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Address: 128C Baker Hall, Carnegie Mellon University, Pittsburgh, PA 15213

Professional Experience

2022- CARNEGIE MELLON UNIVERSITY
Postdoctoral Researcher, Department of Statistics & Data Science.
Advisors: Edward Kennedy and Luke Keele.

Education

2017-2022 HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH
PhD in Biostatistics. (GPA: 4.00/4.00)
Advisor: Sebastien Haneuse.
Dissertation: "Robust methods for causal inference and missing data in electronic health record-based comparative effectiveness research."

2017-2019 HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH
MA in Biostatistics. (GPA: 4.00/4.00)

2015-2017 MCGILL UNIVERSITY
MSc in Biostatistics. (GPA: 4.00/4.00)
Advisor: Robert Platt.
Thesis: "Simulation and causal inference methods for repeated measures or longitudinal data."

2012-2015 MCGILL UNIVERSITY
BSc in Pharmacology. (GPA: 4.00/4.00)

Research Interests

- ◇ Causal inference: observational studies, instrumental variables, partial identification, optimal dynamic treatment regimes, resource constraints, sensitivity analysis, transportability
- ◇ Distribution shift & missing data
- ◇ Semiparametric efficiency theory
- ◇ Nonparametrics & machine learning

Other Experience & Training

2019-2022 HARVARD UNIVERSITY
Statistical Consultant, Harvard Biostatistics Student Consulting Center

2014-2017 MCGILL UNIVERSITY
Research Assistant/Analyst, Department of Psychiatry
Supervisor: Brett Thombs

Selected Awards & Funding

2022	Certificate of Distinction in Teaching. <i>Harvard University</i> .
2020	Certificate of Distinction in Teaching. <i>Harvard University</i> .
2019	Robert B. Reed Prize for Excellence in Biostatistical Sciences, for receiving the highest grade on the Biostatistics Department's doctoral written qualifying exam. <i>Harvard University</i> .
2016	Master's Training Award. <i>Fonds de recherche du Québec – Santé</i> .
2015	Frederick Banting & Charles Best Graduate Scholarship. <i>Canadian Institutes of Health Research</i> .
2015	Dean's Convocation Prize. <i>McGill University</i>

Manuscripts in Preparation

(Note: * indicates equal author contribution)

Levis, A.W.*, Bonvini, M.*, Kennedy, E.H., Wilder, B. Assumption-free bounds for corruption-based sensitivity analysis.

Sun, M., Haneuse, S., Wang, R., Mukherjee, R., Levis, A.W. Improving efficiency in double-sampling based studies.

Loewinger, G., Levis, A.W., Cui, E., Pereira, F. Fast one-step functional generalized estimating equations for longitudinal functional data at scale.

Levis, A.W., Kennedy, E.H. Discussion of “Causal and counterfactual views of missing data models” by Razieh Nabi, Rohit Bhattacharya, Ilya Shpitser, and James M. Robins. In preparation for submission to *Statistica Sinica*.

Preprints and Submitted Manuscripts

Levis, A.W., Ben-Michael, E., Kennedy, E.H. Intervention effects based on potential benefit. [arXiv:2405.08727](https://arxiv.org/abs/2405.08727). Submitted to the *Annals of Statistics*.

Levis, A.W., Kennedy, E.H., McClean, A., Balakrishnan, S., Wasserman, L. Stochastic interventions, sensitivity analysis, and optimal transport. [arXiv:2411.14285](https://arxiv.org/abs/2411.14285). In preparation for submission to the *Journal of the American Statistical Association*.

Benz, L., Levis, A.W., Haneuse, S. Comparing causal inference methods for point exposures with missing confounders: a simulation study. [arXiv:2407.06038](https://arxiv.org/abs/2407.06038). Submitted to *BMC Medical Research Methodology*.

Benz, L., Mukherjee, R., Wang, R., Arterburn, D., Fischer, H., Lee, C., Shortreed, S.M., Haneuse, S., Levis, A.W. Robust causal inference for EHR-based studies of point exposures with missingness in eligibility criteria. [arXiv:2504.16230](https://arxiv.org/abs/2504.16230). Submitted to the *Journal of the American Statistical Association*.

Loewinger, G.*, Levis, A.W.*, Pereira, F. Nonparametric causal inference for optogenetics: sequential excursion effects for dynamic regimes. [arXiv:2405.18597](https://arxiv.org/abs/2405.18597). Under revision for the *Journal of the American Statistical Association, Applications and Case Studies*.

Wang, G., Levis, A.W., Steingrimsson, J.A., Dahabreh, I.J. Efficient estimation of subgroup treatment effects using multi-source data. [arXiv:2402.02684](https://arxiv.org/abs/2402.02684).

Wang, G., **Levis, A.W.**, Steingrimsdottir, J.A., Dahabreh, I.J. Causal inference under transportability assumptions for conditional relative effect measures. [arXiv:2402.02702](#).

Zeng, Z., **Levis, A.W.**, Lee, J., Kennedy, E.H., Keele, L. Nonparametric estimation of local treatment effects with continuous instruments. [arXiv:2504.03063](#).

Rakshit, P., **Levis, A.W.**, Keele, L. Local effects of continuous instruments without positivity. [arXiv:2409.07350](#). Under revision for the *Journal of the Royal Statistical Society: Series B*.

Liu, Y., **Levis, A.W.**, Zhu, K., Yang, S., Gilbert, P.B. and Han, L. Targeted data fusion for causal survival analysis under distribution shift. [arXiv:2501.18798](#). Submitted to *NeurIPS 2025*.

McClean, A., **Levis, A.W.**, Williams, N.T., Díaz, I. Longitudinal weighted and trimmed treatment effects with flip interventions. [arXiv:2506.09188](#).

Levis, A.W., Kennedy, E.H., Keele, L. Nonparametric identification and efficient estimation of causal effects with instrumental variables. [arXiv:2402.09332](#). In preparation for submission to the *Journal of the Royal Statistical Society: Series A*.

Peer-Reviewed Publications

29. **Levis, A.W.**, Bonvini, M.*, Zeng, Z.*, Keele, L., Kennedy, E.H., 2025. Covariate-assisted bounds on causal effects with instrumental variables. *Journal of the Royal Statistical Society: Series B*, p. qkaf028. [doi:10.1093/jrsssb/qkaf028](#).
28. Sun, S., Haneuse, S., **Levis, A.W.**, Lee, C., Arterburn, D.E., Fischer, H., Shortreed, S., Mukherjee, R., 2025. Estimating weighted quantile treatment effects with missing data by double-sampling. *Biometrics*, 81(2), p. ujaf038. [doi:10.1093/biomtc/ujaf038](#).
27. **Levis, A.W.**, Mukherjee, R., Wang, R., Fischer, H., Haneuse, S., 2024. Double sampling for informatively missing data in electronic health record-based comparative effectiveness research. *Statistics in Medicine*, 43(30), p. 6086-6098. [doi:10.1002/sim.10298](#).
26. **Levis, A.W.***, Loewinger, G.*, Pereira, F., 2024. Causal inference in the closed-loop: marginal structural models for sequential excursion effects. [arXiv:2405.18597v1](#). *The Thirty-eighth Annual Conference on Neural Information Processing Systems*. <https://openreview.net/forum?id=BgZcuEsYU8>.
25. Takatsu, K., **Levis, A.W.**, Kennedy, E.H., Kelz, R., Keele, L., 2024. Doubly robust machine learning for an instrumental variable study of surgical care for cholecystitis. *Journal of the Royal Statistical Society: Series A*, p. qnae089. [doi:10.1093/jrsssa/qnae089](#).
24. **Levis, A.W.**, Mukherjee, R., Wang, R., Haneuse, S., 2024. Robust causal inference for point exposures with missing confounders. *The Canadian Journal of Statistics*, p. e11832. [doi:10.1002/cjs.11832](#).
23. Golden, C.D., Zamborain-Mason, J., **Levis, A.W.**, Rice, B.L., Allen, L.H., Hampel, D., Hazen, J., Metcalf, C.J.E., Randriamady, H.J., Shahab-Ferdows, S., Wu, S.M., Haneuse, S., 2024. Prevalence of micronutrient deficiencies across diverse environments in rural Madagascar. *Frontiers in Nutrition*, 11, p. 1389080. [doi:10.3389/fnut.2024.1389080](#).

22. Liu, Y., **Levis, A.W.**, Normand, S. -L., Han, L., 2024. Multi-source conformal inference under distribution shift. [arXiv:2405.09331](https://arxiv.org/abs/2405.09331). *Proceedings of the 41st International Conference on Machine Learning*.
21. Kwakkenbos, L., Carrier, M.E., Welling, J., Levis, B., **Levis, A.W.**, Sauve, M., Turner, K.A., Tao, L., Aguila, K., Carboni-Jiménez, A., Cañedo-Ayala, M., 2022. Randomized controlled trial of an internet-based self-guided hand exercise program to improve hand function in people with systemic sclerosis: the Scleroderma Patient-centered Intervention Network Hand Exercise Program (SPIN-HAND) trial. *Trials*, 23(1), p. 994. [doi:10.1186/s13063-022-06923-4](https://doi.org/10.1186/s13063-022-06923-4).
20. Koffman, L., **Levis, A.W.**, Haneuse, S., Johnson, E., Bock, S., McSperitt, D., Gupta, A., Arterburn, D., 2021. Evaluation of intensive telephonic nutritional and lifestyle counseling to enhance outcomes of bariatric surgery. *Obesity Surgery*, 32, p. 133-141. [doi:10.1007/s11695-021-05749-4](https://doi.org/10.1007/s11695-021-05749-4).
19. Truche, P., Botelho, F., Bowder, A.N., **Levis, A.W.**, Greenberg, S.L., Smith, E., Corlew, S., Bickler, S., Rice, H.E., Ameh, E.A., Meara, J.G., 2021. Potentially avertable child mortality associated with surgical workforce scale-up in low-and middle-income countries: a global study. *World Journal of Surgery*, 45(9), p. 2643-2652. [doi:10.1007/s00268-021-06181-6](https://doi.org/10.1007/s00268-021-06181-6).
18. Thombs, B.D., Kwakkenbos, L., Levis, B., Bourgeault, A., Henry, R.S., **Levis, A.W.**, Harb, S., Tao, L., Carrier, M.E., Bustamante, L., Duchek, D., 2021. Effects of a multi-faceted education and support programme on anxiety symptoms among people with systemic sclerosis and anxiety during COVID-19 (SPIN-CHAT): a two-arm parallel, partially nested, randomised, controlled trial. *The Lancet Rheumatology*, 3(6), p. e427-e437. [doi:10.1016/S2665-9913\(21\)00060-6](https://doi.org/10.1016/S2665-9913(21)00060-6).
17. Koffman, L., **Levis, A.W.**, Arterburn, D., Coleman, K.J., Herrinton, L.J., Cooper, J., Ewing, J., Fischer, H., Fraser, J.R., Johnson, E., Taylor, B., 2021. Investigating bias from missing data in an electronic health records-based study of weight loss after bariatric surgery. *Obesity Surgery*, 31, p. 2125-2135. [doi:10.1007/s11695-021-05226-y](https://doi.org/10.1007/s11695-021-05226-y).
16. Harel, D., Levis, B., Ishihara, M., **Levis, A.W.**, Vigod, S.N., Howard, L.M., Thombs, B.D., Benedetti, A., DEPRESSion Screening Data (DEPRESSD) EPDS Collaboration, Sun, Y., He, C., 2021. Shortening the Edinburgh postnatal depression scale using optimal test assembly methods: Development of the EPDS-Dep-5. *Acta Psychiatrica Scandinavica*, 143(4), p. 348-362. [doi:10.1111/acps.13272](https://doi.org/10.1111/acps.13272).
15. Cañedo-Ayala, M., Rice, D.B., **Levis, A.W.**, Chiovitti, M., Thombs, B.D., 2020. Balance of group sizes in randomized controlled trials published in American Psychological Association journals. *Health Psychology*, 39(11), p. 956. [doi:10.1037/hea0001020](https://doi.org/10.1037/hea0001020).
14. Rice, D.B., Carboni-Jiménez, A., Cañedo-Ayala, M., Turner, K.A., Chiovitti, M., **Levis, A.W.**, Thombs, B.D., 2020. Perceived benefits and facilitators and barriers to providing psychosocial interventions for informal caregivers of people with rare diseases: a scoping review. *The Patient-Patient-Centered Outcomes Research*, 13, p. 471-519. [doi:10.1007/s40271-020-00441-8](https://doi.org/10.1007/s40271-020-00441-8).
13. Wu, Y., Levis, B., Riehm, K.E., Saadat, N., **Levis, A.W.**, Azar, M., Rice, D.B., Boruff, J., Cuijpers, P., Gilbody, S., Ioannidis, J.P., 2020. Equivalency of the diagnostic accuracy of the PHQ-8 and PHQ-9: a systematic review and individual participant data meta-analysis. *Psychological Medicine*, 50(8), p. 1368-1380. [doi:10.1017/S0033291719001314](https://doi.org/10.1017/S0033291719001314).

12. Thombs, B.D., **Levis, A.W.**, Azar, M., Saadat, N., Riehm, K.E., Sanchez, T.A., Chiovitti, M.J., Rice, D.B., Levis, B., Fedoruk, C., Lyubenova, A., 2020. Group sample sizes in nonregulated health care intervention trials described as randomized controlled trials were overly similar. *Journal of Clinical Epidemiology*, 120, p. 8-16. doi:10.1016/j.jclinepi.2019.12.011.
11. He, C., Levis, B., Riehm, K.E., Saadat, N., **Levis, A.W.**, Azar, M., Rice, D.B., Krishnan, A., Wu, Y., Sun, Y., Imran, M., 2020. The accuracy of the Patient Health Questionnaire-9 algorithm for screening to detect major depression: an individual participant data meta-analysis. *Psychotherapy and Psychosomatics*, 89(1), p. 25-37. doi:10.1159/000502294.
10. Azar, M., Riehm, K.E., Saadat, N., Sanchez, T., Chiovitti, M., Qi, L., Rice, D.B., Levis, B., Fedoruk, C., **Levis, A.W.**, Kloda, L.A., 2019. Evaluation of journal registration policies and prospective registration of randomized clinical trials of nonregulated health care interventions. *JAMA Internal Medicine*, 179(5), p. 624-632. doi:10.1001/jamainternmed.2018.8009.
9. Ishihara, M., Harel, D., Levis, B., **Levis, A.W.**, Riehm, K.E., Saadat, N., Azar, M., Rice, D.B., Sanchez, T.A., Chiovitti, M.J., Cuijpers, P., 2019. Shortening self-report mental health symptom measures through optimal test assembly methods: Development and validation of the Patient Health Questionnaire-Depression-4. *Depression and Anxiety*, 36(1), p. 82-92. doi:10.1002/da.22841.
8. Levis, B., Benedetti, A., Riehm, K.E., Saadat, N., **Levis, A.W.**, Azar, M., Rice, D.B., Chiovitti, M.J., Sanchez, T.A., Cuijpers, P., Gilbody, S., 2018. Probability of major depression diagnostic classification using semi-structured versus fully structured diagnostic interviews. *The British Journal of Psychiatry*, 212(6), p. 377-385. doi:10.1192/bjp.2018.54.
7. Thombs, B.D., Kwakkenbos, L., **Levis, A.W.**, Benedetti, A., 2018. Addressing overestimation of the prevalence of depression based on self-report screening questionnaires. *Canadian Medical Association Journal*, 190, p. E44-E49. doi:10.1503/cmaj.170691.
6. Delisle, V.C., Gumuchian, S.T., Rice, D.B., **Levis, A.W.**, Kloda, L.A., Körner, A., Thombs, B.D., 2017. Perceived benefits and factors that influence the ability to establish and maintain patient support groups in rare diseases: a scoping review. *The Patient-Patient-Centered Outcomes Research*, 10, p. 283-293. doi:10.1007/s40271-016-0213-9.
5. Levis, B., Benedetti, A., **Levis, A.W.**, Ioannidis, J.P., Shrier, I., Cuijpers, P., Gilbody, S., Kloda, L.A., McMillan, D., Patten, S.B., Steele, R.J., 2017. Selective cutoff reporting in studies of diagnostic test accuracy: a comparison of conventional and individual-patient-data meta-analyses of the Patient Health Questionnaire-9 depression screening tool. *American Journal of Epidemiology*, 185(10), p. 954-964. doi:10.1093/aje/kww191.
4. **Levis, A.W.**, Harel, D., Kwakkenbos, L., Carrier, M.E., Mouthon, L., Poiraudau, S., Bartlett, S.J., Khanna, D., Malcarne, V.L., Sauve, M., van den Ende, C.H., 2016. Using optimal test assembly methods for shortening patient-reported outcome measures: Development and validation of the Cochin Hand Function Scale-6: A scleroderma patient-centered intervention network cohort study. *Arthritis Care & Research*, 68(11), p. 1704-1713. doi:10.1002/acr.22893.
3. Coronado-Montoya, S., **Levis, A.W.**, Kwakkenbos, L., Steele, R.J., Turner, E.H., Thombs, B.D., 2016. Reporting of positive results in randomized controlled trials of mindfulness-based mental health interventions. *PloS One*, 11(4):e0153220. doi:10.1371/journal.pone.0153220.

2. **Levis, A.W.**, Leentjens, A.F., Levenson, J.L., Lumley, M.A., Thombs, B.D., 2015. Comparison of self-citation by peer reviewers in a journal with single-blind peer review versus a journal with open peer review. *Journal of Psychosomatic Research*, 79(6), p. 561-565. doi:10.1016/j.jpsychores.2015.08.004.
1. Thombs, B.D., **Levis, A.W.**, Razykov, I., Syamchandra, A., Leentjens, A.F., Levenson, J.L., Lumley, M.A., 2015. Potentially coercive self-citation by peer reviewers: a cross-sectional study. *Journal of Psychosomatic Research*, 78(1), p. 1-6. doi:10.1016/j.jpsychores.2014.09.015.

Conference Presentations (* = invited)

13. *American Causal Inference Conference, Detroit, MI. (5/2025)
12. Joint Statistical Meetings, Portland, OR. (8/2024)
11. American Causal Inference Conference, Seattle, WA. (5/2024)
10. Joint Statistical Meetings, Toronto, ON. (8/2023)
9. American Causal Inference Conference, Austin, TX. (5/2023)
8. East North American Region Spring Meeting, Nashville, TN. (3/2023)
7. International Conference on Computational & Methodological Statistics, London, UK. (12/2022)
6. Joint Statistical Meetings, Washington, DC. (8/2022)
5. East North American Region Spring Meeting, Houston, TX. (3/2022)
4. Joint Statistical Meetings, Virtual Conference. (8/2021)
3. International Conference on Computational & Methodological Statistics, Virtual Conference. (12/2020)
2. Joint Statistical Meetings, Denver, CO. (8/2019)
1. Statistical Society of Canada Annual Meeting, St. Catharines, ON. (5/2016)

Referee Service

Annals of Applied Statistics
Biometrics
Biometrika
Biostatistics
Electronic Journal of Statistics
Journal of the American Statistical Association
Journal of the Royal Statistical Society: Series A
Journal of Causal Inference
Observational Studies

Teaching Experience

Guest Lectures at Carnegie Mellon University

Fall 2022 Modern Causal Inference (36-732)

Teaching Assistant at Harvard University

Fall 2021 Theory and Methods for Causality II (BST 257)

Spring 2020 Statistical Inference I (BST 231)

Fall 2019 Advanced Regression and Statistical Learning (BST 235)

Fall 2018 Core Principles of Biostatistics and Epidemiology for Public Health Practice (ID 201)

Additional Academic Service

Co-organizer (2024-2025), Causal Inference Working Group, *Carnegie Mellon University*

Qualifying exam tutor (2019) for Biostatistics PhD Students, *Harvard University*