

# RESEARCH STATEMENT

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My research program lies at the intersection of health economics, public health policy, and applied microeconomics, with a particular emphasis on leveraging large-scale data and rigorous econometric methods to address pressing challenges in population health. With over 25 peer-reviewed publications, including papers in the *Journal of Policy Analysis and Management*, *JAMA Network Open*, and *American Journal of Preventive Medicine*, my work demonstrates both theoretical rigor and practical relevance. My research is driven by three core objectives: (1) understanding how economic incentives and policy interventions shape health behaviors and outcomes, (2) evaluating the effectiveness of safety net programs in mitigating health disparities, and (3) advancing methodological approaches for causal inference in health economics using complex, high-dimensional data.

## I. RESEARCH AGENDA AND CONTRIBUTIONS

### A. Health Economics and Safety Net Program Evaluation

A central pillar of my research examines how social safety net programs affect health and economic outcomes, particularly during crisis periods. My work on the Federal Pandemic Unemployment Compensation (FPUC) program, published in the *Journal of Policy Analysis and Management* (2023), provides critical evidence on the consumption smoothing benefits of unemployment insurance. Using household-level data from over 1.2 million respondents and employing a difference-in-differences design combined with propensity score matching, I demonstrated that the \$600/week supplemental UI benefits reduced food spending by 9.7% and food sufficiency by 6.0% following program expiration. This translates to a marginal propensity to spend on food of 0.06 out of UI benefits, providing crucial parameters for policymakers designing future economic relief programs.

Importantly, my analysis revealed substantial heterogeneity in treatment effects across demographic groups and economic conditions. The consumption smoothing effect was significantly larger in states with higher unemployment rates and among lower-income households, demonstrating the countercyclical nature of UI benefits. This work contributes methodologically by addressing endogeneity concerns through a control function approach in an

endogenous switching regression framework, advancing beyond traditional methods that may produce biased estimates. The findings informed national policy debates and were cited in Congressional testimony regarding unemployment insurance reform.

## **B. Public Health Policy and Behavioral Economics**

My research on COVID-19 vaccine incentive programs, published as co-first author in *JAMA Network Open* (2021, 79 citations), demonstrates my ability to rapidly address emerging policy questions with rigorous empirical methods. This study evaluated state-level vaccine lottery programs using both individual-level data (403,714 respondents) and state-level vaccination rates, employing two complementary methodologies: difference-in-differences analysis and augmented synthetic control methods. The dual approach strengthened causal inference by accounting for both individual heterogeneity and state-specific confounders.

Results indicated that lottery programs were associated with a 2.1% increase in vaccine uptake overall, with substantial heterogeneity across states. In Ohio, the \$5 million lottery program generated approximately 61,000 additional vaccinations at a marginal cost of \$82 per induced vaccination—a cost-effective intervention compared to many public health programs. However, lottery programs were ineffective in several states (Arkansas, Kentucky, West Virginia), highlighting the importance of contextual factors such as political partisanship and baseline vaccine hesitancy. This research contributed to understanding behavioral responses to financial incentives in public health and informed vaccine promotion strategies nationally.

## **C. Chronic Disease Epidemiology and Risk Factor Analysis**

My recent work on e-cigarette use and diabetes prevalence, forthcoming in the *American Journal of Preventive Medicine Focus* (2024), addresses a critical gap in understanding emerging tobacco products and metabolic health. Using data from over 1.2 million adults in the Behavioral Risk Factor Surveillance System (2020-2022), I employed propensity score matching followed by multivariable logistic regression to examine associations between different smoking patterns (sole e-cigarette use, sole combustible cigarette use, and dual use) and prediabetes/diabetes prevalence.

Key findings revealed that sole e-cigarette users had 7% higher odds of prediabetes (AOR: 1.07, 95% CI: 1.03-1.11), while dual users faced 24% higher odds (AOR: 1.24, 95% CI: 1.19-1.29) compared to never-users. Notably, sole e-cigarette use was not significantly associated with

diabetes prevalence, but dual use conferred 4% higher odds (AOR: 1.04, 95% CI: 1.02-1.06). Heterogeneity analyses revealed that effects varied significantly by education, income, BMI, and race/ethnicity, with Hispanic e-cigarette users and obese users experiencing disproportionately higher risks. These findings challenge the perception of e-cigarettes as harmless alternatives to combustible cigarettes and have important implications for FDA tobacco regulation policies.

## **II. METHODOLOGICAL INNOVATIONS AND DATA SCIENCE**

A distinguishing feature of my research is the integration of advanced econometric methods with large-scale data analytics. My doctoral dissertation involved analyzing administrative data from millions of individuals, requiring sophisticated data management skills and computational expertise. I routinely work with datasets containing billions of observations, including Nielsen and IRI InfoScan retail scanner data from NORC, which present unique challenges in terms of storage, processing, and statistical inference.

My methodological toolkit encompasses causal inference techniques (difference-in-differences, regression discontinuity, instrumental variables, propensity score methods), structural econometric models (demand systems, discrete choice models), machine learning approaches (for prediction and variable selection), and decision-analytical methods (Markov models, microsimulation). I am proficient in multiple programming languages and statistical software (Stata, SAS, R, Python, SQL, AWS), enabling me to handle diverse data environments and computational challenges.

Notably, my work on predicting type 2 diabetes using machine learning, published in the *International Journal of Environmental Research and Public Health* (2021, 301 citations), demonstrated the comparative advantages of machine learning algorithms over traditional logistic regression for diabetes prediction. This highly-cited work has influenced clinical screening protocols and risk assessment tools internationally. Additionally, my collaboration on AgriBERT, presented at IJCAI-22 (81 citations), showcased the application of natural language processing and transformer models to agricultural and food systems, demonstrating versatility across disciplines.

## **III. ONGOING AND FUTURE RESEARCH**

### **A. Health Technology Assessment and Cost-Effectiveness Analysis**

Building on my current position as Health Economist with the CDC Foundation, where I serve as Data to Policy Lead for the Bloomberg Philanthropies Data for Health Initiative, I am expanding my research into health technology assessment and cost-effectiveness analysis. I recently led a multi-day workshop in Cebu, Philippines, training 37 participants from 19 countries on decision modeling for health economic evaluation. This work involves developing Markov models and microsimulation frameworks to assess the cost-effectiveness of cancer screening programs, NCD interventions, maternal health initiatives, and road safety policies.

My future research will focus on developing standardized frameworks for health economic evaluation in low- and middle-income countries, where data limitations and institutional constraints require methodological adaptations. I plan to collaborate with international health ministries to conduct budget impact analyses and priority-setting exercises, ensuring that economic evidence informs resource allocation decisions. This work will contribute to both the academic literature on health economics and practical decision-making in global health.

## **B. Food Insecurity, Nutrition, and Health Outcomes**

My ongoing research examines the relationship between food insecurity, dietary quality, and chronic disease burden. Using household scanner data and food security surveys, I am investigating how SNAP participation and benefit levels affect food purchasing patterns, diet quality, and health outcomes. Preliminary findings suggest substantial heterogeneity by store choice, income level, and geographic location (published in *Nutrients*, 2021). Future work will employ structural demand models (Exact Affine Stone Index systems) to estimate price and income elasticities for different food groups, informing optimal SNAP benefit levels and potential food taxes/subsidies.

Additionally, I am exploring the impacts of the Low-Income Home Energy Assistance Program (LIHEAP) on food expenditures and nutrition using welfare analysis frameworks. This research addresses an important but understudied question: do energy assistance programs have spillover effects on food security and diet quality? Understanding these mechanisms is crucial for designing integrated social policies that address multiple dimensions of poverty.

## **C. Climate Change Adaptation and Agricultural Economics**

My work on climate change adaptation in Nepal, published in *Resources, Environment and Sustainability* (2022, 42 citations), employed a control function approach in an endogenous switching regression framework to estimate the impact of adaptation practices on crop revenue and downside risk exposure. Results showed that adaptation strategies increased farm revenue by 21.6% and reduced downside risk exposure by 6.4%, with substantial heterogeneity by household wealth, education, and access to extension services.

Future research will extend this work to examine climate adaptation in other developing countries and assess the cost-effectiveness of different adaptation strategies. I plan to collaborate with

agricultural economists and environmental scientists to model the long-term impacts of climate change on food systems and evaluate policy interventions (insurance programs, agricultural subsidies, technology adoption incentives) designed to enhance climate resilience. This interdisciplinary approach aligns with growing recognition that climate change is fundamentally a public health challenge requiring economic analysis.

#### **IV. RESEARCH IMPACT AND POLICY ENGAGEMENT**

My research consistently demonstrates both scholarly rigor and real-world impact. My work has been cited over 986 times (h-index: 15, i10-index: 20), with several papers achieving high citation rates within years of publication. The diabetes prediction paper (301 citations) and vaccine lottery study (79 citations) exemplify research that resonates across disciplines—from clinical medicine to behavioral economics to public policy.

Beyond academic citations, my research has influenced policy debates and practice. The unemployment insurance work informed Congressional discussions on pandemic relief programs. The vaccine lottery research was covered extensively in national media and cited by state health departments designing incentive programs. My current work with the CDC Foundation directly supports ministries of health in implementing evidence-based policies, with teams developing cost-effectiveness models now being validated with stakeholders and populated with local data.

I actively engage with policymakers through policy briefs, stakeholder presentations, and participation in technical advisory groups. I have presented findings to the CDC, state health departments, international health ministries, and multilateral organizations. This engagement not only enhances research impact but also generates new research questions grounded in practical policy challenges.

#### **V. FUTURE DIRECTIONS AND SCHOLARLY VISION**

Looking forward, my research agenda will continue to address fundamental questions in health economics and public health policy while pushing methodological boundaries. Three priority areas will guide my work over the next five years:

**First**, I will expand my work on health disparities and equity, examining how social determinants of health (income, education, race/ethnicity, geographic location) moderate the effectiveness of health policies and programs. This research will employ advanced econometric techniques to move beyond estimating average treatment effects toward understanding heterogeneous treatment effects across population subgroups. Such analyses are crucial for designing targeted interventions that reduce rather than exacerbate health inequalities.

**Second**, I will leverage emerging data sources and computational methods to enhance causal inference in health economics. This includes integrating machine learning for heterogeneous effect

estimation, using high-frequency administrative data to identify policy effects more precisely, and employing text analysis to extract insights from unstructured health data (clinical notes, policy documents, social media). The intersection of causal inference and machine learning represents a frontier in health economics research.

**Third**, I will strengthen my focus on global health economics, particularly in low- and middle-income countries where the burden of disease is highest but economic evidence to guide resource allocation is scarce. My current work with the CDC Foundation provides a strong foundation for this research agenda. Future projects will examine the cost-effectiveness of interventions for non-communicable diseases, maternal and child health, and infectious diseases in resource-constrained settings, contributing to priority-setting frameworks that maximize population health gains within budget constraints.

## **VI. CONCLUSION**

My research program combines theoretical rigor, methodological innovation, and policy relevance to address critical challenges in health economics and public health policy. With extensive experience in causal inference, large-scale data analysis, and health economic evaluation, I am well-positioned to contribute to advancing knowledge in these fields while training the next generation of health economists and policy analysts. My commitment to translating research into actionable evidence for policymakers ensures that my work generates both scholarly contributions and tangible improvements in population health and well-being. I am eager to continue this research agenda as an Assistant Professor, where I can build a vibrant research program, mentor students, and collaborate with colleagues to tackle the most pressing health policy challenges of our time.