*.
- 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 vs Cox regression to estimate the association of corticosteroids with COVID-19 mortality." *JAMA Network Open*. DOI: 10.1001/jamanetworkopen.2022.34425
- 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 Tabae, 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

Software

- 2024 **Williams, N.** and Rudolph, K. E. "A drug classification pipeline for Medicaid claims using RxNorm." *arXiv preprint arXiv:2404.01514*.
- 2023 **Williams, N.** and Díaz, I. "lmt: An R package for estimating the causal effects of modified treatment policies." *Observational Studies*, 9(2): 103–122.

Preprints and manuscripts under review

- 2024 Liu, R., **Williams, N. T.**, Rudolph, K. E. and Díaz, I. "General targeted machine learning for modern causal mediation analysis." *arXiv preprint arXiv:2408.14620*.
- 2024 Susmann, H., **Williams, N. T.**, Rudolph, K. E. and Díaz, I. "Longitudinal generalizations of the average treatment effect on the treated for multi-valued and continuous treatments." *arXiv preprint arXiv:2405.06135*.
- 2024 Vo, T.-T., **Williams, N.**, Liu, R., Rudolph, K. E. and Díaz, I. "Recanting twins: Addressing intermediate confounding in mediation analysis." *arXiv preprint arXiv:2401.04450*.
- 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." *arXiv preprint arXiv:2403.09928*.
- 2021 Lum, M., Chazen, J.L., **Williams, N.** and Riew, D. "Incidence of Internal Jugular Vein Compression by C1 Transverse Process and Styloid Process in Unselected Patient on CT Angiography." Under review at *Spine*.

INVITED TALKS

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

SOFTWARE

Maintainer

- lmtpl 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

R expert

Julia intermediate

SAS

SQL

C++ novice

Ruby

Updated April 2025