

I am an applied microeconomist with research interests in health, labor, and education. Some of my current work includes an examination of medical staffing in the production of healthcare, an evaluation of the financial performance of hospitals after healthcare reform, and an analysis of the relationship between health insurance and HIV. As someone trained in a school of public policy, my work is oriented towards policy and its impact on industry.

The first chapter of my dissertation focuses on medical staffing and access to care. For over a decade, health policy professionals in academia, government, and industry haven been warning that the U.S. healthcare system is unprepared to meet growing patient demand. For example, the Association of American Medical Colleges currently predicts that by 2032 the demand for physicians will exceed supply by a range of 46,000 to 121,000. This has understandably led to calls on the government to increase its support for graduate medical education. But one drawback with this solution is that producing more doctors is a long and expensive process.

As an alternative, others have suggested using non-physician clinical staff more effectively. My first chapter explores this possibility. Most research in this area are small-scale randomized control trials that examine whether nurses can deliver the same quality of care as physicians, or if nurses can be cost-effective to hire. In contrast to those studies, I examine the impact of non-physician clinical staff on access to care by using a unique, proprietary dataset generously provided to me by the American Medical Group Association to estimate a production function for physician services. If there is ever a shortage of healthcare workers, this method will show how much output will fall after a loss of that type of worker, and which worker/input combinations are needed to maintain the same level of output.

The second chapter of my dissertation examines the financial health of safety-net hospitals in Massachusetts following the state's 2006 reform. It also uses that information to look ahead to what will happen to safety-net hospitals nationally under the Affordable Care Act. Much like the Affordable Care Act, the state reform sought to enact universal coverage by reforming the non-group insurance market, mandating that all individuals purchase insurance, and helping individuals comply with the mandate by expanding Medicaid and providing subsidies. To help cover the costs of the Medicaid expansion and subsidies, the state reallocated funds previously set aside for its safety-net hospitals — those hospitals that, prior to the reform, served a disproportionately high number of uninsured individuals.

In theory, if everyone has health insurance, then those supplemental payments should no longer be necessary. The first federal reduction, totaling \$4 billion, is scheduled to take effect this year with further reductions totaling \$8 billion set to occur every year from 2021 through 2025. Previous research found that the financial performance of the state's safety-net hospitals deteriorated in the immediate aftermath of the reform. In my work, I use a difference-in-differences strategy that compares the financial health of safety-net hospitals to non-safety-net hospitals, before and after the reform. Unlike earlier studies, however, I use a considerably longer timeframe and vary the definition of safety-net hospitals. I show that the earlier estimates, which suggest the reform put safety-net hospitals on worse financial footing, are sensitive to how broad or narrow safety-net hospitals are defined. I also show that the most severely affected safety-net hospitals were still able to recover after several years, and I give an estimate of how many hospitals may be affected by the federal reductions in supplemental payments.

My final dissertation chapter, coauthored with Ben Harrell, tests whether a new HIV medication, Truvada, has slowed the spread of the disease. First introduced in 2012 by Gilead Pharmaceuticals, Truvada was the first drug approved by the Food and Drug Administration for Pre-Exposure Prophylaxis (PrEP), a

once-a-day pill regimen that can inoculate a person against HIV with over 90% efficacy. Three years later, the White House Office of National AIDS Policy updated its five-year plan to specifically include PrEP as one of its strategies for combatting HIV. Unfortunately, without insurance the medication is expensive: a 30-day supply can cost over \$1,500. But Medicaid covers Truvada, and that raises the possibility that the 2014 Medicaid expansion may have significantly reduced the spread of HIV.

We use a difference-in-differences strategy to compare trends in new HIV infections in expansion states relative to new HIV infections in non-expansion states, before and after the reform. The results, however, do not show any statistically significant decline in the number of new HIV infections due to the Medicaid expansion. This suggests that, despite the hopes and expectations of public health officials, people may be engaging in riskier behaviors. For example, since PrEP functions like a vaccine, as the number of users increases the individual benefit of adhering to the prevention strategy diminishes. As a result, a person might therefore decide to stop taking the medication if he suspects there are enough other people on PrEP to confer herd immunity. Public health officials will need to consider these behaviors when they decide how to move forward.

I also have several ongoing projects that are separate from my dissertation. The first project, co-authored with James Marton and Ben Ukert and currently under review, evaluates the impact of the Medicaid expansion on health insurance coverage, access to care, and self-reported health, separately for individuals with and without chronic health conditions. While many previous studies show gains in coverage and improvements in health for different demographic subgroups as a result of the Medicaid expansion, ours is the first that we know of to focus on vulnerable populations that may have been uninsurable prior to the reform because of their pre-existing conditions. Our results indicate the Medicaid expansion led to improvements in access to care for both groups. Although these improvements are mostly larger in magnitude for those with a chronic health condition, the differences in magnitude are not statistically significant.

My next two projects, both coauthored with Grace Eau and Tareena Musaddiq, lie at the intersection of health and education. As computing power has increased, textbook publishers have responded by creating adaptive learning computer programs that dynamically collect information on student knowledge, learning style, ability, and motivation and then process that data in real time to create a customized learning experience. The idea is that this technology will ultimately improve student learning in a cost-effective way, and it may yet play a very important role in the future of higher education. When the COVID-19 pandemic forced hundreds of universities to transition to online-only instruction, 38% of university administrators surveyed by the *Chronicle of Higher Education* said they planned on investing in learning technology.

Our first study together tests the efficacy of the technology by using an experimental design that compares the learning outcomes of students who used an adaptive learning program to those who did not. We find that the programs help high achieving students, particularly women, excel in the classroom. This study is also under review at the *Southern Economic Journal*, and we are currently working on a follow-up study where we examine more deeply how students interact with the program.

In the future, I plan to continue researching issues related to healthcare supply and access to care. The American Medical Group Association conducts numerous annual and bi-annual surveys on physician compensation and productivity, medical group operations, provider benefits, staff recruitment and retention, risk-taking, and provider and employee benefits. These are unique data not readily available elsewhere, and I look forward to working with my professional contacts at the association, and others, to leverage these data in cutting-edge research.