



## America: Equity and Equality in Health 4

# Mass incarceration, public health, and widening inequality in the USA

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Lancet 2017; 389: 1464–74

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This is the fourth in a Series of five papers about equity and equality in health in the USA

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In this Series paper, we examine how mass incarceration shapes inequality in health. The USA is the world leader in incarceration, which disproportionately affects black populations. Nearly one in three black men will ever be imprisoned, and nearly half of black women currently have a family member or extended family member who is in prison. However, until recently the public health implications of mass incarceration were unclear. Most research in this area has focused on the health of current and former inmates, with findings suggesting that incarceration could produce some short-term improvements in physical health during imprisonment but has profoundly harmful effects on physical and mental health after release. The emerging literature on the family and community effects of mass incarceration points to negative health impacts on the female partners and children of incarcerated men, and raises concerns that excessive incarceration could harm entire communities and thus might partly underlie health disparities both in the USA and between the USA and other developed countries. Research into interventions, policies, and practices that could mitigate the harms of incarceration and the post-incarceration period is urgently needed, particularly studies using rigorous experimental or quasi-experimental designs.

### Introduction

In this Series paper, we review research into the effects of mass incarceration on health and health disparities within the USA and between the USA and other developed democracies. We first outline the contours

of mass incarceration. According to sociologist David Garland,<sup>1</sup> who first used a variant of the term mass incarceration, it entails historically and comparatively extreme levels of incarceration that are so heavily concentrated among some groups that incarceration has

### Search strategy and selection criteria

We strove to achieve a complete search of peer-reviewed articles and government-funded reports relating to incarceration and health. Because many of the journals that publish research on family and community effects of mass incarceration are not indexed by PubMed or PsychInfo, we first did a Google Scholar search for peer-reviewed articles and government-funded reports, including a host of specific health conditions (such as hepatitis, cardiovascular disease, and major depressive disorder), in addition to the terms “incarceration,” “imprisonment,” “jail,” and “prison” as our search terms. We then searched PubMed and PsychInfo using the same terms. We did not use any date restrictions in our search. We also searched the bibliographies of key peer-reviewed articles and relied on the few other review articles on the topic. Although our exploration was international in scope, we restricted our search to articles and documents published in English, with a focus on newer, innovative work. We cite the highest-quality works that have contributed the most to this burgeoning field, with special emphasis on studies using strong research designs making identification of plausibly causal relationships possible. Because the goal of our Series paper was to consider the consequences of mass incarceration for health disparities in the USA, we placed substantially more emphasis on studies within the USA, although we also report research on prisoners’ health in other developed democracies when appropriate.

### Key messages

- In the USA, incarceration is common and concentrated in the black community
- Individuals who experience incarceration at any point in their life are disproportionately in poor health both before, during, and after their incarceration
- The physical health of individuals improves in some domains during incarceration, although the mental health of individuals generally worsens
- Having been formerly incarcerated is associated with poor mental health and physical health outcomes, as well as elevated mortality risk
- Although little research considers the indirect health consequences of incarceration, having a family member incarcerated harms the mental and physical health of non-incarcerated female partners and children
- High incarceration prevalence also compromises community health, with the strongest evidence implicating community-level increased incidence of HIV
- Mass incarceration contributes to racial health disparities in the USA across a range of outcomes because of its direct and indirect consequences for health, and the disproportionate concentration of incarceration among black communities
- Because the USA incarcerates many more of its citizens than do other developed democracies, mass incarceration might have contributed to the country’s lagging performance on health indicators such as life expectancy

become a normal stage in the lifecourse. We then consider the health effects of current incarceration and having ever been incarcerated, as well as health disparities attributable to these effects. We next review data about the broader health effects of mass incarceration, focusing on families, communities, states, and nations, as well as health disparities attributable to these effects. Finally, we focus on the next steps for researchers, medical professionals, and policy makers. Throughout, we are careful to note that the teasing out of causal relationships between incarceration and health outcomes on the basis of existing research is difficult because there are no randomised controlled trials of incarceration relative to no incarceration in this research area. To overcome these obstacles to causal inference, we focus (when possible) on studies in which confounders were rigorously addressed through various strategies, including natural experiments.

We find that incarceration is a pressing public health concern, affecting not only the health of currently and formerly incarcerated individuals but also that of their families and communities.<sup>2-4</sup> Because of these myriad negative consequences of mass incarceration for American society, we argue—consistent with some research in this area<sup>5,6</sup>—that mass incarceration might partly account for widening health inequality both within the USA and between the USA and other developed democracies.

### Mass incarceration

On any given day, the USA incarcerates more of its citizens (2·2 million) and at a higher level (700 per 100 000) than any other country. Yet, for much of its history, the USA was no outlier in terms of incarceration. As in most developed democracies—the focus of all of our comparisons, because these countries are more similar to the USA in key ways (such as general standard of living, political structure, and core population health indicators such as infant mortality and life expectancy at birth) than some other countries (eg, China and Russia) that have high incarceration prevalence—the US incarceration prevalence hovered between 100 per 100 000 and 200 per 100 000 in the mid-20th century.<sup>7</sup> In 1950, for instance, the US incarceration prevalence was roughly 175 per 100 000,<sup>8</sup> somewhat lower than Finland's (185 per 100 000).<sup>9</sup> This prevalence was considerably increased for developed democracies, but not an aberration.

Starting in the mid-1970s, the US incarceration prevalence started to spiral upward (figure 1).<sup>5</sup> By 1985, the USA incarcerated 312 of every 100 000 residents. 20 years later, the prevalence had risen to 743 per 100 000. Its closest competitors among developed nations were New Zealand (173 per 100 000), Luxembourg (159 per 100 000), and Spain (140 per 100 000).

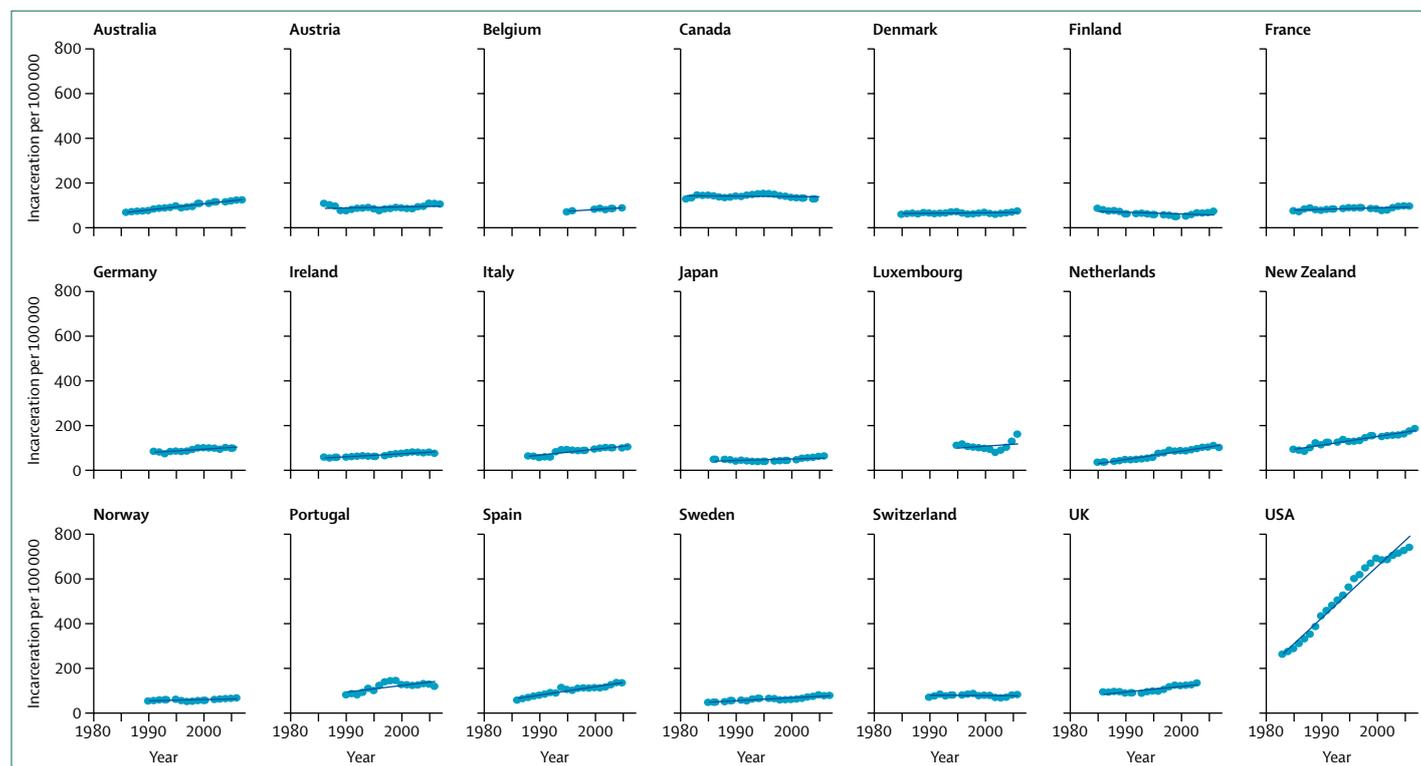
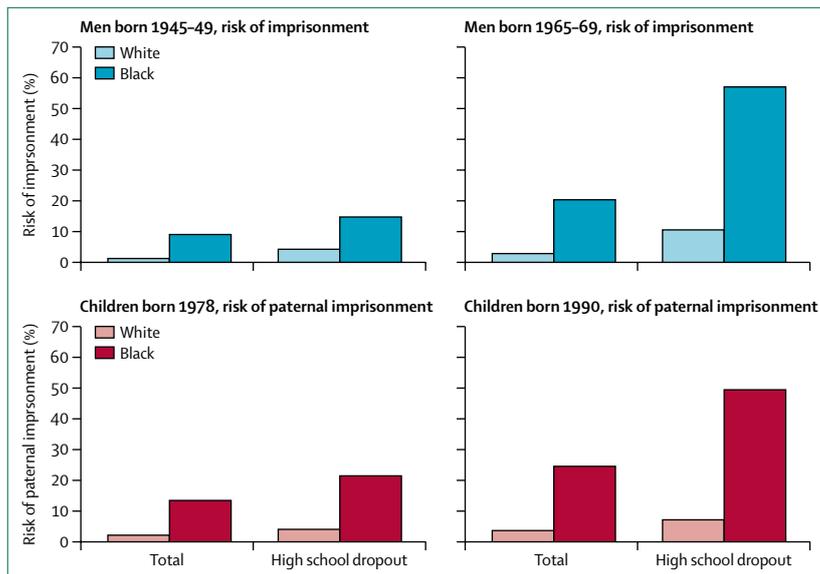
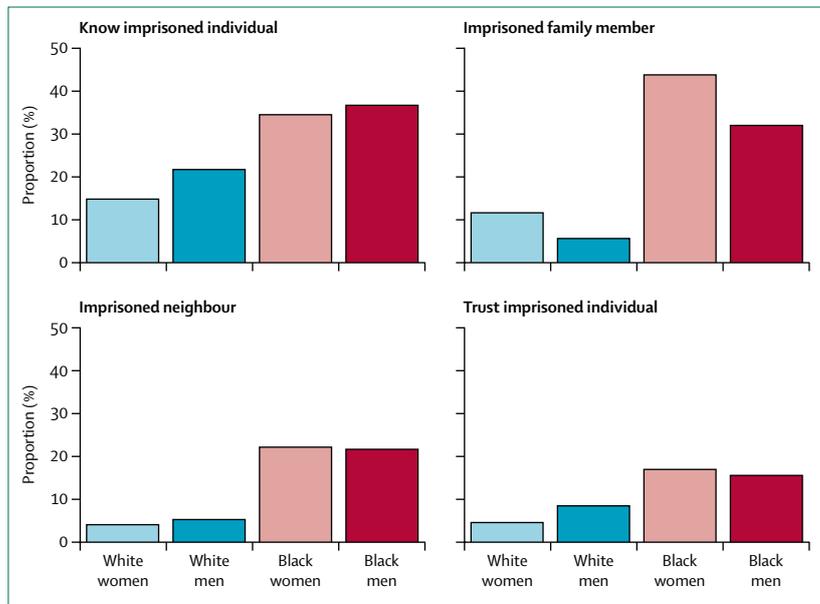


Figure 1: Trends in incarceration prevalence in 21 developed democracies, 1981–2007  
Calculations based on data from Wildeman (2016).<sup>5</sup>



**Figure 2:** Risk of ever experiencing imprisonment by age 30-34 years for US men by birth cohort, and risk of ever experiencing paternal imprisonment by age 14 years for US children by birth cohort  
Sources: Western and Wildeman (2009);<sup>15</sup> Wildeman (2009).<sup>16</sup>



**Figure 3:** Proportion of people in the USA who know individuals currently in state or federal prison, by race and gender  
Source: Lee and colleagues (2015).<sup>19</sup>

Although the causes of mass incarceration are complex, social and criminal justice policies such as the so-called War on Drugs, the deinstitutionalisation of people with mental illnesses, and punitive sentencing policies such as three-strike laws (mandating life imprisonment for third offences of even relatively minor felonies) and mandatory minimum sentences (requiring judges to impose long sentences for specific offences, even for some first-time offenders)

undoubtedly helped to both launch mass incarceration and keep it going.<sup>10,11</sup>

Disparities in incarceration by race or ethnicity and education in the USA are marked and have been since the earliest statistics were collected.<sup>10,12</sup> Incarceration has become common for poor men from ethnic minorities.<sup>13,14</sup> 2.8% of (non-Hispanic) white men born in the late 1960s and 20.3% of (non-Hispanic) black men from the same cohort spent time in prison by their 30s (figure 2).<sup>15,16</sup> For black men who did not complete high school, this risk was 57.0%. Moreover, these figures in fact underestimate the number of men who have experienced incarceration, because the data refer only to incarceration in prisons (facilities run by the state or the federal government that hold inmates with sentences in excess of 1 year) and exclude incarcerations in jails (local facilities that hold inmates awaiting trial or sentenced to less than 1 year), which are far more common. No data are available for the cumulative risk of total incarceration (in prisons and jails) because accurate estimates of the cumulative risk of ever experiencing jail incarceration in the USA do not exist.

The conditions of incarceration in the USA are also extreme, a fact much less discussed in the literature. For example, although precise estimates are not available for the number of individuals in solitary confinement (a form of imprisonment in which an inmate is isolated from any human contact, often with the exception of guards and other members of the prison staff), one study's investigators estimated that 100 000 prisoners are in solitary confinement in the USA on any given day,<sup>17</sup> a figure that suggests that the USA has more prisoners in solitary confinement than the UK has prisoners overall.

Because men who experience incarceration are connected to families, their incarceration can have implications for the health and wellbeing of women and children as well. Furthermore, because of the vast racial disparities in the risk of experiencing incarceration, the spillover effects of incarceration for family members could have implications not only among men but also among whole communities, divided along racial and ethnic lines. The proportion of black children who will ever have a father imprisoned is high (figure 2). A black child born in 1990 had a 25.1% chance of having their father sent to prison;<sup>16</sup> for those whose fathers did not finish high school, the risk was roughly double that, at 50.5%. According to the Bureau of Justice Statistics, 52% of state and 63% of federal inmates reported being parents, to an estimated 1.7 million children (ie, 2.3% of American children).<sup>18</sup>

The exposure of black families to incarceration cuts deeper still. Nearly half of black women have a family member or extended family member imprisoned (figure 3).<sup>19</sup> For white women, the risk is only a quarter as high, at 12%.<sup>19</sup> Black people are also more likely than the overall population to know someone who is incarcerated, have a neighbour incarcerated, or have a confidante incarcerated.<sup>19</sup>

The pronounced disparities in exposure to incarceration emphasise the salience of research into its health effects. If incarceration substantially worsens the health of non-incarcerated family members, mass incarceration could be an important driver of broader health disparities in the USA. Moreover, stark disparities in exposure to incarceration probably extend to acquaintances, neighbours, and confidantes, potentially amplifying the contribution of incarceration to health inequities in the USA.<sup>19</sup>

### Effects on the health of prisoners

A growing number of studies have examined the effects of incarceration on health.<sup>2-4</sup> In this section, we review these effects, which have also been reviewed elsewhere,<sup>2,3</sup> including in a 2016 series in *The Lancet* that explored the relationship between incarceration and communicable diseases such as HIV, viral hepatitis, and tuberculosis. The Series documented the burden of these communicable diseases among prisoners,<sup>20</sup> as well as options for treatment<sup>21</sup> and prevention<sup>22</sup> in carceral settings. Importantly—and by contrast with most research in this area—the Series also considered the implications of communicable diseases for the human rights of prisoners<sup>23</sup> and in regions where disease transmission is an especially pressing problem (sub-Saharan Africa,<sup>24</sup> eastern Europe,<sup>25</sup> and central Asia<sup>25</sup>).

We consider in more detail the family and community consequences of mass incarceration, a topic that has received little attention in the medical community. Although we focus on adults, it is important to note that incarcerated young people are at high risk for poor physical and mental health.<sup>26,27</sup>

Research into the effects of current incarceration on health is beset by several shortcomings beyond the obstacles to causal inference mentioned in our introduction. Scant research has examined objectively measured health outcomes, and relatively few studies have considered the mental health of current and former inmates in the USA.<sup>28</sup> Even fewer studies have explored how different durations (eg, months or years) or types (eg, prison or jail) of incarceration affect health. In a similar vein, little research has considered how the conditions of confinement (eg, solitary confinement) or types of criminal justice policies (eg, three-strike laws) affect health. Despite these caveats, most evidence suggests that incarceration has strongly harmful effects on the health of prisoners over their lifecourse.

### Effects of current incarceration

Being incarcerated might, paradoxically, decrease mortality and physical morbidity in the short term for some groups. Black male prisoners, for instance, have far lower mortality than similarly aged black men in the general population.<sup>29-32</sup> Researchers speculate that the protective effects of current imprisonment for this group might be driven by a decreased risk of death by violence or accidents, reduced

access to illicit drugs and alcohol, and improved health-care access, although the mechanisms are debated.<sup>29-32</sup> However, the decreased mortality for black male prisoners does not hold for other subpopulations of prisoners.<sup>29-32</sup>

Adjudication between these competing hypotheses is beyond the scope of this Series paper, but we note that prisons and jails are some of the only places in the USA where health care is guaranteed by law (although the often-dramatic variation in the quality of health care in correctional facilities undermines the notion that this mandate has been met). In 1976, the US Supreme Court ruled in *Estelle v Gamble* that failure to provide basic health care in correctional facilities violated the constitutional prohibition against cruel and unusual punishment. That ruling mandated that prisons and jails provide acute care services, but, as the prison population has aged, prison health-care services have had to provide increased care for chronic diseases as well.<sup>4</sup>

For many Americans, correctional facilities provide incarcerated adults with their first access to preventive and chronic medical care.<sup>4</sup> An estimated 40% of individuals with chronic medical conditions are diagnosed with a chronic condition while incarcerated,<sup>33</sup> and 80% report seeing a medical provider while incarcerated.<sup>34</sup> Unfortunately, the quality of medical care for chronic disorders in correctional settings is highly variable,<sup>35</sup> and overcrowding of correctional facilities (especially prisons) has even reached the stage at which judges have mandated the release of prisoners because the level of overcrowding constitutes cruel and unusual punishment.<sup>4</sup>

Compared with the non-incarcerated population, incarcerated individuals have increased prevalence of infectious disease (including sexually transmitted diseases, HIV, and hepatitis C), chronic medical conditions (eg, hypertension, diabetes, and asthma), substance use disorders, and mental health disorders;<sup>34,36</sup> Fazel and Baillargeon<sup>2</sup> provide a more exhaustive list of differences. While incarcerated, inmates also have a high prevalence of vitamin D deficiency.<sup>37</sup> However, findings from a few studies have shown that incarceration can improve the management of chronic conditions relative to time spent outside of prison, especially in cases of severe functional limitation<sup>38</sup> and HIV.<sup>39</sup> However, in the time between release and re-incarceration, the probability of viral suppression declines from roughly 50% to 30%.<sup>25</sup> Unfortunately, because of data limitations, the effect of incarceration on many of these disorders is unclear.

Overall, physical and psychological wellbeing worsens for inmates, while mortality declines for black inmates. Some study findings show worsening of depressive symptoms<sup>40</sup> and life satisfaction<sup>41</sup> during incarceration. Furthermore, inmates placed in solitary confinement suffer greatly,<sup>41</sup> and such confinement has serious short-term and long-term repercussions.<sup>42,43</sup> For instance, inmates in solitary confinement in the New York City jail system had 6.27 greater odds (95% CI 3.92–10.01) of

For the Series on HIV and related infections in prisoners see <http://thelancet.com/series/aids-2016>

potentially fatal self-harm (including hanging and ingesting poison) than those not placed in solitary confinement.<sup>44</sup> Nonetheless, most research into the mental health of inmates, while acknowledging the high prevalence of mental health problems in correctional populations, has not tested whether mental health changes as a result of incarceration.<sup>36</sup>

Of course, the total health effect of incarceration is a product of time spent incarcerated and time spent free. Individuals who experience incarceration spend, on average, far more time out of prison than in it, with much of that time happening after prison release since most individuals experience their first incarceration by their late 30s. For instance, black men who ever experience prison incarceration spend 13.4% of their working lives in prison.<sup>45</sup> In other words, the average prisoner spends roughly six times as long exposed to the consequences of past incarceration as they do being incarcerated. Hence, in considering the lifelong health effects of incarceration, the period after release is of crucial importance.

### Effects of past incarceration

Although current incarceration has mixed effects on prisoners' health, past incarceration has a clearly deleterious impact on health. Patients with chronic conditions are often released without medications or a follow-up appointment in the community.<sup>46</sup> Even when provided with a prescription at release, many do not obtain them.<sup>47</sup> Recently released inmates are less likely to have a primary care physician, disproportionately use emergency departments for health care, and have high levels of preventable hospital admissions compared with the general population.<sup>48</sup> Because former inmates are also at disproportionately high risk of mental health problems that can interfere with their ability to follow through with care for serious medical conditions,<sup>49</sup> these obstacles to receiving care are even more important.

Before the Affordable Care Act, four-fifths of former inmates were uninsured at release; even among those who are insured, many do not have the resources to pay for their care.<sup>50</sup> The Affordable Care Act might diminish the health consequences of incarceration, because 10% of the uninsured population has a recent history of criminal justice involvement.<sup>51</sup> Unfortunately, the refusal on the part of several states to accept the Act's expansion of Medicaid coverage for the poor will probably attenuate this benefit.

Upon release, former inmates often have no housing, employment, and family support, and face discrimination in finding jobs and housing.<sup>10,11</sup> Individuals with health issues are also confronted with the responsibility to manage these problems, obtain health care, and keep up with medications and appointments while also meeting their basic needs. Individuals convicted of drug felonies are also prohibited from accessing safety-net services such as public housing and food subsidies.<sup>1</sup> Given the

many barriers that individuals face after incarceration, it is unsurprising that they earn 30% less than similar never-incarcerated individuals and that some of this effect is driven by discrimination.<sup>10,11</sup>

Findings from studies of administrative data have shown increased mortality among former inmates, although the magnitude of this association varies.<sup>29,30,52</sup> Investigators of one study<sup>53</sup> that used a quasi-experimental design to assess whether incarceration caused premature mortality found an effect for women, but not for men, after adjustment for confounders measured before incarceration to ensure appropriate time-ordering of confounders, explanatory variables, and dependent variables (such as a history of illicit drug use, low education, and pre-existing health problems). The findings of this single study should be tested in further research, especially because it is the sole study to suggest that prison release might not increase mortality risk.

The evidence that a history of incarceration is associated with increased morbidity is somewhat more consistent than the data for mortality, although, again, it remains unclear whether this relationship is indeed causal. However, with the exception of the Coronary Artery Risk Development in Young Adults (CARDIA) study<sup>54</sup> and the Veterans Aging Cohort study,<sup>55</sup> few studies include both incarceration measures and objective health data. In CARDIA, the adjusted odds of left ventricular hypertrophy (a common sequela of poorly controlled hypertension) among the ever-incarcerated were 2.7 (95% CI 0.9–7.9) compared with the never-incarcerated.<sup>54</sup> In a matched sample, a history of incarceration was associated with 1.8 times increased odds (95% CI 1.147–2.519) of having hepatitis or tuberculosis.<sup>56</sup> Studies including less precise measures of health have also consistently linked previous incarceration with poor health.<sup>3</sup> Research has also shown that the formerly incarcerated have very high prevalence of psychiatric morbidity, with associations especially pronounced for dysthymia and major depressive disorder, and that incarceration is at least partly to blame for this increase.<sup>40,49</sup>

### The direct effects of incarceration on health disparities

Although black populations have high levels of incarceration, few studies have examined the direct effects of incarceration on racial health disparities. The scant research in this area supports two conclusions. First, racial health disparities among prisoners are muted; differences in mortality and morbidity between black and white individuals are smaller in prison than in the general population.<sup>2,38</sup> Second, the post-release effects of incarceration certainly contribute somewhat to racial health disparities, although the magnitude of this effect is unclear. In an analysis, investigators using data from the National Longitudinal Survey of Youth<sup>56</sup> concluded that disparities in incarceration prevalence contributed greatly to disparities between black and white men in midlife

self-reported health, as measured by the 12-Item Short Form Health Survey; findings from another study<sup>38</sup> that used the same data and a measure of self-reported functional limitation (defined as having had any health problem that precluded working) showed that incarceration explained only 6% of racial disparities in this measure. Findings from a population-based study in New York City<sup>57</sup> suggested that disparities in incarceration contributed substantially to disparities in asthma prevalence.

Mass incarceration also creates methodological problems in documentation of racial health inequities in prospective longitudinal studies. Because black men have very high levels of incarceration, they are more likely than others to drop out of prospective longitudinal surveys. As a result, research based on such surveys could misestimate the magnitude of health disparities if the health status of black men who experience incarceration is worse than those who do not, as most research suggests is indeed the case.<sup>58</sup>

## The indirect effects of incarceration on health

### Overview

Until the past 10 years, most research into the health consequences of incarceration had focused exclusively on how incarceration affects those who experience it. However, as incarceration has become increasingly common, researchers have become aware of the broader health effects of mass incarceration on families, communities, and even nations. Because little research has examined the spillover effects of mass incarceration on direct measures of health, our Series paper also encompasses broader studies of wellbeing. In this area, we are unable to make distinctions between the effects of current and past incarceration.

### Effects of family member incarceration on health

Research into the broader family consequences of incarceration suggests myriad channels through which incarceration might matter. For example, incarceration decreases the financial contributions individuals can make after release;<sup>59</sup> while incarcerated, their financial contributions are virtually nil.<sup>60</sup> Because keeping in touch with a prisoner is costly,<sup>52</sup> incarceration exacerbates financial hardships beyond what would be expected due just to decreased earnings. Incarceration also disrupts romantic unions.<sup>61</sup> The resulting decrease in adults' time available for household duties might reduce the time spent on health-related activities. Having an incarcerated family member—and re-incorporating a former inmate—is also stressful. Moreover, if the stigma attached to incarceration pervades families, as research suggests,<sup>62,63</sup> having a family member incarcerated could reduce the social support available to families.<sup>64</sup>

Although incarceration can also affect prisoners' siblings, husbands, boyfriends, and parents, most research has focused on the heterosexual partnerships

and children of male prisoners. Findings from two studies have suggested a link between parental incarceration and child mortality: investigators of a US study<sup>65</sup> found elevated infant mortality, whereas findings from a Danish study<sup>66</sup> of mortality up to age 18 years showed increased mortality among sons but not daughters of incarcerated men. A few other studies have also shown evidence of gender-specific effects; parental incarceration was associated with significantly more weight gain<sup>67</sup> and higher levels of inflammatory markers (eg, C-reactive protein) among adolescent girls than among boys.<sup>68</sup> Yet, given the dearth of research in this area, these findings about gender differences should be interpreted with some caution.

Although very few studies have used physiological measures to assess the health of children of incarcerated parents, the literature assessing self-reported, caretaker-reported, and teacher-reported outcomes for children is vast. These study findings tell a consistent story: paternal incarceration is associated with behavioural and mental health problems throughout childhood,<sup>69</sup> and a host of poor outcomes (including increased prevalence of substance misuse<sup>70</sup>) in adolescence and adulthood.<sup>71-73</sup> The most wide-ranging assessment of the effect of parental—mostly paternal—incarceration used data from the National Survey of Children's Health,<sup>74</sup> showing links to a host of negative health outcomes among children, including self-rated health, depression, anxiety, asthma, and obesity. Findings from a study<sup>75</sup> that used data from the National Longitudinal Study of Adolescent Health (Add Health) underscored that many of the negative consequences of paternal incarceration continue throughout adolescence and early adulthood.<sup>75</sup>

For maternal incarceration, the story is more complicated. A handful of studies have linked maternal incarceration with worse self-reported health,<sup>75</sup> educational,<sup>76</sup> and criminal justice outcomes<sup>77</sup> for children. However, other study findings<sup>78,79</sup> have shown no effects on children after adjustment for factors that are associated with the risk of incarceration and poor child health, such as low parental education, financial instability, and criminal activity. Given the paucity of studies on this topic, and evidence that maternal incarceration helps some children and harms others,<sup>80</sup> the net effect of maternal incarceration on children remains an open question.

Fewer quantitative studies (but many qualitative ones<sup>60,62,63</sup>) have assessed how incarceration affects other adult family members. Women whose partners are incarcerated experience substantial mental health deterioration,<sup>81</sup> as well as a host of elevated risk factors for cardiovascular disease.<sup>82</sup> However, this effect on cardiovascular risk factors was not observed among men in the household.<sup>82</sup> We must note that the effect of incarceration on family violence is unclear. There is little doubt that incarcerated individuals<sup>83</sup> and their families<sup>65,84</sup> experience great exposure to violence throughout their

lives. The incarceration of a family member might increase family violence by destabilising already-disadvantaged homes. Alternatively, the removal of violent family members from the household might decrease exposure to violence for the remaining household members. Existing research provides little guidance regarding either possibility.

#### Effects of incarceration on communities

Neighbourhoods with high levels of incarceration are associated with poor population health, including high prevalence of asthma, sexually transmitted infections, and psychiatric morbidity;<sup>85-90</sup> the challenge is to decipher whether imprisonment, rather than the factors that lead to imprisonment, is the driver. All studies done so far<sup>85-90</sup> have tested a linear effect of imprisonment, yet a non-linear relationship between neighbourhood-level prevalence of incarceration and community health is also possible. Clear<sup>85</sup> proposed a hypothesis of coercive mobility, suggesting that the crime-fighting benefits of imprisonment at low levels are substantial, but that these benefits fall as imprisonment increases, and that further increases in imprisonment raise—rather than reduce—crime. Testing of this hypothesis is difficult. If true, it has profound implications for understanding the effect of incarceration on community health, not only because high levels of violent crime remain one of the most serious threats to public health in these communities but also because it suggests that the public health consequences of incarceration in these communities could be far larger than an additive model would imply.

#### Indirect effects of incarceration on states, nations, and health disparities

The indirect effects of incarceration on states and nations, and health disparities more broadly, are most readily measured at the population level. Hence, we discuss all three in the same section.

Variation at the state level has rarely been used to analyse the health effects of differences in incarceration prevalence, despite the availability of state-level data about key health outcomes and incarceration. Findings from a few studies have suggested that states with large numbers of former inmates have poorer-quality health-care systems,<sup>91</sup> lower life expectancy,<sup>92</sup> and higher incidence of HIV infection<sup>93</sup> and infant mortality<sup>65</sup> than do states with few former inmates. These state-level studies have also shown a link between incarceration prevalence and health disparities. Findings from one study,<sup>93</sup> for instance, showed that mass incarceration explained most of the racial disparities in the incidence of HIV infection.

There is less country-level than state-level research into the relationship between incarceration and health. Of these studies, two stand out. Stuckler and colleagues<sup>6</sup> showed that increased incarceration was linked with increased tuberculosis incidence (a 1% increase in incarceration was associated with a 0.3% increase in

tuberculosis incidence) and increased multidrug-resistant tuberculosis. Findings from another cross-national study<sup>5</sup> showed that increases in incarceration were associated with substantial worsening of life expectancy and infant mortality, although the population-level consequences of incarceration for health were significantly worse in the USA than in other developed democracies. This analysis suggested that US life expectancy would have increased 51.1% more and infant mortality would have fallen 39.6% more from 1983 to 2005 if incarceration had remained at the mid-1980s level. Taken together, these findings suggest that mass incarceration could contribute to both within-country and between-country inequalities in health.

Finally, as for longitudinal studies, the US point-in-time surveys underlying much of the epidemiological and health services research (eg, the National Health Interview Survey) exclude inmates,<sup>94</sup> resulting in substantial misestimates of disease prevalence and, particularly, racial disparities. With so many minority men behind bars, their exclusion from almost all research provides a fanciful picture of progress in the USA, especially for health inequities between black and white populations.

#### Conclusions and next steps

Soaring incarceration since the mid-1970s has profoundly affected health in the USA, especially in poor and minority communities. Incarceration might temporarily improve some physical health outcomes during imprisonment. However, after release and over the lifecourse more broadly, imprisonment seems to worsen both physical and mental health, although we make this statement with some hesitation because few (if any) strong causal tests are available and the health conditions considered so far have been limited. Although data are sparse, mass incarceration also probably worsens the health of the female partners and children of inmates.

Because of the uneven distribution of incarceration, these ill effects could be a significant contributor to racial health disparities. The criminal justice system has become an institution—like the education system—that both reflects systematic and institutionalised racism and exacerbates existing inequities.<sup>3,11,71</sup> Moreover, as some recent research into the relationship between incarceration and population health indicates,<sup>5</sup> the uniquely high incarceration prevalence in the USA might partly underlie the country's poor showing relative to other developed democracies on population health measures over the past 40 years.

On a more hopeful note, soaring costs, overcrowding of prisons and jails, and a spotlight on overly aggressive policing in minority communities have engendered agreement that mass incarceration has failed and should be reversed. There is also increasing recognition, although not consensus, that policing should be altered

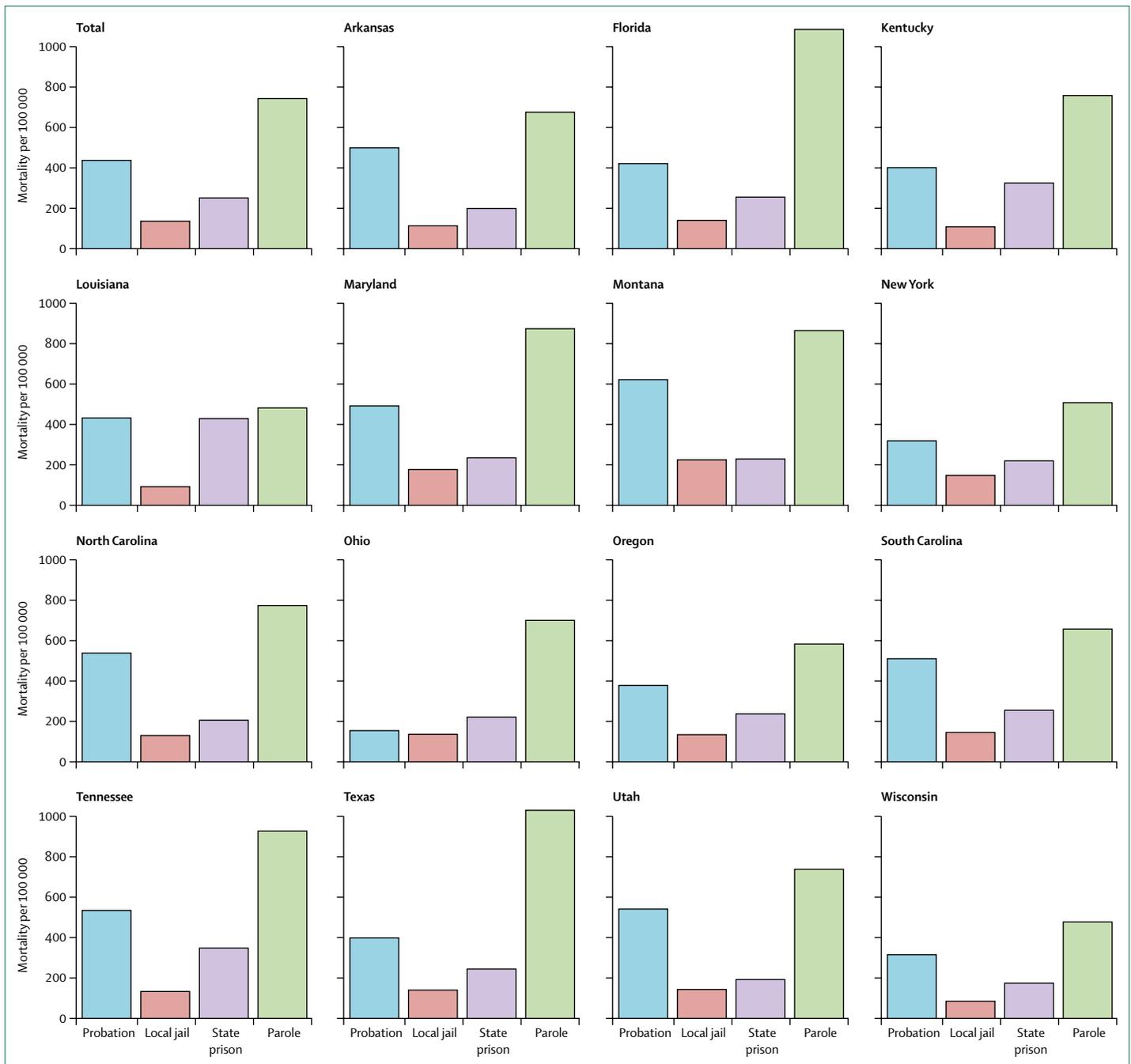


Figure 4: Mortality of individuals on probation, incarcerated in local jails, incarcerated in state prisons, and on parole in 15 US states, 2000-12  
Calculations based on data from the Annual Parole Survey and Annual Probation Survey,<sup>96</sup> and from Noonan and Ginder (2014).<sup>97</sup>

in key ways (eg, to limit stops to those absolutely necessary and to promote less adversarial contact between the police and the community than frequently occurs at present). The shift in the nation's approach to criminal justice and drug sentencing has led to a small decrease in the prison population, a fall of 2·9% since its peak in 2009.<sup>95</sup> The pace of downsizing could be

quicken with more sweeping reforms in drug sentencing, reduced admissions of technical parole violators, expanded community corrections for those convicted of low-level property and drug crimes, and medical paroles for sick and elderly inmates. Those concerned about mass incarceration—and health disparities—should advocate for such reforms, in

conjunction with improved access to health care and social services for individuals who have been affected by the criminal justice system. However, even these changes would cut the penal population by just 30%, because much of the increase in incarceration is due to the adoption of long sentences for violent offenders.

Moreover, shrinking the imprisoned population size while expanding the population under social control in the community will probably not ameliorate health inequity unless the roots of mass incarceration are addressed through broader efforts to provide opportunities and conditions for people in marginalised communities to improve their lives. Our analyses of data from the Bureau of Justice Statistics highlight this point. As shown in figure 4, the crude mortality of probationers and parolees exceeds that of state prisoners and jail inmates in nearly every state.<sup>96,97</sup> These data are unadjusted by age, race, and other traits that might account for these differences. However, until US data collection systems are redesigned, we will not know the health risks for the roughly 6 million Americans on probation.

Were the USA to return to the levels of incarceration of the 1970s, at least a half a million people employed by the criminal justice system could lose their jobs, and 63 million individuals would still have criminal records. The criminal justice system is so deeply rooted in America's political system and socioeconomic structures that the damage to the health of our communities cannot be mitigated without addressing the root causes of mass incarceration and the forces that inevitably seek to maintain it.

True understanding of the health consequences of mass incarceration and necessary changes in criminal justice policy requires investment in improved data, the inclusion of several questions about criminal justice exposure in national health surveys, and the linkage of administrative data about incarceration with data for income, employment, housing, educational outcomes, and health services. We should also invest in a host of experiments that test interventions to mitigate the negative direct and indirect health effects of incarceration and community corrections, and seek perspectives that facilitate engagement between physicians, epidemiologists, and criminologists.<sup>98</sup> There is a special urgency to develop effective interventions that take into account the experiences of women and juvenile offenders. There is also a pressing need to consider whether differential processing within the criminal justice system of individuals with mental health conditions—wherein individuals with more resources are able to gain access to treatment (and avoid jail or prison stay) and those with fewer resources are not—could contribute to growing racial, ethnic, and class disparities in physical and mental health.

Improved data would help us to understand how mass incarceration has contributed to—and will continue to

contribute to—health inequity, and facilitate undoing the damage it has caused. But research is not enough to stem the health effects of mass incarceration on individuals, families, and communities, or to mitigate existing health inequities. As physicians and researchers, we should engage in conversations about the interplay between racism, social control, and health. Such discussions must also address the health consequences of living in a community subject to overly aggressive policing, and engage communities of colour to build trust, develop solutions, and ultimately improve health outcomes.

#### Contributors

CW and EAW contributed equally to all components of this Series paper.

#### Declaration of interests

We declare no competing interests.

#### Acknowledgments

CW is supported by the Rockwool Foundation and by a visiting fellowship from the Bureau of Justice Statistics. EAW is supported by a visiting fellowship from the Bureau of Justice Assistance. The views expressed in this Series paper should not be considered those of the Bureau of Justice Statistics, the Bureau of Justice Assistance, the Office of Justice Programs, or the National Institute of Justice.

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