According to the Global Risks Report 2024 by World Economics, mis/dis-information is emerging as the most severe global risk foreseen in the next two years. Artificial Intelligence (AI) technologies are rapidly reshaping society, medicine, healthcare, popular culture, policy, and economics in ways both electrifying and disturbing. Generative AI like ChatGPT has reached mass adoption in record time, offering many promises in modern aspects; however, they carry a significant risk for the mass generation of an almost infinite surge of health disinformation. And particularly when the world is rapidly beginning to change to a digital medium, much of the risk is shouldered by patients and their families. Therefore, it is necessary to provide safety and protect the people who are most vulnerable, through effective, efficient, and ethical action and initiative.

As a high school student, I had the invaluable opportunity to participate in Case Western Reserve University's Youth Engaged in Science (YES) summer program, opening the world of medical research. Simultaneously however, the COVID-19 pandemic was devastating the nation, causing over 1.2 million deaths, and irreparably affecting the lives of countless people. Yet pivotally, estimates found that more than 200,000 deaths could have been avoided - attributed to anti-vaccine disinformation expounded by social media. This stemmed from confusion and irresolution on CDC guidelines, with data on the COVID-19 pandemic failing to effectively inform public policy: in May 2021, the CDC stated "Fully vaccinated people can resume activities without wearing a mask or physically distancing." In October that year, the former secretary of state Colin Powell, passed away from COVID-19; though he was fully vaccinated, his immune system had been weakened from multiple myeloma, a blood cancer that compromises the body's ability to fight infections. In the same breath, I learned that 17-18 million patients were living with cancer.

To deliver critical health information in time, I analyzed with my research team the electronic health records of 100 million patients from a nationwide medical database, determining the real-world effects of COVID-19 vaccination for patients with 12 common forms of malignant cancer. Our study showed that though cancer patients had been fully vaccinated, many still had a significantly increased risk for COVID-19 breakthrough infections and significant risk of mortality and hospitalization, especially for patients undergoing active cancer care. I was named as the primary author, and our study was published in JAMA Oncology in April 2022 and featured in major news outlets, reaching countless patients, clinicians, and policy-makers.

In 2023, another unprecedented medical paradigm-shift came from the development of the medication Semaglutide (Ozempic/Wegovy). Though it was appraised as the Scientific Breakthrough of the Year - standing as a revolutionary advancement in the medical treatment of both Obesity and Type II diabetes, it also introduced an enormous plethora of uncertainty, unknowns, and complexities - creating a window of vulnerability to misinformation.

I began my research in July 2023 after growing concerns were raised after anecdotes of possible suicidal risk from patients prescribed Semaglutide – prompting investigation by both the European Medical Agencies and the FDA. Suicide is a leading cause of death in the U.S. and the second leading cause ages 10-14. In 2021, there were 48,183 cases of death from suicide alone. Given that millions of patients take Semaglutide, it was imperative to gather comprehensive real-world data to assess the potential suicidal risk. By emulating clinical target trials through a real-world medical database, I worked with my team to determine that there was no substantial evidence supporting an association between suicidal risk and Semaglutide. On the contrary, the results revealed semaglutide was associated with a significant 49% to 73% *reduction* in suicidal risk. Our findings were published in Nature Medicine on January 5, 2024, with myself as the primary author. On January 11, the FDA cleared the suicide risk warning for Wegovy and Ozempic. On April 12, 2024, the European Medicine Agency would also clear the warning of suicide risk of Wegovy and Ozempic, both citing the study as a significant contributor to their decisions.

Though AI technology is still being used to enable rampant and destructive misinformation, these experiences demonstrate the immense potential of advanced AI analytical tools to provide real-world scientific evidence to effectively, efficiently, and ethically guide public health policy. But above all, it illustrated how pivotal it was to take initiative, to protect the health and livelihoods of patients and their families, and to act on the opportunity to make a change.