Nathaniel Hendrix

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Education

University of Washington • Seattle, WA — August 2015 – June 2020 (expected)
Doctor of Philosophy • Health economics and outcomes research

University of Washington • Seattle, WA — August 2011 – March 2015
Doctor of Pharmacy

Texas State University • San Marcos, TX — August 2000 – May 2004
Bachelor of Arts • English literature

Dissertation

- **Title**: Using health economics tools to enhance the clinical utility of machine learning-based diagnostic algorithms
- **Aim 1**: I will construct and administer a discrete choice experiment survey instrument to evaluate how changing the attributes of a hypothetical mammography interpretation algorithm affects the intention of primary care providers to recommend this service over radiologist interpretation.
- **Aim 2**: Using a validated open source model of breast cancer screening outcomes, I will assess the use of the quality-adjusted life year (QALY) for comparing the performance of 47 algorithms submitted to the Digital Mammography DREAM Challenge.

Selected PhD Coursework

Machine learning, econometrics, health services research methods, health outcomes modeling

Selected Work Experience

Research assistant – University of Washington — Jan 2016 – Present
Seattle, WA

- Assist in the design and development of cost-effectiveness models for new pharamceuticals
- Analyze survey and discrete choice data, and draft manuscripts

Consultant (economic modeling) – PATH — March 2015 – Present
Seattle, WA

- Develop demand forecasts and cost-effectiveness analyses for vaccine campaigns in low- and middle-income countries
- Create economic models to assist in the development of target product profiles for novel contraception products for use in low- and middle-income countries

Selected Grants, Honors, and Awards

T32 predoctoral fellowship (Developing Data-Driven Cancer Researchers) – Fred Hutchinson Cancer Research Center — 2018-2020

Graduate Student Leadership Award – University of Washington School of Pharmacy — 2019

Rubenstein Scholarship Fund ($9,000) – University of Washington School of Pharmacy — 2019

Predoctoral fellowship in outcomes research ($37,500) – PhRMA Foundation — 2018-2019

T32 predoctoral fellowship (Health Services Research Training) – University of Washington School of Public Health — 2015-2017

Selected Publications

- *(Under review)* N. Hendrix, D. Regier, A. Basu, D. Veenstra, J. Chatterjee, D. Dhanda, J. Carlson. "Provider preferences for resolving uncertainty and avoiding harms in precision medicine: Results from a discrete choice experiment."
- J. Carlson, D. Kim, G. Guzauskas, C. Bennette, D. Veenstra, A. Basu, N. Hendrix, D. Hershman, L. Baker, S. Ramsey. "A pilot study integrating value of research analyses into NCI clinical trials cooperative group research review and prioritization process." Cancer Medicine. 2018 July.
- N. Hendrix, D. Ollendorf, R. Chapman, A. Loos, S. Liu, V. Kumar, J. Linder, S. Pearson, D. Veenstra. "Cost-effectiveness of targeted pharmacotherapy for moderate-to-severe plaque psoriasis." Journal of Managed Care and Specialty Pharmacy. 2018 December.

My interest in AI research stems from my conviction that the healthcare system can be redesigned for the better once it fully integrates information technologies, including AI. This conviction arose during my Doctor of Pharmacy training, when I learned how cognitive biases, provider fatigue, and reliance on heuristics produced errors and sub-optimal patient outcomes.

Since beginning my PhD in health economics and outcomes research, I have looked for gaps in existing AI research to understand how I can contribute. As such, I decided to write my dissertation on how tools from health economics – the discrete choice experiment and the quality-adjusted life year (QALY) – can be used to solve some issues surrounding AI's translation into the clinic.

As one of my two dissertation aims, I am conducting a discrete choice experiment to see what attributes of a hypothetical AI for the interpretation of breast cancer screening mammograms would prompt primary care providers to recommend AI-enhanced screening over a radiologist alone. With data collection halfway done, my preliminary results suggest that primary care providers widely accept the use of AI to triage likely-negative screens, thus providing what may be the first quantitative look at the acceptability of semi-autonomous clinical AI.

In my future career, I will continue to research translational issues around clinical AI, hopefully at a university. For example, I plan to expand my dissertation research to include patient perspectives on artificial intelligence. My other long-term research interests include using cost-effectiveness analysis to examine different configurations of the AI-clinician partnership and developing patient-centered outcome measures that can be used in all stages of the development of AI algorithms.