Age and COVID-19 mortality in the United States: a comparison of the prison and general population

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Abstract

Purpose – *The USA has a rapidly aging prison population that, combined with their poorer health and living conditions, is at extreme risk for COVID-19. The purpose of this paper is to compare COVID-19 mortality trends in the US prison population and the general population to see how mortality risk changed over the course of the pandemic. The authors first provide a national overview of trends in COVID-19 mortality; then, the authors assess COVID-19 deaths among older populations using more detailed data from one US state.*

Design/methodology/approach – *The authors used multiple publicly available data sets (e.g. Centers for Disease Control and prevention, COVID Prison Project) and indirect and direct standardization to estimate standardized mortality rates covering the period from April 2020 to June 2021 for the US and for the State of Texas.*

Findings – *While 921 COVID-19-related deaths among people in US prisons were expected as of June 5, 2021, 2,664 were observed, corresponding to a standardized mortality ratio of 2.89 (95%CI 2.78, 3.00). The observed number of COVID-19-related deaths exceeded the expected number of COVID-19-related deaths among people in prison for most of the pandemic, with a substantially widening gap leading to a plateau about four weeks after the COVID-19 vaccine was introduced in the USA. In the state population, the older population in prison is dying at younger ages compared with the general population, with the highest percentage of deaths among people aged 50–64 years.*

Research limitations/implications – *People who are incarcerated are dying of COVID-19 at a rate that far outpaces the general population and are dying at younger ages.*

Originality/value – *This descriptive analysis serves as a first step in understanding the dynamic trends in COVID-19 mortality and the association between age and COVID-19 death in US prisons.*

Keywords *Health in prison, Prisoners, Public health, Prison, Elderly prisoners, Infectious disease, COVID-19 aging, Prison, Mortality*

Paper type *Research paper*

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In February 2021, the number of COVID-19-related deaths in the USA surpassed 500,000 (Tompkins *et al.*, 2021), with provisional life expectancy estimates for 2020 showing a 1.5-year decline overall (Arias *et al.*, 2021). However, the COVID-19 mortality burden is not equally distributed. There is an exponential relationship between the COVID-19 infection fatality rate (the proportion of people infected who die) and age (Levin *et al.*, 2020). Early in the global pandemic, a large epidemiological study in China found that the elderly and sick had the highest risk of death with case fatality rates of 14.8% and 10.5% for people aged 80 years and older and people with comorbid health conditions, respectively (Novel Coronavirus Pneumonia Emergency Response Epidemiology Team, 2020). The US Centers for Disease Control and Prevention (CDC) documents that, compared with 18- to 29-year-olds, the rate of COVID-19 death is 600 times higher for people aged 85 years and older [Centers for Disease Control and Prevention (CDC), 2021a].

The USA has a rapidly aging prison population that, combined with their poorer health and living conditions, is at extreme risk for COVID-19. The percentage of people in prison who

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are aged 55 years and older more than tripled between 2000 and 2016, and 2016 marks the first time that older adults (aged 55 years and older) comprise a larger share of the US prison population than young adults aged 18 to 25 years (Li and Lewis, 2020). More than 170,000 people aged 55 or older live in US prisons (Bronson and Carson, 2019). Older people in prison have complex health profiles (Nowotny *et al.*, 2016; Prost *et al.*, 2021) and have more chronic and geriatric conditions than their nonincarcerated counterparts (Williams *et al.*, 2006; Greene *et al.*, 2018; Fazel *et al.*, 2001). A study of incarcerated and community living elderly men found that these groups did not differ by health status even though the community sample was, on average, 15 years older (Loeb *et al.*, 2008). This phenomenon leads some scientists and activists to argue that people "age faster" in prison (Chammah, 2015). The characterization of incarceration as a social stressor that contributes to poor health is well documented, and recent research found that incarceration exposure significantly predicts accelerated epigenetic aging (an indicator of physiological deterioration) among African American adults, with differences in aging of approximately one year and 11 months for men and one year and seven months for women (Berg *et al.*, 2021).

It is important to note that outside the context of COVID-19, death is a rare event in prisons. The overall mortality rate among incarcerated people is lower than in the general population, with higher cause-specific mortality related to liver disease, septicemia and AIDS-related illness (Noonan and Ginder, 2015). However, the mortality rate in prisons has been steadily increasing, jumping from 303 per 100,000 people in 2016 to 344 in 2018 (Wang and Sawyer, 2021). About three-quarters of deaths are from "natural" causes, with the growth in death by suicide, accident, homicide and overdose outpacing death by illness. We would be remiss if we failed to mention that, beyond confinement, incarceration is also associated with shortened life expectancy after release (Zlodre and Fazel, 2012; Binswanger *et al.*, 2007; Patterson, 2013). Mortality risk factors include being placed in restrictive housing during imprisonment (Brinkley-Rubinstein *et al.*, 2019) and post-release homelessness, injection drug use and psychiatric medication use (Binswanger *et al.*, 2016).

In this paper, we compare COVID-19 mortality trends in the US prison population and the general population to see how mortality risk changed over the course of the pandemic using cumulative weekly death counts from the CDC and COVID Prison Project (CPP). We estimate crude mortality rates and standardized mortality ratios (SMR) through indirect standardization to account for the different age compositions of the populations. Using data from one state and direct standardization methods, we also estimate age- and sex-specific COVID-19 mortality rates for the prison and the general population. The overall objective of this study is to understand age-related disparities in COVID-19 mortality between the prison and general population. Given the age-associated risk for COVID-19 and the "faster aging" of the prison population, we would expect that people in prison would die from COVID-19 not only at higher rates but at younger ages than is found in the general population. We first provide a national overview of trends in COVID-19 mortality; then, we assess COVID-19 deaths among older populations using more detailed data from one USA state.

Methods

We used multiple publicly available data sets and indirect and direct standardization to compare the COVID-19 mortality rates of persons in prison to the general population for the USA and for the State of Texas. Data were publicly available from the CPP, CDC, Bureau of Justice Statistics (BJS), US Census, TX Department of Criminal Justice, TX Population Estimates Program and The Texas Tribune. This research was exempt for review by the Human Subjects Research Office.

Data

US population The CPP (www.covidprisonproject.com) publishes an aggregate data set examining COVID-19 in correctional facilities, including data on the number of COVID-19 tests and the number of confirmed positive COVID-19 cases, and mortality due to COVID-19 among correctional staff and incarcerated individuals (Covid Prison Project, 2021a). CPP tracks COVID-19 data for 53 prison systems including the 50 states, Puerto Rico (PR), the Federal Bureau of Prisons and Immigration and Customs Enforcement (ICE) detention centers, from April 22, 2020 to present. ICE and PR were excluded for the current analysis because CPP started collecting these data after April 22, 2020. Age-specific death counts were not reported.

The CDC and National Center for Health Statistics publish provisional death counts for COVID-19 by week (morbidity and mortality weekly reports [MMWR]) [Centers for Disease Control and Prevention (CDC), 2021b]. The counts are based on deaths reported through the National Vital Statistics System and are considered provisional as data are consistently updated due to lagged reporting. We accessed provisional COVID-19 death counts by age, sex and week through June 5, 2021, and reported as of July 29, 2021 (https://data.cdc.gov/d/vsak-wrfu). We chose June 5, 2021 as the end date for the observational period so that there was time for provisional counts to be updated. Also, starting in June 2021, some prison systems stopped reporting COVID-19 data (Covid Prison Project, 2021b). Age groups included under 1 year, 1–4 years, 5–14 years, 15–24 years with successive 10-year intervals until 75–84 years and 85 years and older.

The BJS provided preliminary prisoner counts for December 31, 2018 by age group on April 30, 2020 (Carson, 2020). This is the most recent data that are available. Age groups included 18–19 years, 20–24 years with successive 5-year intervals until 60–65 years and 65 years and older. US Census Bureau Population Division (2020) provided estimates for the resident population by age group for July 1, 2019. This is the most recent data that are available. The age groups included under 5 years, 5–9 years with 5-year intervals until 80–84 years and 85 years and older. The US Census provided alternative age groupings including 18–24 years.

Texas population. We included Texas as a single case study to generate a more in-depth and multi-faceted understanding of COVID-19 mortality in prisons. Texas was chosen because of its relatively robust reporting of COVID-19 deaths in prison, including some information on age at death, sex, location of death, hospitalization and autopsy status. Detailed COVID-19 death data were quantified from narrative news updates provided by the Texas Department of Criminal Justice (TDCJ) on their website (www.tdcj.texas.gov/covid-19/index2.html). This data set is available by request from the lead author. As of this writing, the latest update is from June 8, 2021, and the last confirmed death reported in detail is from November 1, 2020. We extracted detailed death data from 181 of the 259 reported COVID-19 deaths tracked by CPP. The TDCJ unit directory provided contextual information about the more than 100 prison units within TDCJ system (https://tdcj.texas.gov/unit_directory/). Inmate rosters (last updated June 21, 2021) were also accessed through TDCJ via The Texas Tribune (see www.texastribune.org/library/data/texas-prisons/) to estimate the mean and median age of prison unit populations and derive age and sex counts (www.tdcj.texas.gov/documents/High_Value_Data_Sets.xlsx). Finally, COVID-19 death data as of November 2020 by age and sex for the general population of Texas are from the CDC provisional death counts (https://data.cdc.gov/NCHS/Provisional-COVID-19-Deaths-by-Sex-and-Age/9bhg-hcku), and age and sex population estimates are from the US Census via the Texas Population Estimates Program (2018).

Analysis. We used indirect standardization to compare the mortality rates of persons in prison to the general US population (Preson *et al.*, 2000). Indirect standardization is appropriate for age standardizing and comparing mortality rates of two populations when there are data on the crude mortality rates and age distributions of both populations, but the age-specific mortality rates of only one population. In our study, age-specific mortality rates were known for the general population but not the prison population. We estimated crude mortality ratios (CMR) as well as SMR by first calculating the age-specific expected deaths per 100,000 for the prison population by using the product of the prison age distribution and the age-specific mortality rates for the general population as reported by the MMWR reporting week.

This analysis required us to make decisions about aligning the age groups used by the reporting agencies, as they did not match. First, we excluded people aged 17 years and younger in the general population to match the prison population (aged 18 years and older). The CDC reported death counts for the 15–24 years age group. As we excluded those under 18 years, to estimate death counts for 18–24 years, we assumed a constant distribution of deaths across years within the interval. Second, we collapsed the BJS age categories from 5-year intervals into 10-year intervals. Third, we collapsed the CDC provisional death counts, and the US Census population counts at the upper end of the age distribution, from 85 years and older to 65 years and older, to match BJS age intervals. The final age intervals used in this study were 18–24 years, 25–34 years, 35–44 years, 45–54 years, 55–64 years and 65 years and older.

Next, we used direct standardization to compare the mortality rates of persons in prison to the general population in the State of Texas (Preson *et al.*, 2000). Direct standardization is appropriate for age standardizing and comparing mortality rates of two populations when there are data on the crude mortality rates and age distributions of both populations, as well as age-specific mortality rates for both populations. In our study, we estimated age- and sex-specific COVID-19 mortality rates for both the general and prison population of Texas. We then used the US population age distribution as the "standard" for both populations by multiplying the age- and sex-specific crude mortality rates by the standard age distribution and summing the adjusted mortality rates to derive the age- and sex-adjusted mortality rate for the Texas prison and general population. This analysis required us to make decisions about aligning the age groups used by the reporting agencies, and we followed a similar process described above. The final age groupings are 18–29 years, 30–39 years, 40–49 years, 50–64 years, 65–74 years, 75–84 years and 85 years and older.

Results

US population

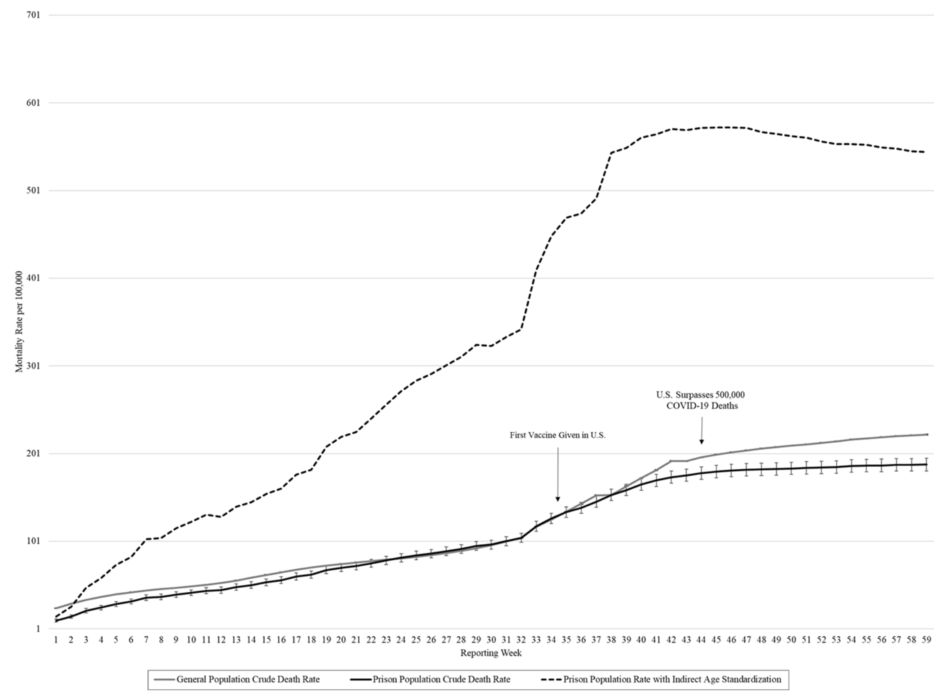
Overall, the age distribution of people in prison was younger than the general population (Table 1). For example, people aged 18–24 years account for 9.5% of the prison population and 12.7% of the general population (numerators and denominators for proportions are i n Table 1). People aged 25–34 years comprise the largest proportion of people in prison (31.9%), and people aged 65 years and older comprise the smallest proportion of people in prison (3.0%). This is compared to 17.7% and 20.5%, respectively, in the general population. Based on the age-specific death rates for the general population on June 5, 2021, the number of expected deaths from COVID-19 for people in prison is 921, as shown in Table 1. The number of observed deaths reported by CPP was much higher (n = 2,664), corresponding to an SMR of 2.89 (95%CI 2.78, 3.00). This means that the risk of death in prison is almost three times that of the general population despite the overall younger age of the prison population.

Figure 1 examines the risk of death from COVID-19 weekly by providing the crude mortality rates for the prison population and the general population as well as the age-standardized mortality rate for the prison population using indirect standardization. Near the beginning of the pandemic on April 25, 2020 (reporting week 1), the crude COVID-19 mortality rate for people in prison (10 per 100,000) was significantly lower (CMR = 0.43, 95%CI 0.17, 0.69) than the general population (24 per 100,000). In other words, the crude mortality rate for the general population was 2.34 times that of the prison population the week of April 25, 2020.

Table 1 Age distribution and COVID-19 mortality rates for people in prison and the general US Population aged 18 years and older, June 5, 2021

	People in prison (n = *1,414,200)*			*General US population* (n = *255,599,556)*			*Number of expected deaths for people in prison*	*Number of observed deaths for people in prison*	*Standardized mortality ratio (95% CI)*
Age group	*Number (%)*		*Mortality rate per 100,000 population*	*Number (%)*		*Mortality rate per 100,000 population*		*2,664*	*2.89 (2.78, 3.00)*
18–24 years	134,349	(9.5)	–	32,440,709	(12.7)	2.05	3		
25–34 years	451,130	(31.9)	–	45,344,674	(17.7)	9.14	41		
35–44 years	391,733	(27.7)	–	41,498,453	(16.2)	25.34	99		
45–54 years	260,213	(18.4)	–	41,605,244	(16.3)	69.79	182		
55–64 years	134,349	(9.5)	–	42,287,362	(16.5)	171.60	231		
65+	42,426	(3.0)	–	52,423,114	(20.5)	862.38	366		
Total							921		

Figure 1 COVID-19 mortality rates for people in prison and the general US population over time by centers for disease control and prevention morbidity and mortality weekly reporting (MMWR), April 25, 2020 to June 5, 2021



By August 29, 2020 (reporting week 19), there was no significant difference in crude mortality rates, with the CMR hovering around 1.0 until January 30, 2021 (reporting week 41).

However, the age-standardized rates tell a different story. After indirect standardization, the observed number of COVID-19-related deaths exceeded the expected number of COVID-19-related deaths among people in prison for most of the pandemic. Applying the age-specific mortality rates from the general US population to the prison population yielded 103 expected deaths by April 25, 2020. The observed deaths (*n* = 148) were 44% higher than expected (SMR = 1.44, 95% CI 1.21, 1.68), given the younger overall age structure of the prison population. There was a period of rapid growth, with the SMR peaking at 3.53 (95% CI 3.39, 3.68) on January 29, 2021 (reporting week 38), approximately four weeks after the introduction of COVID-19 vaccines in the USA. Mortality rates for both the prison population and US general population then plateaus. The latest SMR from June 5, 2021 (reporting week 59) indicates that the risk of death from COVID-19 is 2.89 times that (95%CI 2.78, 3.00) of the risk of death in the general population for people aged 18 years and older after adjusting for age (as shown also in Table 1). To illustrate the magnitude of this difference, the crude mortality rate for the prison population was 188 per 100,000 and the age-standardized mortality rate was 545 per 100,000.

Texas population

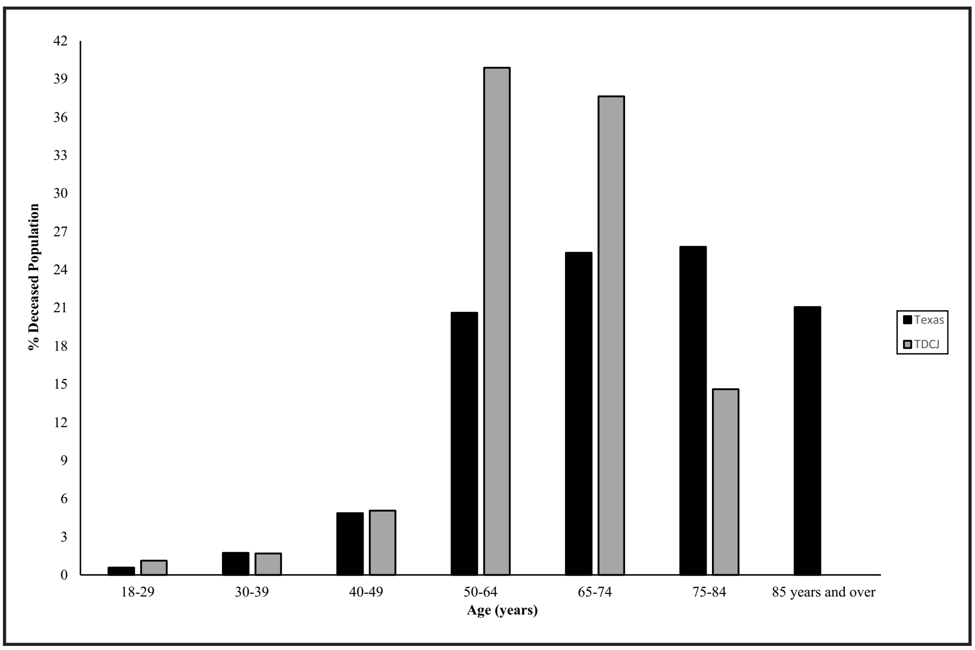
As of June 25, 2021, TDCJ administered almost 600,000 COVID-19 tests and identified 34,725 cases and 259 COVID-19-related deaths. Detailed data for COVID-19 deaths are available for 181 people, with the latest reported death occurring on November 1, 2021. Most of the deceased were men (*n* = 173; 6 women, 2 unknown), and their ages ranged from 28 to 84 years (mean = 63.8; *n* = 178 [three cases were missing date of birth]). About 90% of deaths were among people aged 50 and older (91.7%). The mean number of days from reported COVID-19 diagnosis to death was 18.3 days, ranging from 0 to 177 days

(n = 149; date of diagnosis was not reported for 32 people). Most (169/181) people died in hospitals, with the remaining dying in the prison unit. The reported number of days hospitalized among those who died in a hospital ranged from 0 to 48 days, with a mean of 13.2 days (n = 166 people; hospitalization date was missing for three people who died in a hospital). About half (98/181) of the sample had an autopsy performed post-mortem, and 50.3% (91/181) were noted to have had an underlying health condition.

TDCJ provided cumulative COVID-19 data at the prison unit level from March 2020 until December 2020. Using these data, both the mean and median age of incarcerated people within prison units (n = 98) was significantly correlated with the prison unit-level COVID-19 case rate (r = 0.38, $p < 0.001$ and r = 0.39, $p < 0.001$, respectively) and the prison unit-level COVID-19 mortality rate (r = 0.51, $p < 0.001$; r = 0.51, $p < 0.001$, respectively). Many of the COVID-19 deaths occurred among people confined to the Duncan, Estelle, Pack, Styles and Wynne prison units of the TDCJ. Each of these units experienced more than 10 deaths, and combined; these five units represented about 40% of all confirmed deaths. The units with the highest mortality rates tended to house vulnerable populations, including a geriatric unit, a medical unit and a psychiatric unit.

The age distribution of deaths in prison looks very different compared with the age distribution for the general population of Texas. The age distribution of deaths is shifted downward for the prison population (Figure 2). For example, 39.9% of COVID-19 deaths in the prison population occurred among people aged 50–64 years, compared with 20.6% of COVID-19 deaths in the general population. In prison, there were no deaths in people aged 85 and older, whereas this age group comprised 21.1% of COVID-19 deaths in the general population. Mortality risk was compared using direct standardization to adjust for age and sex (Table 2). The overall adjusted mortality rate for the prison population was 11.18 per 1,000 and for the general population was 6.03, for a risk ratio of 1.85. In the prison population, women and men had similar adjusted mortality rates (5.91 and 5.26, respectively), whereas, in the general population, the adjusted mortality rate among men (3.59) was 47.1% higher than women (2.44). Both women and men in prison had higher age-adjusted mortality rates than their

Figure 2 Percentage of deaths attributed to each age range among COVID-19 deaths of the general population and TDCJ population as of November 1, 2020



counterparts in the general population. This should be interpreted with extreme caution, however, given the low number of deaths among women in prison ($n = 6$).

Discussion

Findings from our study indicate a wide disparity between mortality rates of the US general population and the prison population after adjusting for age. People who are incarcerated are dying of COVID-19 at a rate that far outpaces what would be expected given their overall younger age, and people in prison are dying from COVID-19 at much younger ages than has been documented in the general population. Week over week, the gap between the mortality rate for the general population and prison residents has continued to widen over the course of the pandemic. One possible explanation for this finding is that COVID-19 testing and personal protective equipment (PPE; e.g. masks, hand sanitizer) and later vaccines and treatment were more widely available and available earlier in the pandemic for people living in the community than in prisons. People in the community also had more agency in deciding when and how to use PPE, socially distance and voluntarily test as a mitigation strategy.

Table 2 Age distribution and COVID-19 mortality rates for people in prison and the general population in Texas, aged 18 years and older, November 1, 2020

Sex	*Age group*	*No. (%)*	*Crude mortality rate per 1,000*	*Distribution in US population*	*Adjusted mortality rate per 1,000*
People in prison ($n = 117,472$)					
Female	18–29 years	1,893 (22.2)	0.00	0.21	0.00
Female	30–39 years	3,050 (35.8)	0.00	0.17	0.00
Female	40–49 years	2,011 (23.6)	0.99	0.15	0.15
Female	50–64 years	1,417 (16.6)	1.41	0.25	0.35
Female	65–74 years	125 (1.5)	8.00	0.13	1.01
Female	75–84 years	15 (0.2)	66.67	0.07	4.40
Female	85 years and over	1 (0.0)	0.00	0.03	0.00
Male	18–29 years	22,397 (20.6)	0.09	0.23	0.02
Male	30–39 years	32,703 (30.0)	0.09	0.17	0.02
Male	40–49 years	26,151 (24.0)	0.27	0.16	0.04
Male	50–64 years	23,226 (21.3)	2.97	0.24	0.72
Male	65–74 years	3,886 (3.6)	16.98	0.12	2.05
Male	75–84 years	566 (0.5)	44.17	0.05	2.42
Male	85 years and over	31 (0.0)	0.00	0.02	0.00
					11.18
General Texas Population ($n = 21,352,226$)					
Female	18–29 years	2,453,725 (22.6)	0.05	0.21	0.01
Female	30–39 years	1,986,848 (18.3)	0.17	0.17	0.03
Female	40–49 years	1,850,183 (17.1)	0.49	0.15	0.08
Female	50–64 years	2,545,356 (23.5)	1.57	0.25	0.39
Female	65–74 years	1,165,699 (10.7)	4.64	0.13	0.59
Female	75–84 years	589,183 (5.4)	10.18	0.07	0.67
Female	85 years and over	256,354 (2.4)	24.67	0.03	0.68
Male	18–29 years	2,584,858 (24.6)	0.07	0.23	0.02
Male	30–39 years	2,031,683 (19.3)	0.30	0.17	0.05
Male	40–49 years	1,825,935 (17.4)	0.96	0.16	0.15
Male	50–64 years	2,436,331 (23.2)	3.00	0.24	0.72
Male	65–74 years	1,024,638 (9.8)	8.27	0.12	1.00
Male	75–84 years	457,144 (4.4)	17.81	0.05	0.97
Male	85 years and over	144,289 (1.4)	36.17	0.02	0.67
					6.03
Risk ratio					1.85

Data from Texas generally supports previous research on aging in prisons. Age is associated with COVID-19 mortality, and people in prison are dying at younger ages compared to the general population. For example, in the general US population, among adults aged 25 years and older, 60% of deaths from COVID-19 have occurred among people aged 75 years and older (Feldman and Bassett, 2021). Similarly, the Texas case study in this paper shows that the majority of deaths from COVID-19 occurred among people aged 75 years and older when looking at the population overall. However, in the prison population of Texas, deaths are clustered at younger ages. In fact, COVID-19 deaths of people aged 50–64 years in prison are almost double that of the general population of Texas. We hypothesize that this may be due to the accelerated aging of the prison population – people in prison have a higher number of, and earlier onset of, chronic health conditions and incarceration itself likely increases stress and thus speeds "epigenetic clocks" (Berg *et al.*, 2021) – that may have made people more susceptible to COVID-19 complications. However, the contribution of comorbid conditions to COVID-19 fatality is complicated. [Centers for Disease Control and Prevention (CDC), 2021c] reports that COVID-19 was the only cause mentioned on death certificates in 5% of deaths, and "for deaths with conditions or causes in addition to COVID-19, on average, there were 4.0 additional conditions or causes per death." An in-depth study conducting full-body autopsies on 26 patients that had died of COVID-19 found that comorbidities, such as hypertension, ischemic heart disease and obesity, were present in most patients, yet causes of death did not appear to be an immediate result of preexisting health conditions and comorbidities (Elezkurtaj *et al.*, 2021). Given that only half of the death notifications in our study reported an autopsy was performed, it is difficult to speculate. But, it is clear that the risk of death from COVID-19 among older adults is unique for prison populations compared to the population overall. The drastic difference in mortality for the 85+ age category may also be due to survival bias – there are more people "surviving" to age 85 in the community than in prisons, with people in prison being censored due to premature death or release from prison.

There are several limitations to consider. This study relied on mortality data reported from the Departments of Correction. Correctional agencies are siloed from public health surveillance systems, and it is highly plausible that COVID-19-related deaths have been underreported. For instance, several state systems reporting high numbers of confirmed COVID-19 cases are opting not to report mortality data. This lack of transparency could obscure the magnitude of death. Critically, states, by and large, are not including demographic and other relevant information in their COVID-19 mortality reporting. In particular, timely population denominators are not available. It is also impossible to examine whether there are racial inequities in distributions of death in prison settings as there have been in the general population (Nowotny *et al.*, 2021). Given the hyper-incarceration of racial and ethnic minorities in the USA and that mass incarceration is the fundamental cause of COVID-19 disparities (Novisky *et al.*, 2021), it is highly likely that such inequities persist and are amplified among incarcerated populations (Akiyama *et al*, 2020).

Our findings have implications for curtailing morbidity and mortality driven by the disease Covid-19, which is caused by the SARS-CoV-2 virus, reducing the growing risks for older adults in prison (Prost *et al.*, 2021), and addressing the aging crisis in US prisons (Williams *et al.*, 2012). Two important COVID-19 mitigation strategies are underscored by these results. First, widescale and rapid deployment of the COVID-19 vaccine should continue to occur, and long-term plans for ongoing administration must be put in place. Vaccine allocation decisions should be based on the epidemiology of COVID-19 disease. Simply put, where there are more cases and an increased risk of severe disease and death, the COVID-19 vaccine should be prioritized. This study provides even more evidence that incarcerated populations should be prioritized for the COVID-19 vaccine. Second, decarceration, including compassionate release and medical parole, must be escalated and sustained. We have previously shown that in prison facilities, percent capacity (i.e. a proxy for overcrowding) is associated with the risk of COVID-19 outbreaks (Vest *et al.*, 2021). Therefore, the reduction of the incarcerated population would decrease the risk of contracting COVID-19, which in turn would prevent COVID-19-related deaths. These decarceration efforts must be ongoing. While we currently find ourselves in the middle of a public health crisis that requires urgent action, COVID-19 risk will remain high in America's carceral institutions, given the features of their built environment. Therefore, the fewer people exposed to these settings, the better. Our findings point toward the need to prioritize incarcerated persons for COVID-19 vaccination and for escalated decarceration as this pandemic continues to disproportionately kill incarcerated persons, following national recommendations for best practices (National Academies of Sciences, Engineering and Medicine, 2020) and legal precedence for humanitarian parole (Clark, 2020/2021).

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