COVID-19 Model Finds Nearly 100,000 More Deaths Than Current Estimates, Due to Failures to Reduce Jails

A Partnership Between ACLU Analytics and Researchers from Washington State University, University of Pennsylvania, and University of Tennessee

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COVID-19 MODEL FINDS NEARLY 100,000 MORE DEATHS THAN CURRENT ESTIMATES, DUE TO FAILURES TO REDUCE JAILS

Models projecting total U.S. fatalities to be under 100,000[1] may be underestimating deaths by almost another 100,000 if we continue to operate jails as usual, based on a new epidemiological study completed in partnership between academic researchers and ACLU Analytics. That is, deaths could be double the current projections due to the omission of jails from most public models. Numbers used by the Trump administration largely fail to consider several factors that will explosively increase the loss of life unless drastic reforms are adopted to reduce the nation's jail populations.

- The United States has the highest incarceration rate in the world — with only 4 percent of the world's population but 21 percent of the world's incarcerated population[2]. Models and data of infection spread based on other countries like Italy, China, and South Korea will underestimate the loss of life in the U.S., as their incarceration rates are substantially below U.S. levels.

- The conditions in U.S. jails and prisons are substantially inferior to those of other European and Western nations, propelling the spread of infection. Given the overcrowding and substandard conditions in most U.S. jails and prisons, standard public health interventions to "flatten the curve" and prevent the spread of COVID-19 are simply not feasible. Most are unable to allow for six feet of social distancing among incarcerated people and staff, and lack the facilities that allow for the recommended hand washing and cleaning of surfaces. Moreover, the health care available in our nation's jails is chronically substandard, further fueling the growth of the pandemic and increasing mortality rates among those infected while in jail.

- Jails, in particular, also act as vectors for infection in their surrounding communities. Jails are revolving doors for incarceration and face 10.7 million admissions a year[3]. That's an admission every three seconds in America. There are ~737,900 people in jail on any given day, and ~66 percent of them are pretrial detainees[4] — which means they are presumed innocent and have not been convicted of a crime. Hundreds of thousands of people who are incarcerated in jails nationwide are there because they cannot afford to post bail. The average time an individual spends in jail is 25 days[5].

As a result of the constant movement between jails and the broader community, our jails will act as vectors for the COVID-19 pandemic in our communities. They will become veritable volcanoes for the spread of the virus. The spread of COVID-19 from jails into the broader community will occur along two vectors that are ignored in typical models:

1. *Churn of the jail population* — individuals are arrested, sent to jail, potentially exposed to COVID-19, released on their own recognizance, post bail, or are adjudicated not guilty and are subsequently released. Upon release, the virus will spread through their families and communities unless the individual is quarantined.

2. *Jail staff* — staff come to work each day and are exposed to COVID-19, then return home and infect their families and communities. This vector applies to jails, prisons, and detention centers. There are ~420,000 people who work in jails and prisons in the U.S.[6].

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1   Projections by the Trump administration put potential U.S. deaths at 100,000 on the lower end (https://www.washingtonpost.com/politics/trump-white-house-projects-up-to-240000-coronavirus-deaths-in-us-even-with-mitigation-efforts/2020/03/31/62df5344-7367-11ea-87da-77a8136c1a6d_story.html). In recent days, the Trump administration has moved to an optimistic estimate of deaths "substantially under" 100,000 (https://www.cnbc.com/2020/04/10/trump-says-us-will-have-substantially-under-100000-deaths-from-coronavirus-lower-than-initial-estimates.html).

2   Based on 2018 U.S. incarceration data from the Bureau of Justice Statistics (https://www.bjs.gov/index.cfm?ty=tp&tid=11) and 2018 world incarceration data from the Institute of Criminal Policy Research (https://www.prisonstudies.org/sites/default/files/resources/downloads/wppl_12.pdf).

3   Source: https://www.bjs.gov/content/pub/pdf/ji18.pdf.

4   Source: https://www.bjs.gov/content/pub/pdf/ji18.pdf.

5   Source: https://www.bjs.gov/content/pub/pdf/ji18.pdf.

6   Source: https://www.bls.gov/oes/current/oes333012.htm

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Unfortunately, the radical approaches adopted in broader society to reduce other high-density transmission hubs — the closure of schools, the closure of non-essential businesses, and the enactment of stay-at-home orders — have not been emulated with regard to our jails. Some states have begun to see a reduction in their jail populations, such as Colorado, where there has been a 31 percent reduction[7], potentially saving ~1,100 lives (25% of projected deaths in the state)[8]. However, all states need to do more, and most states have failed to take any steps to stem the impact of the COVID-19 pandemic in jails and the broader community.

To assess the impact of not including jails in our actions to stop COVID-19, the ACLU teamed up with a group of researchers to build the dynamics of a jail system into a standard epidemiological model of COVID-19, using Allegheny County, Pennsylvania (Pittsburgh) as a reference[9]. The model was then tailored and run to the specific circumstances (e.g., jail and community populations, arrest and release rates, jail staff sizes) of the 1,242 counties in the U.S. with jail populations of at least 100 people. These counties include ~90 percent of the total U.S. population.

AS SOCIETY AT LARGE ADOPTS BETTER SOCIAL DISTANCING MEASURES IN PLACES OTHER THAN JAILS, JAILS INCREASINGLY BECOME A PRIMARY VECTOR FOR INFECTION. **THE TAKEAWAY IS CLEAR — SOCIAL DISTANCING MEASURES CAN ONLY BE EFFECTIVE IF WE EXTEND THEM TO JAILS AS WELL.**

In all epidemiological models — as in reality — the total death count will vary depending on policies adopted by our government and behaviors adopted by people in our communities. What our model tells us with near certainty is that ignoring jails in the public health measures taken to mitigate COVID-19 spread will result in the substantial undercounting of potential loss of life. For example, if a model that doesn't account for jails predicts that social distancing and other public health measures will keep the total number of U.S. deaths to 101,000, our model shows that that projection undercounts deaths by 98 percent. Actual deaths, once we account for jails, could be almost double, rising to 200,000.

The below table summarizes the potential underprojection of deaths in the United States when jails are not included in projection models:

	Highly effective social distancing	Somewhat effective social distancing	Less effective social distancing
Projected deaths - not accounting for jails (standard models)	101,000[10]	230,000[11]	989,000[12]
Projected deaths - accounting for jails	200,000	372,000	1,177,000
Underestimated deaths due to jails	**99,000**	**142,000**	**188,000**
% more deaths due to jails	**98%**	**62%**	**19%**

Note: Totals rounded to the nearest 1,000.

Note that the lower the projection without accounting for jails, the bigger the underestimate. This is because as society at large adopts better social distancing measures in places other than jails, jails increasingly become a primary vector for infection. The takeaway is clear — social distancing measures can only be effective if we extend them to jails as well.

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7 Source: https://www.denverpost.com/2020/04/01/colorado-jails-inmate-release-coronavirus-covid/
8 In a "highly effective social distancing" scenario (see Appendix). In a "somewhat effective social distancing" scenario, this reduction could save ~1,500 lives in Colorado.
9 Research paper: https://www.medrxiv.org/content/10.1101/2020.04.08.20058842v1
10 Projections by the Trump administration put potential U.S. deaths at 100,000 on the lower end (https://www.washingtonpost.com/politics/trump-white-house-projects-up-to-240000-coronavirus-deaths-in-us-even-with-mitigation-efforts/2020/03/31/62df5344-7367-11ea-87da-77a8136c1a6d_story.html). We chose to calibrate our lower-death rate benchmark scenario to ~100,000 deaths. See appendix.
11 Projections by the Trump administration put potential U.S. deaths at up to 240,000 (https://www.washingtonpost.com/politics/trump-white-house-projects-up-to-240000-coronavirus-deaths-in-us-even-with-mitigation-efforts/2020/03/31/62df5344-7367-11ea-87da-77a8136c1a6d_story.html). We chose to calibrate our medium-death rate benchmark scenario to between 220,000-260,000 deaths. See appendix.
12 The much-cited Imperial College study projects 1.1M U.S. deaths under moderate mitigation strategies (https://www.imperial.ac.uk/media/imperial-college/medicine/sph/ide/gida-fellowships/Imperial-College-COVID19-Global-Impact-26-03-2020v2.pdf). We chose to calibrate our higher-death rate benchmark scenario to ~1M deaths. See appendix.

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While terrifying, these numbers don't even account for prisons and immigration detention centers, whose incarcerated populations are often held for longer periods of time[13]. Reforms must be enacted to flatten the infection curve and curb the infection rates in jails, prisons, and surrounding communities.

Recommendations: actions we can take now to save lives

EVERY DAY THAT GOES BY WITHOUT ACTION MEANS MORE PEOPLE WILL DIE. **DELAYING ACTION FOR A WEEK COULD MEAN A DIFFERENCE OF 5,000-18,000 LIVES.**

Governors, judges, prosecutors, sheriffs, and chiefs of police have the power to save lives by safely and swiftly reducing populations in local detention facilities, without any changes in the law. The ACLU recommends they use that power to immediately reduce jail populations by following these recommendations:

- **Governors** must provide statewide leadership and coordination, directing the many local law enforcement agencies in their state to work together in a unified fashion to reduce jail populations by following all the policy recommendations below.

- **Chief justices** or state administrative judges should likewise exercise statewide leadership by issuing orders, bringing a uniform approach to the hundreds of judges in their state — by directing them to reduce local jail populations by voiding or suspending, on a statewide basis, outstanding arrest warrants for failure to appear, failure to pay, and technical parole or probation violations; and ordering pretrial release without conditions in all cases where release poses no risk of imminent and willful flight or imminent serious physical harm to another person.

- **Prosecutors,** as the gatekeepers of the local criminal justice system, should decline to prosecute custodial arrests made for low-level charges, recommend pretrial release without conditions in all cases where there is no risk of imminent serious physical harm to another person, and proactively identify and release anyone currently incarcerated who fits this criterion.

- **Sheriffs,** in their capacities as jail administrators, should release anyone in their custody who is uniquely vulnerable to serious illness or death based on age or underlying medical conditions, as defined by the CDC; they also should consider releasing other people in custody where the release poses no risk of serious physical harm to another person, including people held by the sheriff on immigration detainers.

- **Chiefs of police and sheriffs,** in their capacity as law enforcement officers, should not make any custodial arrests unless necessary to prevent an imminent and serious risk of bodily harm to another person, and instead issue summons for serious offenses and give verbal warnings or written citations for all other low-level offenses.

- **Judges** should order pretrial release without conditions in all cases where there is no risk of imminent serious physical harm to another person, order release of anyone currently incarcerated not meeting those conditions, and suspend issuance or enforcement of any bench warrants for failure to appear or technical parole or probation violations.

Taking these actions will directly result in lives saved in jails and in their surrounding communities.

- If we take action to reduce arrests by 50 percent, we can save 12,000 lives in jails, and 47,000 lives in the surrounding communities[14].

- If we stop arrests for anything but the five percent of crimes defined as most serious by the FBI[15] — including murder, rape, and aggravated assault — and are able to double the rate of release for those already detained, we can save 23,000 lives in jails, and 76,000 lives in communities[16].

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13 Given the different nature of incarceration in prisons and immigration detention centers, separate mathematical models for the spread of COVID-19 and the resultant mortality rates in those facilities and surrounding communities must be commissioned and undertaken. Given the revolving door of incarceration through our nation's jails, the spread and impact may indeed be greatest here.

14 In a "highly effective social distancing" scenario, in which a model that doesn't account for jails would project 101,000 total deaths, while a model that incorporates jail dynamics will project 200,000 deaths. In a "somewhat effective social distancing" scenario, we can save 12,000 lives in jails, and 70,000 lives in communities.

15 Source: https://ucr.fbi.gov/crime-in-the-u.s/2018/crime-in-the-u.s.-2018/topic-pages/persons-arrested

16 In a "highly effective social distancing" scenario, in which a model that doesn't account for jails would project 101,000 total deaths, while a model that incorporates jail dynamics will project 200,000 deaths. In a "somewhat effective social distancing" scenario, we can save 23,000 lives in jails, and 120,000 lives in communities.

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Every day that goes by without action means more people will die. Delaying action for a week could mean a difference of 5,000-18,000 lives.[17]

A look at the 20 largest jail systems

In the top 20 jail systems by jail population, we can expect over 5,300 people to die in jails in the next six months if we take no action. Additionally, over 13,300 more people may die than currently projected in those communities once we account for the impact of jails[18].

The breakdown by county:

County	Projected deaths - not accounting for jails	Projected deaths - accounting for jails[19]	Increase in deaths due to jails
Los Angeles County, CA	2,591	731 in jail; 3,322 in community	+1,462 (56% increase)
Harris County, TX	1,696	427 in jail; 2,074 in community	+805 (47% increase)
Maricopa County, AZ	1,384	358 in jail; 1,984 in community	+958 (69% increase)
New York City, NY	4,193[20]	364 in jail; 4,362 in community	+533 (13% increase)
San Bernardino County, CA	410	278 in jail; 1,080 in community	+949 (232% increase)
Dallas County, TX	1115	308 in jail; 1,545 in community	+738 (66% increase)
San Diego County, CA	673	306 in jail; 1,684 in community	+1,317 (196% increase)
Cook County, IL	1,857	256 in jail; 2,056 in community	+455 (24% increase)
Orange County, CA	524	274 in jail; 1,330 in community	+1,080 (206% increase)
Philadelphia County, PA	570	174 in jail; 591 in community	+195 (34% increase)
Bexar County, TX	3,111	214 in jail; 3,114 in community	+217 (7% increase)
Tarrant County, TX	681	171 in jail; 781 in community	+270 (40% increase)
Miami-Dade County, FL	1,184	230 in jail; 1,546 in community	+592 (50% increase)
Riverside County, CA	723	193 in jail; 1,133 in community	+603 (83% increase)
Sacramento County, CA	460	188 in jail; 883 in community	+611 (133% increase)
Broward County, FL	767	164 in jail; 860 in community	+257 (34% increase)
Santa Clara County, CA	477	137 in jail; 584 in community	+244 (51% increase)
Duval County, FL	877	145 in jail; 886 in community	+153 (18% increase)
Clark County, NV	1,157	258 in jail; 2,399 in community	+1,500 (130% increase)
Fresno County, CA	258	136 in jail; 522 in community	+400 (155% increase)

Note: All numbers based on a "highly effective social distancing" scenario, in which a model that doesn't account for jails would project 101,000 total deaths nationwide, while a model that incorporates jail dynamics will project 200,000 deaths nationwide. See appendix for sources for jail population data and notes on counties that have already reduced their jail populations.

17   5,000 lives correspond to delaying a 50% arrest reduction by 1 week nationwide. 18,000 lives correspond to delaying a 95% arrest reduction and a 2x release acceleration by 1 week nationwide. Both numbers refer to the "highly effective social distancing" projection.

18   In a "highly effective social distancing" projection, 38,000 will die in jails and the community when accounting for jails, as opposed to 24,700 without.

19   Jail deaths include incarcerated people and jail staff.

20   All numbers in this table are based on a "highly effective social distancing" scenario. As of 4/20/2020, New York City has already surpassed 10,000 deaths. Because New York City's 10th case date data is likely to be highly inaccurate (see Appendix for discussion of model burn-in), and because social distancing is inherently more challenging to execute effectively in a dense city like New York, a projection between our "somewhat effective social distancing" calibration at 11,125 deaths and our "less effective social distancing" at 38,580 deaths may be a better reflection of reality.

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Because we have tailored our model to each county's unique conditions, the death counts and impacts vary by jurisdiction. In places where the jail population is high relative to the county's overall population — as well as in those where people churn through jails more rapidly — jails will have a larger impact on the spread of COVID-19. In counties where the community implemented social distancing measures earlier, jails also end up being a bigger contributor to the total death count. Conversely, for communities where social distancing measures were adopted late — or those which maintained other high-density hubs for the spread of infection — jails will be a smaller share of a larger problem. What holds true across all counties in the United States is that jails will be the cause of many additional, avoidable deaths.

Methodology: About the Numbers

To paint a national picture of the impact of jails on the spread of COVID-19, we built upon the epidemiological model in "The Epidemiological Implications of Incarceration Dynamics in Jails for Community, Corrections Officer, and Incarcerated Population Risks from COVID-19"[21] and constructed individually-tailored runs of the model for the 1,242 jurisdictions in the United States with jail populations of at least 100 people. We then aggregated across counties for the national infection and mortality numbers in jails and in their communities.

The county-level model:

The county-level model is a classic SEIR compartmental model tailored to the characteristics of COVID-19 (accounting for disease characteristics such as the transmissibility, the duration of infection, and the length of the pre-symptomatic period). These are a standard class of models used by epidemiologists worldwide to study the spread of disease, and can be tailored to model movement between areas. The inclusion of a jail system in this model allows for:

- A realistic representation of jails as hubs with high contact and transmission rates (no social distancing, poor sanitation, high at-risk population)

- Movement of people between jails and the community (due to arrests, releases, and the daily activity of jail staff)

Tailoring to individual jurisdictions & scenarios:

Jail systems vary substantially across the United States, so it is important to tailor the model to the specifics of each jurisdiction. The model allowed for differences in:

- Jail and county population

- Average daily arrests and releases

- Path of COVID-19 spread thus far

To measure the overall impact of jails on COVID-19 infection and death rates, we ran and compared scenarios with jails rapidly emptied to those with jails operating business-as-usual, assuming the rest of the community was sheltering in place. To understand the impact of our policy recommendations, we ran the model under the following scenarios for each county:

- 10 percent reduction in arrest rates

- 50 percent reduction in arrest rates (representing the majority of minor crimes)

- 95 percent reduction in arrest rates (all but violent crimes) and a 2x acceleration of releases

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21   Research paper: https://www.medrxiv.org/content/10.1101/2020.04.08.20058842v1

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In order to construct a reasonable apples-to-apples comparison of the results of our model to popularly cited projections, we adjusted the effectiveness of social distancing in the model so as to yield three calibration levels with "no-jail" projections of 101,000 deaths, 230,000 deaths, and 989,000 deaths.

In no runs of the model do we account for limitations on medical treatment and supplies once a person has been infected. As such, any medical shortages in either the jail or the community would increase the number of projected deaths.

For a more complete explanation of our methodology, see Appendix: Methodological Details.

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Appendix: Methodological Details

This appendix provides technical details and data sources for the construction and aggregation of the nationwide impact numbers included in this report. Note that all data from live and evolving data sources were queried / gathered between April 13, 2020 to April 17, 2020.

County-level COVID-19 SEIR Model with Jails

For details regarding the construction of the county-level model, see "The Epidemiological Implications of Incarceration Dynamics in Jails for Community, Corrections Officer, and Incarcerated Population Risks from COVID-19". Model runs across all counties and scenarios were performed using this underlying model, with varying input data and parameters as described below.

Excluded counties

We have excluded in our analysis counties with jail populations less than 100, and any with no admissions or release data. This means that 1,242 counties are included in our analysis, representing ~90% of the total U.S. population.

County-level input data

We tailored the model scenarios run for each county using the following input data:

- **Jail population —** For the top 50 counties by jail population, we manually gathered the most up-to-date jail population number where available through public sources. Where this data was not available, we relied upon the Vera Institute for Justice COVID-19 project data. Where neither was available, we relied upon the average daily jail population in 2017, reported in the Vera Institute's Incarceration trends dataset version 2.1.

- **Total population —** from the Vera Institute's Incarceration trends dataset version 2.1, which draws on U.S. Census and the CDC's National Vital Statistics System Data. This dataset groups populations by jail — for example, the populations of Manhattan, Brooklyn, Queens, and the Bronx, which all use the Rikers Island jail complex, are aggregated.

- **Daily jail admit & release rates —** from the Vera Institute's Incarceration trends dataset version 2.1.

- **Jail officer population —** For the top 50 counties by jail population, we attempted to manually gather the most up-to-date jail officer population data. However, this data was not typically readily available. Where it was unavailable and for the remaining counties, we relied upon the data from the 2013 Census of Jails published by the Bureau of Justice Statistics. Where we were unable to extract a jail's data in either of the above, we used a k-nearest-neighbour imputation on average daily jail population and total population.

A few parameters were not readily available across counties; for these, we made the following assumptions:

- **Proportion in processing who return quickly to the community —** Our model allows for a portion of arrests to be booked into processing, but be released relatively quickly (in 12 hours). In Allegheny, Pennsylvania, the proportion of those who are released quickly is ~60%, with ~40% remaining in jail for longer. Without better data on other counties, we assumed the same proportion across all counties.

- **Mixing rates in jails and in processing —** Because of their crowded conditions, rates of effective contact[22] in jails and processing are higher than in the community. Based on discussions with jail experts, we assumed factors of 3x and 6x greater effective contact in jails and processing, respectively.

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22   In epidemiological models, "effective contact" is any kind of contact between two individuals that is sufficient to transmit an infection if one person is susceptible and the other is infected.

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While the majority of jail systems have a single facility, some of the larger jail systems consist of multiple facilities. Because of the frequent transfer of incarcerated people between facilities in many of these cases, we deemed it a reasonable approximation to model these as a single facility, consistent with the approach in "The Epidemiological Implications of Incarceration Dynamics in Jails for Community, Corrections Officer, and Incarcerated Population Risks from COVID-19".

Model burn-in period

The original model in "The Epidemiological Implications of Incarceration Dynamics in Jails for Community, Corrections Officer, and Incarcerated Population Risks from COVID-19" begins by seeding a single infection in the community on day 0. However, at the present time, COVID-19 has already progressed to differing degrees in many parts of the United States. Many states and communities have also adopted social-distancing measures at different times. We accounted for this by using a custom model "burn-in period" — that is, we let the infection propagate for a custom number of days in each county under "business-as-usual" conditions, assuming no social distancing for this initial period.

To mirror how this happened in the real world, we "burned-in" from 5 days before the date of the 10th confirmed case in the county until the date a shelter-in-place order or functional shut-down was established in that county. We benchmarked from the 10th case to avoid over-indexing on isolated early cases, and used a 5-day lag to account for the latent period of the virus between the time an average individual is exposed and the time they show symptoms. All counterfactual scenarios assume that any policy intervention affecting jails begins at the date of the shelter-in-place order. For counties whose shelter-in-place order precedes their 10th case by more than 5 days, and for counties who do not yet have a 10th case, we used a burn-in period of 0 days. For counties with no shelter-in-place order as of 4/13/2020, we used a burn-in period equivalent to the time between the date of the 10th detected case and 4/13/2020, plus 5 days.

For dates of 10th case, we relied upon the county-level data collected and released by the New York Times. For the dates of shelter-in-place orders, we also relied upon the New York Times's reporting for state-level orders.

In all scenarios, we run the model through September 30, 2020.

Scenario construction

For the impact numbers provided in this report, we ran the model described above under five sets of scenario assumptions:

1. Baseline — No social distancing in the community at large. Used for calibration only.

2. Shelter-in-place, with Jails — After the burn-in period, shelter-in-place is turned on in the community, but jail conditions continue as usual.

3. Shelter-in-place, with Jails, 10% arrest reduction — After the burn-in period, shelter-in-place is turned on in the community, and jail populations are allowed to decline assuming a 10% reduction in arrests.

4. Shelter-in-place, with Jails, 50% arrest reduction — After the burn-in period, shelter-in-place is turned on in the community, and jail populations are allowed to decline assuming a 50% reduction in arrests.

5. Shelter-in-place, with Jails, 95% arrest reduction & 2X release acceleration — After the burn-in period, shelter-in-place is turned on in the community, and jail populations are allowed to rapidly decline assuming a 95% reduction in arrests and a doubling of the release rate.

For our attribution of the undercount of deaths associated with the continued operation of jails as compared to models that don't account for jails, we used the difference between Scenarios #2 and #5 — that is, the difference in deaths between a scenario in which jails continue to operate as usual while the surrounding community shelters in place, and a scenario in which jails are effectively emptied out rapidly along with implementing shelter-in-place in the community. We interpreted Scenario #5 both as a policy alternative in

which strong action is taken in the jails along with in the communities, as well as as a baseline which we tie to other available public models for comparison purposes. In the latter interpretation, we can read Scenario #5 as a model in which jails are not properly accounted for or don't exist as major centers of density and infection transmission (a "no jails" scenario).

For the impact of the policy interventions that lead to Scenarios #3 and #4, we again used differences with Scenario #2.

In addition to these scenarios, we also ran similar scenarios that assessed the impact of interventions already implemented (such as in Colorado — see below), as well as scenarios in which action is delayed, to assess the impact of delaying policy interventions on lives lost and saved.

For the delayed action scenario, we used a 2-stage burn-in approach in which the 1st stage follows the procedure previously described, and is followed by seven days of shelter-in-place only (equivalent of Scenario #2), before continuing with an arrest reduction and release rate increase (equivalent of Scenario #5).

Calibration and tuning of social distancing effectiveness

As in "The Epidemiological Implications of Incarceration Dynamics in Jails for Community, Corrections Officer, and Incarcerated Population Risks from COVID-19", we calibrated our baseline scenario (assuming no social distancing measures taken) to the model in "The Global Impact of COVID-19 and Strategies for Mitigation and Suppression" from the Imperial College / WHO Collaborating Centre for Infectious Disease Modeling / MRC Centre / Abdul Latif Jameel Institute consortium. This assumes that under a scenario with no social distancing measures taken, 76.7% of the population will be infected and ~1-2% of those who develop symptoms will die.

An additional model parameter describes the effect of shelter-in-place measures on the population contact rate, i.e., the effectiveness of social distancing measures. In this report, we present three different calibrations of the model:

1. **Highly effective social distancing —** In this calibration, we tuned the parameter that controls the effect of social distancing such that deaths in Scenario #5 (our "no jails" scenario) are approximately 100,000, landing at ~101,000. Earlier projections by the Trump administration put potential U.S. deaths at 100,000 on the lower end. Recent projections from the Institute for Health Metrics and Evaluation are among the most optimistic of widely cited projections, putting the likely total deaths in the U.S. at ~69,000 by August 1, 2020 (we run our model until September 30, 2020). In recent days, the Trump administration has also moved to an optimistic estimate of deaths "substantially under" 100,000. We took 100,000 as a useful benchmark.

2. **Somewhat effective social distancing —** In this calibration, we tuned the parameter that controls the effect of social distancing such that deaths in Scenario #5 (our "no jails" scenario) are 220,000-260,000, landing at ~230,000. Earlier projections by the Trump administration also put potential U.S. deaths at up to 240,000. Similar estimates have been reported by the New York Times if social distancing measures are (at least partially) lifted in May. A back-of-the-envelope calculation based on annual flu infections in the U.S. also puts us in the range of 260,000[23].

3. **Less effective social distancing —** In this calibration, we tuned the parameter that controls the effect of social distancing such that deaths in Scenario #5 (our "no jails" scenario) are ~1M, landing at 989,000. The much-cited Imperial College study projects 1.1M U.S. deaths under moderate mitigation strategies.

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23 In a normal, non-pandemic year, influenza causes symptomatic infection in about 7-8% of the U.S. population (~330mil), or ~25M symptomatic infections. Some of the country is immune to circulating annual flu strains; without immunity, there might be ~1.5x as many infections. In addition, COVID-19 may be about twice as infectious, bringing us to ~74M infections under a no-social distancing scenario. With social distancing bringing that down by 1/2, we might estimate 37M infections overall. Applying a 0.7% case fatality rate as measured in Wuhan brings us to ~260,000 deaths.

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All other model parameters not discussed above are chosen to remain identical to those in the paper "The Epidemiological Implications of Incarceration Dynamics in Jails for Community, Corrections Officer, and Incarcerated Population Risks from COVID-19".

Top 20 counties by pre-COVID-19 jail population

As noted above, under "County-level input data," we used the best data we could identify for pre-COVID-19 jail populations. Below are the sources for the 20 top jails by jail population listed in the report. We also identified where some counties are beginning to take action to reduce their jail populations. Note that because of rapid churn in jail populations, reported current populations are not necessarily stable — decreases must be maintained through continued and systematic decreases in arrest rates and increases in release rates.

County	Jail population (pre-COVID)	Jail population source	Notes on COVID-19-related jail population reductions
Los Angeles, CA	17,076	Vera Institute for Justice COVID-19 project data	According to Vera's COVID data, the jail population decreased to 12,362 by 4/15/20.
Harris, TX	9,059	Vera Institute for Justice COVID-19 project data	The Harris Jail publishes a population count, which decreased to 7,479 by 4/14/20.
Maricopa, AZ	7,100	Local news	The news source quotes a sheriff's spokesperson announcing the reduction of the inmate population to 5,785 by 4/10/20.
New York City, NY	6,988	NYC DOC FY 2020 "At a Glance"	By 4/6/20, the jail population decreased to 4,363, according to a City of New York report.
San Bernardino, CA	6,200	Local news interview with sheriff	According to the same source, the population had decreased to 5,500 by 3/25/20.
Dallas, TX	5,879	Texas Commission on Jail Standard 3/1/20 report	As of 4/14/20, we did not find a more recent jail population for Dallas.
San Diego, CA	5,600	Local news from late 2019	The Sheriff's office publishes the inmate population, which decreased to 4,363 by 4/14/20.
Cook, IL	5,555	Vera Institute for Justice COVID-19 project data	Vera's COVID data shows a 4/16/20 inmate population of 4,322.
Orange, CA	5,280	Vera Institute for Justice COVID-19 project data	Vera's COVID data shows a 4/16/2020 inmate population of 3,315.
Philadelphia, PA	4,780	Philadelphia Jail Population Report, February 2020.	Philadelphia jails publish daily population updates. By 4/13/20, the population was 4,087.
Bexar, TX	4,120	Vera Institute for Justice COVID-19 project data	As of 4/14/20, we did not find a more recent jail population for Bexar.
Tarrant, TX	4,102	Texas Commission on Jail Standard 3/1/20 report	By 4/6/20, the number had decreased to 3,379, according to local news.
Miami-Dade, FL	4,034	Vera Institute for Justice COVID-19 project data	Vera's COVID data shows a 4/3/2020 population of 3,400.
Riverside, CA	3,828	Vera Institute for Justice COVID-19 project data	Vera's COVID data shows a 4/16/20 population of 3,377.
Sacramento, CA	3,700	Local news	The sheriff released 421 inmates on 3/25/20, according to a press release.
Broward, FL	3,591	Local news	By 4/7/20, the Broward jail population had decreased to 3,164, according to local news.
Santa Clara, CA	3,219	Vera Institute for Justice COVID-19 project data	Vera's COVID data shows a 4/15/2020 inmate population of 2,391.
Duval, FL	3,211	Florida Detention Facilities Average Inmate Population January 2020 Report	As of 4/14/20, we did not find an updated jail population for Duval.
Clark, NV	3,100	Local news	According to local news, the population decreased to 2,900 by early April.
Fresno, CA	3,079	Vera Institute for Justice COVID-19 project data	Vera's COVID data shows a 4/15/2020 inmate population of 2,498.

ACLU

Treatment of Colorado's recent 31% jail population reduction

To assess the impact of a jail population decrease undertaken across counties in CO, we ran the model for an additional set of arrest reduction scenarios for 34/64 counties. Their jail population reductions have ranged (to date) from 18-79%, and we used the corresponding percentage as an arrest rate reduction percentage in our modeling. The county-specific data is sourced from HB 19-1297: Jail Data, Colorado Division of Criminal Justice, and reflect the average daily population for the quarter ending Dec 31, 2020. Post-COVID-decrease jail populations in Colorado's largest jails were collected by the ACLU of Colorado through phone calls and written communications with the jails.