

Incarceration as a Fundamental Social Cause of Health Inequalities: Jails, Prisons and Vulnerability to COVID-19

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Although research has established the disproportionate health burdens among incarcerated persons, the literature has yet to identify a theoretical framework for outlining the harms of incarceration associated with pandemics. We advance the literature theoretically by arguing two points. First, we assert that incarceration is a potent structural driver of health inequalities that must be considered as a fundamental social cause of disease. To underscore this point, we review how incarceration meets each of the four fundamental social cause criteria originally proposed by Link and Phelan. Second, given that incarceration is a fundamental social cause of disease, both currently and formerly incarcerated populations are likely to face heightened vulnerabilities to pandemics, including COVID-19, further exacerbating health disparities among incarceration-exposed groups.

Key Words: incarceration, health, infectious disease, COVID-19, fundamental causes

On 11 March 2020, the World Health Organization (WHO) classified the scale of infections caused by a novel coronavirus, COVID-19, as meeting the threshold for a pandemic (WHO 2020a). At the time of this writing, 101,561,219 COVID-19 infections and 2,196,944 deaths have been reported globally (WHO 2021). While the WHO released clear guidelines to help slow the rate of outbreaks, environmental differences can shape the degree to which guidelines can be implemented. Correctional facilities in particular are uniquely vulnerable to infectious disease pandemics (Bick 2007; Maruschak *et al.* 2009) and face numerous challenges in their efforts to implement mitigation efforts recommended by the WHO (Williams *et al.* 2020). The built environment and condition of these facilities create circumstances that are highly pathogenic in and of themselves (e.g. poor sanitation and ventilation, inability to social distance due to the congregate setting/overcrowding), furthering heightening the risk of transmission of highly transmissible viruses, such as SARS-CoV-2 in carceral settings. In the face of this elevated transmissibility, moreover, incarcerated people (IP) themselves are particularly vulnerable to

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developing the disease COVID-19—and potentially more severe cases of the disease—due to health inequities that are often present before—yet compounded by—incarceration.

Since early 2020, multiple large outbreaks of COVID-19 have emerged in prisons and jails worldwide (Beaudry *et al.* 2020; Kinner *et al.* 2020). The United States, which has the highest prison population rate in the world (World Prison Brief 2018), has confirmed 372,569 COVID-19 cases and 2,296 deaths among imprisoned people alone, as of 29 January 2021 (COVID Prison Project 2021a). More generally, evidence is emerging of the staggering and disproportionate impact of COVID-19 on IP throughout every region of the world, including in Latin America (Marmolejo *et al.* 2020), Europe (Rapisarda and Byrne 2020a), England and Wales (Brennan 2020), Asia (Rapisarda and Byrne 2020b), Africa (Muntingh 2020), North America (Rapisarda *et al.* 2020) and Oceania (Rapisarda and Byrne 2020c). New Zealand offers one departure from this trend (Murray and Kras 2020). Signifying the heightened risk posed by COVID-19 in correctional facilities, international organizations, including the WHO and United Nations (UN), released a joint statement calling on leaders of global health to recognize and take action pertaining to the heightened vulnerability of IP during the COVID-19 pandemic (WHO 2020b).

To enhance our understanding of the role of correctional facilities in the pandemic, it is vital to situate current events within a framework that addresses the health implications of mass incarceration. Doing so can help provide understanding as to why correctional populations are disproportionately vulnerable to the COVID-19 pandemic, as well as provide a unifying theoretical approach to empirically test the impacts of COVID-19 on correctional populations as data become more available in the future. To meet this need, we contextualize the COVID-19 pandemic through a critical lens that views incarceration as a structural driver of health inequalities. Using COVID-19 as a timely example, we argue that incarceration should be conceptualized as a fundamental social cause of disease. In the sections that follow, we begin by reviewing the literature linking incarceration to diminished health. Next, we provide an overview of Link and Phelan's (1995) theory of fundamental social causes. We then articulate how the theory can be extended by identifying incarceration as a fundamental social cause of disease not only generally but also specifically during the COVID-19 pandemic. We conclude by offering suggestions for policy and research.

BACKGROUND

Research investigating incarceration exposure as a risk factor for poor health has grown tremendously in recent years (for a recent review, see Massoglia and Remster 2019). The preponderance of this research focuses on the health of IP before, during and after incarceration, as well as highlights the ways incarceration can exacerbate pre-existing societal health inequities. Ultimately, people who enter prison and jail tend to be in worse health than the general population. Regardless of pre-existing health conditions, however, 'incarceration has strongly harmful effects on the health of prisoners over their life course' (Wildeman and Wang 2017: 1467).

Health before incarceration

Incarcerated populations are largely drawn from marginalized segments of society, living in conditions that foster poor physical and mental health outcomes (Wakefield and Uggen 2010). Thus, people housed in prisons and jails have worse health than the general population at baseline (Binswanger *et al.* 2009; Wilper *et al.* 2009), including nutritional deficiencies (Nwosu *et al.* 2014), chronic health conditions (Wang *et al.* 2009) and mental health disorders (Fazel and Baillargeon 2011). The evidence suggests that individuals who experience incarceration 'would have been in poor health irrespective of their incarceration' (Wildeman and Muller 2012: 17).

Even so, emergent research also highlights that serving time behind bars acts as a catalyst that accelerates worsening health.

Health during incarceration

Several features of correctional facilities exacerbate the risk of worsening health and well-being. Prisons amplify adverse health conditions, including infectious diseases, through overcrowding, austere custodial physical infrastructure, limited access to basic health care services and inhumane attitudes and practices of custodial staff. Thus, a key mechanism linking imprisonment and health is differential exposure to stressors as a result of the prison experience (Massoglia 2008). These stressors are detrimental for psychological well-being: incarceration worsens depression symptomatology (Turney *et al.* 2012) and increases suicidality (Liebling 1995). However, some evidence suggests that rates of depression may decline the longer one is incarcerated (Porter and DeMarco 2019).

Paradoxically, incarceration may offer some short-term health benefits. For example, the mortality rate of Black men in US prisons tends to be lower than similarly aged Black men in the general population (Rosen *et al.* 2008; Patterson 2010; Spaulding *et al.* 2011), which likely results from decreased risk of deaths from external causes and increased access to health care. It is important to note that any short-term mortality benefit may be outweighed by the long-term mortality consequences of incarceration (Patterson 2013). While individuals can often receive medical care in correctional facilities, the health care infrastructure within correctional facilities frequently creates barriers, limiting access to medical care (Magee *et al.* 2005 Novisky 2018). Moreover, rising global incarceration rates are associated with reductions in hospital bed capacity, suggesting that ‘incarceration may increase the strain placed on national health care systems by contributing to adverse health outcomes while simultaneously reducing the capacity of the systems that treat these health problems’ (Testa *et al.* 2020: 3).

Health after incarceration

Even in the most favourable circumstances, formerly IP face mounting barriers to health and well-being upon re-entry into the community—above and beyond the risks incurred while incarcerated. As stated by Schnittker *et al.* (2011: 1), ‘some of the strongest negative effects of incarceration emerge *after* release, suggesting that the struggles of reintegration are as important as the conditions of incarceration’. Given the significant barriers to success and well-being that are experienced by formerly IP, it is not surprising that incarceration tends to bode poorly for post-release psychological and physical health outcomes.

Concerning physical health post-release, formerly IP are at increased risk for multiple adverse health conditions, including stress-related diseases (Massoglia 2008), diminished oral health (Testa and Fahmy 2020), diabetes (Rolling *et al.* 2019) and premature mortality (Daza *et al.* 2020). Furthermore, due to post-release conditions, formerly IP are likely to engage in poor health behaviours and risky health lifestyles, including having lower quality diets and higher rates of cigarette smoking (Porter 2014), exhibiting a greater degree of sleep problems (Testa and Porter 2017) and engaging in more illicit drug use (Western and Simes 2019). Taken together, poor health behaviours, coupled with residing in disadvantaged and under-resourced communities, may contribute to worse overall health and diminished immune system functioning, making formerly IP particularly vulnerable during an infectious disease pandemic (WHO 2020c).

Fundamental social causes of health inequalities

In 1995, Link and Phelan developed the theory of fundamental social causes to explain the unwavering association between socio-economic status (SES) and health across time and place.

Specifically, they argued for the need to place social factors or circumstances at the forefront of our examinations of health disparities, offering a departure from the general focus at the time on proximate or individually driven causes of disease. At the crux of the theory is the notion that resources are unequally distributed in society, giving some distinct advantages for health protection, while others are left unequally equipped to avoid risk factors linked to disease and morality (Phelan and Link 2005). Thus, rather than focusing narrowly on individual health behaviours, such as diet and exercise, Link and Phelan (1995: 85) challenged medical sociologists to question ‘why people come to be exposed to risk or protective factors related to disease’.

To date, the bulk of the fundamental social cause research has focused on SES as *the* driver of health inequalities, concluding collectively that SES is a stable predictor of morbidity and mortality (Phelan *et al.* 2010). These effects are particularly pronounced for health conditions considered amenable to behaviour change, including lung cancer and heart disease (Phelan *et al.* 2004; Mackenbach *et al.* 2015; Masters *et al.* 2015) versus conditions that lack established preventive protocols or cures, such as brain and ovarian cancers (Phelan and Link 2005). While the majority of the research on fundamental social causes focuses on SES, additional fundamental social causes of health inequalities have been proposed since the theory’s inception, including racism (Phelan and Link 2015), racial capitalism (Pirtle 2020), gender (Roxburgh 2009), social status and autonomy (Marmot 2004) and stigma (Hatzenbuehler *et al.* 2013). Considering the growing body of research documenting the harmful health consequences of incarceration—consequences that have become even more apparent in the wake of COVID-19—we propose that incarceration should be theorized as another fundamental social cause of health disparities. In the section that follows, we outline how incarceration meets each of the four fundamental social cause criteria proposed by Link and Phelan (1995).

INCARCERATION AS A FUNDAMENTAL SOCIAL CAUSE OF HEALTH INEQUALITIES

Evidence incarceration is related to multiple disease outcomes

Following Phelan *et al.* (2010), the first criteria of a fundamental social cause is that it influences multiple disease outcomes. As previously noted, the incarcerated population is disproportionately composed of individuals of lower SES who experience a range of adverse health conditions prior to incarceration. Nonetheless, the research literature has established that incarceration is a catalyst for worsening health with multiple reviews being written on the topic (Brinkley-Rubinstein 2013; Wildeman and Wang 2017; Massoglia and Remster 2019). Considering evidence that prisons and jails serve to amplify the spread of COVID-19 within and outside of correctional facilities, public health experts, including the WHO (2020d), have advocated for prison health to be widely considered public health.

Evidence incarceration is related to multiple risk factors for disease and death

The second component necessary for a fundamental social cause is that it be related to multiple risk factors for disease and death. For one, IP are at risk for accelerated physiological ageing in comparison to their community dwelling peers, making them more susceptible to morbidity and mortality at earlier phases of the life course (Loeb *et al.* 2008), in a process similar to weathering (Geronimous *et al.* 2006). This weathering process may be partly due to stress, which is a particularly robust risk factor for disease and death (Pearlin *et al.* 1989; Williams *et al.* 1997). The stress process is linked to health most blatantly through its impacts on the body’s physiological functioning. Specifically, ‘the persistence, bundling, or layering of stressors over time... can add to what is called the allostatic load; the greater the load, the more diffi-

cult it is for bodily systems and their biological products to function optimally' (Pearlin et al. 2005: 214). Research has shown that incarceration can indeed get 'under the skin' (Semenza and Link 2019) by activating the body's stress response for extended periods of time (Sapolsky 2004). Thus, the stress of incarceration has the capacity to be especially taxing on the body and the mind, in part through isolation via restrictive housing (Haney 2018), exposure to violence (Novisky and Peralta 2020) and loss of privileges (e.g. relationships; Sykes 1958).

Another risk factor for disease and death disproportionately experienced by incarcerated and formerly IP is stigma. Classic sociological research suggests that serving any amount of time is enough to spoil an individual's identity (Goffman 1963), and contemporary research shows that, among incarcerated populations, weakened social integration and low levels of social support from incarcerated peers is determinantal for health and well-being (Haynie et al. 2018). Stigma underpins discriminatory experiences of formerly IP across multiple institutions and settings, including marriage, labour market and civic participation (Uggen and Manza 2002; Pager 2003; Massoglia et al. 2011). This stigma is thought to undermine autonomy and interfere with opportunities for social engagement (Marmot 2004) and produce significant psychological distress (Turney et al. 2013), all of which may at least partly explain the 'burden of disease' among formerly IP (Tyler and Brockmann 2017).

Finally, discrimination can also be conceptualized as a risk factor for disease and death that is intimately tied to incarceration. In the United States, e.g., mass incarceration is an institutional mechanism of racism that structures the health of the population (Bailey et al. 2017; Nowotny and Kuptsevych-Timmer 2018). Mass incarceration is highly concentrated in marginalized Black communities, where it causes much damage by ruining social networks, distorting social norms and destroying social citizenship (Roberts 2004). The health implications of the disproportionate impact of incarceration for Black men can be sizeable, considering the 'burden of multiple, intersecting disadvantaged identities and social positions' they experience (Sun et al. 2018: 78). Thomas (2006), e.g., argues that historic and contemporary social forces of racial subordination—from slavery to contemporary mass incarceration (Alexander 2010)—has led to sexual and care-seeking behaviours that favour the transmission of sexually transmitted infections (STIs) and, ultimately, the disproportionate documented rates of STIs across the US South where systems of racial subordination have been concentrated.

Evidence access to resources is critical in the association between incarceration and health

The third factor necessary to identifying a fundamental social cause is that access to resources is critical in its association to health. Link and Phelan (1995: 87) defined resources as 'knowledge, power, prestige, and the kinds of interpersonal resources embodied in the concepts of social support and social network'. Access to resources is critical because resources place people 'at risk of risks, shaping individual health behaviors by influencing whether people know about, have access to, can afford, and receive social support' while managing their health (Phelan et al. 2010: S30). In short, those with less access to resources related to health management will be at a disadvantage for addressing their health.

Incarceration negatively impacts multiple resources important to leveraging positive health outcomes. Incarceration can diminish existing social ties because contact with the community is significantly reduced, if not altogether severed. This matters because social isolation is related to a variety of health outcomes across the life course (Umberson et al. 2010), including cardiovascular health (Bin et al. 2020). Of course, the most extreme experience of social isolation, solitary confinement, is uniquely experienced by prisoners. Solitary confinement has been linked to multiple declines in health, leading experts worldwide to call for drastic reductions in its use (UN News 2011). In 2015, Phelan and Link expanded their conceptualization of resources to include freedom, using slavery and incarceration as examples that substantially impair one's

ability to make free choices about health behaviours. In prisons, e.g., dietary options are limited, leaving unequal opportunities for people to modify their eating habits unless they can afford to purchase commissary items (Novisky 2018).

In addition to resource deprivation experienced among the currently incarcerated, resources and provisions that might restore or maintain the health of formerly IP are also in short supply. The various forms of resource deprivation that often emerge as collateral consequences of incarceration (e.g. diminished access to food, housing, and medical care) are also known social determinants of health (Tyler and Brockmann 2017), which suggests that they may—in and of themselves—worsen the health of formerly IP. Formerly IP often lack health insurance or financial resources for medical care (Visher *et al.* 2004; Winkelman *et al.* 2017), access to health care organizations in their neighbourhoods (Wallace *et al.* 2015), stable housing (Harding *et al.* 2013), reliable sources of food (Testa and Jackson 2019) and sufficient employment (Pager 2003; Western and Siros 2019).

Evidence the association between incarceration and health is reproduced across time and place

The final criteria for identifying a fundamental social cause is that its association with health is reproduced across time and place. Link and Phelan (1995) predicted that as new technologies, cures and medical recommendations were developed, those with higher SES would reap the benefits due to their enhanced access to resources, while those with lower SES would remain behind because of their sustained inability to access technologies or implement medical guidelines. For example, medical advances in our understanding of the harms of cigarette smoking is important (Remen *et al.* 2018), but IP continue to lag behind in implementation, in part, because crowded prison spaces make it impossible to avoid second-hand cigarette smoke (Hammond and Emmons 2005). Living in confined spaces with limited options for exercise also stifles the ability of people in prison to avoid risks associated with sedentary lifestyles (Biswas *et al.* 2015).

As another example, the history of incarceration is unique in the United States and the historical record is replete with examples of the health harms caused by the deprivations of prison life since its colonial founding. Charles Dickens famously visited Eastern State Penitentiary in Philadelphia in 1842 and observed, 'I believe that very few men are capable of estimating the immense amount of torture and agony which this dreadful punishment, prolonged for years, inflicts upon the sufferers' (Dickens 1913 [1842]: 119). One of the first successful correctional reform movements was achieved by the Philadelphia Society for Alleviating the Miseries of Public Prisons, who reformed the Walnut Street Jail in 1790. One of their efforts included providing food and water at the public's expense to reduce morbidity and mortality.

The prison gained new life after the abolishment of slavery (Alexander 2010), particularly in the south where newly free Black men were often arrested for minor/false charges and then leased to plantation owners for manual labour on former slave plantations. According to Bauer's analysis, 'the death rate of six prisons in the Midwest, where convict leasing was nonexistent, was around one percent. By contrast, in the deadliest year of Louisiana lease, nearly 20 per cent of convicts perished. Between 1870 and 1901, some three thousand Louisiana convicts, most of whom were black, died' (Bauer 2018: 129–30). Activism and reform movements for improving the conditions of confinement throughout the 1800s and 1900s have centred on health and well-being, including Ida B. Wells writing about solitary confinement in 1915 and the Attica Prison Manifesto put forth during the 1971 uprising (Kaufman 1971), which included demands for improvement in medical staffing and policy, food and unsanitary living conditions. Together, these examples from US history highlight the enduring association between incarcer-

ation and health across time and place despite efforts by activists to reform correctional conditions that trigger poor health outcomes.

INCARCERATION, HEALTH INEQUALITY AND VULNERABILITY TO COVID-19

We argue that if incarceration is indeed a fundamental social cause of disease, we can expect that incarceration-exposed populations will experience greater health inequities compared to their non-exposed peers *during a pandemic* and these health inequities will operate through the four pathways illustrated by [Link and Phelan \(1995\)](#). COVID-19 provides a contemporary touchstone to contextualize how incarceration-exposed populations will face heightened vulnerabilities for poor health outcomes during a pandemic given its potency as a fundamental social cause of disease. We next illustrate the ways in which incarceration as a fundamental social cause of disease makes correctional populations more vulnerable to pandemics, including COVID-19, with reference to three focal areas: population factors, intramural factors and extramural factors.

Incarceration as a fundamental social cause for health inequities during the COVID-19 pandemic

Given that incarceration is related to multiple disease outcomes, including infectious disease, the COVID-19 pandemic is likely to disproportionately impact incarcerated populations. Data already supports this. In the United States—where rates of incarceration and COVID-19 exceed other countries—approximately 696 confirmed cases of COVID-19 per 100,000 in prisons have been reported, while community populations have approximately 250 confirmed cases per 100,000 ([Park et al. 2020](#)), although there is wide variation across states ([LeMasters et al. 2020](#)). Adjusting for age and sex distributions, the COVID-19 death rate in the US prison population exceeds the community death rate by three times ([Saloner et al. 2020](#)). Inequities in the levels of COVID-19 infection and mortality have been reported in other countries across all continents as well ([Brennan 2020](#); [Marmolejo et al. 2020](#); [Muntingh 2020](#); [Rapisarda and Byrne 2020a; 2020b; 2020c](#); [Rapisarda et al. 2020](#)).

Population factors

The COVID-19 pandemic underscores the ways incarceration is related to multiple risk factors for disease and death. Population factors, which we define as pre-existing health vulnerabilities that elevate risk for pandemic virus infection among IP are, therefore, important to consider. Incarceration-exposed groups suffer high rates of disease comorbidity, premature mortality and pre-existing health conditions, such as hypertension ([Massoglia 2008](#); [Wang et al. 2009](#)), respiratory illness/lung disease ([Wang and Green 2010](#)), diabetes ([Binswanger et al. 2009](#); [Rolling et al. 2019](#)) and obesity ([Houle 2014](#)). Importantly, research is beginning to reveal that these pre-existing conditions elevate the risk of infections and/or a more serious course of disease (and even fatality) due to COVID-19 ([Dietz and Santos-Burgoa 2020](#); [Fang et al. 2020](#)). In short, incarceration as a driver of disease and health disparities has resulted in a large swath of the population who, at baseline, are overwhelmingly and disproportionately physiologically ill-equipped to fight (and survive) the onslaught of COVID-19 transmission sweeping the globe.

Second, and relatedly, incarceration is linked to multiple risk factors that further exacerbate vulnerability to COVID-19. To illustrate, additional population factors, specifically socio-demographic features that tend to characterize incarceration-exposed populations (i.e. dispro-

portionately minority and low SES), are associated with higher risk of COVID-19 mortality (Millett *et al.* 2020), possibly due to ‘weathering’ (Geronimus *et al.* 2006), which may have consequences for incarcerated populations (Nowotny *et al.* 2021). Because those in correctional facilities are already deprived of liberty, further restrictive measures placed upon them in an attempt to contain infectious disease spread, including lockdowns and medical isolation (Cloud *et al.* 2020), may exacerbate stress (WHO 2020c). The elevated levels of stress exposure endured by IP are likely to increase their vulnerability to an infectious disease pandemic, including heightening the risk of mortality from COVID-19 infections via increases in cortisol levels (Tan *et al.* 2020). In sum, given its connection to various population risk factors for disease, incarceration represents a worrisome nexus at which multiple risk factors for vulnerability to COVID-19 intersect.

Intramural factors

Third, the structural features of incarceration block resources and knowledge from incarcerated populations to protect themselves from COVID-19. Intramural factors can be defined as policies that exist or originate within prison walls that increase vulnerability to pandemic viruses. COVID-19 spreads mainly through contact with respiratory droplets produced and propelled when an infected person coughs or sneezes, with the virus remaining viable in the air for up to 3 hours, and for up to 72 hours on hard surfaces, such as plastic and steel (WHO 2020d). As a result, the WHO recommends that people wash their hands frequently and thoroughly, use alcohol-based hand sanitizers when soap and water are unavailable and regularly disinfect frequently touched surfaces. Importantly, *these behaviours all require access to resources*. Yet, IP lack uninhibited access to soap, water, tissues, hand sanitizer and surface cleansers. This lack of supplies is in combination with being surrounded almost exclusively by hard surfaces that render viral droplets viable for longer periods of time.

Another fundamental resource to protect from disease in the case of COVID-19 and other communicable diseases is the ability to physically distance. However, intramural factors exist that force individuals to share bunks, toilets, showers, recreation spaces and eating areas, leaving them in close contact with others frequently and likely to be more vulnerable to the coronavirus disease (WHO 2020c). The UN High Commissioner (2020) Michelle Bachelet has called attention to this issue noting ‘in many countries, detention facilities are overcrowded, in some cases dangerously so. People are often held in unhygienic conditions and health services are inadequate or even non-existent. Physical distancing and self-isolation in such conditions are practically impossible’. Security searches provide another example as social distancing is not practical in those situations. Another intramural factor that amplifies population-level risk factors among incarcerated populations includes poor access to personal protective equipment. A recent study on correctional system responses to the pandemic in the United States found that access to masks and sanitation supplies varied widely across state prison systems, with some jurisdictions banning access to supplies altogether (Novisky *et al.* 2020). Incarcerated individuals also lack autonomy to decide when go to the emergency room for medical care. In the community, 70 per cent of adults with internet access rely on it as their primary health information source (Prestin *et al.* 2015). Yet, IP often have little to no access to the internet and other digital technologies (Reisdorf and Jewkes 2016), resulting in reduced abilities to independently learn about COVID-19, its impacts and what is being done to address it (Beaudry *et al.* 2020).

Extramural factors

Extramural factors, which we define as drivers of vulnerability that originate externally (outside of prison walls), combine with intramural factors to further amplify population-level risk factors among incarcerated populations and leave them more susceptible to viral infection.

One example involves the number of correctional staff who come in and out of facilities each day. In the United States, over 400,000 correctional staff enter and exit facilities daily as they begin their shifts and return home afterwards (Bureau of Labor Statistics 2020), as well as continuations of transfers between institutions, new admissions, delivery of goods by contractors (e.g. food services) and movement for court hearings and medical appointments. This regular filtering of people in and out of facilities is known as ‘prison churning’ (Siva 2020). Yet another extramural factor involves the lack of mass testing among incarcerated residents and staff (Aspinwall and Neff 2020; Novisky *et al.* 2020). Not having access to testing as a resource means that many IP cannot definitively know whether they (and those around them) have contracted the virus. In combination, the lack of infection prevention and control measures render the spread of COVID-19 virtually impossible to contain upon entry into these facilities (WHO 2020c). Those living in correctional facilities are bounded in their abilities to mitigate social contact-driven risks for COVID-19 based on their exposure to both intramural and extramural factors.

In many respects, resource deprivation associated with intramural and extramural factors follows IP upon re-entry into the community in ways that can have significant implications for the spread of and susceptibility to COVID-19. Formerly IP often face significant challenges in obtaining stable, non-hazardous housing arrangements (Harding *et al.* 2013), which renders individuals vulnerable to a variety of illnesses and diseases (Aldridge *et al.* 2018). Perhaps one of the most important health resources for formerly IP in the fight against COVID-19 is a coordinated response to comprehensive health care and health services. Yet, formerly IP face barriers in acquiring continuous health care coverage and accessing quality health care services in their communities (Wallace *et al.* 2015). Indeed, recent evidence suggests COVID-19 is not impacting all communities equally; rather, communities that are disproportionately racial/ethnic minority and suffer from structural marginalization in terms of inadequate health care access, housing density and unstable housing, high unemployment and pervasive discrimination are hit the hardest (Millet *et al.* 2020). Unfortunately, these are the types of neighbourhoods that many formerly IP return to, making incarceration-exposed populations among the most vulnerable to the health impacts of COVID-19.

Finally, because the association between incarceration and health is reproduced across time and space, we must emphasize that the health disparities we have articulated here are not exclusive to the COVID-19 pandemic but in many respects can be generalized to other infectious disease pandemics. During past disease outbreaks, such as H1N1 in 2009 (Guthrie *et al.* 2012) and the Influenza outbreak in 1918 (Stanley 1919), prisons and jails were especially hard hit and had limited resources to respond. Absent structural changes that alter incarceration as a fundamental social cause for health inequities, we expect that incarcerated populations will remain acutely vulnerable in the presence of other pandemics, epidemics and infectious disease outbreaks *across space and time*. The COVID-19 pandemic serves as but one, albeit timely, example of how any advancements in medical technology are unlikely to be equally distributed to carceral populations, leaving them vulnerable to health disparities not only in the middle of an outbreak but also over time (Weiss *et al.* 2018). Experts in many countries have called for people in prisons to be prioritized in COVID-19 vaccination plans (Siva 2020), yet limited data exist on the number of vaccines distributed to incarcerated populations. This is especially concerning considering that diminished access to vaccines among IP was also the case during the 1968 H3N2 and the 2009 H1N1 influenza outbreaks (Beaudry *et al.* 2020; Lee *et al.* 2012). In the United States, most state prison systems have not even released plans for vaccinating incarcerated residents (COVID Prison Project 2021b). As for global guidance, the WHO has yet to publish guidelines for when prison populations should be vaccinated.

FUTURE RESEARCH AND POLICY

Historical evidence demonstrates that prisons have been epicentres for infectious disease outbreaks during past pandemics (Bick 2007). While there is limited data pertaining to COVID-19 spread in prisons globally, existing evidence suggests that the pandemic has disproportionately impacted those in correctional facilities across nearly every region of the world (Nowotny and Piquero 2020). Taken together, this evidence from historical infectious disease outbreaks, coupled with emerging evidence of the disproportionate spread and harm of COVID-19 in correctional facilities across the world, suggests that prisons are a fundamental social cause of health inequities during COVID-19. Although more data are needed to test this hypothesis, our study offers value by proposing a unifying theoretical framework to guide future research and policy practices that are yoked to applications of the fundamental social causes theory.

Given that COVID-19 outbreaks ebb and flow in severity, theory testing should ideally occur at the end of the pandemic and as more robust data sets become available. Furthermore, we caution that our thesis of incarceration being a fundamental social cause of health inequities (particularly during the pandemic) may be exaggerated in the United States compared to some other countries, especially countries with smaller incarcerated populations and more humane conditions of confinement, such as New Zealand (Murray and Kras 2020). To explore this possibility, it is critical that empirical testing of our thesis include comparative, international approaches when appropriate data become available. In the space that remains, we highlight several policy areas that any future applications of incarceration as a fundamental social cause of health inequalities should consider in light of COVID-19.

De-carceration

During the present time of public health crisis, prisons and jails are subjected to exceedingly high levels of infection and risk of infection (Kinner *et al.* 2020). This is particularly the case in overcrowded prison systems, such as Italy (Cingolani *et al.* 2020), the United Kingdom (Brennan 2020) and Brazil (Ribeiro and Diniz 2020). Recent evidence from the United States suggests that prison overcrowding is linked to higher rates of COVID-19 disease outbreak and high death profile (Vest *et al.* 2021). Therefore, it is vital that de-carceration be considered as the first avenue for mitigating the spread of COVID-19 among IP and staff. De-carceration can take several forms; however, to both ensure public safety and minimize the mortality rate of IP, there is likely some wisdom in prioritizing de-carceration for older and/or infirm persons, those nearing release and those convicted of non-violent crimes (Beaudry *et al.* 2020; Franco-Paredes *et al.* 2021). Such efforts will aid in the practicalities of implementing public health guidelines both pre- and post-release.

Health measures inside facilities

First, respiratory disease transmission can be reduced through the implementation of hygiene and cough etiquette training programs (Bick 2007). These programs provide education to both incarcerated populations and correctional staff regarding the importance of covering one's mouth and nose when coughing or sneezing, as well as performing hand hygiene in accordance with WHO guidelines following contact with respiratory secretions. To ensure compliance with hygiene/cough etiquette programs, correctional facilities will need to stock facilities with adequate supplies, including tissues and masks for incarcerated residents and correctional staff, as well as ensuring that antiseptic hand wash is liberally distributed and soap is available at all sinks. Where sinks are not available, correctional facilities can provide hand-sanitizing wipes.

Second, adequate planning and preparation for how to respond to future infectious disease pandemics will be vital for ensuring that correctional facilities have a clear plan in place ahead

of time. To ensure adequate planning efforts, correctional facilities should develop a pandemic influenza preparedness and response plan in accordance with guidelines from public health experts, such as the [Department of Health and Human Services \(2007\)](#) pandemic planning checklist for correctional facilities or [WHO \(2020e\)](#) guidelines to evaluate preparedness, prevention and control of COVID-19 in prisons. Aside from drafting a preparedness plan consisting of specific guidelines, correctional agencies should also develop interagency agreements ([Beaudry et al. 2020](#)) and coordinate with other key stakeholders (e.g. law enforcement agencies, state and local health agencies and local hospitals) to confer what resources will be needed, learn how other agencies will plan to respond during a pandemic and ensure that correctional facilities have adequate access to testing and personal protective equipment ([Maruschak et al. 2009](#); [Spaulding et al. 2009](#)). Ideally, such a coordination can result in training exercises between public health and criminal justice professionals to ensure adequate preparedness ([Schwartz 2008](#)).

Third, proper coordination across multiple societal sectors will be important for coordinating an appropriate response. In many countries, the health care of those in correctional facilities is held by government officials in justice/internal affairs rather than health officials. Thus, facilitating coordination between health and justice sectors are critical to formulating a proper response and protecting the health of correctional facility residents and the broader community ([WHO 2020c](#)). Effectively preparing correctional medical personal will require a multipronged strategy that focuses on both enhancing training for infectious disease detection and mitigation efforts, implementing procedures to effectively communicate these strategies with IP and skillfully addressing medical/institutional distrust ([Puglisi et al. 2017](#)).

Fourth, at the first signs of an infectious disease outbreak, rapid testing must be deployed, and once an outbreak is confirmed, daily surveillance testing and contact tracing should continue through the confirmed end of the disease outbreak ([Bick 2007](#)). At the onset of an expected outbreak, facilities can limit the spread of the disease by restraining movement throughout the facility, including suspending all movement in and out of an infectious or suspected infection area. To reduce the spread of infectious disease after an outbreak has begun, suspected or confirmed cases should be housed in separate cells or isolated sections of facilities through the ethical use of medical isolation, not solitary confinement ([Cloud et al. 2020](#)). Likewise, at the first sign of an outbreak either in a correctional facility or the general population, prisons and jails should move to replace in-person visitations (with friends, family and legal representatives) with teleconferencing services or other communication services as supported by the technology infrastructure of the correctional facility ([Akiyama et al. 2020](#)). Of course, national and local efforts must also be in place to ensure IP have timely access to vaccination ([Beaudry et al. 2020](#)).

Re-entry

As noted previously, formerly IP are subject to a host of reintegration barriers, many of which involve blocked access to fundamental resources that promote health and could (in some cases) prevent or minimize the spread of the disease (e.g. coordinated health care and housing). Given the risk of fundamental resource deprivation and stigma upon re-entry into the community, particularly for people of colour, the poor and the disenfranchised, it is vital that robust community resources be precipitously developed to combat the spread of infectious diseases (such as COVID-19). Research on the transition of care for formerly IP suffering from other infectious diseases (e.g. HIV) suggests that care can become inadequate as other basic needs (e.g. housing and employment) are prioritized over the receipt of needed medical care ([Dennis et al. 2016](#)). Thus, integrating correctional and community health care for formerly IP in a way that ensures continuity of care is essential during this public health crisis ([Patel et al. 2014](#)).

Furthermore, the collateral benefits of providing access to other basic, fundamental resources related to housing, food and employment must also be seriously considered during this time of crisis as, collectively, extant research suggests that providing such provisions could minimize stress and free up the mental energy and time for formerly IP to invest in treatment and preventive care. Additionally, at a logistical level, providing safe, stable housing in which the formerly incarcerated (many of whom may be infected upon release) can quarantine is essential to protecting the health of the broader community to which these formerly IP will return (Tsai and Wilson 2020; WHO 2020c).

CONCLUSION

It is not mere hyperbole to suggest that the COVID-19 era is altering the social fabric in profound ways that are yet to be fully understood. Against this backdrop, we argue that fundamental social cause theory provides a rich sociological account of incarceration as a major social driver of poor health and disease in vulnerable populations. Using this lens allows for several coherently aligned policies and practices that can attenuate the health disparities and inequities engendered by incarceration and amplified by the COVID-19 pandemic. As such, the fundamental social causes view advanced here is parsimonious, possessing both explanatory power for necessary future research and ameliorative capacity.

REFERENCES

- Akiyama, M. J., Anne, C. S., and Josiah, D. R. (2020), 'Flattening the Curve for Incarcerated Populations—Covid-19 in Jails and Prisons', *New England Journal of Medicine*, 382: 2075–7. doi: [10.1056/NEJMp2005687](https://doi.org/10.1056/NEJMp2005687).
- Aldridge, R. W., Story, A., Hwang, S. W., Nordentoft, M., Luchenski, S. A., Hartwell, G., Tweed, E. J., Lewer, D., Katikireddi, S. V. and Hayward, A. C. (2018), 'Morbidity and Mortality in Homeless Individuals, Prisoners, Sex Workers, and Individuals with Substance Use Disorders in High-Income Countries: A Systematic Review and Meta-Analysis', *The Lancet*, 391: 241–50.
- Alexander, M. (2010), *The New Jim Crow: Mass Incarceration in the Age of Colorblindness*. The New Press.
- Aspinwall, C. and Neff, J. (2020), *These Prisons Are Doing Mass Testing for COVID-19—And Finding Mass Infections*. The Marshall Project.
- Bailey, Z. D., Krieger, N., Agénor, M., Graves, J., Linos, N. and Bassett, M. T. (2017), 'Structural Racism and Health Inequities in the USA: Evidence and Interventions', *The Lancet*, 389: P1453–63.
- Bauer, S. (2018), *American Prison: A Reporter's Undercover Journey into the Business of Punishment*. Penguin Press.
- Beaudry, G., Zhong, S., Whiting, D., Javid, B., Frater, J. and Fazel, S. (2020), 'Managing Outbreaks of Highly Contagious Diseases in Prisons: A Systematic Review', *BMJ Global Health*, 5: e003201.
- Bick, J. A. (2007), 'Infection Control in Jails and Prisons', *Clinical Infectious Diseases*, 45: 1047–055.
- Bin, Y., Steptoe, A., Chen, L.-J., Chen, Y.-H., Lin, C.-H. and Ku, P.-W. (2020), 'Social Isolation, Loneliness, and All-Cause Mortality in Patients with Cardiovascular Disease: A 10 Year Follow Up Study', *Psychosomatic Medicine*, 82: 208–14.
- Binswanger, I. A., Krueger, P. M. and Steiner, J. F. (2009), 'Prevalence of Chronic Medical Conditions among Jail and Prison Inmates in the USA Compared With the General Population', *Journal of Epidemiological Community Health*, 63: 912–9.
- Biswas, A., Oh, P. I., Faulkner, G. E., Bajaj, R. R., Silver, M. A., Mitchell, M. S. and Alter, D.A. (2015), 'Sedentary Time and Its Association With Risk for Disease Incidence, Mortality, and Hospitalization in Adults: A Systematic Review and Meta-Analysis', *Annals of Internal Medicine*, 162: 123–32.
- Brennan, P. K. (2020), 'Responses Taken to Mitigate COVID-19 in Prisons in England and Wales', *Victims & Offenders* 15: 1215–33.
- Brinkley-Rubinstein, L. (2013), 'Incarceration as a Catalyst for Worsening Health', *Health & Justice*, 1: 3.
- Bureau of Labor Statistics (2020), 'Occupational Employment and Wages, May 2019: 33–3012 Correctional Officers and Jailers', available online at <http://www.bls.gov/oes/current/oes333012.htm>. Accessed 13 May 2020.

- Cingolani, M., Caraceni, L., Cannovo, N. and Piorgiorgio, F. (2020), 'The COVID-19 Epidemic and the Prison System in Italy', *Journal of Correctional Health Care*, doi: [10.1177/1078345820929733](https://doi.org/10.1177/1078345820929733).
- Cloud, D. H., Ahalt, C., Augustine, D., Sears, D. and Williams, B. (2020), 'Medical Isolation and Solitary Confinement: Balancing Health and Humanity in U.S. Jails and Prisons During COVID-19', *Journal of General Internal Medicine*, 35: 2738–42.
- COVID Prison Project (2021a), 'National Coronavirus Statistics', available online at <https://covidprisonproject.com/data/data-v2/>. Accessed 29 January 2021.
- (2021b), 'COVID-19 Vaccine Doses', available online at <https://covidprisonproject.com/covid-vaccine-doses/>. Accessed 16 January 2021.
- Daza, S., Palloni, A. and Jones, J. (2020), 'The Consequences of Incarceration for Mortality in the United States', *Demography*, 57: 577–98.
- Dennis, A. C., Barrington, C., Hino, S., Gould, M., Wohl, D. and Golin, C. E. (2016), 'You're in a World of Chaos: Experiences Accessing HIV Care and Adhering to Medications After Incarceration', *Journal of the Association of Nurses in AIDS Care*, 26: 542–55.
- Department of Health and Human Services (2007), 'Correctional Facilities Pandemic Influenza Planning Checklist', available online at <https://www.cdc.gov/flu/pandemic-resources/pdf/correctionchecklist.pdf>. Accessed 13 May 2020.
- Dickens, C. (1913 [1842]), *American Notes for General Circulation*. Chapman & Hall, Ltd. Available online at <https://www.gutenberg.org/files/675/675-h/675-h.htm>. Accessed 1 July 2020.
- Dietz, W. and Santos-Burgoa, C. (2020), 'Obesity and its Implications for COVID-19 Mortality', *Obesity*, doi: [10.1002/oby.22818](https://doi.org/10.1002/oby.22818).
- Fang, L., Karakioulakis, G. and Roth, M. (2020), 'Are Patients with Hypertension and Diabetes Mellitus at Increased Risk for COVID-19 Infection?', *The Lancet: Respiratory Medicine*, 8: e21.
- Fazel, S. and Baillargeon, J. (2011), 'The Health of Prisoners', *The Lancet*, 377: 956–65.
- Franco-Paredes, C., Ghandnoosh, N., Latif, H., Krsak, M., Henao-Martinez, A. F., Robins, M., Barahona, L. V. and Poeschla, E. M. (2021), 'Decarceration and Community Re-entry in the COVID-19 Era', *The Lancet Infectious Diseases*, 21: e11–16.
- Geronimus, A. T., Hicken, M., Keene, D. and Bound, J. (2006), 'Weathering and Age Patterns of Allostatic Load Scores among Blacks and Whites in the United States', *American Journal of Public Health*, 96: 826–33.
- Goffman, E. (1963), *Stigma: Notes on the Management of Spoiled Identity*. Prentice-Hall.
- Guthrie, J. A., Lokuge, K. M. and Levy, M. H. (2012), 'Influenza Control Can Be Achieved in a Custodial Setting: Pandemic (H1N1) 2009 and 2011 in an Australian Prison', *Public Health*, 126: 1032–037.
- Hammond, S. K. and Emmons, K. M. (2005), 'Inmate Exposure to Secondhand Smoke in Correctional Facilities and the Impact of Smoking Restrictions', *Journal of Exposure Science & Environmental Epidemiology*, 15: 205–11.
- Haney, C. (2018), 'Restricting the Use of Solitary Confinement', *Annual Review of Criminology*, 1: 285–310.
- Harding, D. J., Morenoff, J. D. and Herbert, C. W. (2013), 'Home is Hard to Find: Neighborhoods, Institutions, and the Residential Trajectories of Returning Prisoners', *The ANNALS of the American Academy of Political and Social Science*, 647: 214–36.
- Hatzenbuehler, M. L., Phelan, J. C. and Link, B. G. (2013), 'Stigma as a Fundamental Cause of Population Health Inequalities', *American Journal of Public Health*, 103: 813–21.
- Haynie, D. L., Whichard, C., Kreager, D. A., Schaefer, D. R. and Wakefield, S. (2018), 'Social Networks and Health in a Prison Unit', *Journal of Health and Social Behavior*, 59: 318–34.
- Houle, B. (2014), 'The Effect of Incarceration on Adult Male BMI Trajectories, USA, 1981–2006', *Journal of Racial and Ethnic Health Disparities*, 1: 21–8.
- Kaufman, M. T. (1971), 'Attica Demands Presented to Correction Chief in July', available online at <https://www.nytimes.com/1971/09/19/archives/attica-demands-presented-to-correction-chief-in-july.html>. Accessed 19 September 1971.
- Kinner, S. A., Young, J., Snow, K., Southalan, L., Lopez-Acuña, D., Ferreira-Borges, C. and O'Moore, E. (2020), 'Prisons and Custodial Settings are Part of a Comprehensive Response to COVID-19', *The Lancet Public Health*, 5: e188–9.
- Lee, A. S., Berendes, D. M., Seib, K.G., Whitney, E. A. S., Berkelman, R. L., Omer, S. B., Spaulding, A. C., Chavez, R. S. and Meyer, P. L. (2012), 'Receipt of A (H1N1)pdm09 Vaccine by Prisons and Jails—United States, 2009–10 Influenza Season', *Morbidity and Mortality Weekly Report*, 60: 1737–40.
- LeMasters, K., McCauley, E., Nowotny, K. and Brinkley-Rubinstein, L. (2020), 'COVID-19 Cases and Testing in 53 Prison Systems', *Health & Justice*, 8: 24.
- Liebling, A. (1995), 'Vulnerability and Prison Suicide', *The British Journal of Criminology*, 35: 173–87.

- Link, B. G. and Phelan, J. (1995), 'Social Conditions as Fundamental Causes of Disease', *Journal of Health and Social Behavior*, 35: 80–94.
- Loeb, S. J., Steffensmeier, D. and Lawrence, F. (2008), 'Comparing Incarcerated and Community-Dwelling Older Men's Health', *Western Journal of Nursing Research*, 30: 234–49.
- Mackenbach, J. P., Kulhánová, I., Bopp, M., Deboosere, P., Eikemo, T. A., Hoffmann, R., Kulik, M. C., Leinsalu, M., Martikainen, P., Menvielle, G., Regidor, E., Wojtyniak, B., Östergren, O. and Lundberg, O. (2015), 'Variations in the Relation between Education and Cause-Specific Mortality in 19 European Populations: A Test of the "Fundamental Causes" Theory of Social Inequalities in Health', *Social Science & Medicine*, 127: 51–62.
- Magee, C. G., Hult, J. R., Turalba, R. and McMillan, S. (2005), 'Preventive Care for Women in Prison: A Qualitative Community Health Assessment of the Papanicolaou Test and Follow-Up Treatment at a California State Women's Prison', *American Journal of Public Health*, 95: 1712–17.
- Marmolejo, L., Barberi, D., Bergman, M., Espinoza, O. and Gustavo F. (2020), 'Responding to COVID-19 in Latin American Prisons: The Cases of Argentina, Chile, Colombia, and Mexico', *Victims & Offenders*, 15: 1062–085.
- Marmot, M. (2004), *The Status Syndrome: How Social Standing Affects Our Health and Longevity*. Henry Holt and Company.
- Maruschak, L. M., Sabol, W. J., Potter, R. H., Reid, L. C. and Cramer, E. W. (2009), 'Pandemic Influenza and Jail Facilities and Populations', *American Journal of Public Health*, 99: S339–44.
- Massoglia, M. (2008), 'Incarceration as Exposure: The Prison, Infectious Disease, and Other Stress-Related Illnesses', *Journal of Health and Social Behavior*, 49: 56–71.
- Massoglia, M. and Remster, B. (2019), 'Linkages Between Incarceration and Health', *Public Health Reports*, 134: 8S–14S.
- Massoglia, M., Remster, B. and King, R. D. (2011), 'Stigma or Separation? Understanding the Incarceration-Divorce Relationship', *Social Forces*, 90: 133–55.
- Masters, R. K., Link, B. G. and Phelan, J. C. (2015), 'Trends in Education Gradients of "Preventable" Mortality: A Test of Fundamental Cause Theory', *Social Science & Medicine*, 127: 19–28.
- Millett, G. A., Jones, A. T., Benkeser, D., Baral, S., Mercer, L., Beyrer, C., Honermann, B., Lankiewicz, E., Mena, L., Crowley, J. S., Sherwood, J. and Sullivan, P. (2020), 'Assessing Differential Impacts of COVID-19 on Black Communities', *Annals of Epidemiology*, 47: 37–44. doi: [10.1016/j.annepidem.2020.05.003](https://doi.org/10.1016/j.annepidem.2020.05.003).
- Muntingh, L. M. (2020), 'Africa, Prisons and COVID-19', *Journal of Human Rights Practice*, 12: 284–92.
- Murray, L. J. and Kras, K. R. (2020), 'We Must Go Hard and We Must Go Early: How New Zealand Halted Coronavirus in the Community and Corrections', *Victims & Offenders*, 15: 1385–95.
- Novisky, M. A. (2018), 'Avoiding the Runaround: The Link Between Cultural Health Capital and Health Management Among Older Prisoners', *Criminology*, 56: 643–78.
- Novisky, M. A., Narvey, C. S. and Semenza, D. C. (2020), 'Institutional Responses to the COVID-19 Pandemic in American Prisons', *Victims & Offenders*, 15: 1244–61.
- Novisky, M. A. and Peralta, R. L. (2020), 'Gladiator School: Returning Citizens' Experiences with Secondary Violence Exposure in Prison', *Victims & Offenders*, 15: 594–618.
- Nowotny, K. M., Bailey, Z. and Brinkley-Rubinstein, L. (2021), 'The Contribution of Prisons and Jails to U.S. Racial Disparities', *American Journal of Public Health*, 111: 197–9. doi: [10.2105/AJPH.2020.306040](https://doi.org/10.2105/AJPH.2020.306040).
- Nowotny, K. M. and Kuptsevych-Timmer, A. (2018), 'Health and Justice: Framing Incarceration as a Social Determinant of Health for Black Men in the United States', *Sociology Compass*, 12: e12566.
- Nowotny, K. M. and Piquero, A. R. (2020), 'The Global Impact of the Pandemic on Institutional and Community Corrections: Assessing Short-Term Crisis Management and Long-term Change Strategies', *Victims & Offenders*, 15: 839–47.
- Nwosu, B. U., Maranda, L., Berry, R., Colocino, B., Flores Sr, C. D., Folkman, K., Groblewski, T. and Ruze, P. (2014), 'The Vitamin D Status of Prison Inmates', *PLoS One*, 9: e90623.
- Pager, D. (2003), 'The Mark of a Criminal Record', *American Journal of Sociology*, 108: 937–75.
- Park, K., Meagher, T. and Li, W. (2020), 'Tracking the Spread of Coronavirus in Prisons', available online at <https://www.themarshallproject.org/2020/04/24/tracking-the-spread-of-coronavirus-in-prisons>. Accessed 31 January 2021.
- Patel, K., Boutwell, A., Brockmann, B. W. and Rich, J. D. (2014), 'Integrating Correctional and Community Health Care For Formerly Incarcerated People Who Are Eligible For Medicaid', *Health Affairs*, 33: 468–73.
- Patterson, E. J. (2010), 'Incarcerating Death: Mortality in U.S. State Correctional Facilities, 1985–1998', *Demography*, 47: 587–607.

- (2013), 'The Dose-Response of Time Served in Prison on Mortality: New York State, 1989-2003', *American Journal of Public Health*, 103: 523-8.
- Pearlin, L. I. (1989), 'The Sociological Study of Stress', *Journal of Health and Social Behavior*, 30: 241-56.
- Pearlin, L. I., Schieman, S., Fazio, E. M. and Meersma, S. C. (2005), 'Stress, Health, and the Life Course: Some Conceptual Perspectives', *Journal of Health and Social Behavior*, 46: 205-19.
- Phelan, J. C. and Link, B. G. (2005), 'Controlling Disease and Creating Disparities: A Fundamental Cause Perspective', *The Journals of Gerontology Series B* 60, 60: S27-S33.
- (2015), 'Is Racism a Fundamental Cause of Inequalities in Health?' *Annual Review of Sociology*, 41: 311-30.
- Phelan, J. C., Link, B. G., Diez-Roux, A., Kawachi, I. and Levin, B. (2004), 'Fundamental Causes of Social Inequalities in Mortality: A Test of the Theory', *Journal of Health and Social Behavior*, 45: 265-85.
- Phelan, J. C., Link, B. G. and Tehranifar, P. (2010), 'Social Conditions as Fundamental Causes of Health Inequalities: Theory, Evidence, and Policy Implications', *Journal of Health and Social Behavior*, 51(1_ suppl): S28-S40.
- Pirtle, W. N. (2020), "Racial Capitalism: A Fundamental Cause of Novel Coronavirus (COVID-19) Pandemic Inequities in the United States". *Health Education & Behavior*, 44: 504-8.
- Porter, L. C. (2014), 'Incarceration and Post-Release Health Behavior', *Journal of Health and Social Behavior*, 55: 234-49.
- Porter, L. C. and DeMarco, L. M. (2019), 'Beyond the Dichotomy: Incarceration Dosage and Mental Health', *Criminology*, 57: 136-56.
- Prestin, A., Vieux, S. N. and Chou, W.-Y. S. (2015), 'Is Online Health Activity Alive and Well or Flatlining? Findings From 10 Years of the Health Information National Trends Survey', *Journal of Health Communication*, 20: 790-8.
- Puglisi, L., Calderon, J. P. and Wang, E. A. (2017), 'What Does Health Justice Look Like for People Returning from Incarceration?', *AMA Journal of Ethics*, 19: 903-10.
- Rapisarda, S. S. and Byrne, J. M. (2020a), 'The Impact of COVID-19 Outbreaks in the Prisons, Jails, and Community Corrections Systems Throughout Europe', *Victims & Offenders*, 15: 1105-12.
- (2020b), 'An Examination of COVID-19 Outbreaks in Prisons and Jails Throughout Asia', *Victims & Offenders* 15: 948-58.
- (2020c), 'An Examination of COVID-19 Outbreaks in Prisons and Jails in Oceania', *Victims & Offenders*, 15: 1361-6.
- Rapisarda, S. S., Byrne, J. and Marmolejo, L. (2020), 'An Examination of COVID-19 Outbreaks in Prisons and Jails in North America, Central America, and the Caribbean', *Victims & Offenders*, 15: 1234-43.
- Reisdorf, B. C. and Jewkes, Y. (2016), '(B)Locked Sites: Cases of Internet Use in Three British Prisons', *Information, Communication & Society*, 19: 771-86.
- Remen, T., Pintos, J., Abrahamowicz, M. and Siemiatycki, J. (2018), 'Risk of Lung Cancer in Relation to Various Metrics of Smoking History: A Case-Control Study in Montreal', *BMC Cancer*, 18: 1-12.
- Ribeiro, L. and Diniz, A. M. A. (2020), 'The Brazilian Penitentiary System Under the Threat of COVID-19', *Victims & Offenders*, 15: 1019-043.
- Roberts, D. E. (2004), 'The Social and Moral Costs of Mass Incarceration in African American Communities', *Stanford Law Review*, 56: 1271-305.
- Rolling, C. A., Vaughn, M. G., Velez, D., Jackson, D. B., Holzer, K. J., Jaegers, L. and Boutwell, B. B. (2019), 'Prevalence and Correlates of Diabetes Among Criminal Justice-Involved Individuals in the United States', *Annals of Epidemiology*, 36: 55-61.
- Rosen, D. L., Schoenbach, V. J. and Wohl, D. A. (2008), 'All-Cause and Cause-Specific Mortality Among Men Released from State Prison, 1980-2005', *American Journal of Public Health*, 98: 2278-84.
- Roxburgh, S. (2009), 'Untangling Inequalities: Gender, Race, and Socioeconomic Differences in Depression', *Sociological Forum*, 24: 357-81.
- Saloner, B., Parish, K., Ward, J. A., DiLaura, G. and Dolovich, S. 2020. 'COVID-19 Cases and Deaths in Federal and State Prisons', *JAMA*, 324: 602-3. doi: [10.1001/jama.2020.12528](https://doi.org/10.1001/jama.2020.12528).
- Sapolsky, R. M. (2004), 'Social Status and Health in Humans and Other Animals', *Annual Review of Anthropology*, 33: 393-418.
- Schnittker, J., Massoglia, M. and Uggen, C. (2011), 'Incarceration and the Health of the African American Community', *Du Bois Review: Social Science Research on Race*, 8: 133-41.
- Schwartz, R. D. (2008), 'The Impact of Correctional Institutions on Public Health During a Pandemic or Emerging Infection Disaster', *American Journal of Disaster Medicine*, 3: 165-70.

- Semenza, D. C. and Link, N. W. (2019), 'How Does Reentry Get Under the Skin? Cumulative Reintegration Barriers and Health in a Sample of Recently Incarcerated Men', *Social Science & Medicine*, 243: 112618.
- Siva, N. (2020), 'Experts Call to Include Prisons in COVID-19 Vaccine Plans', *The Lancet*, 396: 1870.
- Spaulding, A. C., McCallum, V. A., Walker, D. Reeves, A. Drenzek, C., Lewis, S., Bailey, E., Buehler, J. W., Spotts Whitney, E. A. and Berkelman, R. L. 2009. 'How Public Health and Prisons Can Partner for Pandemic Influenza Preparedness: A Report from Georgia', *Journal of Correctional Health Care*, 15: 118–28.
- Spaulding, A. C., Seals, R. M., McCallum, V. A., Perez, S. D., Brzozowski, A. K. and Kyle Steenland, N. (2011), 'Prisoner Survival Inside and Outside of the Institution: Implications for Health-Care Planning', *American Journal of Epidemiology*, 173: 479–87.
- Stanley, L. L. (1919), 'Influenza at San Quentin Prison, California', *Public Health Reports 1896–1970*, 34: 996–1008.
- Sun, S., Crooks, N., Kemnitz, R. and Westergaard, R. P. (2018), 'Re-entry Experiences of Black Men Living with HIV/AIDS After Release from Prison: Intersectionality and Implications for Care', *Social Science & Medicine*, 211: 78–86.
- Sykes, G. E. (1958), *The Society of Captives*. Princeton University Press.
- Tan, T., Khoo, B., Mills, E. G., Phylactou, M., Patel, B., Eng, P. C., Thurston, L., Muzi, B., Meeran, K., Prevost, A. T., Comminos, A. N., Abbara, A. and Dhillon, W. S. (2020), 'Association Between High Serum Total Cortisol Concentrations and Mortality From COVID-19', *The Lancet Diabetes & Endocrinology*, 8: 659–60.
- Testa, A. and Fahmy, C. (2020), 'Oral Health Status and Oral Health Care Use Among Formerly Incarcerated People', *The Journal of the American Dental Association*, 151: 164–73.
- Testa, A. and Jackson, D. B. (2019), 'Food Insecurity Among Formerly Incarcerated Adults', *Criminal Justice and Behavior*, 46: 1493–511.
- Testa, A. and Porter, L. C. (2017), 'No Rest for the Wicked? The Consequences of Incarceration for Sleep Problems', *Society and Mental Health*, 7: 196–208.
- Testa, A., Santos, M. R. and Weiss, D. B. (2020), 'Incarceration Rates and Hospital Beds Per Capita: A Cross-national Study of 36 Countries, 1971–2015', *Social Science & Medicine*, 263: 113262.
- Thomas, J. C. (2006), 'From Slavery to Incarceration: Social Forces Affecting the Epidemiology of Sexually Transmitted Diseases in the Rural South', *Sexually Transmitted Diseases*, 33: S6–S10.
- Tsai, J. and Wilson, M. (2020), 'COVID-19: A Potential Public Health Problem for Homeless Populations', *The Lancet Public Health*, 5: e186–7
- Turney, K., Lee, H. and Comfort, M. (2013), 'Discrimination and Psychological Distress Among Recently Released Male Prisoners', *American Journal of Men's Health*, 7: 482–93.
- Turney, K., Wildeman, C. and Schnittker, J. (2012), 'As Fathers and Felons: Explaining the Effects of Current and Recent Incarceration on Major Depression', *Journal of Health and Social Behavior*, 53: 465–81.
- Tyler, E. T. and Brockmann, B. (2017), 'Returning Home: Incarceration, Reentry, Stigma and the Perpetuation of Racial and Socioeconomic Health Inequity', *The Journal of Law, Medicine & Ethics*, 45: 545–57.
- Uggen, C. and Manza, J. (2002), 'Democratic Contraction? Political Consequences of Felon Disenfranchisement in the United States', *American Sociological Review*, 67: 777–803.
- Umberson, D., Crosnoe, R. and Reczek, C. (2010), 'Social Relationships and Health Behavior Across the Life Course', *Annual Review of Sociology*, 36: 139–57.
- UN High Commissioner (2020), 'Urgent Action Needed to Prevent COVID-19 Rampaging Through Places of Detention', available online at <https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=25745>. Accessed 25 March 2021.
- UN News (2011), 'Solitary Confinement Should be Banned in Most Cases, UN Expert Says', available online at <https://news.un.org/en/story/2011/10/392012-solitary-confinement-should-be-banned-most-cases-un-expert-says>. Accessed 31 January 2021.
- Vest, N., Johnson, O., Nowotny, K. and Brinkley-Rubinstein, L. (2021), Prison Population Reductions and COVID-19: A Latent Profile Analysis Synthesizing Recent Evidence from the Texas State Prison System', *Journal of Urban Health*, 98:53–58.
- Visher, C. A., LaVigne, N. G. and Travis, J. (2004), *Returning Home: Understanding the Challenges of Prisoner Reentry. Maryland Pilot Study, Findings from Baltimore*. Urban Institute, Justice Policy Center.
- Wakefield, S. and Uggen, C. (2010), 'Incarceration and Stratification', *Annual Review of Sociology*, 36: 387–406.
- Wallace, D., Eason, J. M. and Lindsey, A. M. (2015), 'The Influence of Incarceration and Re-entry on the Availability of Health Care Organizations in Arkansas', *Health & Justice*, 3: 3.

- Wang, E. A. and Green, J. (2010), 'Incarceration as a Key Variable in Racial Disparities of Asthma Prevalence', *BMC Public Health*, 10: 290.
- Wang, E. A., Pletcher, M., Lin, F., Vittinghoff, E., Kertesz, S. G., Kiefe, C. I. and Bibbins-Domingo, K. (2009), 'Incarceration, Incident Hypertension, and Access to Health Care: Findings from the Coronary Artery Risk Development in Young Adults (CARDIA) Study', *Archives of Internal Medicine*, 169: 687–93.
- Weiss, D., Rydland, H. T., Øversveen, E., Jensen, M. R., Solhaug, S. and Krokstad, S. (2018), 'Innovative Technologies and Social Inequalities in Health: A Scoping Review of the Literature', *PLoS One*, 13: e019447.
- Western, B. and Simes, J. T. (2019), 'Drug Use in the Year After Prison', *Social Science & Medicine*, 235: 112357.
- Western, B. and Sirois, C. (2019), 'Racialized Re-entry: Labor Market Inequality After Incarceration', *Social Forces*, 97: 1517–42.
- Wildeman, C. and Muller, C. (2012), 'Mass Imprisonment and Inequality in Health and Family Life', *Annual Review of Law and Social Science*, 8: 11–30.
- Wildeman, C. and Wang, E. A. (2017), 'Mass Incarceration, Public Health, and Widening Inequality in the USA', *The Lancet*, 389: 1464–74.
- Williams, B. A., Ahalt, C., Cloud, D., Augustine, D., Rorvig, L. and Sears, D. (2020), 'Correctional Facilities in the Shadow of COVID-19: Unique Challenges and Proposed Solutions', available online at <https://www.healthaffairs.org/doi/10.1377/hblog20200324.784502/full/>. Accessed 13 May 2020.
- Williams, D. R., Yu, Y., Jackson, J. S. and Anderson, N. B. (1997), 'Racial Differences in Physical and Mental Health: Socio-economic Status, Stress, and Discrimination', *Journal of Health Psychology*, 2: 335–51.
- Wilper, A. P., Woolhandler, S., Boyd, W. J., Lasser, K. E., McCormick, D., Bor, D. H. and Himmelstein, D. U. (2009), 'The Health and Health Care of U.S. Prisoners: Results of a Nationwide Survey', *American Journal of Public Health*, 99: 666–72.
- Winkelman, T. N., Choi, H. J. and Davis, M. M. (2017), 'The Affordable Care Act, Insurance Coverage, and Health Care Utilization of Previously Incarcerated Young Men: 2008–2015', *American Journal of Public Health*, 107: 807–11.
- World Health Organization (2020a), 'WHO Director-General's Opening Remarks at the Media Briefing on COVID-19, 11 March 2020', available online at https://www.who.int/docs/default-source/coronaviruse/transcripts/who-audio-emergencies-coronavirus-press-conference-full-and-final-11mar2020.pdf?sfvrsn=cb432bb3_2. Accessed 5 June 2020.
- (2020b), 'UNODC, WHO, UNAIDS and OHCHR Joint Statement on COVID-19 in Prisons and Other Closed Settings', available online at <https://www.who.int/news/item/13-05-2020-unodc-who-un aids-and-ohchr-joint-statement-on-covid-19-in-prisons-and-other-closed-settings>. Accessed 13 May 2020.
- (2020c), 'Preparedness, Prevention and Control of COVID-19 in Prisons and Other Places of Detention: Interim Guidance 15 March 2020 (No. WHO/EURO: 2020-1405-41155-55954)', available online at <https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/technical-guidance/prevention-and-control-of-covid-19-in-prisons-and-other-places-of-detention>. Accessed 31 January 2021.
- (2020d), 'Modes of Transmission of Virus Causing COVID-19: Implications for IPC Precaution Recommendations: Scientific Brief, 27 March 2020', available online at <https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations>. Accessed 31 January 2021.
- (2020e), 'Checklist to Evaluate Preparedness, Prevention and Control of COVID-19 in Prisons and Other Places of Detention (No. WHO/EURO: 2020-1406-41156-55956)', available online at https://www.euro.who.int/__data/assets/pdf_file/0020/438041/Covid19-PrisonsChecklist-eng.pdf. Accessed 31 January 2021.
- (2021), 'WHO Coronavirus Disease (COVID-19) Dashboard', available online at <https://covid19.who.int/>. Accessed January 30, 2021.
- World Prison Brief (2018), 'World Prison Population List. 12th Edition', available online at https://www.prisonstudies.org/sites/default/files/resources/downloads/wppl_12.pdf. Accessed 13 May 2020.