

## Tech Companies and Public Health Care in the Ruins of COVID

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The COVID-19 pandemic has proven the cruelty of the U.S. market-driven health care system that disproportionately affects the poor. It illuminates how much a well-funded public health care system is vital for the survival of all. However, amidst the ruins of the pandemic and economic crisis, digital capitalism is driving a new round of capitalist restructuring with the health care sector at the center of capital's new digitization push. Tech companies are at the forefront of this capitalist endeavor. Long before the outbreak, these companies and others have been cultivating the health sector into their profit-making enterprise. The pandemic has further opened the door. This article demonstrates how tech companies are weaving themselves into the medical-industrial complex built over the last several decades. By exploiting the pandemic, they are quickly grasping an opportunity to occupy the public health system.

*Keywords: COVID-19, Internet industry, public health care, medical-industrial complex, digital capitalism*

At the time of this writing in 2021, the coronavirus is ravaging the planet, killing hundreds of thousands of people, and exposing the undeniable violence of the capitalist system that treats public health as a profit-making enterprise that harshly and disproportionately affects the poor who already subsist with few if any social protections. With the absence in the United States of publicly funded universal health care provision for most of its citizens, private companies are "stepping up" as they are loath to let any crisis go to waste. In particular, the tech giants are flexing their muscles with their industrial-scale tech infrastructure and deep pockets to take over the United States and world health care sectors. In response to the crisis, Google and Apple were even willing to collaborate to build coronavirus contact-tracing apps. Bill Gates announced that the Bill & Melinda Gates Foundation would invest millions of dollars to cope with the virus<sup>2</sup>; Mark Zuckerberg's philanthropy group—the Chan Zuckerberg Initiative—pushed large amounts of private funding toward increasing coronavirus testing in the Bay Area; Amazon shifted its shipping priority toward

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<sup>2</sup> Bill & Melinda Gates Foundation has been a major player in the global health arena. Through philanthropic work, the foundation has long promoted market solutions and opening markets for the pharmaceutical industry. For further discussion, see Loffredo and Greenstein (2020) and McGoey (2015).

high-demand medical supplies. Eric Schmidt, Google's former CEO, publicly hoped that people would be more grateful for big tech once and for all (Schleifer, 2020).

Is this unprecedented crisis finally reorienting the profit-motivated nature of these tech companies toward treating health care as a public good? Or, given the recent backlash against these Silicon Valley tech giants, are their COVID-19-related initiatives merely part of their more cynical, merely clever public relations strategies? The answer is neither. Long before the coronavirus outbreak, the health care sector had been a target for tech companies. Because the tech giants have drawn much media attention for their monopolistic behavior in various tech sectors—search, e-commerce, and social media—their long-term business ambitions in the health sector are less known to the public. As the coronavirus crisis deepens and accelerates around the world and another capitalist crisis reminiscent of the 1930s looms, the tech industry is seizing a new business opportunity in the health care sector and exploiting the pandemic for its own profit.

Deploying critical political economy, which looks at the process of commodification of information and communication, the relationship between information and communication technologies and evolving capitalism, concentration of corporate power, and policies shaping the Internet industry (McChesney, 2013; Mosco, 2009; Wasko, 2014), this article shows how Google, Amazon, Apple, and Microsoft are augmenting the already heavily privatized health sector as a new field of profit-making during the pandemic. The purpose of this article is to call attention to the continuing process of commodification and commercialization of the public health and health care services sectors, which is now being accelerated by tech companies with the support of the state during the pandemic.

Before explicating how the Internet giants have interwoven themselves into the health care sector and capitalized during a crisis of capitalism triggered by the pandemic, this article begins with the concept of digital capitalism, which is instructive as it situates today's dynamics of capitalism within the crisis-ridden evolution of capitalism. The article concludes with a call for a long-overdue public ownership of the health care network infrastructure.

### **Crisis of Capitalism**

Historian Ellen Wood (2016) succinctly recounts that capitalism brings "the compulsions of competition, profit-maximization, capital accumulation, and a relentless imperative to improve the productivity of labor so as to reduce costs in order to reduce prices" (para. 13). Capitalism is prone to crisis with what some analysts call "overaccumulation": a condition that occurs when surplus capital reaches market absorption capacity resulting in declining rates of profit. To overcome the crises that result, Harvey (2003) argues that capital attempts to develop new markets, what he calls a "spatio-temporal fix" (p. 109). Drawing from Harvey, D. Schiller (1999, 2011) posits that in response to the economic downturn of the 1970s, the U.S. political economy further pivoted to information and communication technologies as a spatio-temporal fix to restructure the economy by creating networked information systems to expand business processes as well as to renew profitable growth. In 2020 alone, investment in information and communication technologies amounted to \$4.3 trillion spread across economic sectors and providing an essential foundation for digital capitalism.

D. Schiller (2014) theorizes that digital capitalism is similar to “industrial capitalism”: “the far-reaching political economic mutations in the 19th century that were being introduced around new forms of machinery in England and increasingly elsewhere” (p. 8). As industrial capitalism absorbed machinery into production processes, digital capitalism has been incorporating digital machineries. The process has accelerated as a result of the contemporary crisis of capitalism and the intensification of pressure to increase productivity and control labor processes while maintaining the existing modes of production and the dominant social order. The political economy’s voracious embrace of digital technology is described by many scholars as a new form of capitalism; they use various terms such as *surveillance capitalism* (Zuboff, 2019), *cognitive capitalism* (Moulier-Boutang, 2011), and *informational capitalism* (Castells, 2010). However, digital capitalism is not a new order that breaks fundamentally with the earlier history of agricultural and industrial capitalism; rather, it is firmly situated within the compulsions and imperatives and crisis tendencies of this type of political economy (D. Schiller, 2014).

Today, digital capitalism grips every sector, as it has expanded and extended beyond information industries and reorganized the entire economy from manufacturing production to finance, science, education, and the arts, and impacts every iota of people’s social lives. The current growth of the health sector driven by tech companies needs to be situated within the context of the development of digital capitalism.

The crisis of 2007–2009 was never fully resolved; instead, it has reappeared and been greatly aggravated by COVID-19. In January 2020, the World Bank warned of a fresh new wave of global debt crisis, describing “the largest, fastest and most broad-based” increase since the 1970s (Elliot, 2020, para. 2). The International Monetary Fund (IMF) projected that the global economy would contract by 4.9% in 2020 (World Economic Outlook, 2020). In the midst of this maelstrom, digital capitalism is driving a new round of capitalist restructuring with the health care sector at the center of capital’s new digitization push. In the era of COVID with the compounded economic crisis, the long-existing medical-industrial complex has been enabled as a key part of the spatial-temporal fix required by capital. Tech companies are at the forefront of this capitalist endeavor as they are asserting their power into the complex where access to health care has to be bought and poor working-class communities are left out in the cold.

### **Medical-Industrial Complex**

The commodification of medicine in the United States goes back to the 19th century, as capital brought science under its sway as a means of production and gave rise to the modern science-based industry (Noble, 1979). During industrial expansion, the pharmaceutical industry arose with systemic and systematic applications of science and research that rationalized and transformed medicine into a capital-intensive large-scale industry (Brunton, 2013). Early science-based industry—in particular the electrical and chemical sectors—established corporate research arms and drew in universities to serve corporate interests. By 1931, more than 16,000 companies including pharmaceutical firms supported in-house industrial research labs (Reich, 2002).

In the post-World War II era of Big Science, the federal government heavily funded medical research, development of medical technologies, and hospital construction, as medicine was increasingly specialized and focused on advanced technologies that drove the expansion of the private health industry (Tomes, 2006). This brought a closer link among government, medical research, drug companies, and health

care networks became increasingly intertwined, thus beginning the rise of the “medical-industrial complex” (Ehrenreich, 2016, p. 57).

By the 1970s, medicine had clearly become a profit-making site for Wall Street financiers and industrial capitalists, backed by the capitalist state in the throes of the oil crisis, which forced the U.S. economy into economic stagnation and a search for new growth sectors. Barbara and John Ehrenreich, in the *Health/PAC Bulletin* published by the Health Policy Advisory Center—a hub of health care activism in the late 1960s—described the U.S. for-profit health care system as a medical-industrial complex consisting of a network of health care corporations, with academic enterprises and government closely tied to and serving corporate interests. The complex grew during the 1980s with a new wave of privatization and deregulation in response to the worldwide economic downturn, an era of neoliberalism. Driven by the slogan “Don’t just stand there, undo something,” the Reagan administration actively injected market principles into the expanding health care industry, alarming even medical professionals (Goodman & Loveman, 1991, para. 2).

In the 1980s, Arnold Relman, editor of *The New England Journal of Medicine*, observed the emergence of profit-driven health services in hospitals, nursing homes, homecare services, and diagnostic services. To describe the ascendance of this new industry around health care, he deployed the concept of the “new medical-industrial complex” (Relman, 1980, p. 963). He described every segment of the field as a new medical-industrial complex, excluding the pharmaceutical industry that had emerged in the 19th century. With the zeal of probusiness policy, Marcia Angell (2005), another former *New England Journal of Medicine* editor, also pointed out that the 1980s was “the fundamental element in the rapid rise of big pharma” (p. 6). And beyond the prevalent private firms in medical services and the power of big pharma, Starr (1982) noted that there was not only privatization and corporatization, but also concentration and consolidation in the health industry throughout the 1980s and 1990s. Furthermore, corporate power over health care systems was further strengthened by a series of U.S. government science and technology policies between 1977 and 2001 that brought the medical scientific communities closer to venture capital and moved further away from building health care for people.

The Bayh–Dole Act of 1980, signed into law by President Jimmy Carter—drawn from the 1980 Stevenson–Wydler Technology Innovation Act—followed by the Federal Technology Transfer Act of 1986 spurred universities to commercialize patents resulting from their faculties’ federally funded research. Under these policies, research institutions were given intellectual property (IP) rights so that they could license patents to the private sector. Pre-Bayh–Dole, there were fewer than 250 patents per year issued to universities. By 2005, several thousand patents were being issued to universities every year (Furcht & Hoffman, 2014). In particular, during the first 25 years under Bayh–Dole, almost 70% of universities’ patents were in the fields of biotechnology and the life sciences (Furcht & Hoffman, 2014). One of the major results of this market-driven science policy was the acceleration of the commercialization of life sciences research given that the fruits of publicly funded research on which big pharma relied were transferred to the pharmaceutical industry (Angell, 2005). This meant an increase in the enclosure of access to life-saving medicines by locking up IP and patents for longer periods of time rather than producing affordable medicines for people. This process—accumulation by dispossession—is based on taking away from people with little to generate more wealth for the rich (Harvey, 2003).

Recently, the Bayh–Dole Act has drawn fresh attention from the pharmaceutical industry as the U.S. government has committed to spending almost \$10 billion through “Operation Warp Speed” to develop a new coronavirus vaccine, including \$3 billion for coronavirus research through the National Institutes of Health (NIH) working with drug companies (U.S. Department of Health and Human Services, 2020a). In fact, the pharmaceutical company Moderna received \$483 million from the U.S. government (Langreth, 2020). To ensure their exclusive licenses, the pharmaceutical industry quickly responded by launching a new coalition called Bayh–Dole 40 to prevent the government from using its “march-in right,” a provision included in the legislation whereby the federal government could “march in” in certain circumstances and issue compulsory licenses. So far, the U.S. government has never exercised the provision, but the industry wanted to make sure that the pandemic would not be the first time when so much money stood to be gained.

Corporate control over vital medical knowledge and research has been replicated across the globe for decades. Wealthy countries, led by the United States, have shaped the global IP regime through the rules-making process within the Trade-Related Aspects of Intellectual Property Rights agreement under the auspices of the World Trade Organization. The agreement was adopted in 1994, and has imposed an IP regime that facilitates corporate monopolies in all fields of knowledge production on which people’s lives hinge, including medicine, plants, and seeds. IP has long been used by the Global North as an instrument for looting the Global South, transforming basic human knowledge into commodities and exercising monopoly power over them (Mgbeoji, 2014). The agreement deprives many countries in the Global South of the ability to develop and access cheap and affordable generic drugs by imposing an IP dominated by corporate interests and denying millions of people access to essential medicines (Greene, 2014). Thus, it is no surprise that the development of coronavirus vaccines to save people’s lives now depends on the mercy of corporations.

In developing COVID-19 vaccines, diagnostics, and drugs, the majority of patents that are needed are in the hands of big pharma. Facing this global public health crisis, the World Health Organization (WHO) passed a resolution calling for a voluntary patent pool of rights related to patented COVID-19 technologies. UN Secretary General Antonio Guterres (2020) implored,

A world free of COVID-19 requires the most massive public health effort in global history.  
. . . Data must be shared, production capacity prepared, resources mobilized, communities engaged and politics set aside. . . . COVID-19 anywhere is a threat to people everywhere.

It is necessary to create a common pool to collect patent rights, test data, and other information in order to develop drugs, vaccines, and diagnostics for the global population. However, the question remains whether pharmaceutical companies will cave to global pressure to join the patent pools. The United States, along with the UK, Switzerland, and Japan, has had the strong pharmaceutical industry push back against the WHO’s call for a global IP pool to secure COVID-19 drugs for everyone. The United States under the Trump administration even officially withdrew from the WHO, although the new Biden administration has rejoined the organization.

Within this context of the U.S.'s institutional arrangement of the medical-industrial complex, which is constituted by the State and a neoliberal health care policy framework, for-profit and privately owned health care corporations, and university and college research that largely serves this political economy at the expense of people's need for accessible and equitable health care, Big Tech companies are now positioning themselves to capitalize on the digitization of health care and gaining access to people's health data.

### **Digitization of Health Care**

The tech giants are particularly eager to get their hands on health data and promote their own access to the data during the pandemic; as well, there has long been support by the federal government to digitize health records as part of the promotion of the "new" economy. In the 1990s, the Clinton administration, which privatized the publicly funded Internet, began the push for electronic health records (EHRs) by enacting the Health Information Portability and Accountability Act (Carter, 2008, p. 307). The act incentivized health care providers to accelerate the deployment of EHRs; however, major adoption of EHRs did not occur until the Obama administration, which accelerated President George W. Bush's policy on the computerization of health records (White House, 2004).

In response to the Great Recession of 2008, the Obama administration, as part of the economic stimulus put forth by the American Recovery and Reinvestment Act of 2009, allocated \$27 billion for EHRs through the Health Information Technology for Economic and Clinical Health (HITECH) Act. The HITECH Act was created to promote the use of EHRs by health care providers. In fact, the digitization of health records was one of the Obama administration's priorities, attained with the passage of the HITECH Act. The law creating the EHR program promoted *meaningful use* to incentivize hospitals and health care providers to digitize health records and adopt EHR systems. The logic behind "meaningful use" as part of the national recovery act was to spur the growth of the health care tech industry.

Soon after the passage of the HITECH Act, President Obama signed Executive Order 13642, "Making Open and Machine Readable the New Default for Government Information" (2013). Following that order, the Food and Drug Administration (FDA) launched a project called OpenFDA, opening up machine-accessible health data sets such as genomic data, active and inactive ingredients, regulatory and clinical research, and patents. OpenFDA allows people to quickly find and access millions of redacted patient records as well as providing an application programming interface (API) to major structured data sets for developers and researchers. There is little question that the use of these health data should be treated as a social good in support of the public interest. The initiative was presented as public access to medical information; however, it was more about releasing valuable data collected at taxpayer expense to the tech sector so that tech companies could recompute and repackage them into a new commodity. In fact, these big data sets are not useful for everyday citizens because they require a value-added interface, computational power, and technical skills. This is not unprecedented. In the 1980s, Herbert Schiller (1981) showed how remote sensing data including soil, weather, and other planetary information should be treated as a global social utility, but was instead turned over to private companies that had technical capability and processed the data for purely corporate interests.

President Obama did not hide his intentions, stating,

One of the things we're doing to fuel more private sector innovation and discovery is to make vast amounts of America's data open and easy to access for the first time in history. And talented entrepreneurs are doing some pretty amazing things with it. (White House, 2013, para. 4)

In fact, part of the Obama health care reform enriched Silicon Valley by incentivizing the development of health care technologies and health care infrastructure designed to accelerate the adoption of digital technologies.

Under the Trump administration, the policy on health data was changed from *meaningful use* to *interoperability*, because without interoperability, the data have limited use. On March 9, 2020, the administration issued two policies by the Health and Human Services Office of the National Coordinator for Health Information Technology and Centers for Medicare & Medicaid Services—the 21st Century Cures Act as an amendment to the HITECH Act and the MyHealthEData initiative (U.S. Department of Health and Human Services, 2020b).

These data-sharing policies require health care providers to offer patients access to their own records and the interoperability of these data among providers, patients, and third-party apps. The administration touted this as "data at the point of care," which would empower patients and give them the freedom to control their own records (Centers for Medicare & Medicaid Services, 2020, para. 2).

However, this illusion of freedom, which shifts data control from health care providers to individual patients, carries significant implications not only for privacy, but also for control over data. First, when the data leave hospital systems, they are no longer protected by the medical privacy provisions within HIPAA. Second, the individually owned health data can be easily transferred to third parties and mined by tech companies. It is also important to note that the digitization of the health sector and promotion of access to health data were done in conjunction with the defunding of public health care and exploitation of underpaid health care workers. Besides privatized employer-sponsored health care, which has left 15% of Americans without health care during the pandemic, between 2005 and 2020, public health funding in the United States, including staff, training, equipment, and supplies, decreased 45% adjusted for inflation (O'Donnell, 2020). Since the 2008 Great Recession, local and state health departments have lost more than 51,000 jobs, or almost 19% of the workforce (Wilson, 2020). Worse yet, amid the pandemic, the defunding of health care has continued as President Trump's 2021 budget has proposed a cut for the Department of Health and Human Services, including a 15% cut in Centers for Disease Control and Prevention funding and a \$900 billion cut to Medicaid over 10 years (Berg, 2020).

An anemic public sector and a political economy that has long permitted exploitative corporate data practices in and around medicine and health have created conditions allowing tech companies to swiftly exploit the present moment of data-intensive and surveillance business across the entire medicine and health sector in the era of COVID while touting that they would "help" to alleviate the global public health crisis.

### Here Come the Tech Giants

The global digital health market is expected to reach \$639 billion by 2026 (Global Market Insights, 2020) and is undergoing a rapid digitization process, accelerating "datafication": the conversion of our social activities into quantified data that enables the use of information in new ways (Mayer-Schönberger & Cukier, 2013, p. 36). The tech giants are intensifying datafication as a profit-making business model by deploying their industrial-sized Internet infrastructure and transforming themselves into what Srnicek (2017) calls "platform firms," which work as intermediaries connecting and interacting with various users and also enabling the building of third-party marketplaces. Google, Amazon, Apple, and Microsoft are developing potentially lucrative sectoral health platforms to commodify the public value of health data (van Dijck, Poell, & de Waal, 2018, p. 98) as they are moving into what Fields (2004) calls "new territories of profit making" (p. 230). Google is leading the pack.

More than a decade ago, Google began to dabble in health care under the radar. The company launched a personal health record service called Google Health in 2006, which allowed users to store and manage their health care information. After five years without success, Google shut down Google Health. But the company soon reorganized its efforts, boosting health-focused Google search G Suite for health care businesses, and creating subsidiaries devoted to various health sectors. In 2015, Google established its health care division Verily Life Science, previously known as Google Life Sciences. Google scooped up a couple of former Obama staffers, hiring former FDA commissioner and cardiologist Robert Califf as its head of strategy and policy and former Obama health official Karen DeSalvo as its first chief health officer. They play interlocutors among Verily and the health care industry, research institutions, and the government. However, Google's Verily did not just come out of thin air; rather, it coincided with President Obama's 1-million-volunteer health study as part of his Precision Medicine Initiative, funded by NIH and the National Cancer Institute to collect patient data through the institutes' funded long-term research (Sankar & Parker, 2017). Verily was deeply involved in the initiative, as NIH selected Verily and Vanderbilt University to work on the first stage of the Precision Medicine Initiative, cannibalizing existing public health institutions as they were being weakened by the withdrawal of funding.

For years, Google has been actively laying the groundwork to cultivate its health care business, embarking on a series of projects to build its health care information technology infrastructure to collect, store, and analyze patient data (van Dijck et al., 2018). The company has been extending partnerships with major hospital systems and health care providers to access tens of millions of patient records including medication needs, allergies, vaccinations, existing and previous illnesses, and test results (Copeland, 2019). Google has hoovered up medical records from more than 2,600 U.S. hospitals without informing patients or doctors as part of a machine-learning project named Nightingale. Since 2018, Google has been working with Ascension Hospitals, one of the nation's largest health systems, which shared the data of millions of patients with Google to develop a health-related search tool and AI tools for diagnostics and medications. This had alerted Health and Human Services' Office for Civil Rights, and Google is currently under investigation by the agency over its data use.

And given that Google operates globally, Google's ambition to collect health data is not limited to the United States. In 2019, to get access to bulk health data in the UK, Google acquired and incorporated into



Google's health division the London-based AI company DeepMind Health. DeepMind Health signed an agreement with five hospitals in the National Health Service to share health data including treatment dates, medical history, diagnoses, ethnic origin, and religion (Vaughan, 2019). The company has free access to the data while it is building propriety products to monopolize market power (van Dijck et al., 2018). Google had already applied for a patent on a method for aggregating EHR patient records to predict medical outcomes.

With its focused amassing of health data and entrance into the health care industry, Google is also deeply integrating itself into the medical-industrial complex. The company has its sights set on the clinical trial space, which is projected to be a \$69 billion market by 2026. Google's Verily has built a strategic alliance with major pharmaceutical companies like Pfizer Novartis, Sanofi, and Otsuka, targeting the clinical trial market with its technologies and infrastructure, promising to speed up clinical trial recruitment, collecting data, and managing the workflows of clinical trials. The company describes its new venture as democratizing clinical trials and a patient-centered approach to research (Lee, 2020). To "modernize" the clinical trial process, Google sells its services drawn from facilitating patient enrollment in trials to aggregate data from various sources including health-tracking wearable devices and pharmaceutical companies. Moreover, Google is no longer just a purveyor of technologies, but rather has turned into a pharmaceutical company in its own right. Verily has partnered with the European pharmaceutical giant GlaxoSmithKline and formed a new drug company called Galvani Bioelectronics for the development of bioelectronic medicine, which is a branch of medicine that uses electronic signals for treatment (Vincent, 2016).

Verily has also been working on a large-scale five-year research project called Project Baseline to design health care tools and services with Duke and Stanford's schools of medicine. The project has recruited 10,000 volunteers for their research, following their subjects for four years and collecting data on their lifestyles, activity levels, sleep habits, and diet deploying machine learning, fitness trackers, physical check-ups, and genetic testing (Rosenberg, 2018).

Accumulated EHR data will be stored in Google Cloud, computed and fed into Google's "personalized data-driven" health care service business. As Google turned its search technology into a point of control between users and content owners, Google is now inserting its "big data" power and digital technologies—search, cloud infrastructure, data mining, and AI—among doctors, medical institutions, the health industry, and patients.

To fully integrate these digital technologies at the core of human health, Google is even betting on genome data from around the world, and has launched its Cloud Life Science (formerly Google Genomics). Cloud Life Science sells an API to store, process, and analyze DNA sequences on the Google Cloud platform. Google is not alone in the game. Amazon, Microsoft, and IBM are all in the race for genome data as well, with the global genomics market expected to reach \$35.7 billion by 2024 (Market Watch, 2021).

Leveraging its massive computing power with the field of genomics, Google formed a secretive biotech company called Calico Labs in 2013 with a mission "to build a Bell Labs of aging research" (Regalado, 2016, para. 2). Calico has partnered with Chicago-based pharmaceutical giant AbbVie to work on anti-aging drugs. The company is paving the way for its pharmaceutical business portfolio as Google's GoogleVenture

arm has backed several biotech companies centered around antiaging, flu vaccines, and gene therapies. Besides forging relationships with pharmaceutical companies, Calico is working with MIT and Harvard's Broad Institute, a biomedical and genomic research center looking to develop new drugs on anti-aging, a \$56+ billion market as of 2020 (Shahbandeh, 2020).

Google's competitor Microsoft has long been present in the health care sector. But in 2017, the company officially established a health department in its Cambridge research lab to vie for business opportunities in several health fields that intersect with Google, specifically cloud, AI, machine learning, genomics, precision medicine, telemedicine, and health data cybersecurity. In 2018, Microsoft had 1,100 people working in its health unit and 14,000 partners with health care providers (Kharpal, 2018). The company kicked off its Healthcare NExT initiative to push its AI and cloud products, selling health care data storage and sharing platforms as well as AI-powered virtual health "assistants." In January 2020, Microsoft officially launched the \$40 million five-year project AI for Health to burrow into the health care sector by recruiting a mix of nonprofits, academics, industry, and governments to experiment with AI and cloud tools for studies on everything from diabetic retinopathy, tuberculosis, maternal mortality, to cancer (Coldewey, 2020).

Meanwhile, Apple CEO Tim Cook said, "The healthcare market makes the smartphone market look small" (CB Insights, 2019, para. 2), recognizing the trillions of dollars in health care spending annually or about 10% of global GDP. Apple considers health and wellness at the center of its app, services, and wearables strategy. The company has several health-related services such as HealthKit, CareKit, and ResearchKit giving access to health data to patients, researchers, and developers through various mobile devices (Farr & Sullivan, 2016). In 2018, Apple released its personal health record feature called Health Records, which aggregates patient-generated data in the health app combined with patients' electronic medical records from their health care providers. Apple is working with a growing list of major hospitals in the United States including Stanford Medicine, Scripps, New York University Langone Medical Center, and the U.S. Department of Veterans Affairs (Comstock, 2018).

Amazon, which has mastered the supply chain for its e-commerce business and has built a massive cloud infrastructure, has made inroads into the health care supply chain. The company has moved into the area of consumer medical devices, pharmacy services, and medical care services. It acquired online prescription service PillPack and has already filed for a trademark for the name Amazon Pharmacy. Amazon created a "Health & Wellness" team within their Alexa voice assistant division to use Alexa in health care. Alexa has been deployed in hospitals and, by attaining HIPAA compliance, allowed Alexa to access consumers' prescription medications, personal health information, medical appointments, and insurance (Perez, 2019). Amazon also introduced Amazon Comprehend Medical, which uses text analysis and machine learning to read patient records—prescriptions and test reports—uploading the data to its cloud platform to organize data about diagnoses, treatments, and symptoms (Shu, 2018). By exerting its various health care technologies and vast technical infrastructure, Amazon has been able to embed itself more deeply into the health market. It has rolled out its health care service Amazon Care to its employees and other companies, which encompasses the entire medical encounter including telemedicine along with in-person service, online chat with nurses, and medication delivery.

Not to be left out, Facebook requested that major U.S. hospitals share anonymized data about their patients for their research project (Farr, 2018). Although Facebook's demands fell through, this did not stymie the company from launching its Preventive Health tool, which offers check-up reminders, scheduling, and health resources. It shows that the company is eager to exploit the health care market along with its major competitors that are already increasingly investing resources and occupying the sector. Besides these leading tech companies, IBM, Oracle, Intel, CIA-funded Palantir, Uber, Samsung, and Tencent are all betting on health care as their next "big thing."

### **Exploiting the Pandemic**

A crisis is an opportunity for corporate capital to find new markets for continued growth and profit (Huws, 2011). Indeed, the tech giants are profiting from the pandemic while the Trump administration neglected its responsibilities in directing an ill-equipped health care system and hollowed-out federal pandemic response team. Without mentioning the failure of the market-driven health system, tech companies purport that the lack of proper health care for everyday people is due to insufficient and inefficient technologies rather than the record of political choices. They have positioned themselves as the solution for this current plight, exercising their industrial strength technologies and political and economic power. New York Governor Andrew Cuomo recruited tech billionaires Bill Gates, Eric Schmidt, and others to "reimagine New York" from the ruins of the pandemic that has laid bare New York's crumbling social infrastructure after 40 years of neoliberal policies designed to shrink the social safety net and punish the poor. Eric Schmidt will lead a 15-member commission to improve telehealth and broadband systems across New York State. Schmidt said, "The first priorities of what we're trying to do are focused on telehealth, remote learning and broadband. . . . We can take this terrible disaster and accelerate all of those in ways that will make things much, much better" (Klein, 2020, para. 4). It is clear that the priorities are not about providing basic human needs—food, health care, shelter, and education—rather they are again prioritizing the needs of corporate capital by further opening up critical public services for corporate interests.

Not coincidentally, the Trump administration deregulated telehealth policy including HIPAA rules, further incentivizing the adoption of telehealth (Boyd, 2020). Although telehealth is valuable for the public, just deploying more digital technologies will not challenge the disparities inherent in the capitalist health care system; rather, it feeds and exacerbates the inequities of the market economy. Google has already rolled out several coronavirus-related projects: telehealth, online self-screening surveys, the virus screening platform, and antibody research study for COVID-19. Google's Verily is working on antibody research with scientists at Duke University as part of the Healthcare Worker Exposure Response and Outcomes research program. Google, with Palantir, Microsoft, and Amazon are involved in the UK's National Healthcare Service, supporting software, data collection, and cloud platform (Sonnemaker, 2020).

Microsoft, which has enjoyed a stock surge with strong growth in its cloud service, launched its health industry-specific cloud offerings incorporating its existing products like chatbots, teams, and Azure IoT. Microsoft's Healthcare Bot Service has gone live and been deployed in medical facilities in 23 countries. The Microsoft Azure-based virtual service uses AI to answer people's questions, purporting to alleviate workload for medical staff and better care for patients. In particular, global health care cloud computing is one of the most lucrative markets, set to hit over \$51 billion by 2024 (McGrail, 2020). For Apple, with its

iPhone sales falling because of the coronavirus, economic slowdown, mobile market saturation, and contention between the United States and China, the expansion into the health care sector has become even more important. Apple subsidiary Claris, which sells the low-code application development software FileMaker, has pushed its service to health care providers by quickly developing apps in a day or two used for making real-time medical decisions (Rosenbaum, 2020).

Tech companies are hailing the cloud, AI, voice search, chatbots, and virtual reality as the answers to the most intractable problems in health care in the United States, long waiting times to see doctors, and unaffordable prescription drugs. The tech giants are working toward occupying the medical and health care fields, but at the same time, they are also pouring in massive amounts of corporate philanthropy meant to draw positive mainstream media attention to show that capitalism is not just operating through brute force; rather, it is "compassionate," diverting the focus away from their true base corporate interest.

Rivals Apple and Google have shown their "compassion" by teaming up to launch the decentralized exposure notification API (Gapple API), allowing governments, public authorities, and other third parties to create apps on top of the API. Apple and Google boasted that to protect users' privacy, their contact-tracing system would be designed to use Bluetooth, which stores data on people's phones rather than in a central database. Unlike GPS-based contact-tracing systems, the Gapple Bluetooth system does not track people's physical location, but rather picks up nearby cellphone signals as a substitute for GPS location data.

The companies have stated that they would not share data or technical specifications with third parties, including governments. This project was originally called the Privacy-Preserving Contact Tracing Project, as Apple and Google preemptively inscribed the project with stringent privacy measures to deflect any criticism; both companies have faced backlashes from domestic and European regulators concerned about their exploitative surveillance business model. The technical design indeed solves the privacy problem, but it also shows the power of the two tech giants and how they control the digital technology terrain.

Although this decentralized approach was initially praised by European regulators who have long tried to rein in the U.S. tech giants on multiple fronts including on privacy issues, they soon realized that Apple and Google control all hardware, software, and all technical specifications and standards, so it is difficult if not impossible for countries to create their own contact-tracing applications (Newton, 2020). As *The Guardian* reported, Google and Apple permit only one app per country with approval by its government. The two companies set the conditions, so each country's disease-control authority cannot access data generated by the app to analyze and learn more about how the pandemic is progressing in their own country (Ilves, 2020).

France, Germany, Italy, Spain, and Portugal, as well as many doctors and researchers, are demanding that these tech companies should not "control the terms, conditions or capabilities" (Albergotti, 2020, para. 6) of digital contact tracing, and are demanding access to their operating systems. Initially, European countries resisted the Gapple API, as they sought a European-designed and controlled contact-tracing app; however, every European country except France has shifted to the Gapple API because of technical complications as well as lack of technical capability. Recalling comparable skirmishes during the debates over the new international information order, France rejected the Gapple API, stating that this is a matter of "technological sovereignty."

Tech companies are all rolling up their sleeves and calling for “private–public” partnerships as they try to show the world that they are all contributing toward the fight against COVID-19. However, corporate philanthropic heroism inscribed with digital gospel is intended to spread their technologies as wide as possible from hospitals to schools to transportation as a solution to failed government policies. It also conceals the extent of corporate welfare that is extracted from public taxpayers while long-standing anemic funding for public services including health care continues unabated.

### Conclusion

The crisis triggered by the COVID-19 pandemic is deepening digital capitalism as tech sectors are raking in billions of dollars in profit. The global tech companies purport that they are offering their technologies for free to alleviate the current public health crisis; however, in reality, they are tightening their grip over this new market by precipitously building private networked health care technical infrastructures, further marketizing public health, and undercutting any small grassroots momentum toward universal health care.

The strategy for tech companies is to use the crisis to make their technologies indispensable so that people will have to rely on proprietary technologies to access, build, and maintain each country’s health care system, everything from finding doctors to clinical trials. Under the guise of “improving” people’s lives and reducing costs, tech companies are tightly weaving themselves into the existing medical-academic-industrial complex, restructuring insurance companies, hospitals, drug companies, and universities, and further commodifying basic health care. This falls into what Wood (1998) describes as the universalizing logic of capitalism, which imposes a market logic on all aspects of our lives. This move has to be stopped by claiming, broadening, and funding a public universal health care agenda.

The Tricontinental Institute for Social Research, an international research institution aimed at social and political movements, has proposed a 10-point agenda for the Global South after COVID-19 (Prashad, 2020). Among the 10 points, medical solidarity, creation of an intellectual commons, and investment in the public sector are especially pertinent to a universal health care system.<sup>3</sup> Although the Tricontinental Institute’s agenda is focused on the Global South, the agenda offers an entry point to think about a meaningful universal health care system in the United States and other parts of the world. Building on the principles of solidarity, commons, and public service, the provision of universal health care should encompass access to free medical services for all and decommodification of medical knowledge by dismantling the current IP regime. Moreover, it also needs to be expanded to include public ownership of the technical infrastructure undergirding public health care systems.

The pandemic has demonstrated that corporate-owned Internet infrastructures and services, which are often invisible, have become essential for our survival just like water, air, and electricity. In the midst

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<sup>3</sup> Tricontinental Institute for Social Research’s 10 points: tackle the global pandemic, broaden medical solidarity, create an intellectual commons, cancel debt, expand food solidarity, enhance and invest in the public sector, implement wealth taxes, enact capital controls, shift to non-dollar-based regional trade and centralized planning, and decentralize public action.

of the pandemic, millions of people still cannot access or afford proper health care and continue to lose their employer-based health insurance. Our public health and survival should not be subordinated to corporate-driven technologies, interests, and philanthropy. The crisis calls for social solidarity and putting an end to health care as a site of private wealth accumulation.

### References

- Albergotti, R. (2020, May 20). European government officials call for tech companies to loosen grip on contact-tracing technology. *The Washington Post*. Retrieved from <https://www.washingtonpost.com/technology/2020/05/29/apple-google-contact-tracing/>
- Angell, M. (2005). *The truth about the drug companies: How they deceive us and what to do about it*. New York, NY: Random House.
- Berg, M. (2020, March 13). *Trump weakened our health-care infrastructure—and that undermined his response to coronavirus*. Retrieved from <https://www.plannedparenthoodaction.org/blog/trump-administration-weakened-our-health-care-infrastructure-now-it-cant-respond-to-coronavirus>
- Boyd, A. (2020, March 17). *Trump relaxes patient data rules to allow doctors to use personal phones for telehealth*. Retrieved from <https://www.nextgov.com/policy/2020/03/trump-relaxes-patient-data-rules-allow-doctors-telehealth-using-personal-phones/163847/>
- Brunton, D. (2013). *Health and wellness in the 19th century*. Santa Barbara, CA: Greenwood.
- Carter, J. H. (2008). *Electronic health records: A guide for clinicians and administrators*. Philadelphia, PA: ACP.
- Castells, M. (2010). *The rise of the network society*. Oxford, UK: Blackwell.
- CB Insights. (2019, January 8). *Apple is going after the healthcare industry, starting with personal health data*. Retrieved from <https://www.cbinsights.com/research/apple-healthcare-strategy-apps/>
- Centers for Medicare and Medicaid Service. (2020, July 20). *CMS advances MyHealthEData with new pilot to support clinicians*. Retrieved from <https://www.cms.gov/newsroom/press-releases/cms-advances-myhealthedata-new-pilot-support-clinicians>
- Coldewey, D. (2020, January 29). *Microsoft takes wraps off \$40M "AI for Health" initiative*. Retrieved from <https://techcrunch.com/2020/01/29/microsoft-takes-wraps-off-40m-ai-for-health-initiative/>
- Comstock, J. (2018, March 29). *Apple reveals 39 hospitals to launch Apple Health Records*. Retrieved from <https://www.healthcareitnews.com/news/apple-reveals-39-hospitals-launch-apple-health-records>

- Copeland, R. (2019, November 11). Google's "Project Nightingale" gathers personal health data on millions of Americans. *The Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/google-s-secret-project-nightingale-gathers-personal-health-data-on-millions-of-americans-11573496790>
- Dijck, J. van, Poell, T., & de Waal, M. (2018). *The platform society: Public values in a connective world*. New York, NY: Oxford University Press.
- Ehrenreich, J. (2016). *Third wave capitalism: How money, power, and the pursuit of self-interest have imperiled the American dream*. Ithaca, NY: Cornell University Press.
- Elliot, L. (2020, January 8). World Bank warns of global debt crisis amid borrowing buildup. *The Guardian*. Retrieved from <https://www.theguardian.com/business/2020/jan/08/world-bank-global-debt-crisis-borrowing-build-up/>
- Exec. Order No. 13642, 78 Fed. Reg. 28111. (2013). Retrieved from <https://www.federalregister.gov/documents/2013/05/14/2013-11533/making-open-and-machine-readable-the-new-default-for-government-information>
- Farr, C. (2018, April 5). Facebook sent a doctor on a secret mission to ask hospitals to share patient data. *CNBC*. Retrieved from <https://www.cnbc.com/2018/04/05/facebook-building-8-explored-data-sharing-agreement-with-hospitals.html>
- Farr, C., & Sullivan, M. (2016, August 22). *Apple acquires personal health data startup Glimpse*. Retrieved from <https://www.fastcompany.com/3062865/apple-acquires-personal-health-data-startup-glimpse>
- Fields, G. (2004). *Territories of profit: Communications, capitalist development, and the innovative enterprises of G. F. Swift and Dell Computer*. Stanford, CA: Stanford University Press.
- Furcht, L., & Hoffman, W. (2014). *The biologist's imagination: Innovation in the biosciences*. New York, NY: Oxford University Press.
- Global Market Insights. (2020, June 15). Global digital health market size in 2019 and a forecast for 2026 (in billion U.S. dollars). Retrieved from <https://www.statista.com/statistics/1092869/global-digital-health-market-size-forecast/>
- Goodman, J. B., & Loveman, G. W. (1991). Does privatization serve the public interest? *Harvard Business Review*. Retrieved from <https://hbr.org/1991/11/does-privatization-serve-the-public-interest>
- Greene, J. A. (2014). *Generic: The unbranding of modern medicine*. Baltimore, MD: Johns Hopkins University Press.

- Guterres, A. (2020, April 24). *Secretary-General's remarks at the launch of the statement of commitment and call for support for the global collaboration to accelerate the development, production and equitable access to new COVID-19 tools*. Retrieved from <https://www.un.org/sg/en/content/sg/statement/2020-04-24/secretary-generals-remarks-the-launch-of-the-statement-of-commitment-and-call-for-support-for-the-global-collaboration-accelerate-the-development-production-and>
- Harvey, D. (2003). *The new imperialism*. Oxford, UK: Oxford University Press.
- Huws, U. (2011, December 22). *Crisis as capitalist opportunity*. Retrieved from <https://socialistproject.ca/2011/12/b581/>
- Ilves, I. (2020, June 16). Why are Google and Apple dictating how European democracies fight coronavirus? *The Guardian*. Retrieved from <https://www.theguardian.com/commentisfree/2020/jun/16/google-apple-dictating-european-democracies-coronavirus>
- Kharpal, A. (2018, July 16). Microsoft health unit is a "multi-billion-dollar business," medical chief says. *CNBC*. Retrieved from <https://www.cnbc.com/2018/07/26/microsofts-health-unit-is-a-multi-billion-dollar-business.html>
- Klein, N. (2020, May 8). *Screen new deal*. Retrieved from <https://theintercept.com/2020/05/08/andrew-cuomo-eric-schmidt-coronavirus-tech-shock-doctrine/>
- Langreth, R. (2020, April 16). Moderna soars after \$483 million Covid-19 agreement with U.S. *Bloomberg*. Retrieved from <https://www.bloomberg.com/news/articles/2020-04-16/moderna-snares-483-million-u-s-funding-for-covid-vaccine-tests>
- Lee, V. (2020, January 10). *Better data, better care*. Retrieved from <https://verily.com/stories/better-data-better-care/>
- Loffredo, J., & Greenstein, M. (2020, July 8). *Why the Bill Gates global health empire promises more empire and less public health*. Retrieved from <https://thegrayzone.com/2020/07/08/bill-gates-global-health-policy/>
- Market Watch. (2021, January 20). *Genomics market worth \$35.7 billion by 2024*. Retrieved from <https://www.marketwatch.com/press-release/genomics-market-worth-357-billion-by-2024-key-players-are-thermo-fisher-scientific-inc-us-illumina-inc-us-qiagen-nv-2021-01-20>
- Mayer-Schönberger, V., & Cukier, K. (2013). *Big data: A revolution that will transform how we live, work, and think*. Boston, MA: Houghton Mifflin Harcourt.



- McChesney, R. W. (2013). *Digital disconnect: How capitalism is turning the Internet against democracy*. New York, NY: New Press.
- McGoey, L. (2015). *No such thing as a free gift: The Gates Foundation and the price of philanthropy*. London, UK: Verso.
- McGrail, S. (2020, January 2). *Global healthcare cloud computing market to reach \$51.9B by 2024*. Retrieved from <https://hitinfrastructure.com/news/global-healthcare-cloud-computing-market-to-reach-51.9b-by-2024>
- Mgbeoji, I. (2014). *Global biopiracy: Patents, plants, and indigenous knowledge*. Vancouver, Canada: University of British Columbia Press.
- Mosco, V. (2009). *The political economy of communication: Rethinking and renewal*. London, UK: SAGE Publications.
- Moulier-Boutang, Y. (2011). *Cognitive capitalism*. Cambridge, UK: Polity.
- Newton, C. (2020, May 8). *Why countries keep bowing to Apple and Google's contact tracing app requirements*. Retrieved from <https://www.theverge.com/interface/2020/5/8/21250744/apple-google-contact-tracing-england-germany-exposure-notification-india-privacy>
- Noble, D. F. (1979). *America by design: Science, technology, and the rise of corporate capitalism*. Oxford, UK: Oxford University Press.
- O'Donnell, J. (2020, March 2). "This is not sustainable": Public health departments, decimated by funding cuts, scramble against coronavirus. *USA Today*. Retrieved from <https://www.usatoday.com/story/news/health/2020/03/02/coronavirus-response-depleted-public-health-departments-scramble-respond/4868693002/>
- Perez, S. (2019, April 4). *Amazon Alexa launches its first HIPAA-compliant medical skills*. Retrieved from <https://techcrunch.com/2019/04/04/amazon-alexa-launches-its-first-hipaa-compliant-medical-skills/>
- Prashad, V. (2020, June 18). Ten-point agenda for the Global South after COVID-19. *The Tricontinental*. Retrieved from <https://www.thetricontinental.org/newsletterissue/25-2020-ten-point-agenda/>
- Regalado, A. (2016, December 15). Google's long strange life-span trip. *MIT Technology Review*. Retrieved from <https://www.technologyreview.com/2016/12/15/69305/googles-long-strange-life-span-trip/>
- Reich, L. (2002). *The making of American industrial research: Science and business at GE and Bell, 1876-1926*. Cambridge, UK: Cambridge University Press.

- Relman, A. S. (1980). The new medical-industrial complex. *The New England Journal of Medicine*, 303(17), 963–970. Retrieved from <https://www.nejm.org/doi/full/10.1056/NEJM198010233031703>
- Rosenbaum, E. (2020, May 1). An Apple business you may not know that's poised to boom from coronavirus crisis. *CNBC*. Retrieved from <https://www.cnbc.com/2020/05/01/an-apple-business-you-dont-know-that-bets-on-big-coronavirus-growth.html>
- Rosenberg, J. (2018, July 3). Project Baseline: Understanding and mapping human health. *The American Journal of Managed Care*. Retrieved from <https://www.ajmc.com/focus-of-the-week/project-baseline-understanding-and-mapping-human-health>
- Sankar, P., & Parker, L. (2017). The Precision Medicine Initiative's All of Us Research Program: An agenda for research on its ethical, legal, and social issues. *Genetics in Medicine*, 19(7), 743–750. Retrieved from <https://doi.org/10.1038/gim.2016.183>
- Schiller, D. (1999). *Digital capitalism: Networking the global market system*. Cambridge, MA: MIT Press.
- Schiller, D. (2011). Power under pressure: Digital capitalism in crisis. *International Journal of Communication*, 5, 924–941.
- Schiller, D. (2014). *Digital depression: Information technology and economic crisis*. Urbana: University of Illinois Press.
- Schiller, H. (1981). *Who knows: Information in the age of the Fortune 500*. Norwood, NJ: ABLEX.
- Schleifer, T. (2020, April 14). *Google's former CEO hopes the coronavirus makes people more "grateful" for recode*. Retrieved from <https://www.vox.com/recode/2020/4/14/21221141/coronavirus-eric-schmidt-google-big-tech-grateful>
- Shahbandeh, M. (2020, May 15). Size of the anti-aging market worldwide from 2018 to 2023. *Statista*. Retrieved from <https://www.statista.com/statistics/509679/value-of-the-global-anti-aging-market/>
- Shu, C. (2018, November 28). *Amazon's newest service uses machine learning to extract medical data from patient*. Retrieved from <https://techcrunch.com/2018/11/27/amazons-newest-service-uses-machine-learning-to-extract-medical-data-from-patient-records>
- Sonnemaker, T. (2020, March 31). Secretive big data company Palantir is reportedly providing software to help the CDC track the coronavirus pandemic, even as critics slam its work with ICE. *Business Insider*. Retrieved from <https://www.businessinsider.com/palantir-providing-cdc-with-coronavirus-tracking-software-report-2020-3>

- Srnicek, N. (2017). *Platform capitalism*. Cambridge, UK: Polity Press.
- Starr, P. (1982). *The social transformation of American medicine: The rise of a sovereign profession and the making of a vast industry*. New York, NY: Basic.
- Tomes, N. (2006). Patients or health-care consumers? In: R. A. Stevens, C. E. Rosenberg, & L. R. Burns (Eds.), *History and health policy in the United States: Putting the past back in* (pp. 83–110). New Brunswick, NJ: Rutgers University Press.
- U.S. Department of Health and Human Services. (2020a, June 16). *Fact sheet: Explaining Operation Warp Speed*. Retrieved from <https://www.hhs.gov/sites/default/files/fact-sheet-operation-warp-speed.pdf>
- U.S. Department of Health and Human Services. (2020b, March 9). HHS finalizes historic rules to provide patients more control of their health data [Press release]. Retrieved from <https://www.hhs.gov/about/news/2020/03/09/hhs-finalizes-historic-rules-to-provide-patients-more-control-of-their-health-data.html>
- Vaughan, A. (2019, September 27). *Google is taking over DeepMind's NHS contracts—Should we be worried?* Retrieved from <https://www.newscientist.com/article/2217939-google-is-taking-over-deepminds-nhs-contracts-should-we-be-worried/>
- Vincent, J. (2016, August 1). GlaxoSmithKline and Google team up to create new bioelectronics health company. *Verge*. Retrieved from <https://www.theverge.com/2016/8/1/12340454/gsk-google-bioelectronic-medicine-company>
- Wasko, J. (2014). The study of the political economy of the media in the twenty-first century. *International Journal of Media & Cultural Politics*, 10(3), 259–271.
- White House. (2004, January 20). *Transforming health care: The president's health information technology plan* [Press release]. Retrieved from [https://georgewbush-whitehouse.archives.gov/infocus/technology/economic\\_policy200404/chap3.html](https://georgewbush-whitehouse.archives.gov/infocus/technology/economic_policy200404/chap3.html)
- White House. (2013, May 9). *Obama administration releases historic open data rules to enhance government efficiency and fuel economic growth* [Press release]. Retrieved from <https://obamawhitehouse.archives.gov/the-press-office/2013/05/09/obama-administration-releases-historic-open-data-rules-enhance-governmen>
- Wilson, R. T. (2020, April 5). A deficit of more than 250,000 public health workers is no way to fight COVID-19. *STAT*. Retrieved from <https://www.statnews.com/2020/04/05/deficit-public-health-workers-no-way-to-fight-COVID-19/>

Wood, E. M. (1998). Modernity, postmodernity or capitalism? In R. W. McChesney, E. M. Wood, & J. B. Foster (Eds.), *Capitalism and the information age* (pp. 27–49). New York, NY: Monthly Review.

Wood, E. M. (2016, January 14). *Capitalism's gravediggers*. Retrieved from <https://www.versobooks.com/blogs/2313-ellen-meiksins-wood-capitalism-s-gravediggers>

World Economic Outlook. (2020, June). *A crisis like no other, an uncertain recovery*. Retrieved from <https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020>

Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. New York, NY: Public Affairs.