



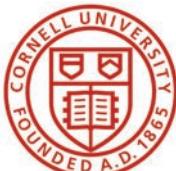
The Relationship Between Water Shutoffs and COVID Infections and Deaths

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A nationwide water shutoff moratorium might have saved more than 9,000 lives and prevented nearly half a million people from being infected with COVID-19 through the end of 2020. This study finds that in states with moratoria, the growth rates for COVID-19 infections and deaths were significantly lower. Had these shutoff protections been in place nationally, it might have reduced total COVID cases by 4.0 percent and COVID deaths by 5.5 percent in the 41 states without a full coverage of a moratorium over the period from April 17, 2020 to December 31, 2020. Existing water shutoff protections have protected human health and helped slow the spread of novel coronavirus.

Since March 2020, when the outbreak of the COVID-19 was declared a national emergency, hundreds of localities and states took strong action to suspend water shutoffs to ensure households had water for handwashing and sanitation. Unfortunately, this patchwork of protections was never uniformly applied nationwide and left millions of people vulnerable to service disruptions due to an inability to pay water bills during the pandemic.

With emerging variants of the virus that causes COVID-19, it is critical to ensure access to water services to continue to help slow the spread of the virus and prevent worsening infection rates. Food & Water Watch urges President Joe Biden to halt water shutoffs nationally for the remainder of the COVID-19 national emergency, and his administration should champion legislative solutions to cancel the water debt accrued during the pandemic and fully fund our public water infrastructure to provide long-term relief into the future.



Key Findings

From April 17, 2020 to December 31, 2020, states with moratoria on water shutoffs significantly reduced their growth rates of COVID infections and deaths, compared to states without moratoria, with the biggest reduction seen in states with comprehensive water shutoff moratoria covering all water systems in the state.

A moratorium on water shutoffs was associated with a reduced daily infection growth rate by 0.235 percent, and daily death growth rate by 0.135 percent. These small reductions in the daily growth rates were significant and had a sizeable impact on the cumulative case and death numbers.

Comprehensive water shutoff moratoria that apply to all water systems in a given state are associated with even lower infection and death growth rates.

A nationwide water shutoff moratorium might have reduced COVID cases by 3.97 percent and COVID-related deaths by 5.51 percent in the 41 states without full coverage of a moratorium over this period.

Extrapolating from model results, we estimated a nationwide water shutoff moratorium during the study period might have protected 480,715 people from COVID-19 infection and 9,052 people from death.

A National Water Affordability Crisis

The pandemic has exposed and exacerbated the pre-existing water affordability crisis in the United States. Since March 2020, one of the Centers for Disease Control and Prevention's top recommendations to help stop the spread of the novel coronavirus has been thorough and frequent handwashing,¹ but tens of thousands of people have been unable to follow this simple but crucial advice because their water service was shut off over water debt.²

For years, unaffordable water bills have been a growing problem in communities across the country.³ A 2017 study found that water bills were already unaffordable for 12 percent of households, and if water charges increased at projected rates, nearly

36 percent of U.S. households would be unable to afford their water bills within five years.⁴ This crisis disproportionately affects low-income households and communities of color.⁵ A study of Michigan found that communities of color pay higher average household water bills than communities with lower percentages of racial minorities.⁶

Austerity underlies this crisis. The federal government has cut back support for water systems, shifting the burden onto local ratepayers. Federal funding for water and sewer systems fell by 77 percent in real dollars from its peak in 1977 to 2017.⁷ At the same time, water pipes are aging and need to be replaced, while treatment plants need updates to comply with stronger water quality regulations, and climate chaos creates unprecedented challenges in many parts of the country.⁸ With weak federal support, water systems rely on rate increases to meet these daunting challenges.⁹ But many people just can't keep up with bills that outpace their wages.

Hardships and Water Shutoffs

One of the main collection practices of utilities for unaffordable water bills is service shutoffs.¹⁰ In a more typical year, 2016, an estimated 15 million people experienced a water shutoff for nonpayment.¹¹ A 2015 national survey found only 8 percent of municipalities had programs to protect low-income consumers from water shutoffs, and publicly owned water operators were more likely to protect residents from water shutoffs.¹²

Water shutoffs pose a real threat to human health.¹³ Without water service, people cannot flush their toilets, wash their hands or bathe. Lack of adequate sanitation can cause diseases to spread and allow people to become sick. The elderly, pregnant women, children and people with diabetes and other illnesses would be especially vulnerable.¹⁴ Black and Indigenous people of color, Latinx communities and low-income populations face higher disconnection rates and are more likely to lack access to basic water services.¹⁵ Water shutoffs can be traumatic. There is a substantial, statistically significant effect of water insecurity on psychological distress.¹⁶

A January 2021 working paper from Duke University researchers, published by the National Bureau of Economic Research, found that policies that promote housing stability through moratoria on evictions and utility shutoffs can have profound impacts on COVID death and infection rates.¹⁷

Water Shutoff Moratoria During the Pandemic

Before the pandemic, protections from water shutoffs were rare in the United States,¹⁸ but on March 9, 2020, Detroit became among the first U.S. cities to pause water shutoffs and temporarily reconnect water services for all residents.¹⁹ Advocates had fought water shutoffs in Detroit for nearly two decades before this historic decision,²⁰ which sparked a wave of moratoria nationally. Over the next several months, more than 800 localities and states followed Detroit's lead.²¹

A Wave of Protections

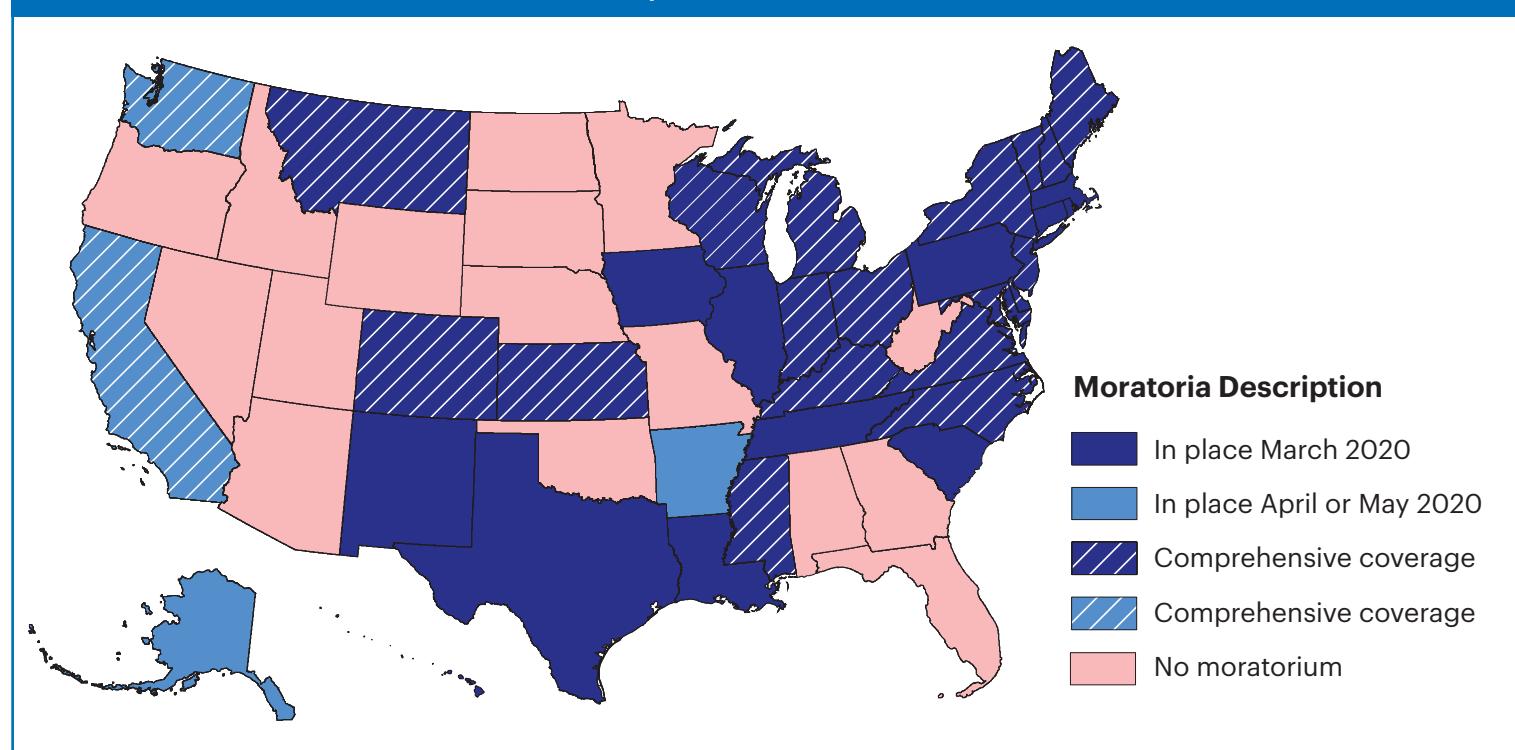
By June 2020, 34 states had imposed moratoria on water shutoffs, protecting the 247 million people living in those states. Twenty states imposed comprehensive water shutoff moratoria that apply to all

water systems in the state, and an additional 14 states imposed partial moratoria that covered only water systems, typically investor-owned utilities, that are regulated by state public utility commissions (see Figure 1 and Appendix A).

States that regulate private water utilities through their public utility commission and states that had higher COVID-19 case rates were more likely to impose a moratorium on water shutoffs in the first two months of the COVID-19 pandemic.²² Cities with higher per capita income, a higher percent of people of color, and higher income inequality and Democratic-led states were also more likely to impose moratoria on water shutoffs.²³

It is clear that moratoria on water shutoffs have protected hundreds of thousands of people from disconnection. Based on limited data from the New Jersey Board of Public Utilities, 37,386 households — about 100,000 people — in New Jersey alone were protected from losing their water at the end of 2020 because of the state-issued moratoria.²⁴ California found that 1.6 million households (one in eight households) were behind on their water bills, owing more than \$1 billion as of January 2021.²⁵

FIGURE 1. State Water Shutoff Moratoria as of May 2020



SOURCE: See Appendix A

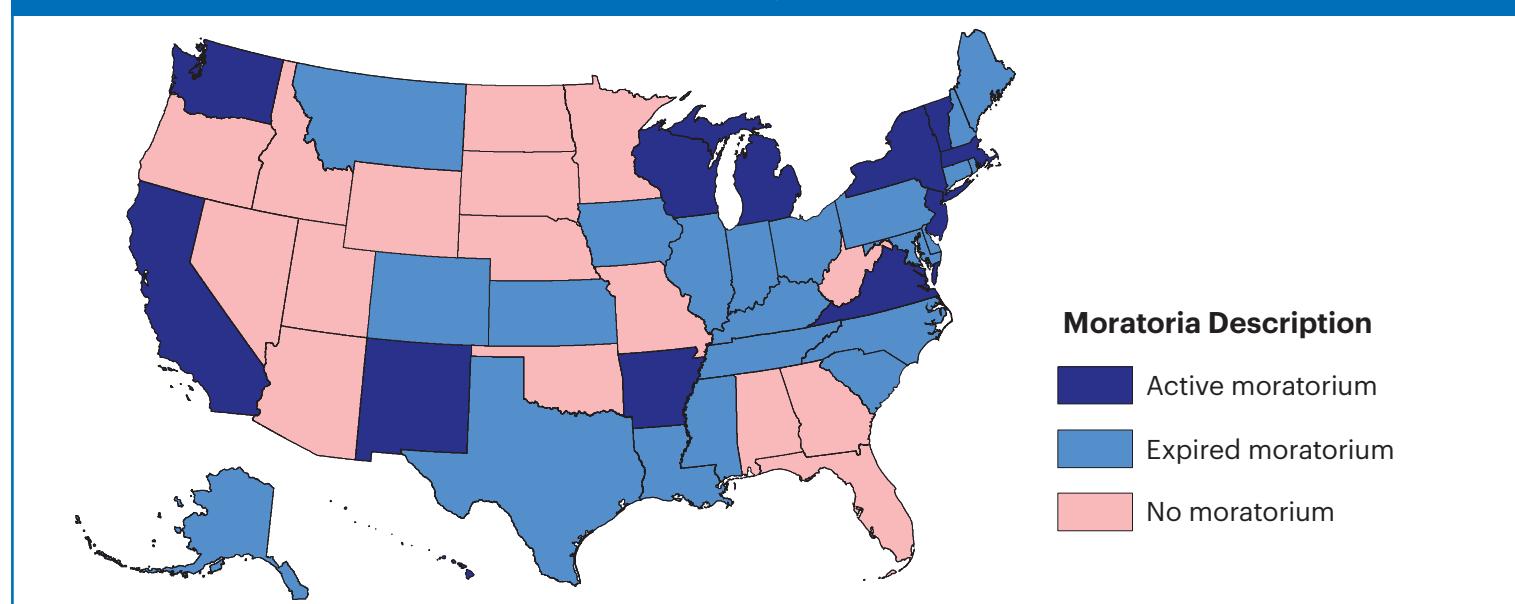
A Wave of Endangerment

Many of these protections were short-lived and expired months before COVID cases peaked in January 2021. By the end of 2020, 22 states had allowed their moratoria to expire, leading to 134 million people losing protections from water shutoffs. Only 12 states still had moratoria in place by the end of 2020 (see Figure 2 and Appendix A). As of December 2020, 65 percent of the country — 211 million people — were not covered under a state-issued moratorium. This includes 75 million people of

color and 2.6 million households in the lowest income quintile. These households are most at risk of water disconnection.

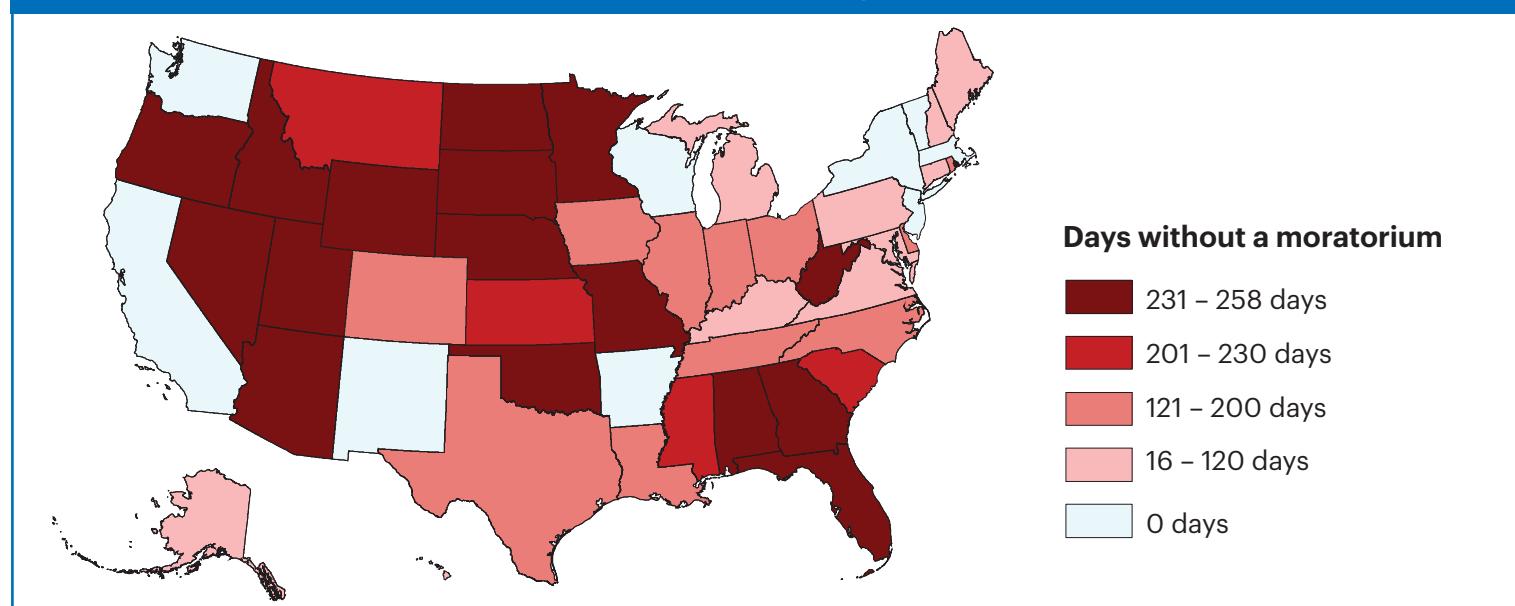
The length of state-imposed moratoria varied greatly across the country (see Figure 3 for the number of days that states went without a moratorium during the study period). During the study period, only nine states had a moratorium in place the entire time. Twenty-five states had a moratorium in place part of the time, and 16 states had no moratorium for the entire period.

FIGURE 2. State Water Shutoff Moratoria as of December 31, 2020



SOURCE: See Appendix A

FIGURE 3. Days without a state moratorium on water shutoffs during the study period (April 17 -December 31, 2020)



SOURCE: See Appendix A

In Michigan, for example, Governor Whitmer issued a comprehensive statewide water restoration order and moratorium on March 28, 2020.²⁶ The order, as extended, was set to remain in effect until at least the end of the year, but in October, the state Supreme Court struck down many of the Governor's COVID protections, including the shutoff moratorium.²⁷ Figure 4 shows that cases were peaking, due to the second wave, in the days when the moratorium was not in effect. Michigan water advocates successfully passed state legislation to reimpose a moratorium, which went into effect in December 2020.²⁸

Study Design

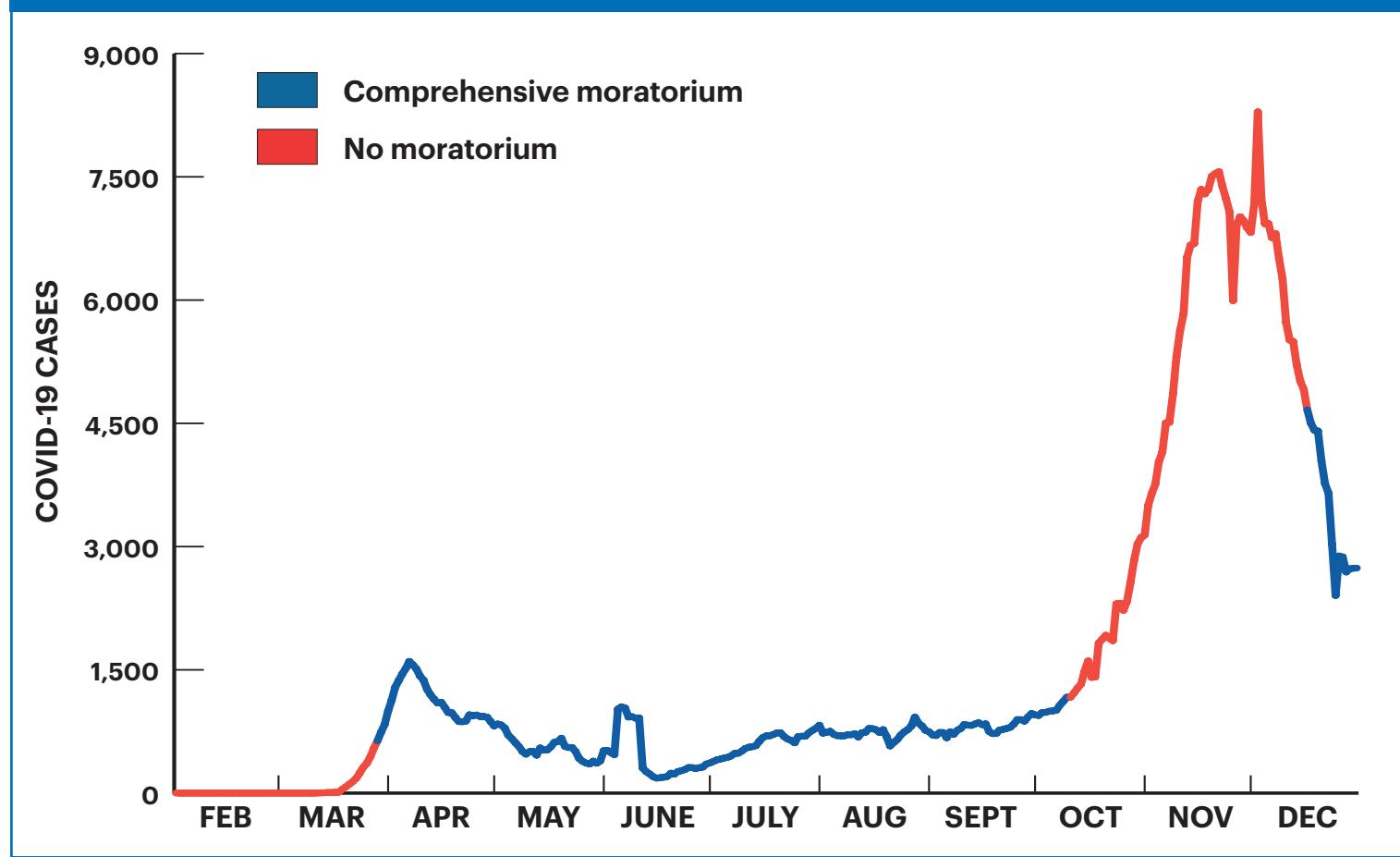
We ran a multilevel mixed effects linear regression to examine the relation between water shutoff moratoria and COVID-19 daily infection growth rate and daily death growth rate between April 17 and December 31, 2020.²⁹ This method has been used in other studies of COVID-19 health policies.³⁰ Both the COVID-19

infection growth rate and death rate had a large fluctuation at the beginning of the pandemic in March due to the low initial denominator of cases, so we excluded these outliers.

We calculate growth rate in confirmed cases and deaths using the prior seven day rolling average. This smooths spikes and reporting fluctuations (e.g., weekends) to more accurately estimate the trend. Our model controls for the effect of time to get an overall effect of the moratoria.

Because the infection rate is related to testing capacity which varies across states, we controlled for the daily test growth rate in the infection growth rate model. We also controlled for comprehensive coverage of the moratoria (applied to all water systems), and other confounding factors that might affect COVID case rates, including other state policies, such as mask mandates, the level of health insurance coverage and state demographic characteristics, such as minorities and essential workers.³¹

FIGURE 4. COVID-19 cases and water shutoff moratoria over time in Michigan (February – December 2020)



SOURCE: See Appendix A and New York Times COVID tracker (2020).

Results: Significant Decrease in COVID Infections and Deaths with Moratoria

Model results show that for the days when states had a moratorium on water shutoff in place, daily infection growth had a 0.235 percent decrease and the death growth rate had a 0.135 percent decrease (see Appendix 2). In addition, comprehensive coverage of the moratorium was significantly associated with an even lower infection and death growth rate. This small change in the growth rate had a significant impact. Recognizing that shutoffs would directly affect people living in poverty most, we also controlled for poverty and still found a significant and sizable impact.

Protecting 9,000 Lives and Preventing Nearly Half A Million Infections

Had a national shutoff moratorium been in place during the study period, it might have protected 480,715 people from COVID-19 infection and 9,052 people from death. This accounts for 4.0 percent of the increase in confirmed cases and 5.5 percent of the increase in total deaths for the 41 states which had days without a moratorium during the study period. Using model results, we calculate the potential impacts as shown in Table 1 (see Appendix 3 for calculation). These estimates exclude the 9 states which had a moratorium in place (whether partial or comprehensive) during the *entire* study period. Partial moratoriums cover less of the population; but in the analysis below, we do not distinguish partial and comprehensive, we only measure days when a moratorium was not in place.

TABLE 1. Potential reduction in COVID-19 cases and deaths if water shutoff moratoria in place across all U.S. States (April 17 – Dec 30, 2020)

Actual number		
Estimated number if moratorium had been in place		
Difference (number)		
Difference (percent) (difference/actual number)		

Figure 5 (on page 7) illustrates the number of people in each state that might have avoided contracting COVID had a moratorium been in place. Figure 6 (on page 7) shows the number of lives in each state that might have been saved with a nationwide water shutoff moratorium. The biggest benefits are in states with short or no moratoria, and also reflect the state's relative population size.

Conclusions and Recommendations

A nationwide water shutoff moratorium might have reduced COVID infections by 4.0 percent and deaths by 5.5 percent in states that lacked moratoria. Through a patchwork of protections in states with existing moratoria on water shutoffs, the growth rate of both COVID infections and deaths was significantly lower, with the biggest protection observed in states that imposed comprehensive moratoria on both public and private water systems. A national moratorium might have saved thousands of people. To ensure protection of water access for every person in the country, Food and Water Watch recommends that President Joe Biden work with Congress to:

- **Enact a nationwide moratorium on utility shutoffs for the remainder of the COVID-19 emergency.**

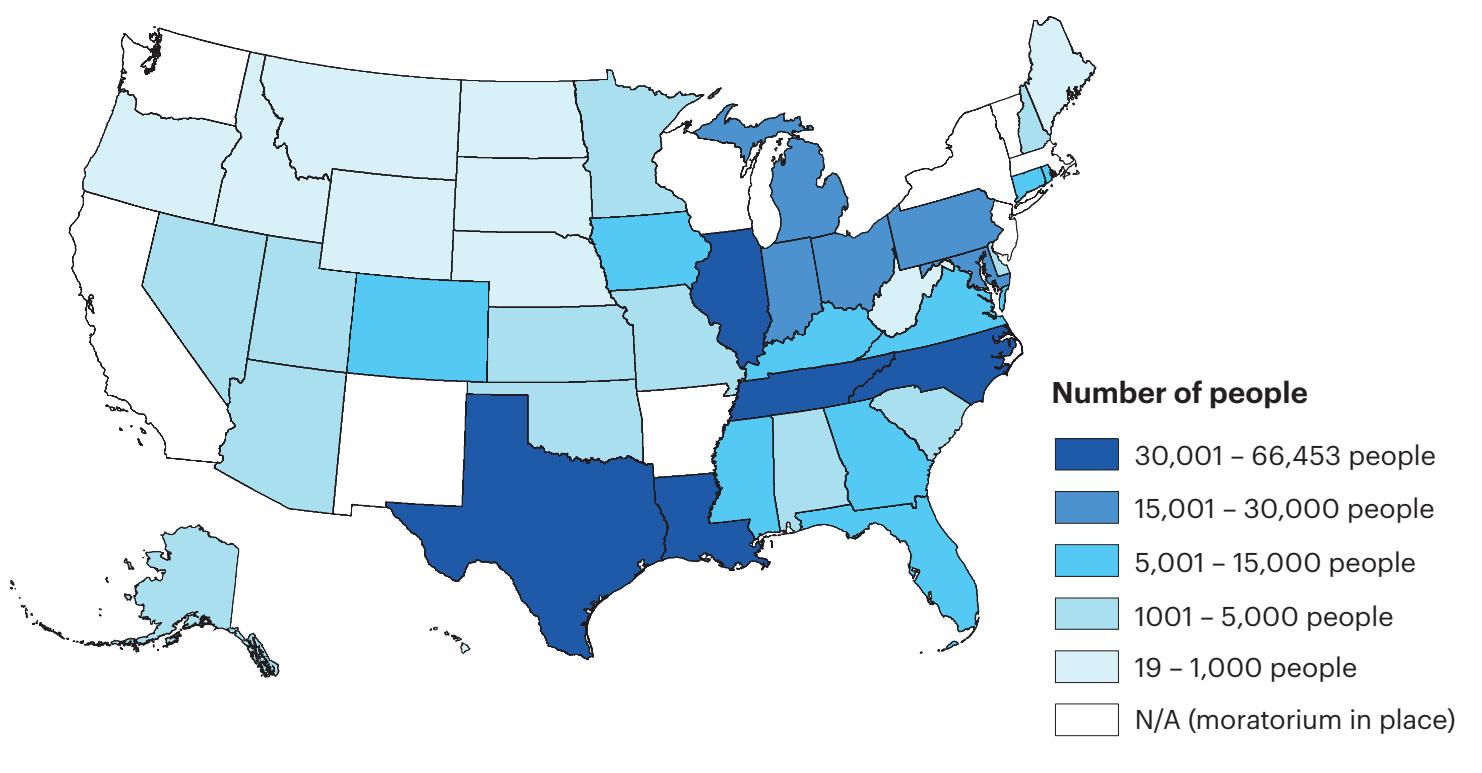
Enacting a nationwide moratorium on utility shutoffs is an important and urgent measure to help slow the spread of COVID-19. There should be policies in place to automatically impose a water shutoff moratorium during states of emergency in the future. Moreover, vulnerable households must be protected from shutoff at all times. This includes households with young children, seniors, and medically compromised individuals.

**States without water shutoff moratoria
(based on growth rate impacts from Appendix 3)**

	Confirmed cases	Deaths
Actual number	12,113,950	164,306
Estimated number if moratorium had been in place	11,633,235	155,254
Difference (number)	-480,715	-9,052
Difference (percent) (difference/actual number)	-3.97%	-5.51%

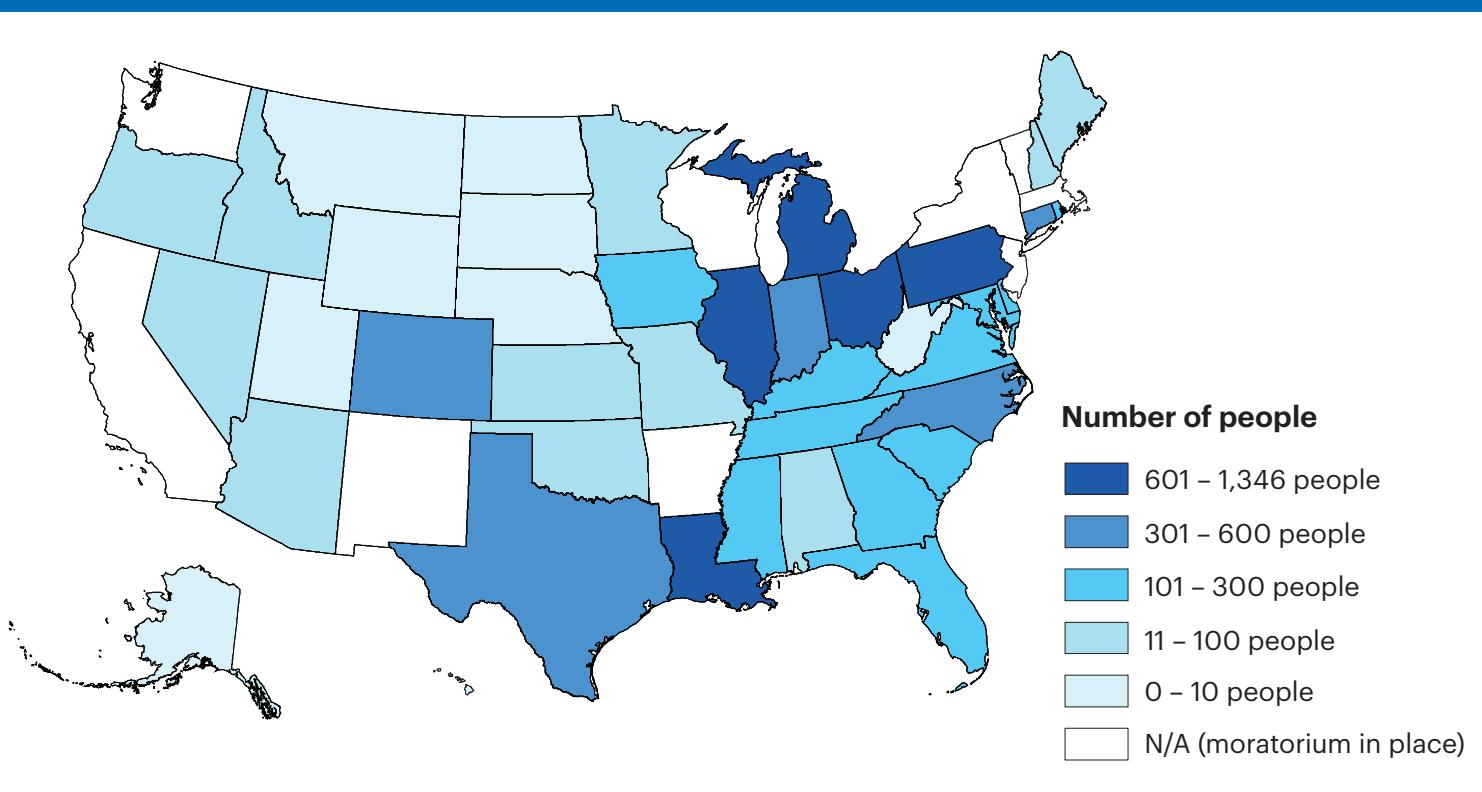
SOURCE: Calculations based on model results (see Appendices 2 and 3) for the 41 states which did not have a moratorium in place during the entire study period

**FIGURE 5. People who might have been protected from COVID-19 infection by a shutoff moratorium
(April 17 - December 31, 2020)**



SOURCE: Calculations based on model results (see Appendix 2 and 3)

**FIGURE 6. People who might have been protected from COVID-19 death by a shutoff moratorium
(April 17 - December 31, 2020)**



SOURCE: Calculations based on model results (see Appendices 2 and 3)

- **Cancel water debt.** Households have accrued an estimated nearly \$9 billion in water and sewer debts over the pandemic.³² Federal support is necessary to offer forgiveness of these debts to avoid a tidal wave of shutoffs when moratoria expire.
- **Establish income-based water affordability programs.** Federal funding should support the establishment of state and local programs to provide percentage-of-income payment plans with arrears management components for all households at or below 200 percent of the federal poverty level. Combined water and wastewater bills should not exceed 3 percent of household income, according to the United Nation's standard of water affordability.³³
- **Collect better data.** Better data collection and reporting are necessary to help inform policy and solutions. Utilities should periodically report statistics about shutoffs, restorations, arrears, aging of arrears, and other metrics to inform policy. These data must be provided by zip code or census tract to allow for investigation of disparate impacts based on race and other socioeconomic factors and to better inform the outreach of low-income aid providers.
- **Restore federal funding for water infrastructure.** National support for long-term financing for water utilities would help address systemic inequalities and create stronger, more resilient and more equitable communities. The nation's water and wastewater systems need federal support.³⁴ The Water Affordability, Transparency, Equity and Reliability (WATER) Act is the type of sweeping legislation needed to address water contamination, affordability, job creation and justice all at the same time. Water must be a priority for an infrastructure stimulus. With adequate water funding, we can provide immediate relief to households and fight the coronavirus, and we can also protect the health and safety of all communities. We must come out of this crisis with a newfound commitment to providing universal access to water for all.

Appendix 1: State Moratoria on Water Shutoff

State	Shutoff Moratorium	Moratorium Coverage	Status as of December 2020	Start Date	Expiration Date
Alabama	No	None			
Alaska	Yes	Partial	Expired	4/09/20	11/15/20 ³⁵
Arizona	No	None			
Arkansas	Yes	Partial	Active	4/10/20 ³⁶	
California	Yes	Comprehensive	Active	3/17/20 (regulated) ³⁷ 4/2/20 (comprehensive) ³⁸	
Colorado	Yes	Comprehensive (voluntary with confirmation)	Expired	3/20/20 ³⁹	6/13/20 ⁴⁰
Connecticut	Yes	Partial	Expired	3/12/20 ⁴¹	10/1/20 ⁴²
Delaware	Yes	Comprehensive	Expired	3/24/20 ⁴³	7/1/20 ⁴⁴
Florida	No	None			
Georgia	No	None			
Hawai'i	Yes	Partial	Active	5/4/20 ⁴⁵	
Idaho	No	None			
Illinois	Yes	Partial	Expired	3/18/20 ⁴⁶	8/31/20 ⁴⁷
Indiana	Yes	Comprehensive	Expired	3/19/20 ⁴⁸	8/14/20 ⁴⁹
Iowa	Yes	Partial	Expired	3/27/20	7/1/20 ⁵⁰
Kansas	Yes	Comprehensive	Expired	3/17/20 ⁵¹	5/31/20 ⁵²
Kentucky	Yes	Comprehensive	Expired	3/16/20 (regulated) ⁵³ 5/8/20 (nonregulated) ⁵⁴	10/20/20 (regulated) ⁵⁵ 11/6/20 (nonregulated) ⁵⁶
Louisiana	Yes	Partial	Expired	3/13/20 ⁵⁷	7/16/20 ⁵⁸
Maine	Yes	Comprehensive	Expired	3/16/20 ⁵⁹	11/1/20 ⁶⁰
Maryland	Yes	Comprehensive	Expired	3/16/20 ⁶¹	9/1/20 (comprehensive) ⁶² 11/15/20 (regulated) ⁶³
Massachusetts	Yes	Partial	Active	3/24/20 ⁶⁴	
Michigan	Yes	Comprehensive	Active	3/28/20 ⁶⁵ 12/22/20 ⁶⁶	10/12/20 ⁶⁷
Minnesota	No	None			
Mississippi	Yes	Comprehensive	Expired	3/15/20 ⁶⁸	5/26/20 ⁶⁹

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APPENDIX 1: STATE MORATORIA ON WATER SHUTOFF CONTINUED

State	Shutoff Moratorium	Moratorium Coverage	Status as of December 2020	Start Date	Expiration Date
Missouri	No	None			
Montana	Yes	Comprehensive	Expired	3/30/20 ⁷⁰	5/24/20 ⁷¹
Nebraska	No	None			
Nevada	No	None			
New Hampshire	Yes	Comprehensive	Expired	3/17/20 ⁷²	7/15/20 ⁷³ (comprehensive) 10/12/20 ⁷⁴ (regulated)
New Jersey	Yes	Comprehensive	Active	3/20/20 (voluntary with confirmation) ⁷⁵ 10/15/20 (mandate) ⁷⁶	
New Mexico	Yes	Partial	Active	3/18/20 ⁷⁷	
New York	Yes	Comprehensive	Active	3/13/20 (regulated voluntary) ⁷⁸ 6/17/20 (comprehensive) ⁷⁹	
North Carolina	Yes	Comprehensive	Expired	3/31/20 ⁸⁰	7/29/20 ⁸¹
North Dakota	No	None			
Ohio	Yes	Comprehensive	Expired	3/31/20 ⁸²	7/10/20 ⁸³
Oklahoma	No	None			
Oregon	No	None			
Pennsylvania	Yes	Partial	Expired	3/13/20 ⁸⁴	11/9/20 ⁸⁵
Rhode Island	Yes	Partial	Expired	3/16/20 ⁸⁶	7/18/20 ⁸⁷
South Carolina	Yes	Partial	Expired	3/18/20 ⁸⁸	5/14/20 ⁸⁹
South Dakota	No	None			
Tennessee	Yes	Partial	Expired	3/27/20 ⁹⁰	8/29/20 ⁹¹
Texas	Yes	Partial	Expired	3/26/20 ⁹²	6/13/20 ⁹³
Utah	No	None			
Vermont	Yes	Comprehensive	Active	3/30/20 ⁹⁴	
Virginia	Yes	Comprehensive	Active	3/16/20 (regulated) ⁹⁵ 11/18/20 (comprehensive) ⁹⁶	10/05/2020 (regulated) ⁹⁷
Washington	Yes	Comprehensive	Active	4/17/20 ⁹⁸	
West Virginia	No	None			
Wisconsin	Yes	Comprehensive	Active	3/13/20 ⁹⁹	
Wyoming	No	None			

Appendix 2: Impact of State Water Shutoff Moratoria on COVID-19 Infection and Death Rates: Model Results, US States, 2020

	Daily infection growth rate ¹ Column (1)	Daily death growth rate ¹ Column (2)
Moratorium on water shut-off ²	-0.235*	-0.135*
Comprehensive coverage of moratorium ²	-0.169*	-0.228*
Mask mandates ³	-0.214*	-0.103*
Percent Hispanic population ⁴	0.003*	0.004*
Percent essential workers ⁵	0.020*	0.038*
Percent health insurance coverage ⁴	0.001	-0.013*
Daily test growth rate ¹	0.552*	
Daily hospitalization growth rate ¹		0.017*
N (number of days * 50 states)	12950	12950
Log likelihood	-17197	-19784

DATA SOURCES:

- 1 New York Times (2020).
- 2 FWW (2021, Appendix 1).
- 3 Ballotpedia (2021).
- 4 ACS (2015–2019, 2021).
- 5 CBPP (2020).

* p < 0.05. This is a statistical measure of significance meaning with 95% confidence.

Appendix 3: Calculation of change in confirmed cases or deaths if a moratorium been in place

Our model estimates change in growth rate of infections or deaths. To convert this to an estimate of the number of cases we do the following:

Change in confirmed cases or deaths (Δ Confirmed cases or deaths):

$$\Delta\text{Confirmed cases or deaths} = \sum_{k=1}^{50} \sum_{i,j=4/17/2020}^{12/31/2020} \Delta\text{Confirmed cases or deaths } (k, i, j)$$

Whereas $\Delta\text{Confirmed cases or deaths } (k, i, j)$ is the change in confirmed cases or deaths for state k from day i to day j.

$$\begin{aligned} \Delta\text{confirmed or death cases } (k, i, j) \\ = & \text{cumulative confirmed or deaths } (k, i) \\ & * (1 + \# \text{ of days from } i \text{ to } j * \text{Adj}_{\text{growth rate}}) \\ & - \text{cumulative confirmed or death cases } (k, j) \end{aligned}$$

To estimate the decrease in infection (column 1) and death (column 2) rates in Table 1, we use the following formula and the Coeff for each model from Appendix 2:

$$\text{Adj}_{\text{growth rate}} = \frac{\frac{\text{cumulative confirmed or death cases } (k, j)}{\text{cumulative confirmed or death cases } (k, i)} - 1}{\frac{\# \text{ of days from } i \text{ to } j}{\text{Coeff}}} + \text{Coeff}$$

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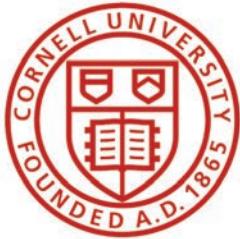
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