



Plumbing the Depths: Californians Without Toilets and Running Water

Laura Feinstein
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July 2019

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The Pacific Institute envisions a world in which society, the economy, and the environment have the water they need to thrive now and in the future. In pursuit of this vision, the Institute creates and advances solutions to the world's most pressing water challenges, such as unsustainable water management and use; climate change; environmental degradation; food, fiber, and energy production for a growing population; and basic lack of access to freshwater and sanitation. Since 1987, the Pacific Institute has cut across traditional areas of study and actively collaborated with a diverse set of stakeholders, including policymakers, scientists, corporate leaders, international organizations such as the United Nations, advocacy groups, and local communities. This interdisciplinary and nonpartisan approach helps bring diverse interests together to forge effective real-world solutions. More information about the Institute and our staff, directors, and funders can be found at www.pacinst.org.

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ACRONYMS AND ABBREVIATIONS

ACS – American Community Survey

ANOVA – Analysis of Variance

MHI – Median Household Income

OEHHA – Office of Environmental Health Hazard Assessment

PUMA – Public Use Microdata Area

PUMS – Public Use Microdata Samples

RV – Recreational Vehicle

SRO – Single-Room Occupancy (or Single-Resident Occupancy)

US HUD – United States Department of Housing and Urban Development

DEFINITIONS

Housing Unit – A house, apartment, mobile home, room, or group of rooms that is intended to provide separate living quarters. The American Community Survey includes all housing units located on a parcel with a postal address (US Census Bureau 2015b).

Incomplete Plumbing – A housing unit that lacks one of three essential fixtures: hot and cold piped indoor water, an indoor flush toilet, or a tub/shower. Units with complete plumbing have all three fixtures within the private living space.

Public Use Microdata Samples (PUMS) – Records on individual people or housing units. The PUMS records differ from American Community Survey Summary Tables, which show data tabulated by geographic areas (US Census Bureau 2009).

Public Use Microdata Areas (PUMAs) – Geographic regions consisting of at least 100,000 persons. The US Census Bureau reports microdata within PUMAs to protect anonymity of the respondents. In densely populated areas, PUMAs typically fall within one county. In less densely-populated regions, they fall within multiple counties.

Single-Room Occupancy (SRO) – A room or rooms that are rented to one or more people. Most share bathrooms and kitchens with other units, although some have private kitchenettes or half-baths.

Temporary Shelters – Boats, recreational vehicles, vans, tents, railroad cars, and the like are included in the American Community Survey if they are occupied and serve as a person's current place of residence (US Census Bureau 2015b).

EXECUTIVE SUMMARY

CALIFORNIA'S HUMAN RIGHT TO WATER law states that "every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes." To date, the policy discussion on meeting California's Human Right to Water has focused largely on expanding and improving drinking water utility services in the state, and improving the quality and reliability of drinking water for rural households using domestic wells. Sanitation and wastewater have received less attention. There also has been less attention paid to individuals and households in communities served by functional water and wastewater utilities but lacking the plumbing necessary to access those services.


To partially remedy these gaps, we set out to better understand the number of Californians with inadequate access to toilets and hot and cold running water.

KEY FINDINGS

In 2015, 208,000 Californians had inadequate access to toilets. 88,000 people lived in a household without a private indoor flush toilet. Another 120,000 people experiencing homelessness were also unlikely to have adequate access to a toilet (Figure ES-1).

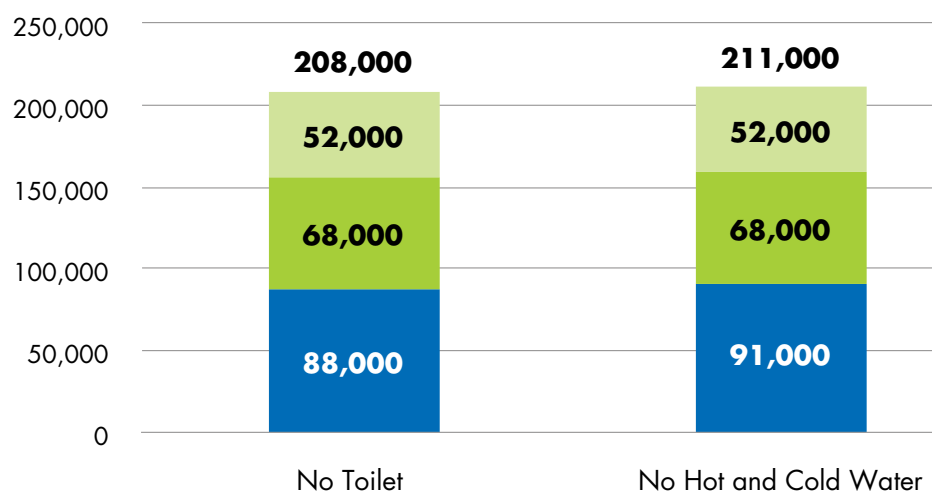
In 2015, 211,000 Californians had inadequate access to hot and cold running water. 91,000 people lived in a household without hot and cold running water. Another 120,000 people experiencing homelessness were also unlikely to have adequate access to hot and cold running water (Figure ES-1).

Incomplete plumbing was a problem throughout the state, in both urban and rural areas. Counties with the highest rates of housing without toilets were San Francisco (2.3 percent), Humboldt (0.89 percent), and Imperial (0.60 percent), while

Figure ES1.
Californians Without Access to a Toilet or Hot and Cold Water, Including Persons Experiencing Homelessness, in 2015 

■ Sheltered Homeless
■ Unsheltered Homeless
■ Individuals with a Residence

Source: US Census Bureau (2015a), US HUD (2016)



counties with the highest rates of housing without hot and cold indoor piped water were Shasta (0.96 percent), Imperial (0.73 percent), and San Francisco (0.71 percent).

Many Californians live in buildings with shared bathrooms, which are often poorly maintained. Housing units with incomplete plumbing were concentrated in low-income urban areas with high numbers of Single-Room Occupancies. Public health agencies have often found shared toilets to be unclean or in disrepair.

Many single-family homes also lacked a private toilet or indoor running water. There were 17,000 stand-alone structures (single-family homes, mobile homes, and temporary shelters) that lacked an indoor flush toilet. These households did not have access to shared facilities in the building.

Most households with incomplete plumbing lacked a toilet, shower, or both. The majority (86 percent) of those with incomplete plumbing lacked either a toilet, hot and cold water, or both. The remaining 14 percent lacked only a tub or shower.

Income and race correlated with incomplete plumbing by census tract. Median household income was the strongest predictor of rates of incomplete plumbing. Racial makeup was also statistically significant.

RECOMMENDATIONS

California should address the problem of inadequate plumbing within California's larger policy framework of the Human Right to Water. We recommend incorporating plumbing and sanitation into the Human Right to Water framework, implementing policy solutions to reduce the problem, and improving the data available to understand the problem.

Expand the Human Right to Water Framework to Include Sanitation and Household-Level Problems

- **Recognize sanitation as a co-equal component of the Human Right to Water.** Amend California Water Code Section 106.3 to formally recognize sanitation as a human right.
- **Address inadequate plumbing in state agency efforts to estimate the number of people living without the Human Right to Water in California.** The state agencies presently engaged in estimating the number of people without full access to water should include Californians residing in housing with incomplete plumbing, as well as those without homes.

Address the Problem of Incomplete Plumbing

- **Require stormwater discharge permits to include the provision of public restrooms as a strategy to meet water quality goals.** The California State Water Resources Control Board should consider requiring the Regional Water Boards and Caltrans to include the provision of public restrooms (including toilets and handwashing stations) in Stormwater Discharge Permits as a strategy to meet water quality goals.
- **Increase funding for access to safe and hygienic public restrooms, and institute state and regional policies to ensure resources are evenly distributed across local jurisdictions.** Local, regional, and state governments should invest the funds to increase access to safe and hygienic public restrooms. Regional and state governments need to consider mechanisms to ensure that public restrooms are broadly distributed and serve all members of the public.

- **Increase funding for adequate sanitation and hygiene in affordable housing.** Finding resources to increase affordable housing in California is one of the state's most intractable policy challenges. Our results indicate that state, regional, and local governments must also do a better job of finding resources to ensure that low-cost housing offers adequate sanitation and hygiene for residents.

Improve the Information Available on Incomplete Plumbing

- **Improve our empirical understanding of the financial costs and benefits of public investments in the provision of water and toilets.** Full cost-benefit studies should address, at a minimum, impacts to public health, water quality, law enforcement, quality of life, and economic growth.
- **Improve the American Community Survey questions on plumbing.** The survey should ascertain whether a household has piped water separately from a hot water heater. The US Census Bureau should also restore the recently-removed question on private flush toilets.

CONCLUSION

Hundreds of thousands of Californians still struggle with inadequate access to water and sanitation on a daily basis. While those impacted represent less than one percent of the population, the problems are serious for those experiencing them. Thus, inadequate access to water and sanitation is simultaneously an urgent problem and a solvable one for a state as large and resourceful as California.

INTRODUCTION

DEFINING THE PROBLEM OF INCOMPLETE AND INACCESSIBLE PLUMBING

CALIFORNIA'S HUMAN RIGHT TO WATER, passed in 2012, states that "every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes." (California Water Code §106.3, Chaptered 2012). To date, the policy discussion on meeting California's Human Right to Water has focused largely on expanding and improving drinking water utility services in the state and improving the quality and reliability of water for rural households using domestic wells. Sanitation and wastewater have received far less attention. There also has been less attention paid to Californians who reside in areas served by functional utilities, yet do not have the plumbing in their homes to access those services, or who cannot access toilets and running water because they are experiencing homelessness.

Several lines of evidence suggest that the lack of access to toilets and water for handwashing is pervasive in California, resulting in water pollution, disease outbreaks, and damage to quality of life and personal dignity. A recent survey found that incomplete plumbing was common in housing on rural tribal lands ([California Department of Housing and Community Development, Rural Community Assistance Corporation, and California Coalition](#)



Access to toilets and running water are essential components for achieving the Human Right to Water, but those residing in substandard housing or experiencing homelessness struggle to meet these basic needs.

[for Rural Housing in press](#)). Numerous media reports document that outdoor defecation is a major problem in California cities ([Walker 2017](#); [Sacramento Bee Editorial Board 2018](#); [York 2017](#); [DeHaven 2017](#); [Schneider 2018](#)). In 2017 and 2018, several California cities experienced Hepatitis A outbreaks, stemming from a lack of toilets and handwashing facilities for people experiencing

homelessness ([Karlman 2017](#); [San Diego County Health and Human Services Agency 2018](#)). A full third of California waterways are impaired for fecal indicator bacteria under the Clean Water Act ([State Water Board 2016a](#)). While it is difficult to differentiate between animal and human sources of fecal indicator bacteria, one study in San Diego concluded that human fecal

matter was ubiquitous throughout the watershed ([Steele et al. 2017](#)).

Private, indoor plumbing, including flush toilets and hot and cold water, are essential for accessing water and sanitation in a developed country. Without these, people are likely to spend more time and money acquiring water, skip daily

Box 1

Finding a Bathroom while Living on the Streets

Interview with James “Faygo” Clark of Sacramento, California

James “Faygo” Clark has lived in Sacramento since he was a kid. He is an activist for the basic rights of people experiencing homelessness in his hometown. He also is homeless himself. In Faygo’s experience, cities and counties implement policies that worsen access to water and sanitation by leaving water fountains in disrepair and closing public bathrooms throughout the city.

“Part of your routine as a person who is homeless is finding a bathroom. You may have to walk a mile or two. It’s not good for you to hold it that long. And there are lots of people who can’t walk a mile to find a bathroom.

“If you are planning on getting thirsty or having to pee, you better have \$5 on you. That way, you can buy a cup of coffee and use the restroom, and then fill up your water bottle. If you look too dirty, even after you buy something, they may not let you use the bathroom. And then there are others, who will refuse to sell you a cup of coffee because they say all you want is to use the bathroom.

“Plan when you’re going to eat, based on when you know your bathrooms are open. If you have to go outside, and you don’t have somewhere to wash your hands... It’s creating a public health crisis. And that’s not even the human part of it. When you don’t have access to a bathroom, that attacks you at an emotional level. It’s dehumanizing to have to go to the bathroom outside.

“We have to overcome the stigma. If people had a toilet to use, a place to wash their hands, a shower, people would be able to look for employment, because they’d be more presentable. The community would have less feces and urine. And people would have more dignity.”



James “Faygo” Clark, Sacramento homeless advocate.

Source: Sacramento News and Review, “[James ‘Faygo’ Clark, homelessness advocate](#),” 3/19/2015

necessities like washing their hands, or resort to outdoor defecation that contributes to public health epidemics ([Lipson, Anderson, and Bolton 2010](#); [Esteves Mills and Cumming 2016](#)).

Feinstein ([2018](#)) defined goals and indicators, grouped into “service ladders,” for meeting the Human Right to Water in California. The service ladders were developed in accordance with international guidelines and customized to reflect California’s prevailing norms, laws, and regulations. Feinstein’s report defined the goal for accessible drinking water as water that is “available in the home, in sufficient volumes to meet domestic needs, at hot and cold temperatures, at the times needed.” It reflects the United Nation’s normative interpretation of Sustainable Development Goal 6.1, which states that drinking water should be sufficient to meet domestic needs and reliably available close to home ([UN Water 2017](#)). The major difference between the international criteria and Feinstein’s California-specific goal is the inclusion of temperature. This addition was made to reflect state law requiring hot and cold water in the home (California Civil Code §1941 and Health and Safety Code §17920.3), and because the best available dataset, the American Community Survey (ACS), does not differentiate between households with no water and those with only cold water.

Similar to the California goal for accessible drinking water, Feinstein ([2018](#)) defined the goal for accessible household sanitation as a toilet that is “private, located in the home, safe to visit, and available when needed.” This aligns with the United Nation’s normative interpretation of the Sustainable Development Goal 6.2, which states that sanitation and hygiene needs should be met by facilities that are close to home, easy to reach, and can be used by all types of people, when needed, with “dignity” ([UN Water 2017](#)).



Drinking water should be available in the home, in sufficient volumes to meet domestic needs, at hot and cold temperatures, at the times needed.

PURPOSE OF THE REPORT

This report quantifies the availability of two essential household plumbing fixtures needed to meet the Human Right to Water: flush toilets and hot and cold piped water. For this analysis we used the ACS data on plumbing in occupied housing in California, including in temporary shelters like RVs, vans, and tents. ACS defines housing with complete plumbing as a home with a flush toilet, hot and cold water, and a tub or shower. Homes with incomplete plumbing lack at least one of these three fixtures. We also used data on homelessness from the United States Department of Housing and Urban Development (US HUD). Our motivating questions were:

1. How many people in California lacked a toilet, hot and cold water, and/or a tub or shower?
2. How did the numbers of households lacking toilets and/or hot and cold water vary by county and type of housing?



Previous work showed that between 1.6 and 1.7 million people had incomplete plumbing in the United States, but it was unknown whether those people lacked toilets and hot and cold running water, or the less-essential tub and shower.

3. How did numbers of housing units lacking toilets and/or hot and cold water compare with the total with “incomplete plumbing”? That is, what percentage of those with “incomplete plumbing” lacked the more essential toilet and hot and cold water versus the less-essential tub and shower?
4. Was there a correlation between incomplete plumbing, race, and household income?

Previous work, such as “Still Living Without the Basics” ([Gasteyer and Vaswani 2004](#)), and reporting from the *Washington Post* ([Ingraham 2014](#)) documented that between 1.6 and 1.7 million people resided in approximately 650,000 households with incomplete plumbing in the United States from 2000 to 2013. However, to our knowledge, there has been no comprehensive analysis of the extent to which people lacked each of the three components of complete plumbing. This gap meant it was impossible to conclusively state that households with incomplete plumbing lacked toilets and hot and cold running water,

as opposed to the less-essential tub and shower. This report answers that question for the State of California.

METHODS

We estimated the numbers of housing units and individuals in California with incomplete plumbing using the 2011-2015 ACS ([US Census Bureau 2016](#)). The ACS questionnaire inquired whether the housing unit had hot and cold water, a flush toilet, and a bathtub or shower inside the unit. Respondents were instructed not to consider shared plumbing outside their unit. Responses were gathered from 5 percent of the population of the United States over a five-year period. The Census Bureau made several attempts to contact residents, including an in-person visit to addresses that failed to respond. Responding to the ACS is mandatory under federal law ([US Census Bureau 2013](#)).

The ACS defined housing units as a house, an apartment, or a mobile home. Housing units also included boats, recreational vehicles (RVs), tents, and other non-standard housing if they served as someone’s current place of residence. For our analysis, we included only occupied housing units. The ACS did not include persons residing in locations without an address, such as homeless encampments on sidewalks or under highway overpasses. For counts of persons experiencing homelessness, we used the 2015 Annual Homeless Assessment Report to Congress ([US HUD 2016](#)).

We combined information provided in the ACS Summary Table with the Public Use Microdata Samples (PUMS) ([US Census Bureau 2015a](#)).¹ The ACS Summary Tables provided the percentage of housing units with complete or incomplete

¹ We downloaded PUMS data from the Integrated Public Use Microdata Series – U.S.A. ([Ruggles et al. 2017](#)).

plumbing at the census tract level. The PUMS provided more detailed information on which components of plumbing were missing; however, this information is only available at a coarser geographic scale known as the Public Use Microdata Area (PUMA). For simplicity, we refer to PUMAs either by their respective county or, for those containing multiple counties, by the name of the most populous county in each reporting area. Table 1 lists the six multi-county PUMAs in California and the abbreviated Region Name.

Table 1.

Multi-County Reporting Areas in California for American Community Survey Public Use Microdata Samples

Region Name	Counties
Tuolumne	Alpine, Amador, Calaveras, Inyo, Mariposa, Mono, Tuolumne
Tehama	Colusa, Glenn, Tehama, Trinity
Siskiyou	Del Norte, Lassen, Modoc, Plumas, Siskiyou
Mendocino	Lake, Mendocino
Monterey	Monterey, San Benito
Nevada	Nevada, Sierra
Sutter	Sutter, Yuba

We used a non-parametric Analysis of Variance (ANOVA) to test whether there was a correlation between incomplete plumbing, median household income, racial makeup, and the frequency of non-standard housing in a census tract. We used the R package in R studio ([R Core Team 2017](#); [RStudio 2012](#)). We tested for the assumptions of an ANOVA and found the distribution of households with incomplete plumbing was highly non-normal.² Consequently we used a nonparametric ANOVA within the Generalized Additive Model function,

² Shapiro-Wilk test for normality on the percentage of housing units with incomplete plumbing, $W = 0.42969$, $p\text{-value} < 2.2e-16$ (highly significant). Significant results indicate a non-normal distribution of the data.



The ACS discontinued asking about indoor flush toilets in 2016, resulting in the loss of an invaluable source of public health information.

which does not assume normal distribution of residuals. Because non-parametric approaches are limited in their ability to test for interactive effects, we limited our analysis to the effect of individual predictor variables.

To complement the quantitative analysis in this report, Theodora Josephine Simon of the American Civil Liberties Union of Northern California conducted interviews on the topic of access to household plumbing in the winter of 2017-2018.

DATA LIMITATIONS

There were important limitations in the data. The ACS reported the presence of hot and cold piped water, which meant that some households lacked both hot and cold water, whereas others only lacked hot water. Additionally, ACS noted whether a flush toilet was available in a living unit, such as an apartment, but did not note whether the occupants had access to a toilet shared with other

units ([US Census Bureau 2015b](#)). Last, the ACS did not address any aspect of water and sanitation beyond the physical presence of hot and cold piped water and a toilet. We did not know from this dataset whether the drinking water was safe and affordable, nor whether the toilet was connected to a well-functioning septic or wastewater system. The results can only inform us on the presence of hot and cold piped water and flush toilets in the unit.

Perhaps the most important limitation in the data is that the ACS discontinued asking about indoor flush toilets in the 2016 survey in response to criticism from members of Congress that the question was personally invasive ([US Census Bureau 2016](#); [Cohn 2014](#)). As a result, this invaluable source of public health information is no longer being collected. For the continental United States, the ACS now only tracks the presence of hot and cold piped water and a tub or shower. The Puerto Rico version of the questionnaire retained the query on toilets and also includes separate questions to differentiate between the presence of piped water and hot water heaters ([US Census Bureau 2016](#)).

RESULTS AND DISCUSSION

CALIFORNIANS WITH INCOMPLETE PLUMBING

In 2015, an estimated 140,000 people living in California had incomplete plumbing. Of those, 88,000 lacked a toilet, 91,000 lacked hot and cold water, and 94,000 had no tub or shower (Figure 1 and [Appendix 1](#), “Venn Diagram” worksheet). The majority of those with incomplete plumbing (86 percent) lacked either a toilet, hot and cold water, or both. The remaining 14 percent lacked only a tub or shower. These findings indicate the majority of those with incomplete plumbing lack



In 2015, 140,000 Californians lived in homes with incomplete plumbing. Another 120,000 people experiencing homelessness had unreliable access to toilets and hot and cold water.

one of the two essential plumbing fixtures for meeting the Human Right to Water: a toilet or hot and cold water.

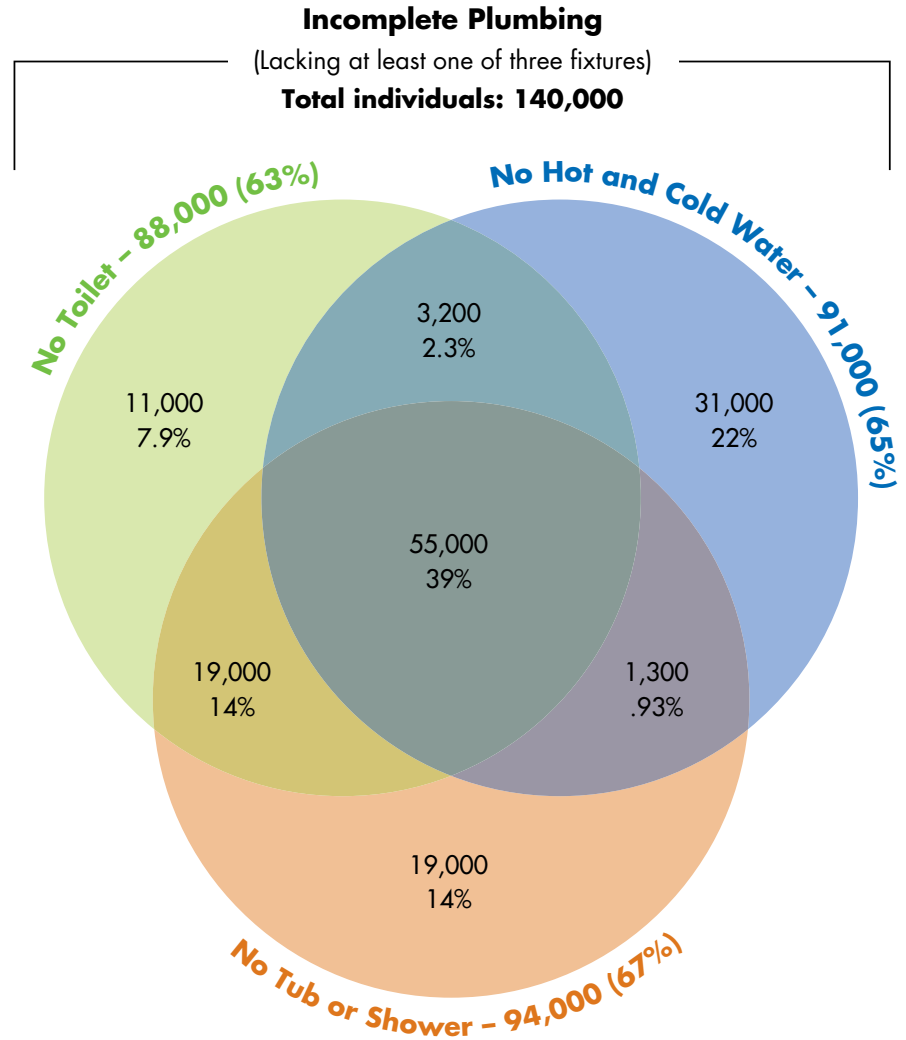
The ACS, however, did not fully account for people experiencing homelessness. People who sleep in parks, on sidewalks, and in other places not ordinarily designated as a residence often lack a nearby toilet and/or hot and cold water. Even those who spend the night in homeless shelters are often required to leave during the day and do not have access to toilets and sinks except at night ([Los Angeles Central Providers Collaborative 2017](#)). In 2016, an estimated 68,000 people in California were unsheltered, and another 52,000 resided in emergency shelters ([US HUD 2016](#)). Accounting for those experiencing homelessness brought the estimated population of Californians without access to a toilet to 208,000. Approximately 211,000 Californians also lacked access to hot and cold water. (Figure 2 and [Appendix 1](#), “Plumbing CA” worksheet).

Figure 1.

Population Lacking a Toilet, Hot and Cold Water, or Tub or Shower in their Home in California, 2011-2015

Note: Percentages calculated as a proportion of those with incomplete plumbing. Figures do not necessarily sum to total due to rounding. Numbers rounded to two significant figures. Supporting data can be found in [Appendix 1](#), "Venn Diagram" worksheet.

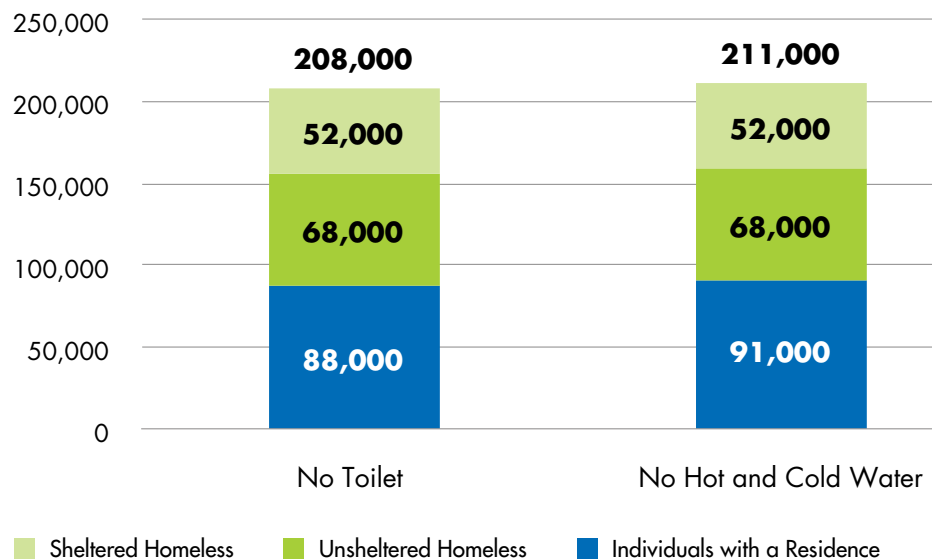
Source: US Census Bureau (2015a).


Figure 2.

Californians Without Access to a Toilet or Hot and Cold Water, Including People Experiencing Homelessness, in 2015

Note: Unsheltered homeless reside out-of-doors and typically have little or no access to plumbing, while sheltered homeless may lose access for part of the day. Supporting data can be found in [Appendix 1](#), "Plumbing CA" worksheet.

Source: US Census Bureau (2015a), US HUD (2016)

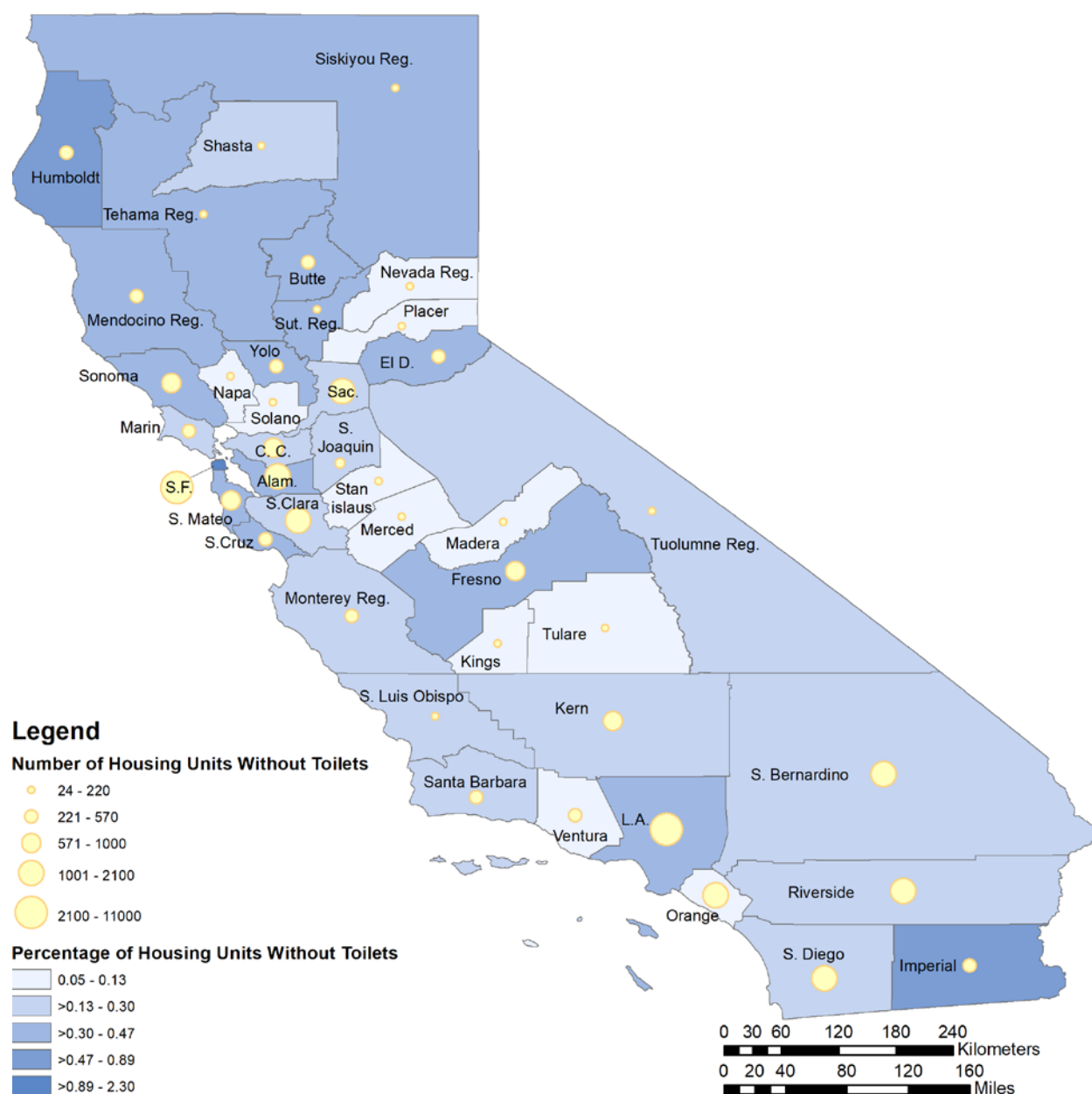


The rate of housing with incomplete plumbing varied across the state (Figures 3 and 4). The counties with the highest percentage of housing units without a toilet were San Francisco (2.3 percent), Humboldt (0.89 percent), and Imperial

(0.60 percent). The counties with the highest percentage of housing units without hot and cold water were Shasta (0.96 percent), Imperial (0.73 percent), and San Francisco (0.71 percent). The high rates of households without toilets and hot

Figure 3.

Housing Units Without a Toilet in California, 2011-2015 🔍



Note: Some counties are grouped into multi-county regions, as listed in Table 1. Supporting data, including standard errors and confidence intervals, can be found in [Appendix 1](#), “Plumbing HU” worksheet.

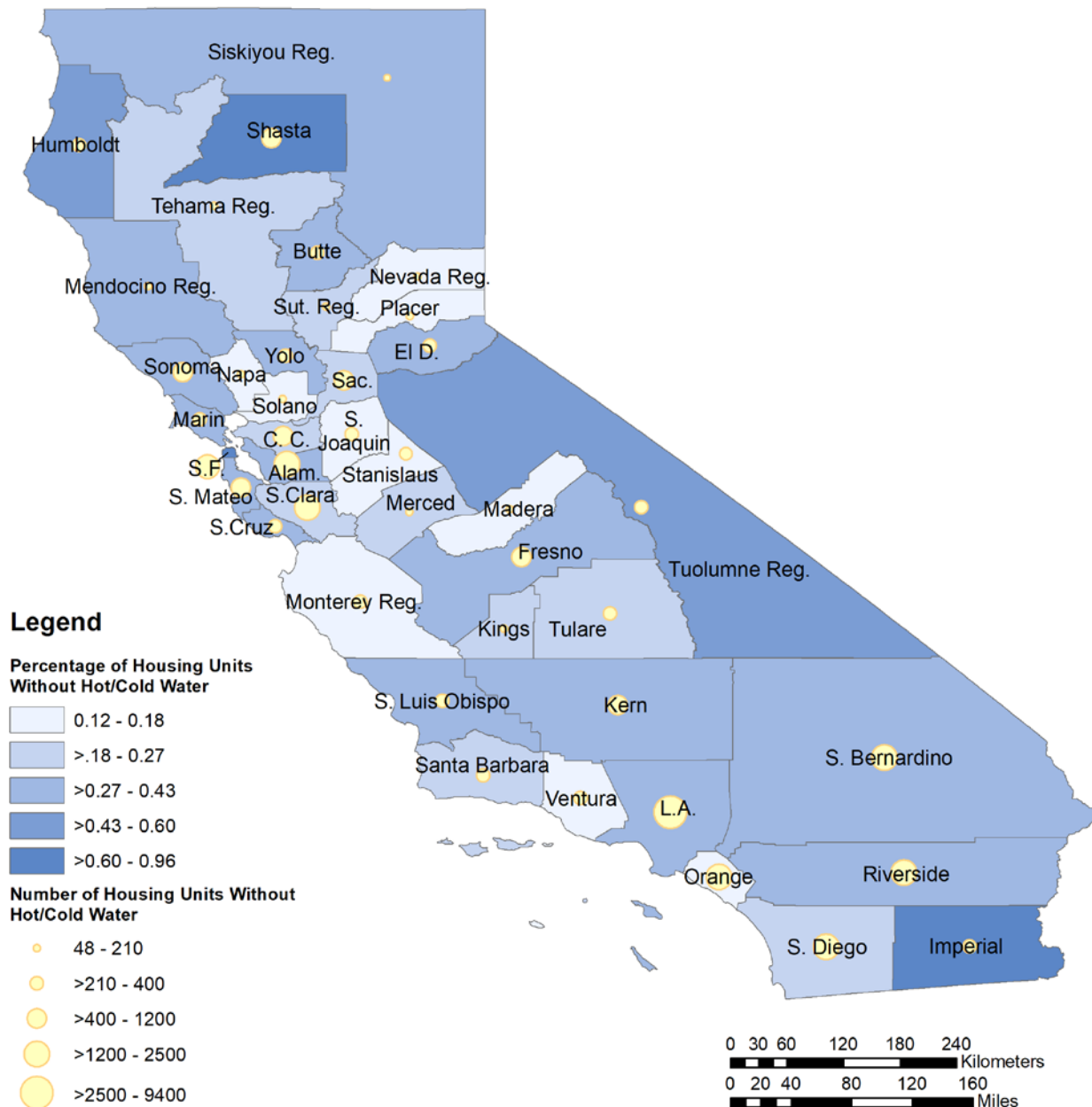
Source: [US Census Bureau \(2015a\)](#)

and cold water in San Francisco indicated that the problem was not restricted to rural areas. While the counties with the highest rates of incomplete plumbing were scattered around the state, the

areas with the greatest number of housing units with plumbing were the populous counties of San Francisco, Los Angeles, and San Diego.

Figure 4.

Percentage of Housing Units Without Hot and Cold Water in California by County, 2011-2015 🔍



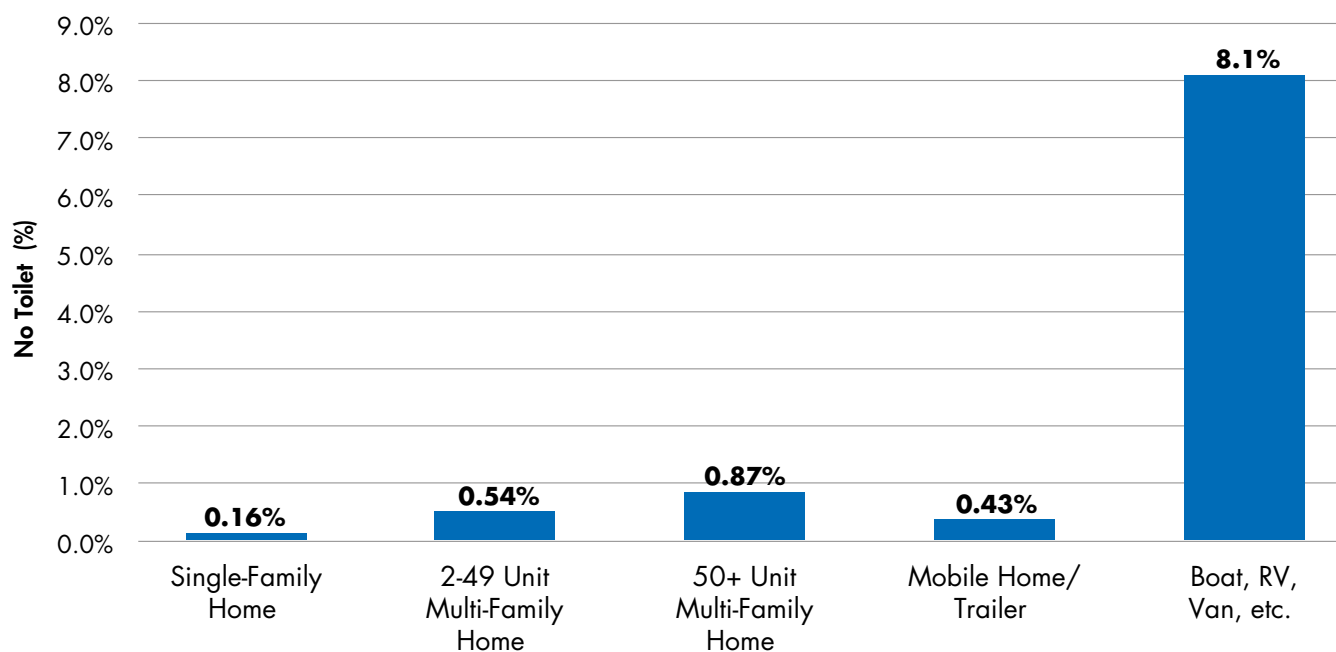
Types of Housing Without Toilets and/or Hot and Cold Water

Statewide, an estimated 8.1 percent of temporary shelters, such as boats, RVs, vans, and tents, lacked a toilet, compared with less than one percent in all other types of housing (Figure 5). While temporary shelters had a high percentage of units without toilets, this type of shelter was relatively uncommon and represented a small share (only 3 percent) of the total number of units lacking toilets. The vast majority of housing without toilets (97 percent) were single-family, multi-family, and mobile home/trailer units ([Appendix 1](#), “HU Type State” worksheet).

Multi-family homes without toilets were likely Single-Room Occupancy (SRO) buildings, which do not meet ACS’s criteria of having plumbing in the unit because multiple residents share toilets. In San Francisco and Los Angeles, the neighborhoods with the highest concentrations of housing units with incomplete plumbing were also those that had high concentrations of SROs. In San Francisco, census tracts with high rates of incomplete plumbed overlapped with five zip codes that also had a high number of SROs ([Comerford 2016](#)), with one notable exception: a census tract in the Bayview neighborhood of southeast San Francisco with an incomplete plumbing rate of 27 percent (Figure 6). While it is not clear why the census tract in Bayview was unusual, this was

Figure 5.

Percent of Units Without Toilets by Housing Type, 2011-2015 🔍



Note: Percentages are number of units for a housing type without a toilet divided by the total housing units of that type in California. Supporting data can be found in [Appendix 1](#), “HU Type State” worksheet.

Source: [US Census Bureau \(2015a\)](#)

one of the least populated census tracts in the city, hosting only 150 occupied housing units. Thus, a relatively small number of substandard housing units or a single SRO building could account for the high rate of incomplete plumbing for the tract. In Los Angeles, the highest rates of incomplete plumbing (22 percent and 28 percent in census tracts 2062 and 2063, respectively), were in the Skid Row neighborhood ([Appendix 1](#), “CensTrac” worksheet), which also had a high concentration of SROs ([Terry 1997](#)).


We inferred from the co-location of incomplete

plumbing and SROs that many of the units with incomplete plumbing in urban areas were SROs. This was corroborated by the different types of housing lacking toilets in rural versus urban counties. In rural Humboldt and Imperial counties, most units without toilets were single-family homes. In the more urban counties of San Francisco, San Diego, Los Angeles, Contra Costa, and Alameda, most units without toilets were multi-family homes ([Appendix 1](#), “HU Type County” worksheet).






Figure 6.

Incomplete Plumbing in San Francisco, 2011-2015 🔍

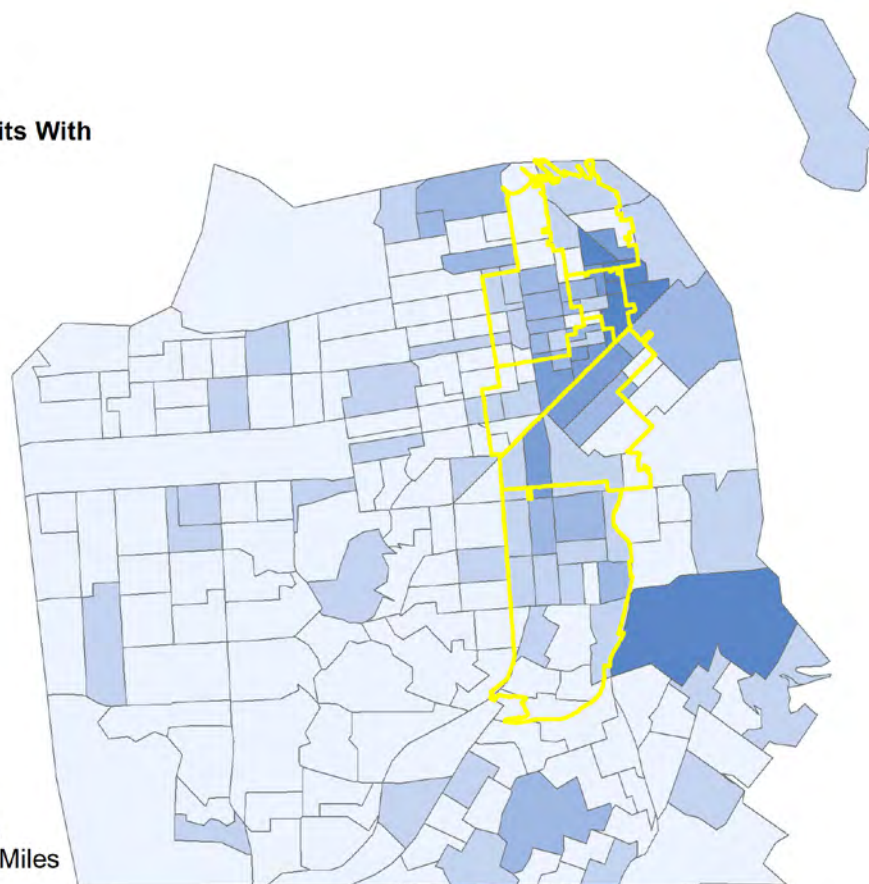
Zip Codes

 High Concentration of SROs

Percentage of Housing Units With Incomplete Plumbing

 0 - 1
 >1 - 4
 >4 - 10
 >10 - 20
 >20 - 40

0 0.5 1 2 3 4 Miles
 0 0.75 1.5 3 4.5 6 Kilometers



Source: [US Census Bureau \(2015a\)](#), [Comerford 2016](#)

While residents of SROs have access to a shared toilet, the facilities are often unusable or unsafe. San Francisco Department of Public Health tallied over 400 sanitation violations in the city's SROs between 2008 and 2012, noting that exposure to bacteria and viruses transmitted through feces in communal bathrooms was a hazard for SRO residents (Comerford 2016). Many families opted to use chamber pots rather than shared facilities (Lybarger 2014; Kam 2015). Poor hygiene and maintenance, as well as the threats to personal safety incurred when using shared toilet facilities, have been well-documented in the field of international development (Evans et al. 2017). For more information on shared toilets in shelters and SROs, see Feinstein (2018).³

Correlation Between Race, Income, and Incomplete Plumbing

Both income and race correlated with incomplete plumbing by census tract. Median Household Income (MHI) was the strongest predictor of the rate of incomplete plumbing. Racial makeup,

While residents of SROs have access to a shared toilet, the facilities are often unusable or unsafe.

defined as the percentage of white, non-Latino residents, was also statistically significant, though less so than MHI. The rate of incomplete plumbing declined as income and percentage of white, non-Latinos increased. The percentage of mobile and temporary shelters in the tract did not correlate with the rate of incomplete plumbing (Table 2).

CONCLUSION

While the percentage of housing units in California with incomplete plumbing was relatively low, the numbers were high, with 140,000 people living in housing units with incomplete plumbing. Most of these people lacked an indoor flush toilet, hot and cold water, or both. Incomplete plumbing

Table 2.

Correlation Between Incomplete Plumbing, Income, Race, and Mobile Homes by Census Tract

	DF	Npar F	Pr(F)	Significance
Median Household Income	3	74.063	< 2e-16	highly significant
Race	3	3.413	0.01668	significant
Mobile Home	3	0.959	0.41112	

Notes: Output from Generalized Additive Model of Incomplete Plumbing as a function of Median Household Income, Race, and Mobile/Temporary Shelters. DF = Degrees of Freedom, Npar F = non-parametric F-test, Pr(F) = Probability of F-value. Informally speaking, the statistical test for significance indicates that the rate of incomplete plumbing covaried with income and race more than one would expect to observe due to chance.

³ See Box 4, "Shared Toilets: Context and Controversies," in Feinstein (2018) for a discussion of the poor conditions of toilets found in many SROs (p. 41) and "Accessible Sanitation" (pp. 38-40) for a discussion of problems of poor-quality or unavailable public restrooms for people experiencing homelessness.



California's efforts to encompass the Human Right to Water need to address the problem of inadequate plumbing for households and individuals.

in California was not restricted to rural areas; in fact, the largest numbers of housing units with incomplete plumbing were concentrated in low-income urban areas with high numbers of SROs, indicating that many households with incomplete plumbing may have been in apartments with shared toilets. Many people likely did not have access even to shared toilet facilities. There were 17,000 stand-alone structures (single-family homes, mobile homes, and temporary shelters) that lacked an indoor flush toilet.

Much of the policy discussion in California around access to water and sanitation has focused on problems with failing or nonexistent public drinking water and wastewater systems. Addressing these system-level problems is essential, but lack of access to water and sanitation is a problem that must also be examined at the individual and household level. Many Californians reside in areas served by functional utilities, yet do not have the plumbing in their homes to access those services. Improving the

Improving the reach and quality of services delivered by utilities will not resolve all the problems with water and sanitation in California.

reach and quality of services delivered by utilities will not resolve all the problems with water and sanitation in California. We also need to ensure that Californians have access to housing, and that every home has the plumbing needed to access essential services.

RECOMMENDATIONS

The problem of incomplete plumbing is intertwined with California's housing crisis. The state's dearth of affordable, livable housing has been documented elsewhere ([Legislative Analyst's Office 2019](#); [Levin and Christopher 2017](#)). Expanding California's stock of affordable homes and housing the homeless are the subjects of active policy debates ([Petek 2019a, 2019b, 2019c](#)). Here, we do not attempt to propose novel solutions to the chronic lack of high-quality affordable housing in California. Rather, we focus on policy proposals and data collection to address inadequate plumbing within efforts to address the Human Right to Water at the state and regional level.

EXPAND THE HUMAN RIGHT TO WATER FRAMEWORK TO INCLUDE SANITATION AND HOUSEHOLD-LEVEL PROBLEMS

Recognize sanitation as a co-equal component of the Human Right to Water. State statute recognizes that every person has a right to water for sanitary purposes (California Water Code §106.3) but does

not adequately address key elements of sanitation, i.e., a toilet and a treatment system for safe reuse or discharge of waste. The benefits of delivering adequate drinking water service—a reduction in waterborne illness and the commensurate benefits for public health—cannot be achieved without also ensuring adequate sanitation. Water and sanitation are essential to achieving the human dignity of daily cleanliness. Ideally, the legislature should amend the statute to explicitly recognize sanitation as a co-equal goal in the Human Right to Water.

Address inadequate plumbing in state agency efforts to estimate the number of people living without the Human Right to Water in California.

California adopted the Human Right to Water in 2012. Since then, the California State Water Resources Control Board (State Water Board) and the Office of Environmental Health Hazard Assessment (OEHHA) have begun to develop estimates of the number of Californians with inadequate drinking water service ([State Water Board 2016b](#); [Balazs et al. 2019](#)). Both assessments of the Human Right to Water examine drinking water service (excluding sanitation), and focus on the quality of service by public water systems. The State Water Board’s “Human Right to Water Portal” and OEHHA’s “Framework and Tool” on the Human Right to Water should be expanded to include estimates of the number of people in California who lack full access to water and sanitation because of incomplete plumbing in their homes, or because they lack housing entirely ([Balazs et al. 2019](#); [State Water Board 2018](#)).

ADDRESS THE PROBLEM OF INCOMPLETE PLUMBING

Require stormwater discharge permits to include the provision of public restrooms as a strategy to meet water quality goals. The State Water Board, along with the nine Regional Water



Source: Aakorotky, iStock

Public restrooms should be included in stormwater discharge permits as a strategy to meet water quality goals.

Boards, issue Stormwater Discharge Permits to municipal governments and Caltrans ([State Water Board n.d.](#)). These permits are a mechanism to ensure that local and regional governments adopt and implement strategies to meet water quality targets. Stormwater permits have typically sought to reduce fecal indicator bacteria through the removal of waste and the treatment of stormwater. Investments in safe and accessible public restrooms, including toilets and sinks for handwashing, should also be considered as a potential means to improve water quality. We recommend that the Water Boards investigate the impact of public restrooms on stormwater quality to determine the effectiveness of this approach (described in greater detail in “Improve the Information Available on Incomplete Plumbing,” below). If the evidence supports public restrooms as an effective mechanism to improve stormwater quality, this should be more widely adopted as a formal strategy in the stormwater permits.

Increase funding for access to safe and hygienic public restrooms, and institute state and regional policies to ensure resources are evenly distributed across local jurisdictions. For people experiencing homelessness, public restrooms are often limited in number, too far to reach, or closed for part of the day. More funds are needed to keep shelter restrooms open during the day, while public restrooms should be more numerous, easily accessible, and open 24 hours per day. But neighborhoods and cities often resist hosting public restrooms because of fears that facilities attract more people experiencing homelessness to a neighborhood and encourage permanency for encampments (e.g., see [Holland 2017](#); [Money 2018](#); [Los Angeles Central Providers Collaborative 2017](#)). Regional and state governments need to institute mechanisms to ensure that public restrooms are broadly distributed and serve all members of the public, rather than concentrating them in a few neighborhoods and targeting only people experiencing homelessness. For public toilets, attendants can greatly improve cleanliness and safety ([Breitenbach 2017](#)). San Francisco's Pit Stop program, with paid attendants staffing 17 public toilets, is a model that could be emulated and expanded ([San Francisco Public Works n.d.](#)). Structures, such as the Portland Loo, use designs that are easy to clean and discourage use for unintended purposes ([Breitenbach 2017](#)). Portable, attended toilets and showers deployed in San Francisco, Alameda, and Los Angeles counties have proven particularly effective and are quicker to implement than building permanent structures. Because the portable facilities are staffed by trained employees, they offer a level of human dignity and care not typically seen in the provision of sanitation and hygiene facilities ([Diringer, Ghoghaie, and Schwartz 2019](#)).

Increase funding for adequate sanitation and hygiene in affordable housing. Our findings

indicate that many Californians residing in low-cost housing, including large multi-family units with shared bathrooms as well as substandard single-family and mobile units, are surviving without proper access to sanitation and hygiene. While there are no easy ways to find greater funding to improve the quality of affordable housing in California, it is clear that the policy debates on how to fund additional affordable housing must also consider how to allocate funds to ensure that low-cost housing provides adequate access to water and sanitation.

IMPROVE THE INFORMATION AVAILABLE ON INCOMPLETE PLUMBING

Improve understanding of the costs and benefits of public investments in the provision of water and toilets. Meeting stormwater quality goals and controlling public health epidemics are major expenses for state and local governments. Beyond the question of basic human dignity, is there a financial case to make for improving access to handwashing and toilets in publicly-operated affordable housing and in public spaces? At least one study assessing alternative means of reducing stormwater pathogen loads found that targeting human sources of fecal matter was the most cost-effective approach ([San Diego RWQCB 2017](#)). The study did not differentiate between sources of pollution from leaky sewer pipes, septic systems, or outdoor defecation, but a more detailed examination could identify the costs and benefits specifically of addressing outdoor defecation through increasing access to toilets.

Maintain and improve the American Community Survey (ACS) questions on plumbing. In 2016, the Census Bureau discontinued asking about indoor flush toilets as part of the ACS. At this point there is no other survey that can provide insight into the number, location, and demographics of people without indoor flush toilets. The ACS

should reinstitute the question as an essential first component to addressing the lack of sanitation in the United States. The questionnaire should adopt the format used in Puerto Rico, where residents are asked separately about whether they have running water and hot water ([US Census Bureau 2015b](#)). Under this approach, only running water is a component of complete plumbing (along with an indoor flush toilet and tub or shower), while the presence of a hot water heater is tracked separately.

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