

Letters

RESEARCH LETTER

COVID-19 Cases and Deaths in Federal and State Prisons

Novel coronavirus disease 2019 (COVID-19) represents a challenge to prisons because of close confinement, limited access to personal protective equipment, and elevated burden of cardiac and respiratory conditions that exacerbate COVID-19 risk among prisoners.¹ Although news reports document prison outbreaks of COVID-19, systematic data are lacking.² Relying on officially reported data, we examined COVID-19 case rates and deaths among federal and state prisoners.

Methods | Counts of COVID-19 cases and presumed or confirmed deaths among prisoners were collected daily by the UCLA Law COVID-19 Behind Bars Data Project from March 31, 2020, to June 6, 2020.³ Counts were extracted daily from departments of corrections websites and, as needed, supplemented with news reports and press releases. Data included all states, the District of Columbia, and the Federal Bureau of Prisons. Cases were reported cumulatively (including active confirmed cases, recoveries, and decedents). Deaths attributable to COVID-19 were defined by each department of corrections based on the determination of the departments of corrections or external medical exam-

iners. COVID-19 case rates and deaths for the states were obtained for the same period from the US Centers for Disease Control and Prevention.⁴

Separately, prison population data were obtained from current departments of corrections reports in early May 2020, representing the best available census of all state and federal prisons. US population data were obtained from the US Census Bureau's American Community Survey. We calculated crude COVID-19 case and death rates separately for prisoners and the overall population. To account for demographic differences between prisons and the overall population, we also calculated mortality rates adjusted for age and sex with indirect standardization. This calculation relied on mortality rates specific to age and sex in the overall population (mortality breakdowns by age and sex were not reported for prisons by departments of corrections). Because this study used aggregated public data, it was determined not to constitute human subject research by the Johns Hopkins University institutional review board. Data were analyzed using RStudio version 1.2.5042.

Results | By June 6, 2020, there had been 42 107 cases of COVID-19 and 510 deaths among 1 295 285 prisoners with a case rate of 3251 per 100 000 prisoners. The COVID-19 case rate for prisoners was 5.5 times higher than the US population

Table. Mortality Attributable to Coronavirus Disease 2019 (COVID-19) Among Prison and US Populations

Population by age group, y	Prison population in 1000s ^a	US population			
		In 1000s ^b	COVID-19 deaths ^c	Age-specific COVID-19 mortality rate/100 000	Expected prison deaths ^d
Men					
≤24	115	52 333	87	0.17	0.19
25-34	377	22 727	433	1.91	7.19
35-44	331	20 257	1184	5.84	19.32
45-54	222	19 923	3236	16.24	36.12
55-64	117	19 865	7558	38.05	44.36
≥65	37	23 923	38 899	162.60	60.59
Women					
≤24	8	50 545	50	0.10	0.01
25-34	36	22 482	207	0.92	0.33
35-44	28	20 770	465	2.24	0.63
45-54	16	20 776	1352	6.51	1.06
55-64	6	21 890	3881	17.73	1.10
≥65	1	28 865	38 254	132.53	1.90
Total ^e	1295	324 356	95 608	29.47	172.80 ^f

^a Derived from 2018 published estimates from US Bureau of Justice statistics (<https://www.bjs.gov/content/pub/pdf/p18.pdf>).

^b Estimated from 2019 US Census Bureau data (<https://www.census.gov/data/tables/2019/demo/age-and-sex/2019-age-sex-composition.html>).

^c Estimated from the US Centers for Disease Control and Prevention as of June 6, 2020 (<https://data.cdc.gov/NCHS/Provisional-COVID-19-Death-Counts-by-Sex-Age-and-S/9bhg-hcku>).

^d Calculated as the age-specific mortality rate in the US population × the prison population.

^e The age- and sex-standardized mortality ratio is 510/172.8 = 2.95 and was calculated as the observed prison deaths as of June 6, 2020/expected US deaths as of June 6, 2020.

^f Because prison deaths attributable to COVID-19 are not reported by age and sex strata, an indirect standardization method was used.

case rate of 587 per 100 000. The crude COVID-19 death rate in prisons was 39 deaths per 100 000 prisoners, which was higher than the US population rate of 29 deaths per 100 000 (Table). However, individuals aged 65 years or older comprised a smaller share of the prison population than of the US population (3% vs 16%, respectively) and accounted for 81% of COVID-19 deaths in the US population. The Table provides a standardized calculation showing that the adjusted death rate in the prison population was 3.0 times higher than would be expected if the age and sex distributions of the US and prison populations were equal.

The Figure displays the daily trends in cumulative, confirmed cases of COVID-19 in state and federal prisons and the US population from March 31, 2020, to June 6, 2020. The COVID-19 case rate was initially lower in prisons but surpassed the US population on April 14, 2020. The mean daily case growth rate was 8.3% per day in prisons and 3.4% per day in the US population.

Discussion | COVID-19 case rates have been substantially higher and escalating much more rapidly in prisons than in the US population. One limitation of the study is that it relied on officially reported data, which may be subject to inaccuracies and reporting delays, but are the only data available. Comprehensive data on testing rates were not available, and testing rates in both prisons and the overall population were uneven, with many facilities testing no prisoners or only symptomatic persons.^{2,5} Mass testing in select prisons revealed wide COVID-19 outbreaks, with infection rates exceeding 65% in several facilities.² Reported case rates for prisoners therefore likely understated the true prevalence of COVID-19 in prisons.

A second limitation is that departments of corrections generally did not report demographic data on decedents, and therefore we could not adjust death rates to account for race/ethnicity and comorbidity. This study focused on prisons but did not include jails or other detention facilities where there have been notable COVID-19 outbreaks. Although some facilities did engage in efforts to control outbreaks, the findings suggest that overall, COVID-19 in US prisons is unlikely to be contained without implementation of more effective infection control.

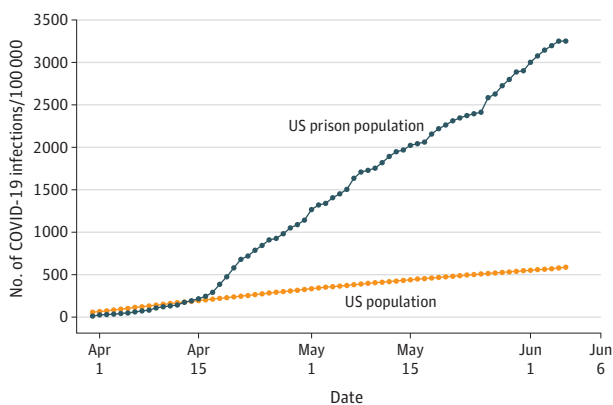
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Figure. Trends in Cumulative Coronavirus Disease 2019 (COVID-19) Confirmed Case Rate per 100 000 People for Prison and US Populations



Data are from the UCLA Law COVID-19 Behind Bars Data Project and the US Centers for Disease Control and Prevention.^{3,4} The US population is 327 167 439 and the US prison population is 1 295 285.

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Concept and design: Saloner, Parish, Ward.

Acquisition, analysis, or interpretation of data: All authors.

Drafting of the manuscript: Saloner, Parish, Ward, DiLaura.

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Persistent Symptoms in Patients After Acute COVID-19

In Italy, a large proportion of patients with coronavirus disease 2019 (COVID-19) presented with symptoms (71.4% of 31 845 confirmed cases as of June 3, 2020).¹ Common symptoms include cough, fever, dyspnea, musculoskeletal symptoms (myalgia, joint pain, fatigue), gastrointestinal symptoms, and anosmia/dysgeusia.²⁻⁴ However, information is lacking on symptoms that persist after recovery. We assessed