

# NATHANIEL HENDRIX

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Center for Professionalism and Value  
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## RESEARCH POSITIONS

American Board of Family Medicine, Center for Professionalism and Value in Health Care  
Data Scientist, 2022 – Present

Harvard University, T.H. Chan School of Public Health  
Visiting Scientist, 2022 – Present

## EDUCATION & TRAINING

Postdoctoral Fellowship, Harvard University, T.H. Chan School of Public Health, 2020 – 2022.

Ph.D. Health Economics and Outcomes Research, University of Washington, 2020.

Dissertation Title: “Using Health Economics Tools to Enhance the Clinical Utility of Artificial Intelligence-Based Diagnostics: A Case Study in Breast Cancer Screening”

Committee: David L. Veenstra (chair), Aasthaa Bansal, Brett Hauber, Christoph I. Lee

Pharm.D., University of Washington, 2015.

B.A. English Literature, Texas State University, 2004.

## RESEARCH INTERESTS

Clinical Artificial Intelligence, Information Technology, Pharmacoepidemiology, Preference Assessment

## PEER-REVIEWED PUBLICATIONS

\* indicates co-first author

1. **N. Hendrix**, R.L. Phillips, and A.W. Bazemore (in press). “How Often Do Family Physicians Document Social Needs in Electronic Health Records?” *Journal of the American Board of Family Medicine*.
2. **N. Hendrix**, S. Bolongaita, S.T. Memirie, M.T. Tolla, D. Villano, and S. Verguet (in press). “Equitable prioritization of healthcare interventions by weighting outcomes on financial risk protection criteria.” *Value in Health*.
3. **N. Hendrix**, S. Warkaye, L. Tesfaye, M. Agachew, A. Arja, R. Sato, F. Getnet, and S. Verguet (in press). “Estimated Travel Time and Staffing Constraints to Accessing the Ethiopian Healthcare System: A Two-Step Floating Catchment Area Analysis.” *Journal of Global Health*.
4. **N. Hendrix**, N. Oestreicher, D. Lalla, C.M. Dolan, K.A. Fisher, D.L. Veenstra and B. Moy (2022). “Residual disease burden after neoadjuvant therapy among U.S. patients with high-risk HER2+ early-stage breast cancer: A population effectiveness model.” *Clinical Breast Cancer*, online before print. doi: 10.1016/j.clbc.2022.08.012
5. **N. Hendrix\***, K.P. Lowry\*, J.G. Elmore, W. Lotter, A.G. Sorensen, W. Hsu, G.J. Liao, S. Parsian, S. Kolb, A. Naeim, and C.I. Lee (2022). “Radiologist preferences for the implementation of artificial intelligence-based decision support for detection and risk prediction during interpretation of screening mammography.” *Journal of the American College of Radiology*, 19(10). doi: 10.1016/j.jacr.2022.06.019

6. S. Jiang, P. Mathias, **N. Hendrix**, D.L. Veenstra, and B. Devine (2022). "Customizing value-based methods to prioritize implementation of pharmacogenomic clinical decision support for learning health systems: A cost-utility analysis." *The Pharmacogenomics Journal*, 22. doi: 10.1038/s41397-022-00275-7
7. **N. Hendrix**, X. Jiang Kwete, S. Bolongaita, I. Megiddo, S.T. Memirie, A. Mirkuzie, J. Nonvignon, and S. Verguet (2022). "Economic evaluations of health system strengthening activities in low- and middle-income countries: A methodological systematic review." *BMJ Global Health*, 7(e007392). doi: 10.1136/bmjgh-2021-007392
8. L.F. Assebe, D. Dillu, K.A. Johansson, M.T. Tolla, G. Tiru, S. Bolongaita, A. Chakrabarti, and **N. Hendrix** (2021). "Financial risks of care-seeking for malaria by rural households in southwest Ethiopia." *BMJ Open*, 11(e056162). doi: 10.1136/bmjopen-2021-056162
9. **N. Hendrix**, D.L. Veenstra, M. Cheng, N.C. Anderson, and S. Verguet (2021). "Assessing the economic value of clinical artificial intelligence: Challenges and opportunities." *Value in Health*, 25(3). doi.org/10.1016/j.jval.2021.08.015
10. **N. Hendrix**, R. Gulati, B. Jiao, A.K. Kader, S.T. Ryan, and R. Etzioni (2021). "Clarifying the trade-offs of risk-stratified screening for prostate cancer: A cost-effectiveness study." *American Journal of Epidemiology*, 190(10). doi:10.1093/aje/kwab155
11. B. Jiao, R. Gulati, **N. Hendrix**, J.L. Gore, S. Rais-Bahrami, T.M. Morgan, and R. Etzioni (2021). "Modeling the cost-effectiveness of multi-parametric magnetic resonance imaging and urine-based reflex testing before prostate biopsy in men with intermediate prostate-specific antigen levels." *Value in Health*, 24(8). doi:10.1016/j.jval.2021.02.009
12. **N. Hendrix**, D.D. Kim, K.S. Patel, and B. Devine (2021). "Differences in the selection of health state utility values by sponsorship in published cost-effectiveness analyses." *Medical Decision Making*, 41(3). doi:10.1177/0272989X20985821
13. **N. Hendrix**, B. Hauber, C.I. Lee, A. Bansal, and D.L. Veenstra (2020). "Artificial intelligence in breast cancer screening: Primary care provider preferences." *Journal of the American Medical Informatics Association*, 28(6). doi:10.1093/jamia/ocaa292
14. **N. Hendrix**, Z. Marcum, and D.L. Veenstra (2020). "Medication persistence of targeted immunomodulators for plaque psoriasis: A retrospective analysis of a US claims database." *Pharmacoepidemiology & Drug Safety*, 29(6). doi:10.1002/pds.5021
15. **N. Hendrix**, D.A. Regier, A. Basu, D.L. Veenstra, J. Chatterjee, D.S. Dhanda, and J.J. Carlson (2020). "Provider preferences for resolving uncertainty and avoiding harms in precision medicine: Results from a discrete choice experiment." *Personalized Medicine*, 17(5). doi:10.2217/pme-2020-0018
16. R. Baral, J. Fleming, S. Khan, D. Higgins, **N. Hendrix**, and C. Pecenka (2020). "Inferring antenatal care visit timing in low- and middle-income countries: Methods to inform potential maternal vaccine coverage." *PLOS One*, 15(8). doi:10.1371/journal.pone.0237718
17. F. Debellut, **N. Hendrix**, V.E. Pitzer, K.M. Neuzil, D. Constenla, N. Bar-Zeev, A. Marfin, and C. Pecenka (2019). "Forecasting demand for the typhoid conjugate vaccine in low- and middle-income countries." *Clinical Infectious Diseases*, 68(S2). doi:10.1093/cid/ciy1076
18. **N. Hendrix**, D.A. Ollendorf, R.H. Chapman, A. Loos, S. Liu, V. Kumar, J.A. Linder, S.D. Pearson, and D.L. Veenstra (2018). "Cost-effectiveness of targeted pharmacotherapy for moderate to severe plaque psoriasis." *Journal of Managed Care & Specialty Pharmacy*, 24(12). doi:10.18553/jmcp.2018.24.12.1210
19. J.J. Carlson, D.D. Kim, G.F. Guzauskas, C.S. Bennette, D.L. Veenstra, A. Basu, **N. Hendrix**, D.L. Hershman, L. Baker and S.D. Ramsey (2018). "Integrating value of research into NCI Clinical Trials Cooperative Group research review and prioritization: A pilot study." *Cancer Medicine*, 7(9). doi:10.1002/cam4.1657
20. F. Debellut\*, **N. Hendrix**\*, J.R. Ortiz, P. Lambach, K.M. Neuzil, N. Bhat, and C. Pecenka (2018). "Forecasting demand for maternal influenza immunization in low- and lower-middle-income countries." *PLOS One*, 13(6). doi:10.1371/journal.pone.0199470
21. W.J. Canestaro, **N. Hendrix**, A. Bansal, S.D. Sullivan, B. Devine, and J.J. Carlson (2017). "Favorable and publicly-funded studies are more likely to be published: A systematic review and meta-analysis." *Journal of Clinical Epidemiology*, 92. doi:10.1016/j.jclinepi.2017.08.004

22. **N. Hendrix**, N. Bar-Zeev, D. Atherly, J. Chikafa, H. Mvula, R. Wachepa, A. Crampin, T. Mhango, C. Mwansambo, R. Heyderman, N. French, N. Cunliffe, and C. Pecenka (2017). "The economic impact of childhood acute gastritis on Malawian families and the healthcare system: A prospective cohort study." *BMJ Open*, 7(9). doi:10.1136/bmjopen-2017-017347
23. P.C. Mathias, **N. Hendrix**, W.-J. Wang, K. Keyloun, M. Khelifi, P. Tarczy-Hornoch, and B. Devine (2017). "Characterizing pharmacogenomic-guided medication use with a clinical data repository." *Clinical Pharmacology & Therapeutics*, 102(2). doi:10.1002/cpt.611

#### MANUSCRIPTS UNDER REVIEW

1. **N. Hendrix**, A. Bazemore, AJ Holmgren, L.R. Rotenstein, A.R. Eden, A.H. Krist, and R.L. Phillips. "Variation in Family Physicians' Experiences Across Different Electronic Health Record Platforms."
2. P.C. Mathias, S. Jiang, **N. Hendrix**, B.H. Shirts, P. Tarczy-Hornoch, D.L. Veenstra, D. Malone, and B. Devine. "PRECISE Value: An interactive web application that estimates the value of implementing a clinical decision support system for a pharmacogenomic testing program."
3. L.F. Assebe, O.F. Norheim, **N. Hendrix**, and S. Verguet. "Equity impact of a package of interventions addressing infectious diseases in Ethiopia."
4. L. Tesfaye, T. Forzy, F. Getnet, A. Misganew, M. Agachew, A. Arja, S. Warkaye, S. Kassahun, S. Memirie, T. Moshag, R. Sato, **N. Hendrix**, M. Zelalem, Y. Lakew, M. Hailu, and S. Verguet. "Estimating immunization coverage at the district level: A case study of measles and diphtheria-pertussis-tetanus vaccines in Ethiopia"

#### GRANTS AND SPONSORED PROJECTS

##### Active Funding

1. Novel algorithmic fairness tools for reducing health disparities in primary care (PI: S. Rose)  
 Role on Project: Sub-PI  
 Funder: National Institutes of Health (National Library of Medicine)  
 Project Period: April 2022 - March 2026  
 Project Identifier: R01 LM013989-01  
 Amount: \$1,531,866
2. Physician use and burdens of health IT (cooperative agreement, PI: R.L. Phillips)  
 Role on Project: Data Scientist  
 Funder: US Department of Health & Human Services (Office of National Coordinator for Health IT)  
 Project Period: March 2021 - March 2024

##### Under Review

1. Using Machine Learning to Simulate N-of-1 Trials to Support Personalized Diabetes Management in Primary Care (PI: N. Hendrix)  
 Role on Project: PI  
 Funder: National Institutes of Health Common Fund  
 Project Identifier: DP2 OD034761-01

##### Completed Funding

1. Developing Data-Driven Cancer Researchers (PIs: R. Etzioni and S. Schwartz)  
 Role on Project: Pre-Doctoral Trainee  
 Funder: National Institutes of Health (National Cancer Institute)  
 Project Period: September 2018 - July 2020

Project Identifier: T32 CA009168-42

2. Pre-Doctoral Fellowship in Outcomes Research

Role on Project: Pre-Doctoral Trainee

Funder: PhRMA Foundation

Project Period: July 2018 – December 2019

Total: \$37,500

Description: Funds provided for cost-of-living support during my Ph.D. dissertation.

3. Health Services Research Training (PI: D. Grembowski)

Role on Project: Pre-Doctoral Trainee

Funder: Agency for Healthcare Research and Quality

Project Period: September 2015 – August 2017

Project Identifier: T32 cHS013853-17

#### INVITED PRESENTATIONS

1. “Machine Learning for Population Health.” ML4H@NeurIPS, New Orleans, 2022.
2. “Radiologist Preferences for AI-Based Decision Support during Breast Cancer Screening.” University of Washington, Program in Health Economics and Outcomes Research (PHEnOM), Seattle, 2021.
3. “Cost-Effectiveness Analysis to Support the Equitable Implementation of Clinical Artificial Intelligence.” Harvard University Center for Research for Computation and Society Health Equity Panel, online (due to COVID-19), 2021.
4. “Cost-Effectiveness of Risk-Stratified Screening for Prostate Cancer.” Cancer Intervention and Surveillance Modeling Network (CISNET) Annual Meeting, online (due to COVID-19), 2020.

#### SELECTED PRESENTATIONS

1. **N. Hendrix**, B. Hauber, C.I. Lee, A. Bansal, and D.L. Veenstra (2020). “Provider preferences for attributes of artificial intelligence in breast cancer screening: A discrete choice experiment.” ASCO Annual Meeting, online (due to COVID-19).
2. **N. Hendrix**, Z. Marcum, and D.L. Veenstra (2019). “Drug survival of targeted therapies for plaque psoriasis: Evidence from a large U.S. claims database.” International Conference on Pharmacoepidemiology & Therapeutic Risk Management (ICPE), Philadelphia, Pennsylvania.
3. **N. Hendrix**, B. Adamson, A. Basu, and B. Devine (2018). “Increasing trend toward reporting significant digits in utility weights: Behavior implications of ‘flat of the curve’ medicine?” ISPOR Annual Meeting, Baltimore, Maryland.
4. **N. Hendrix**, D.A. Ollendorf, R. Chapman, A. Loos, S. Liu, V. Kumar, J. Linder, S. Pearson, and D.L. Veenstra (2017). “Cost-effectiveness of targeted therapy for moderate-to-severe plaque psoriasis: an analysis based on Institute for Clinical and Economic Review (ICER) report.” ISPOR Annual Meeting, Boston, Massachusetts.
5. **N. Hendrix**, and B. Devine (2016). “Deriving utility weights from patient-reported outcomes in epilepsy.” ISPOR Annual Meeting, Washington, DC.
6. **N. Hendrix**, C. Pecenka, J. Chifaka, R. Wachepa, H. Mvula, R. Heyderman, N. French, N. Cunliffe, N. Bar-Zeev, and D. Atherly (2016). “Household costs for treatment of rotavirus-associated diarrheal disease in Malawi.” Twelfth International Rotavirus Symposium, Melbourne, Australia.
7. **N. Hendrix**, C. Pecenka, and C. Keech (2015). “Methods for estimating the global impact of an RSV vaccine.” RSV Vaccines for the World, La Jolla, California.

## TEACHING

### *Harvard University*

Guest lecture: “Visualizing results of cost-effectiveness analyses using R and ggplot2.” Harvard T.H. Chan School of Public Health, GHP 501 (Modeling for Health System Analysis & Priority Setting: graduate level course with approximately 25 enrolled students), 2021.

### *University of Washington*

Curriculum developer and instructor of MarketScan Summer Bootcamp (an introduction to claims data for 10 entering graduate students), 2019.

Approximately 18 hours of lecture and office hours covering basic SAS, SQL and R programming; data subsetting and cleaning; patient identification; and descriptive statistics

Teaching assistant for PHARM 541 (Pharmacy, Healthcare, and Society), 2018.

Developed and graded exercises on reimbursement in the healthcare system and basic ideas in the economic evaluation of medicines for a class of approximately 90 PharmD students

## HONORS & AWARDS

Rubenstein Scholarship Fund (\$5,000), University of Washington School of Pharmacy, 2020.

Rubenstein Scholarship Fund (\$4,000), University of Washington School of Pharmacy, 2019.

Graduate Student Leadership Award, University of Washington School of Pharmacy, 2019.

## SERVICE TO PROFESSION, UNIVERSITY & DEPARTMENT

### *Editorial Service*

Abstract reviewer, American Medical Informatics Association Annual Symposium, 2021.

Referee for *Applied Health Economics*, *BMC Health Services Research*, *BMJ Global Health*, *BMJ Open*, *ClinicoEconomics and Outcomes Research*, *European Journal of Health Economics*, *Journal of Biomedical Informatics*, *Journal of Managed Care and Specialty Pharmacy*, *Journal of Urology*, *Pharmacoepidemiology & Drug Safety*, *PLOS One*, *Value in Health*, and *Value in Health Regional Issues*

### *University of Washington, The Comparative Health Economics, Outcomes & Policy (CHOICE) Institute*

Member, Strategic Planning Committee, 2019.

Founder and lead student editor, *Incremental Thoughts: The CHOICE Institute’s Student Blog*, 2018-2019.

Member, Ph.D. Admissions Committee, 2018.

## PROGRAMMING LANGUAGES

R, Python, VBA, SQL