My research journey in health information technology started with a simple question at a complicated time. The question; “Why don’t computers do this?”, the time; in the midst of managing my father’s care for oropharyngeal cancer. To coordinate a primary care physician, an oncologist in and a community hospital in my hometown, and an oncology team and hospital at a nearby academic medical center, I’d organized printed test results and communications into a binder that I took to every appointment to ensure that each part of the care team was up to date on the latest results and treatment plans. But it’s 2014 – why don’t computers do this? Over a decade after the HITECH Act spent billions of dollars to digitize the US care delivery, the state of information technology in health care is still poor – equally likely to exacerbate burdens on patients, caregivers, and clinicians as it is to alleviate them. My work is motivated by a desire to address the real problems faced by thousands of people who interact with the health care system every day.

My research explores the use of information technology to improve health and health care delivery. I am interested in how organizations make decisions around IT use and how the US health care delivery system can most effectively leverage the $40 billion-dollar public investment in health information technology. My work is situated at the intersection of health policy, management, and informatics. This interdisciplinary framework allows me to collaborate broadly across disciplinary boundaries to answer critical policy and practice questions using a wide variety of methods, ranging from survey-based primary data collection to the use of large electronic health record (EHR) derived datasets. I work to collaborate broadly with clinicians, economists, implementation scientists, statisticians, computer scientists, sociologists, and informaticians to draw insights and practices from across those fields.

My primary research interest is in health information technology adoption and use in health care delivery organizations. My research in this area examines variation in organizational adoption and use of health information technology, and how that variation contributes to differences in performance.

**Management of Information Technology.** Despite rapid adoption of electronic health records by health care delivery organizations in the US, there is significant variation in how organizations have deployed their new technology. Some organizations have used newly digitized clinical data for purposes such as data analytics, machine learning, and to facilitate cutting edge research, while others have struggled to move beyond antiquated workflows designed for an analog world. This variation manifests even within similar organizations using the same EHR vendor software. To address this, I use a new survey sponsored by a grant from the John A. Hartford Foundation to identify specific hospital organizational practices for the implementation and optimization of information technology and assess whether those practices predict advanced IT functions such as using clinical EHR data for predictive analytics, currently under review at Health Services Research. This stream of work also uses EHR metadata to examine how IT impacts clinician work, productivity, and well-being. These projects include identifying international variation in physician EHR work under revise & resubmit at JAMA Internal Medicine, use of a machine learning algorithm to predict nurse turnover.
from EHR metadata recently accepted at *Health Care Management Review*, and using EHR audit log data to examine learning curves in resident physicians currently under review at *The Journal of General Medical Education*.

**Health Information Technology to Improve Care.** Electronic health records were designed to reduce medical errors such as adverse drug events, as computerized ordering allows clinical decision support (CDS) to intervene at the point of care to prevent potentially dangerous orders from being carried out. However, early studies found conflicting data on safety improvement, and many clinicians find decision support alerts burdensome and distracting. In this stream of work I use data from a national evaluation of hospital clinical decision support quality for inpatient drugs to track safety performance over time, identify learning curves and how experience predicts improvement, and examine the trade-offs between safety and “alert fatigue”, in studies published in *BMJ Quality & Safety*, *JAMA Open*, and *JAMIA*. I then use this data to examine how hospitals respond to quality feedback regarding their IT safety performance using a regression discontinuity design, finding hospitals who receive non-perfect categorical feedback improved significantly more in the subsequent year compared to hospitals who received perfect categorical scores on either side of the sharp discontinuity. This paper also explores the specific mechanisms of improvement and evaluates evidence of spillovers in other dimensions of quality improvement and is currently in preparation for submission at *Health Services Research*.

My secondary research interest is evaluating spillover impacts of health information technology and IT policy. The passage of the HITECH Act in 2009 and the subsequent rapid adoption of electronic health records set the stage for a wide array of changes in both health care and health IT markets. Projects in this stream of research include an analysis of hospitals acquired by health systems switch EHR systems to the vendor used by other hospitals in the system in the years following acquisition, published in *Health Affairs Blog*. Two other papers in preparation use the HITECH Act as a treatment for a differences-in-differences analysis, one examining the impact of HITECH on hospital market consolidation, the other measuring the spillover effects of HITECH on innovation by comparing patenting activity in the US and Europe, which are in preparation for submission at *Health Affairs* and *Management Science*, respectively.

Finally, I maintain a diverse set of research interests in digital health broadly, including tracking the adoption of new technologies such as application programming interfaces, measuring national levels of interoperable data exchange, the use of mobile health applications, and the impact of prescription drug monitoring programs for opioid prescribing.

My future research agenda expands upon these research streams, diving further into understanding the first and second order effects of health information technology. Electronic health record data is slowly becoming more available and usable for research purposes and represents a new frontier in granular clinical data. EHR metadata provides a detailed look into clinician work, and I plan to continue to develop my ongoing collaboration with Epic Systems to
use their large cross-institutional data to generate important insights for both managers and policymakers. I expect my research agenda to be both policy relevant as rulemaking surrounding the 21st Century Cures Act continues as well as actionable by practitioners such as health system leaders making strategic IT decisions. These new large datasets often call for the use of innovative new methods. I plan to combine my training in econometrics and biostatistics with new techniques in machine learning and statistics to apply more robust causal inference to studies of IT in health care. I also hope to deepen my collaborations with clinicians and clinical partners in order to guide my research agenda and ensure that my work both properly contextualized as well as relevant for practicing clinicians.

The COVID-19 pandemic has dramatically changed the delivery of care in both the short and long-term, and the United States has seen an explosion in the use of telehealth and other information technology to deliver care outside of the traditional four walls of the clinic or hospital. Careful research on the impact of video visits, remote monitoring, asynchronous communication between patients and clinicians, and other innovative new technologies is critical to crafting sustainable policy and practice guidelines and to answer pressing questions like how to reimburse for these non-traditional care touch points, what impact this new workflow has on physician well-being, and most importantly how these technologies can ensure and expand access to care for all patients.

As a junior faculty member my research will continue to seek to understand how information technology impacts health and care delivery. I believe my work will be attractive to extramural funding agencies such as the Agency for Healthcare Research and Quality (AHRQ), which funds a significant number of information technology focused projects. My dissertation work was made possible in part by a grant from the John A. Hartford Foundation, and other non-governmental funders such as the Gordon and Betty Moore foundation also maintain a robust portfolio of health information technology research funding. As health care continues to move into the 21st century by adopting new digital technologies, research into how these innovations impact health and care delivery is critical to deploying new technologies effectively for everyone.

In conclusion, my research seeks to understand how to maximize the value of health information technology to improve health and health care delivery. I hope that throughout my career that my research informs policymakers and practitioners on how to maximize the national investment in health information technology. I believe a robust knowledge base built on high-quality empirical research from multiple disciplines is critical to ensuring not only the effectiveness of existing digital technologies, but that new technology is efficacious, equitable, and accessible for all.