B2 | GLOBAL HEALTH 2.0? DIGITAL TECHNOLOGIES, DISRUPTION, AND POWER

Introduction

The global expansion of digital infrastructures, devices, big data analytics, and artificial intelligence (AI) has been popularized by the World Economic Forum as "our fourth industrial revolution" (Schwab 2015), with "a disruptive potential for healthcare [that] is only beginning to be grappled with" (Bustreo, Jha, and Germann 2018). The promise of this revolution to improve health outcomes has generated enormous enthusiasm in the global public health field in recent years, with the World Health Organization (WHO) identifying digital health as essential to achieving the UN's Sustainable Development Goals (SDGs). At the same time, there is growing debate about the possible risks of an uncritical embrace of digital technologies in the medical and public health spheres. Bernardo Mariano, who is responsible for coordinating WHO's digital health vision and strategy, himself acknowledges that "this rapidly developing field raises transnational ethical, legal and social concerns about equitable access, privacy, appropriate uses and users, liability, bias and inclusiveness" (Mariano 2020).

Technological innovations are not value neutral in their design, nor in their social impacts. They are developed and deployed in specific social and political contexts: they are susceptible to biases, embedded in the technology itself, as well as adoption by harmful institutions, and other unforeseen side effects. The rapid expansion of these technologies is all too often aligned with the interests of economically dominant institutions, experts, and countries. The concentration and overlap of technological and economic power have raised urgent concerns over questions of inequity, representation, and democratic accountability (Storeng et al. 2021).

This chapter discusses some of the critical issues relating to the digital health revolution globally, situating the rise of digital health within the broader political determinants of health. This approach examines digital health in relation to how politics and political alignments, social norms and ideologies, power disparities, and global governance processes both shape health, and create health inequities (Ottersen et al. 2014).

We first define the term "digital health" and outline areas in which digital technologies are being applied to improve health. We then summarize the anticipated benefits of these applications and juxtapose these with some of the risks that are being uncovered as digital health technologies are implemented in diverse health sector settings. Our analysis focuses on the digital health

Image B2.1 A sticker that reads "Big Data is watching you."

Source: Photo by ev on Unsplash, taken in Lyon, France. See https://unsplash.com/photos/gpjvRZyavZc

revolution emerging from the rising power and influence of American-dominated global commercial technology, acknowledging that there are also numerous tech initiatives – both private and state-run – in South and East Asia and elsewhere working on digital health. Our focus reflects the aggressive expansion of Silicon Valley-based American "Big Tech" corporations in healthcare markets globally, alongside an intensifying fight for "digital sovereignty" between corporations and states. We then discuss how Big Tech's involvement in the response to the COVID-19 pandemic that is still raging globally, and Big Tech's consideration of low- and middle-income countries (LMICs) as a burgeoning market, creates tech "disruption" not only in their novel partnerships with health systems but also in their ability to potentially undermine those systems.

What is digital health?

"Digital health" is a broad term whose parameters change as new technologies develop. In many ways, it defies simple categorization: one study review of 1,527 sources found 95 different definitions (Fatehi, Samadbeik, and Kazemi 2020). We use digital health here to describe the application of computing platforms, connectivity, software, and hardware for healthcare and related uses – whether targeted at individual patients, healthcare workers, managers, or systems. These applications can range in sophistication from basic health-promoting SMS messages to smartphone apps capable of diagnosing, monitoring, and facilitating

treatment for a wide range of conditions, and from algorithms and AI tools that draw on "big data" to diagnose, treat, and predict disease trajectories and organize the delivery of healthcare, to digital financial services for the payment of health insurance and direct healthcare costs. Furthermore, the term can also encompass health information campaigns or health advice delivered through mobile phone (mHealth), telephone, and video consultations (eHealth), predictive disease modeling, personal health tracking through wearable devices, and electronic health records.

Such technologies are transforming healthcare in rich and poor countries across the world. The promotion of digital health by many international health non-governmental organizations (NGOs), donor agencies, and major philanthropic organizations is consistent with their embrace of market-based solutions and technologies that are believed to produce cost-effective solutions to the world's problems. In LMICs, this vision is especially associated with The Bill & Melinda Gates Foundation and the Gates-funded non-profit PATH, which describes itself as "a global team of innovators working to accelerate health equity."[1] Alongside these philanthrocapitalist endeavors, some government donor agencies are arguing for open-source data, algorithms, and code as part of a move to secure "digital public goods" and sometimes insisting that grantees produce open-source technologies. The Norwegian development agency Norad, for example, sees digitalization as important to achieving the SDGs and funds several digital health projects. The most prominent project they support is the District Health Information Software (DHIS2), described as "a global public good transforming health information management around the world." Developed by the Health Information Systems Programme at the University of Oslo, DHIS2 is being used in more than 73 LMICs (District Health Information Software 2 2021).

These digital health expansions are occurring against a backdrop of intensive investment in health data and technologies by corporations and private investors. For example, Google and Microsoft have been aggressively acquiring health data and platforms from non-profits and corporate partners. Africa, having already served as a site of intensive investment and experimentation in financial technology, is being cultivated as the next big place for health tech investment (Quartz 2021). Fueled by support from agencies like the World Bank, start-ups from within and beyond Africa have been encouraged to see African health systems as ripe for disruption (Friederici, Wahome, and Graham 2020), such as in a recent "Global Tech Challenge" sponsored by the World Bank and The Consumer Technology Association, which focused on health tech in East Africa, resilience in India, and gender equality. As an outcome of that challenge, the World Bank Group, through its International Finance Corporation, has awarded 17 new tech start-ups in healthcare in East Africa access to a grant pool of $1 million alongside "technical and advisory support."[2]

Techno-optimism

Sweeping claims about the clinical and health systems benefits of digital health are frequent. According to the WHO, for example, "digital health plays an important role in strengthening health systems and public health, increasing equity in access to health services, and in working towards universal health coverage" (WHO Europe 2021). In the USA, the Food and Drug Administration (FDA) maintains that digital health provides opportunities to improve medical outcomes, enhance efficiency, reduce costs, increase quality, make medicine more personalized, and "empower" patients and consumers to better manage and track their health and wellness-related activities (FDA 2020). Such benefits are assumed to be achievable globally; it is increasingly common to claim that digital health will transform health in poor countries by "leapfrogging" over poor infrastructure such as constrained telecom systems in Africa and Asia to reach the most rural population (Neumark 2020).

However, there is limited systematic evidence to support the notion that digital health has had, or will have, demonstrable health benefits. Instead, most digital health interventions are unproven public health interventions in the sense that claims of effectiveness and cost-efficiency are often based on unsystematic assessments or anecdotes. Moreover, digital health interventions often take the form of pilots that may not cater to the needs and priorities of specific health systems, with some "scaled up" or transferred to other country settings despite lack of evidence of effectiveness (Al Dahdah 2019). Although initiatives like the International Telecommunication Union (ITU)-WHO Focus Group on Artificial Intelligence for Health are working on benchmarking AI in health devices,[3] there are currently no standard criteria for assessing their effectiveness. Producing such evidence is complicated by privacy policies that limit data access or because data and AI systems are considered proprietary (Storeng and Puyvallée 2021).

The risks of digital solutions to health challenges

An uncritical embrace of digital health technologies in medicine and public health carries important risks of shifting public health agendas and approaches, not least because digital solutions focus on the most proximate, individual-level biomedical health determinants, and are often endorsed without adequate regard for social determinants like socioeconomic status, housing, employment, or access to social support networks and healthcare. Investments in digital health solutions often occur at the expense of less costly and more established interventions in the management of healthcare systems and can have high opportunity costs. For example, digital contact tracing apps developed during COVID-19 not only have substantial development costs, but high running costs, using up resources that might better have been invested in strengthening manual contact tracing systems (Erikson 2020).

Digital health solutions are often promoted as a way to increase access to healthcare to geographically or socially marginalized populations, but their

benefits usually do not go to those populations. Despite the major digitalization that has taken place globally in recent years, the gap between rich and poor is exacerbated by "digital divides" in both rich and poor countries, and reliance on digital health can reinforce existing inequalities, even when technologies like mobile phones are used informally to overcome systematic gaps in healthcare systems (Hampshire et al. 2021). Digital solutions can also have high costs for users, for example, requiring ownership and use of expensive digital devices or having electricity or reliable mobile network access. They also generate demand for expensive but ultimately unnecessary interventions, like wearable devices, and lead to harms caused at least in part by the application of health information technology, so-called e-iatrogenesis (Weiner et al. 2007). As reliance on digital technologies for tracking and surveillance of health grows, there is a further danger that those without access may become increasingly invisible or uncounted, and therefore ultimately not receive the care that they need (Davis 2020).

Critical social scientists are providing important insights into how the introduction of new digital technologies is changing the production of knowledge about health, power relations, work practices, and the patient-doctor relationship, and even how we perceive and respond to our bodies. For example, lay people can now blog about their illnesses or set up crowdfunding websites to pay for medical expenses. They can use gaming console technologies for fitness and health-promoting activities, and healthcare institutions can establish far-reaching social media networks that enhance their reputation and directly appeal to clients (Lupton 2017). Moreover, digital technologies are also reshaping how individuals conceptualize and exercise their right to healthcare. Nora Kenworthy's (2019) ethnographic research into the rise of medical crowdfunding, for example, shows how technologies are shifting political norms about an individual's personal responsibility for health and their entitlement to publicly provided healthcare. Kenworthy calls medical crowdfunding through platforms like GoFundMe "the antithesis of Universal Health Coverage."

The application of digital technologies to broader social and commercial determinants of health presents even greater concerns. These include the corporate and government capture of personal data and its use for private profiteering and/or political surveillance, such as by oppressive governments, police, and security services, or even social service agencies (Eubanks 2018). Here, corporate and government interests intersect to use technologies and data in ways that spread misinformation about health (Snyder, Zenone, and Caulfield 2021), undermine democracy, citizenship rights, and cybersecurity (with respect to infrastructures, elections, or military-related technologies), and even lead to negative impacts on global financial stability (IMF Blog 2020; Focus on the Global South 2021). There is a growing awareness that digital platforms such as Facebook are particularly prone to misuse by powerful individuals and corporations, contributing to "infodemics" (an overabundance of conflicting information, both online and offline, including deliberate misinformation) as well as discourses that fuel

extremism, hate, and anti-democratic sentiment. Corporate interests and private control of platforms and their digital architectures mean there is little corporate incentive to diminish these harms, and little public oversight or regulation of the technology that contributes to them.

Box B2.1: Digital surveillance

The rapid creation and adoption of digital surveillance tools by both corporations and government agencies poses challenges for considering rights, privacy, and regulation around the world. Digital surveillance tools encompass not only video and audio surveillance but also voice and facial recognition tools, geospatial tracking, biometric data collection, web and online tracking, spyware, and drone-enabled surveillance (Electronic Frontier Information 2021). The video surveillance market alone was estimated at more than $40 billion in 2019, larger than more than 50% of the world's economies by gross domestic product (GDP) (Valuates Reports 2020). Many of these technologies are developed and sold by private corporations that market them indiscriminately to governments, police and security forces, and other private companies. While some corporations have faced litigation for exporting surveillance tools to regimes that use them to violate human rights, such as China, surveillance is largely an unregulated market (Electronic Frontier Foundation n.d.(a)). Regulation failures occur at several levels: at the level of production (whether an invasive technology should be produced at all), sale (to what entities these technologies are sold, and for

Image B2.2 A sign on a wall in Nicaragua warning visitors about video surveillance.
Source: Photo taken by Tobias Tullius on Unsplash. See https://unsplash.

what purposes), and use (how they are used to violate rights and privacy, particularly of repressed and minoritized groups).

Digital repression

Digital surveillance technologies are being created for, and sold to, states for the purposes of repression and human rights violations. While there is a tendency to focus on China's excessive surveillance of its own people and export of repressive technologies, these narratives are often Sinophobic, overlooking how ubiquitous surveillance technology use has been in "democratic" countries and other regions, and how much of it has also been developed by US and European firms (AI Now Institute 2021). China does employ extensive facial recognition technology, video surveillance, and biometric tracking to police and punish ethnic minority groups as well as control workers. During the pandemic, these practices expanded in the name of epidemiologic surveillance as part of efforts to build a "digital wall" against the pandemic (French Press Agency 2021). While China's use of technology may be more extensive than other states, digital surveillance has been used against protesters of the Arab Spring and against Palestinians and has been extensively deployed by police forces in the USA, to name a few examples. The Electronic Frontier Foundation documents dozens of efforts by activists to resist repressive surveillance; many of these efforts have focused on allegedly democratic regimes in Europe and North and South America (Electronic Frontier Foundation n.d.(b)).

Racialized surveillance and policing

Whether used against Uighur communities in China or black neighborhoods in the USA, such digital surveillance is in many places racialized, disproportionately used on, and punitively affecting, racially marginalized populations. Not only are such tools more often likely to be used in minoritized communities, but the tools serve broader agendas of racial monitoring and oppression. In addition, many tools rely on AI systems that have been built to reinforce racism, for example by more often misidentifying and misrecognizing darker faces. Even seemingly innocuous technologies are embedded in complex networks of private and public surveillance. Take the Amazon Ring as one example: a doorbell that provides video footage to homeowners of who comes to their doors. In addition to being built on histories of racial segregation in neighborhoods and perceived threat of non-white Others entering those spaces, the Amazon Ring was built through partnerships with US police departments which allow police to access camera footage for community surveillance. As numerous groups have noted, this technology encourages racist judgements of who does and does not belong, facilitates digital surveillance of communities by police, and encourages a "racialized surveillance" that is engaging consumers in

"watching from below" to reinforce and protect racial hierarchies (Poster 2019). These technologies contribute to the widespread over-policing and disproportionate incarceration of communities of color and the poor in the USA and elsewhere (Our Data Bodies Project n.d.).

Surveillance gatekeeping

In addition to its uses in repression and policing, digital surveillance is increasingly used as a form of gatekeeping for access to public spaces, public goods, and other entitlements. Digital tracking is now a ubiquitous part of many welfare state services. Biometric data is required in many spaces, by both governments and corporations, to gain access, verify identity, or obtain new identity documents. Even more ubiquitous but no less insidious is the extensive access to phone users' usage and geospatial data that is demanded by apps, websites, and even states. The COVID-19 pandemic has ushered in many new forms of surveillance gatekeeping – from vaccine passports to digital contact tracing apps. As consenting to surveillance is becoming increasingly necessary for access to spaces, resources, and digital tools, citizens risk becoming inured to these incursions, and even seeing them as potentially beneficial. Without far more regulation of, and citizen resistance to, digital surveillance tools, differentiating between the potential benefits and harms of surveillance is likely to become ever more complicated.

Image B2.3 An umbrella protest in Hong Kong. Hong Kong's famous umbrella protests were not simply about "branding" a populist movement. The umbrellas were used to prevent police and other surveillance devices from face recognition of protesters.

Source: Photo by Joseph Chan on Unsplash. See https://unsplash.com/photos/uNHrmuZ6VKE

Digital health, big data analytics, and digital governmentality

Because digital health increasingly relies on sophisticated computational analytics drawing on "big data" and AI, there have been growing concerns about the ethical and security issues related to the collection, sharing, repurposing, sale, and potential for misuse of big data and of sensitive personal health information. For example, the *Financial Times* reported on mounting concerns about the increased participation of tech companies in managing hospital data in the USA, where 33 of the 50 hospitals examined were working with Amazon, Google, or Microsoft without standardized or open rules over data protection management (Financial Times 2020). The same story noted widespread surreptitious data sharing in the consumer healthcare space: one review of medicine-related apps on the Android mobile platform found 79% of those sampled shared user data with third parties including advertising companies, private equity firms, and credit agencies. Health data from both high- and low-income countries is a highly valuable commodity, and its acquisition and use by both private companies and powerful global health institutions, such as the Institute for Health Metrics and Evaluation, is especially hard to track (Tichenor and Sridhar 2019).

Concerns about the commercialization of data which was shared in good faith by users is not restricted to personal health information, but extends to a wide range of behavioral, contextual, and social data. This raises concerns about how this commercialization is driving the rise of a process of "data colonialism" that is normalizing the exploitation of human beings through data (Couldry 2019). Tracking and commercializing such "surplus" data is at the core of the business model that has pushed Amazon, Apple, Alphabet (Google), and Facebook to become the most dominant businesses in the global technology sector. Shoshana Zuboff (2019) describes this as a whole new era of "surveillance capitalism," marked by an expansion not only in the collecting of bio-behavioral data, but in the leveraging of machine learning and AI systems to generate new value through marketing and speculative data trading. Crucially, "behavioral surplus" data generated from user interactions with digital platforms and wearables have become highly profitable because of their value in predicting and manipulating individual purchasing behavior, including health-related products and services.

Government agencies in different countries are also increasingly appropriating such behavioral data to institute a new form of "digital governmentality" in which the state deploys algorithms drawing on big data to automate decision-making in the health and welfare sectors and, increasingly, in other areas, such as law enforcement. Such state-corporate surveillance is not only happening in authoritarian societies but also in liberal democracies. For example, in her book *Automating Inequality*, Virginia Eubank (2018) discusses how "high-tech sorting and monitoring programs" are increasingly used to surveil, police, and discipline the poor in the USA. Similarly, the United Nations (UN) Rapporteur on Human Rights, Philip Alston, noted the rise of a "digital welfare state" in the UK (United Nations 2019). As he explains, vast quantities of data are collected from

a wide range of sources, connected between government silos. These data are then processed to enable "automated" decision-making by algorithms applying predictive analytics to calculate potential risks, such as fraud, and to estimate outcomes. Key uses of predictive analytics in healthcare are in diagnosis (for example, predicting likelihood of certain diagnoses in a patient cohort), prognosis (which patients are at greatest risk of readmission) and treatment (the best course of treatment for patients with chronic conditions). All of these uses can have important implications for equity if used as the basis for priority-setting in rationing healthcare resources. For example, one frequently used algorithm for assessing kidney function in the USA assigns healthier scores to black patients despite poor functioning, contributing to delayed or denied healthcare for this population, and reinforcing racism in medicine (NPR 2020). Critics have also drawn attention to the dangers of using biometric data systems in humanitarian crises, calling them a form of "surveillance humanitarianism" (Benjamin 2019b; Noble 2018; *New York Times* 2019).

Bias in the big data that is used in such algorithms – as well as bias in the algorithms themselves – can exacerbate discrimination along lines of gender, race, class, and other categories of disadvantage. When combined with behavioral economics, this allows governments to target public health messages to change social and health-related behaviors. Although behavior-change health promotion has long been a standard public health practice, it has also been subject to decades of critique for its potential "victim-blaming." Ilona Kickbusch, chair of the Financial Times/Lancet Commission on digital health, argues that from a human rights perspective, such big data uses in health promotion make the most vulnerable and powerless in society "subject to demands and forms of intrusiveness without accountability" (Kickbusch 2020). While citizens are increasingly visible to their governments, the same transparency and accountability does not flow in the other direction.

Box B2.2: Activism in health data governance

The shift from traditional statistical systems to big data and allied technologies has changed the role of data in public health. The networked environments in which machine-readable health data sets are collected, processed, and accessed have created a new infrastructural dimension for public health policies. In addition, planetary-scale "datafication" creates new possibilities for health research with predictive models that combine personal and non-personal data sets.

Understood this way, data infrastructures bring new concerns for the right to health for all. The potential risks to privacy associated with the marketization of public data sets have been the subject of recent contestations,

as seen in the case against the National Health Service in the UK, challenging the extension of what should have been a short-term COVID-related contract with the US data firm Palantir. The secret deal allowed Palantir's access to NHS data with implications for citizens' privacy, and sidestepped due process obligations, including a public consultation (British Broadcasting Corporation 2021). Another crucial concern is the absence of checks and balances – essentially, a rule of law for holistic data governance – that would ensure corporations do not monopolize and capture public data for their own profits (IT for Change 2020). Global policy shifts over the past decade favoring open data (Ubaldi 2013) and emerging discourses of open digital ecosystems promoted by corporate philanthropy (Omidyar Network and Boston Consulting Group 2020) have brought to sharp relief the urgent case for fairness and equity. Without appropriate boundaries to protect and promote the enormous public and social value of digital health infrastructures, openness in and of itself may deepen inequality (Singh and Gurumurthy 2014). The governance deficit in health data and a laissez-faire data marketplace are already leading to the subordination of the social and human dimensions of health services to commercial priorities (Kelsey 2020), with innovations locked up in corporate trade secrets or patents. Governments' sharing of data with private sector entities to enable innovation, such as India's National Digital Health Mission (NDHM 2020), highlights the need to rein in the private capture of data. The infrastructure of open data must remain oriented towards positive outcomes for universal healthcare and citizen welfare.

To address these challenges, activist groups are calling for the establishment of more equitable and inclusive frameworks for the governance of private and public data (Transform Health Coalition 2020). These governance frameworks would broaden the scope of advocacy beyond data privacy and security to ensure that emerging public digital health infrastructures are designed to facilitate increased data sharing, realize research and innovation, and maximize community benefit. Institutional models that may help realize such visions are already being developed in the form of various data trusts and data cooperatives that offer patients more agency in how their data is shared and with whom, as seen in citizen projects such as "PatientsLikeMe" or "midata.coop" (Bass and Old 2020). By and large these initiatives originate in the Global North, offering a useful compass for pooling and managing data through ethical approaches towards uses for the common good.

While recognizing the importance of previously highlighted efforts to strengthen individual control of personal data, these approaches stress the importance of acknowledging the relational nature of people and of data

through solidarity-based data governance models (Pransaick 2021). Such models advocate for strengthened benefit sharing to ensure that commercial benefits accrued from data use are also returned to the public domain from which it arises. Individual-controlled data ecosystems, however, are only part of the solution, and cooperative data pooling based on values such as privacy and security, in and of itself, may not lead to appropriate data use in the public interest. Overarching health data policies are needed to incentivize research and innovation for public interest and health equity. Laws and rules for patient-led data stewardship models must therefore be complemented by suitable policies legitimizing health data as a public good. Such policy frameworks need to straddle data protection rights (of individuals and groups) with positive rights that guarantee equitable distribution of the benefits of data (Just Net Coalition 2021).

The efficacy of such governance models requires strong international institutional frameworks. As highlighted by the Third World Network, the call to recognize health data as a global public good by the WHO (WHO 2021) can threaten data sovereignty of nation states (Third World Network 2020). Similarly, the strong push in the context of the pandemic for a global agreement on health data as a public good (Open Data Institute 2021), without a clear regime of data ownership and control, could jeopardize the rights of people in developing countries as data flows out of these nations over global digital supply chains. A clear framework of international cooperation to advance equity, accountability, and democratic control in relation to health data, promoting an Ostromian idea of nested governance of the data commons (Williams 2018), is the need of the hour.

State-corporate cooperation in the pandemic response

The COVID-19 pandemic has accelerated the development and use of digital health technologies worldwide, whether by using AI to identify patterns in big data to forecast the spread of outbreaks, expanding online medical consultations, or by using smartphone apps designed to automate and assist established manual contact tracing (see Chapter B3). While China and other South-East Asian countries including South Korea were front-runners in the application of digital technologies in the pandemic response, Western countries quickly followed suit. In August 2020, a *Lancet* commentary even claimed that "countries that have quickly deployed digital technologies … have remained front-runners in managing disease burden" (Whitelaw et al. 2020).

The embrace of digital solutions in Western countries has often taken the form of partnerships between private technology companies and public health authorities, with Big Tech executives included among advisors on national and

international authorities' pandemic response. For example, a co-founder of Google's AI DeepMind division attended a meeting of the secretive Scientific Advisory Group for Emergencies (SAGE) group advising the UK Prime Minister on the COVID-19 response (Storeng and Puyvallée 2021). In addition, the WHO organized a consultation with Silicon Valley executives in the early stages of the pandemic to receive assistance with managing the emerging "infodemic" of misinformation. Big Tech companies and major telecommunication firms also worked with public health agencies to track the spread of the pandemic, providing them with users' aggregated and anonymized localization data for use in modeling the effects of social countermeasures like travel restrictions on population mobility. These efforts built on their previous experiments with syndromic surveillance based on scanning of social media and use of mobile data in humanitarian settings and in LMICs. Facebook, for example, has posted freely available data useful for modeling COVID-19, including high-resolution population density maps and social connectedness indices (Facebook 2020).[4] Most strikingly, Apple and Google have partnered for the first time, cooperating to develop unique technology known as Google-Apple Exposure Notification (GAEN) which public health authorities all over the world have adopted as the basis for so-called contact tracing apps.

According to the *Financial Times*, during the pandemic, health agencies have been "striking partnerships with tech companies at a speed and scale hard to imagine under normal circumstances" (Financial Times 2020). The National Health Service (NHS) in the UK, for example, is working with Amazon, Microsoft, and Palantir to create data models to optimize the allocation of ventilators, hospital beds, and staff, while governments worldwide loosen regulatory restrictions on digital health. The US and Australian governments have both approved reimbursement for telemedicine consultations to keep people away from overstretched hospitals, while the UK government has launched a coronavirus chatbot to relieve the pressure on the NHS and reduce in-person contact (Financial Times 2020). These innovations are often implemented hastily with little assessment or oversight but are forecast to become permanent features even after the pandemic is over.

Far larger impacts, however, are being felt with Big Tech companies' direct involvement in the pandemic response. Apple and Google claim that their contact tracing endeavors are motivated by a "shared sense of responsibility to help governments and our global community fight this pandemic" (Google 2020). Many other efforts harness Big Tech and major telecommunication companies' expertise in scaling mobile big data analytics and AI for various corporate social responsibility schemes, branded "Big Data for Social Good." Engagement in "social responsibility" borrows a critical tactic from other harm industries, burnishing reputations while benefiting companies in multiple ways. Their involvement in the pandemic response establishes greater demand for their platforms, services, or devices. It also appears to be boosting their public

image at a time when they are facing antitrust lawsuits for their monopolistic behavior in the USA and in Europe, along with growing criticism about their impact on privacy, free speech and censorship, and national security (The Guardian 2019). Big Tech companies' contribution to the pandemic also detracts attention from past scandals, such as that which erupted in the UK in 2017 when the NHS shared citizens' personal medical records with Google's AI arm, DeepMind (Roberts 2020).

Indeed, the pandemic appears to be providing an impetus for Big Tech companies to "disrupt" healthcare markets in the USA and globally. According

Image B2.4 Data is the new oil. But for whom?
Source: Sketch by Kriti Shukla for *Global Health Watch 6*.

to a recent report by a research firm focused on digital transformation, these companies are "gunning to carve out spaces within the (American) healthcare market, each targeting different areas to transform and disrupt" (Insider Intelligence 2021). As the report points out, "Microsoft is focused on its race with Amazon and Google to lay claim to the healthcare cloud market, Apple is knuckling down on clinical research initiatives via its wearables, Alphabet is focusing on its AI expertise to drive precision medicine, and Amazon is shaping up to disrupt the pharmacy, virtual care, and telehealth realms" (ibid.). The impact of these efforts being provided by private companies threatens existing healthcare services offered by both public and private providers, the report warns: Amazon's prescription delivery service, for example, has traditional pharmacies looking for ways to retain their customer bases, while Alphabet is building an ecosystem that could be at odds with established experts in the electronic health records industry (Insider Intelligence 2021; Healthcare Success 2018).

In LMICS, too, the expansion of corporate social responsibility projects is difficult to disentangle from efforts at monetization and market expansion. For many years, Facebook has provided "free" internet access in LMICs through its "Internet.org" initiative, which allows users to access the internet only via the Facebook platform. This initiative has come under enormous criticism for fueling extremism, violence, and hate speech in places such as Myanmar (Stevenson 2018). More recently, Facebook announced plans to partner with telecom providers in a nearly $1 billion project to expand internet access in Africa. It is not difficult to see that such initiatives greatly enhance Facebook's customer base and the data and governance power it wields in poor countries. But Facebook has also leveraged its "Data for Good" project to assist UNICEF with vaccination programs, and the Institute for Health Metrics and Evaluation with COVID-19 models for countries around the world (Facebook 2020). Increasingly, Big Tech seems as keen to export its models for innovation to LMIC health systems as it is to import data from these countries. A recent study from the University of Washington, for example, used Amazon algorithms to develop an "Amazon Prime-type service" for HIV treatment home delivery in South Africa during the pandemic. While expanded access shows success, it also normalizes charging low-income, immuno-suppressed patients fees for delivery of what should be essential health services (Medpage Today 2021). Big Tech companies are also becoming involved in global health financing, alongside government donor agencies and private philanthropists. Google is among the private sector partners and foundations that mobilized significant new resources for the Gavi COVAX AMC (see Chapters B4 and D1), committing $2.5 million, and donating an additional $15 million in ad credits through its charitable arm, Google.org, according to a Gavi news report in April 2021 (Gavi 2021). In the long term, "Google.org engineers will support Gavi's broader innovation agenda" (Gavi 2021), though what this will entail in practice remains opaque.

The fight for digital sovereignty

Big Tech companies' involvement in the pandemic response not only signals their incursion into healthcare markets and public health practice but also reveals their growing political power and the broader fight between states and corporates over control of the digital realm, or "digital sovereignty" (Floridi 2020). Tech corporations have expanded their products across the globe, extracting data and profit from users all around the world while concentrating power and resources in one country, namely the USA, and with China as a growing competitor (Couldry and Mejias 2019; Kwet 2019). Kwet argued that such activities amount to "US transnational corporations … reinventing colonialism in the South through their ownership and control of intellectual property, digital intelligence, and the means of computation" (Kwet 2021). While poorer countries struggle to compete, Big Tech corporations take control of digital infrastructure, use proprietary software, corporate clouds, and centralized internet services to spy on users, process their data, and "spit back manufactured services to subjects of their data fiefdoms" (Kwet 2019).

Concerns about foreign tech companies' societal impact are not just felt in LMICs with poor regulatory systems, however, increasingly in Europe as well. The digital contact tracing experiment, which first drew accusations of growing state surveillance and control, has instead become an exemplar of how limited the power of European states can be relative to the tech giants (Storeng and Puyvallée 2021). EU governments such as Latvia ran into "a Silicon Valley-built brick wall" when they initially tried to design their own versions of digital contact tracing apps, but were blocked by Apple and Google (The Guardian 2020; 2021). Apple and Google effectively managed to settle the debate about privacy versus public health benefit to their own advantage; subsequently, their exposure notification technology was widely adopted by public health authorities, with the latter forced to accept the corporations' terms and conditions, most critically their stringent privacy protections. Apple and Google refused to share contact cases' identities with public authorities, thus undermining governments' abilities to follow up to ensure individuals test, quarantine, and isolate where appropriate, as well as their limited ability to identify additional exposures and more rapidly contain the spread of the virus. Many consider such protection of private data desirable, especially where there is a risk that autocratic governments can abuse those data, but opinions about privacy are ambiguous.[5] Citizens may consent to public institutions having access to their health data for improving health services but may be concerned about it being shared with other public or private agencies, such as insurance companies and law enforcement. Nevertheless, the contact tracing phenomenon raises broader questions about corporate power over the public decision-making of democratically elected governments and, as a recent Chatham House Report remarks, the "significant differences in levels of accountability and transparency between public and private sectors" (Hakmeh et al. 2021).

The global governance of digital health

The pandemic has exacerbated an emerging "technological wild west," where concentrated power and market control among Big Tech companies combines with inadequate regulation to constitute a powerful political determinant of health (Storeng and Puyvallée 2019; 2021). Weak or non-existent regulation of digital tech companies is a global challenge that affects LMICs disproportionately. In India, the combination of a strong tech sector and a chaotic health system marked by unregulated privatization has made the country a center for the development of AI aimed at the health sector. Yet there are no agreed frameworks for ensuring that this burgeoning technology reduces rather than increases India's vast health inequities.

There is growing awareness amongst global health scholars and activists that the trends outlined here require a concerted global response if we are to tackle the lack of normative, regulatory, and technical standards to govern the digital health revolution, as well as to ensure that it serves to promote equity in health and beyond, fairness, and distributive justice. As a normative body, the WHO identifies itself as the appropriate institution for determining how the digital transformation of the healthcare sector can improve quality of care, reduce healthcare costs, and increase accessibility in line with the goal of universal health coverage.

In 2018, the World Health Assembly passed a resolution on digital health (WHO 2018). Strengthening governance for digital health at both global and national levels is at the core of the WHO's new Global Strategy on Digital Health (2020–2025), which aims to enshrine the value of health data and associated digital health products as a global public good (WHO 2020). Meanwhile, the Digital Public Goods Alliance has been established as a multistakeholder initiative that aims to accelerate the attainment of the SDGs in LMICs by facilitating "the discovery, development, use of, and investment in digital public goods" (Digital Public Goods Alliance 2021), understood as open-source software, open data, open AI models, open standards, and open content. The UN Secretary-General has also elaborated a Roadmap for Digital Cooperation, which sets out how stakeholders can advance "a safer, more equitable digital world" (United Nations 2020). There are also burgeoning policy initiatives that deal directly with the potential governance issues around digital health in lower income countries, notably the Financial Times/Lancet Commission on Digital Futures launched in 2019 (Alami et al. 2020; WHO Bulletin 2020).

These global-level debates and efforts are starting to engage with how discriminatory design, weak regulations, high costs, and questionable effectiveness challenge the ideal of digital public goods capable of advancing health equity. However, they deal insufficiently with the broader political determinants of digital health. As activists such as the Third World Network have pointed out, regulation of digital platforms is extremely difficult in the face of ongoing trade negotiations in which Big Tech has demanded extreme intellectual property protections for data and source codes.

Global-level debates about the governance of digital health seem to assume that partnerships between public and private sectors will help harness digital health technologies for health equity, viewing such partnerships as the means to alter or reform technology, bending the technology to the pursuit of more benevolent ends. Yet as Ruha Benjamin warns (Benjamin 2019a), "techno-benevolence" is a spell, and approaches that emphasize "fixes" or "tweaks" can be magical thinking. Benjamin calls for an abolitionist approach that reimagines technology with justice at its core. Such imaginings are not out of reach. The global health community would do well to listen to, and learn from, activist networks that have been working to develop ethical tech alternatives, and to educate and empower communities to realize and exercise their digital rights. Examples of such efforts include the Our Data Bodies project (and its Digital Defense Playbook), the Algorithmic Justice League, Allied Media Projects, Data for Black Lives, the Feminist Data Justice project, and Bot Populi.

Conclusion

As we have shown, there are massive expectations about the positive disruptive potential of digital technologies in healthcare and public health. This disruption is all too frequently couched in positive terms, without any critical evaluation of the effectiveness of the use of such technologies for improving healthcare globally, especially relative to their high opportunity costs. Techno-optimism has increased rapidly under the COVID-19 pandemic, with Big Tech expanding into what have traditionally been governmental and public domains, setting agendas and requiring governments to accept corporate terms and conditions, without any seeming attendant public debate. While there is a growing recognition that global governance frameworks are needed urgently to mitigate potential ethical and public health risks, concerns in the public health domain are only parts of a greater process underway: the broader contestation over power between private technology corporations and public authorities that is unfolding globally. Too much governance power in these negotiations has already been ceded to technology corporations. Thus, there is an urgent need for civil society organizations and global health activists to include digital justice and regulation as a key part of their agendas. Addressing digital technology as an issue of global health justice requires pushing back on the commercial, governmental, and ideological powers that have given digital technologies so much control over lives and livelihoods, while also embracing alternate systems of knowledge generation, connectivity, and innovation that will achieve health for all.

Notes

1 As described on PATH's website: https://www.path.org/. Until 2014, PATH was an acronym for Program for Appropriate Technology in Health.

2 See for example: https://www.ces.tech/Global-Tech-Challenge.aspx; https://www.ces.tech/Global-Tech-Challenge/IFC-TechEmerge-Health-Tech-Challenge.aspx; https://www.

techemerge.org/country/tech-emerge-east-africa. The International Finance Corporation (IFC) offers low-cost loans to the private sector and actively promotes private healthcare in LMICs. As Chapter B3 notes, most of the World Bank COVID-19 health assistance is being directed through the IFC, raising concerns about deepening the privatization of healthcare, notably in Africa.

3 See Terms of Reference for all details at: https://www.itu.int/en/ITU-T/focusgroups/ai4h/Pages/default.aspx.

4 See Google's website at: https://www.google.com/covid19/exposurenotifications/.

5 See Susan Landau, *People Count: Contact-Tracing Apps and Public Health*. Cambridge, MA: MIT Press, 2021.

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