

## **Association Between Prison Crowding and COVID-19 Incidence Rates in Massachusetts Prisons, April 2020-January 2021**

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*JAMA Intern Med.* 2021;181(10):1315-1321. doi:10.1001/jamainternmed.2021.4392

**Importance** COVID-19 incidence and mortality are higher among incarcerated persons than in the general US population, but the extent to which prison crowding contributes to their COVID-19 risk is unknown.

**Objective** To estimate the associations between prison crowding, community COVID-19 transmission, and prison incidence rates of COVID-19.

**Design, Setting, and Participants** This was a longitudinal ecological study among all incarcerated persons in 14 Massachusetts state prisons between April 21, 2020, and January 11, 2021.

**Exposures** The primary exposure of interest was prison crowding, measured by (1) the size of the incarcerated population as a percentage of the prison's design capacity and (2) the percentage of incarcerated persons housed in single-cell units. The analysis included the weekly COVID-19 incidence in the county where each prison is located as a covariate.

**Main Outcomes and Measures** The primary outcome was the weekly COVID-19 incidence rate as determined by positive SARS-CoV-2 tests among incarcerated persons at each prison over discrete 1-week increments.

**Results** There was on average 6876 people incarcerated in 14 prisons during the study period. The median level of crowding during the observation period ranged from 25% to 155% of design capacity. COVID-19 incidence was significantly higher in prisons where the incarcerated population was a larger percentage of the prison's design capacity (incidence rate ratio [IRR] per 10-percentage-point difference, 1.14; 95% CI, 1.03-1.27). COVID-19 incidence was lower in prisons where a higher proportion of incarcerated people were housed in single-cell units (IRR for each 10-percentage-point increase in single-cell units, 0.82; 95% CI, 0.73-0.93). COVID-19 transmission in the surrounding county was consistently associated with COVID-19 incidence in prisons (IRR [for each increase of 10 cases per 100 000 person-weeks in the community], 1.06; 95% CI, 1.05-1.08).

**Conclusions and Relevance** This longitudinal ecological study found that within 14 Massachusetts state prisons, increased crowding was associated with increased incidence rates of COVID-19. Researchers and policy makers should explore strategies that reduce prison crowding, such as decarceration, as potential ways to mitigate COVID-19 morbidity and mortality among incarcerated persons.