

To Whom this May Concern,

I am submitting this short comment regarding the need to mobilize data for public health and health equity.

To start I will focus on the need to leverage and mobilize electronic health record data for health equity and local, state, and federal levels. I will start by emphasizing that the vast majority of EHR systems are privately owned, with Epic and Oracle making up the biggest market shares. This is a direct result of federal intervention through the meaningful use investments from the Centers for Medicare and Medicaid Services. In a move for data accessibility, Epic has been opening up its data infrastructure to be accessed by researchers wanting to answer health research questions at scale. This initiative, called Epic Cosmos, contains records from more than 162 million patient records and is just starting to be used by researchers to examine the impacts of various care regimes and advance evidence-based care. I will outline briefly why maintaining these open records is vital to the growth of evidence-based medicine as well as how the data sources can be mobilized to advance health equity.

In just the past 3 years since Cosmos launched, it has helped to support vital investigatory work across academia, clinical research, and the federal government. The CDC used Cosmos to study COVID reinfections, and researchers have mobilized the data to study the linkages between COVID and preexisting conditions like diabetes and alcohol use disorder, delays in cancer care, and even firearm injuries. Cosmos allows researchers to query clinical questions in minutes and provides data that is representative of the United States, across race, sexes, age, rural-urban, and types of insurance. Finally, it includes patient-generated data as well as social determinants of health, a marker of health equity. This source of data must remain free to use, especially given the vital questions that can be asked by collaborators such as community organizations and public health departments that do not have the capital of major medical systems. Given the rise of EHRs use as a result of direct federal intervention, these deidentified patient records should be considered a vital asset that can be leveraged by policymakers and federal employees to pursue evidence-based policymaking and funding that supports overall health.

To outline how Cosmos (and open-source, EHR data) can be leveraged for health equity, I will speak about some of my work studying medical technologies that create inequitable outcomes in patient care. To make my point, I will focus on the pulse oximeter, which has been in the news recently because of the racial bias in the tool that negatively impacted patient outcomes during COVID-19. Pulse oximeters (pulse ox) are ubiquitous tools in medical settings, where they help clinicians track the “fifth vital sign”—oxygenation—in patients. These pulse ox readings are then used to inform how clinicians treat everything from asthma to heart failure to COVID-19, with the numerical score being input directly into decision-making algorithms. The racial bias in the tool led to an overestimation of oxygen content, and thus delayed patient care. Studies (on a small scale) show that during the pandemic, Black patients have been [29% less likely to receive supplemental oxygen](#) as part of their COVID-19 treatment, and [three times as likely to suffer occult hypoxemia](#). By mobilizing de-identified EHRs, we could map how this problem affected patients across the nation and the scale of the delay in care in different treatment settings. These findings could then directly inform the FDA about a need to do a post-market evaluation of the technology, and perform adequate safety evaluations to then inform the future use of this technology in patient care. CMS and its accrediting agencies can monitor these technologies and assess

whether they should receive government funding and/or be procured in federally-funded hospitals, thus providing incentives for companies to develop more equitable technologies. While my focus was on technology, I can see this regular review and evaluations extending to other medical products like drugs, as well as care practices, that need to be evaluated for bias to create a more equitable standard of care.

Furthermore, there is an enormous need to modernize and standardize data collection in public health, focusing on data sharing capacity between health providers and public health agencies. During the COVID-19 pandemic, many public health agencies were reliant on outdated models of information transfer, such as fax machines, greatly inhibiting the ability to respond to the pandemic. The lack of data infrastructure can be directly connected to funding directed to public health. Public health funding has declined over the last two decades, with the Center for Disease Control and Prevention (CDC) seeing a budget reduction of $\frac{1}{3}$ and the Hospital Preparedness Program, the primary source of federal funding for health systems to respond to emergencies, seeing a reduction of nearly $\frac{2}{3}$ since FY2002, when adjusted for inflation. While resources have been infused into public health departments through the American Rescue Plan Act, past crises have shown these investments are cut after the emergency period subsides. Federal funding for public health is done in a disease-specific way, limiting investment in resources and infrastructure like surveillance, data collection, and the workforce.

Beyond pandemics, this outdated information technology infrastructure will very likely fail in the face of climate change and emerging climate threats. Climate change presents a diverse array of threats to human health, from immediate climate dangers, such as hot temperatures, rising sea levels, more zoonotic diseases, diseases transmitted from animals to people, or the physical impacts of natural disasters to indirect threats like damages to the social infrastructure of communities, like homes, businesses, and transportation networks (for people and food, water, and resources), and disruptions to personal lives.

Marginalized communities are at a greater risk of the adverse effects of climate change. These differential impacts are already being felt by frontline communities, those that experience the “first and worst” of climate change, especially during the COVID-19 pandemic. Researchers at Harvard University found that higher historic exposure to particulate matter, and air pollutants, were positively associated with higher county-level COVID-19 mortality rates. Vulnerable communities are more likely to live in areas with a higher burden of pollution according to the American Lung Association, contributing to the observed disparities in the overall COVID-19 death toll for Black and Latino Americans. The EPA’s 2021 report on climate and social vulnerability predict these disparities will grow under warming scenarios of 2°C and 4°C, with minority populations experiencing a greater risk of poor health and infrastructural damage compared to non-minority populations. Vulnerable communities are more likely to not have health insurance coverage to care for climate-caused or exacerbated diseases and lack climate adaptations. Interventions to address disparate impacts must address the systemic causes of both climate change and health inequities. Most of our current data infrastructure is not well equipped to monitor these threats and their cumulative impacts.

Big investment is needed to fund infrastructure, especially data infrastructure, to effectively respond to climate change. For example, the CDC’s Climate the Ready States and Cities Initiative can only support 9 states, one city, and one county, despite 40 jurisdictions having applied. The Trust for America’s Health (TFAH) found that a funding increase from \$10 million to \$110 million would be required to support all

states, improve climate surveillance, and offer resources for scientific studies. The TFAH also found that an additional \$75 million is needed to extend the CDC's National Environmental Public Health Tracking Program, a program that tracks threats and plans interventions, to every state. Finally, and most seriously for a just transition, the Office of Climate Change and Health Equity remains unfunded a year after being established, leaving it with no permanent staff. FY2023 appropriations authorize \$3 million for the office, yet it is unclear whether it will make the final budget resolution. State governments have had to take the lead, with California spending \$100 million on community cooling centers and Washington's Department of Health hiring the state's first climate epidemiologist in summer 2022. Federal support, though, will be critical to sustaining this progress. This will be especially true in deploying the necessary affordable multi-modal monitoring technologies needed to increase the capacity to identify emerging climate threats.