TRACKING CALIFORNIA
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DATA BRIEF

Invisible Patients, Part 1: How Improved Homelessness Coding Revealed Who Is Missing from California's Health Data

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People experiencing homelessness have been historically excluded from California's environmental health data. Because unhoused patients often lack a fixed address, they are routinely left out of county-level health statistics, including rates for conditions like asthma, COPD, heart attacks, and heat-related illness. Until recently, it was impossible to know how many of these omissions represented people experiencing homelessness versus out-of-state visitors or incomplete records. A 2019 change in California hospital coding practices has made it possible, for the first time, to identify unhoused patients in discharge records and measure how often they are left out of public health data. That analysis reveals that the majority of excluded patients were unhoused, and that their health needs look very different from those who were counted.

KEY TAKEAWAYS

- **Most excluded patients are unhoused.** These are not data errors or out-of-state visitors. For COPD, nearly 4 in 5 excluded records are unhoused patients.
- **Heat-related illness has the highest exclusion rate of any condition tracked**, with more than 1 in 10 ED visits missing from county-level rates.
- **Excluded patients are disproportionately male, Black, and working-age,** groups that are overrepresented among the unhoused population more broadly.
- **The 2019 coding improvement turned "missing data" into actionable information.** For the first time, we can see who is missing and why.
- **Reported rates undercount the impact of heat** in communities with large unhoused populations, with implications for how health departments direct resources.

BACKGROUND

The Centers for Disease Control's (CDC) National Environmental Public Health Tracking Program requires states to calculate and display nationally consistent data and measures (NCDMs), which include rates of emergency department (ED) visits and hospitalizations for asthma, chronic obstructive pulmonary disease (COPD), myocardial infarction (heart attacks), and heat-related illness.[1]

In California, Tracking California has calculated these NCDMs at the county level using hospital discharge data from the California Department of Health Care Access and Information (HCAI) for nearly 25 years.[2,3] Because county-level rates are based on a patient's residential address, encounters for patients without a valid California county of residence have been excluded. This includes patients experiencing homelessness, out-of-state visitors, and records with missing address data.

California hospitals record homelessness in discharge data through two mechanisms: a patient zip code of "ZZZZZ" (indicating no residential address) and the ICD-10-CM diagnosis code Z59.0 (homelessness). These codes existed prior to 2019 but were applied inconsistently. In 2019, in response to HCAI directives and the passage of Senate Bill 1152, hospitals began more reliably and consistently coding homelessness in discharge records.[4,5] This improvement did not change the definition of homelessness in the data — it changed how consistently hospitals documented it. This improvement matters because it allows analysts to distinguish why residence data is missing.

Because unhoused patients were previously indistinguishable from out-of-state visitors and coding errors in the data, it has never been possible — until now — to quantify how much of the surveillance gap is driven by homelessness.

METHODS

We analyzed all ED visits and hospital discharge records for 2019–2020 with a primary discharge diagnosis of asthma, COPD, or myocardial infarction, or any diagnosis of heat-related illness. We classified residence data as "missing" if the patient's county of residence was either blank or listed as "unknown" (based on county FIPS code). We classified a record as belonging to a patient experiencing homelessness when the residential zip code was recorded as "ZZZZZ".

For each health outcome, we calculated the proportion of records excluded from the NCDMs due to missing residence data, determined the proportion attributable to homelessness versus other causes, and examined demographic differences between included and excluded patients using chi-square tests (note: demographic breakdown of homeless-coded visits specifically was not available for this analysis).

RESULTS

Exclusion Rates by Health Condition

Across the four health outcomes, the proportion of ED visits excluded from the NCDMs due to missing county of residence ranged from 3.1% to 12.3%:

Health Outcome	Total ED Visits	Missing County	% Excluded
Asthma	265,857	10,241	3.90%
COPD	209,402	12,727	6.10%
Heart Attack	112,101	3,519	3.10%
Heat-Related Illness	10,774	1,327	**12.30%**

More than 1 in 10 heat-related ED visits were excluded from county-level rates — the highest exclusion rate of any condition. Heat-related illness has the highest exclusion rate of any NCDM (12.3% of ED visits), double the rate of the next condition, COPD at 6.1%.

Exclusion Rates by Housing Status

The improved coding reveals that most excluded records are from patients experiencing homelessness rather than data errors or out-of-state visitors. For COPD, **nearly 4 in 5 excluded records** were from patients experiencing homelessness. For heat-related illness, it was more than 7 in 10. Without the coding update, these patients would have appeared as undifferentiated "missing data."

Health Outcome	% Homeless	% Out-of-State	% Unknown
Asthma	63.50%	29.30%	7.20%
COPD	**78.00%**	17.20%	4.80%
Heart Attack	49.00%	45.40%	5.60%
Heat-Related Illness	71.40%	21.40%	7.20%

Exclusion Rates by Demographics

Across all four conditions, patients excluded from the NCDMs show a strikingly consistent demographic profile compared to those who are counted (all differences p<.0001). Excluded patients were:

- More likely to be male
- More likely to be African American/Black, and to a lesser extent, White
- Less likely to be Hispanic/Latino
- Less likely to be Asian/Pacific Islander
- Less likely to be children or elderly adults

These patterns closely mirror the known general demographics of California's homeless population, which is disproportionately male, Black, and non-elderly.[6]

Diagnosis-specific Exclusion Rates by Demographics

Asthma

Of the 10,241 ED visits excluded from asthma NCDMs, 63.5% were from people experiencing homelessness. As shown in Table 1, excluded patients look strikingly different from those included in surveillance data. The excluded population skews male, is disproportionately Black and White relative to the included population, and is dominated by working-age adults rather than children, who make up nearly a third of included visits but less than 9% of excluded ones.

Table 1. Asthma ED Visits 2019–2020

Patient demographics: residence available vs. missing • N=265,857 • 3.9% excluded

Characteristic	% of Residence Available	% of Residence Missing
Sex		
Male	46.8%	**60.2%**
Female	53.2%	39.8%
Race / Ethnicity		
African American / Black	20.0%	**30.5%**
European American / White	25.1%	**36.9%**
Hispanic / Latino	42.4%	18.5%
Asian / Pacific Islander	6.1%	5.7%
Other	6.4%	**8.3%**
Age		
0–4	9.9%	2.9%
5–17	21.8%	5.7%
18–34	26.6%	**31.7%**
35–64	33.4%	**53.4%**
65+	8.4%	6.4%

Highlighted rows = groups overrepresented among patients with missing residence (Missing % > Available %)

COPD

Of the 12,727 ED visits excluded from COPD NCDMs, 78.0% were from people experiencing homelessness, the highest proportion of any condition. As shown in Table 2, excluded COPD patients are disproportionately male, Black, and working-age. Most striking is the age gap: adults 45–64 make up 57.6% of excluded visits compared to 38.1% of included visits, while patients 75 and older, nearly a quarter of included COPD visits, account for just 7.1% of excluded visits. By excluding these patients, reported COPD rates systematically undercount the burden on working-age adults, particularly when compared to elderly patients.

Table 2. COPD ED Visits 2019–2020

Patient demographics: residence available vs. missing • N=209,402 • 6.1% excluded

Characteristic	% of Residence Available	% of Residence Missing
Sex		
Male	44.6%	**62.5%**
Female	55.4%	37.5%
Race / Ethnicity		
African American / Black	14.7%	**21.1%**
European American / White	54.0%	**60.8%**
Hispanic / Latino	20.5%	8.9%
Asian / Pacific Islander	5.6%	3.4%
Other	5.2%	**5.8%**
Age		
25–44	12.9%	10.1%
45–54	12.2%	**19.2%**
55–64	25.9%	**38.4%**
65–74	24.1%	**25.2%**
75+	24.8%	7.1%

Highlighted rows = groups overrepresented among patients with missing residence (Missing % > Available %)

Heart Attack

Of the 3,519 ED visits excluded from heart attack NCDMs, 49.0% were from people experiencing homelessness — the lowest proportion of any condition. Notably, heart attack is the only condition where out-of-state visitors account for a nearly equal share of exclusions (45.4%), likely reflecting the acute, life-threatening nature of the condition. As shown in Table 3, excluded heart attack patients are disproportionately male and skew younger than included patients. African American/Black patients are particularly overrepresented, at nearly double their share of included visits (14.0% vs. 7.8%).

Adults 45–64 make up 53.0% of excluded visits compared to 37.4% of included visits, while those 75 and older account for just 14.3% compared to 32.3% of included visits.

Table 3. Heart Attack ED Visits 2019–2020

Patient demographics: residence available vs. missing • N=112,101 • 3.1% excluded

Characteristic	% of Residence Available	% of Residence Missing
Sex		
Male	63.6%	**74.5%**
Female	36.4%	25.5%
Race / Ethnicity		
African American / Black	7.8%	**14.0%**
European American / White	49.4%	**56.2%**
Hispanic / Latino	24.8%	15.0%
Asian / Pacific Islander	10.8%	5.4%
Other	7.2%	**9.4%**
Age		
35–44	4.4%	**6.9%**
45–54	12.7%	**17.9%**
55–64	24.7%	**35.1%**
65–74	25.8%	**25.9%**
75–84	19.6%	10.7%
85+	12.7%	3.6%

Highlighted rows = groups overrepresented among patients with missing residence (Missing % > Available %)

Heat-Related Illness

Of the 1,327 ED visits excluded from heat-related illness NCDMs, 71.4% were from people experiencing homelessness — the second-highest proportion of any condition — consistent with the known vulnerability of unhoused individuals to extreme heat. As shown in Table 4, excluded HRI patients are disproportionately male and White, while Hispanic/Latino patients are notably underrepresented. While heat risk is often framed as primarily affecting the elderly, the excluded population tells a different story: adults aged 35–64 make up 60.1% of excluded visits compared to 41.3% of included visits, while patients 65 and older account for just 13.5% compared to 23.7%.

Table 4. Heat-Related ED Visits 2019–2020

Patient demographics: residence available vs. missing • N=10,774 • 12.3% excluded

Characteristic	% of Residence Available	% of Residence Missing
Sex		
Male	64.7%	**72.5%**
Female	35.3%	27.5%
Race / Ethnicity		
African American / Black	8.4%	**10.4%**
European American / White	44.3%	**58.3%**
Hispanic / Latino	35.4%	21.5%
Asian / Pacific Islander	4.9%	1.1%
Other	7.0%	**8.7%**
Age		
0–4	1.1%	0.6%
5–17	7.6%	1.3%
18–34	26.3%	24.5%
35–64	41.3%	**60.1%**
65+	23.7%	13.5%

Highlighted rows = groups overrepresented among patients with missing residence (Missing % > Available %)

DISCUSSION AND OPPORTUNITIES

The 2019 coding improvement was a critical step for environmental health surveillance in California. For the first time, it allowed Tracking California and other data users to see who is being excluded from health data and why. Before reliable coding, the excluded population appeared simply as records with missing data — invisible and uncharacterizable.

The findings reveal a structural bias in the reported NCDMs. Because the CDC methodology requires county of residence for rate calculation, and people experiencing homelessness lack a stable residential address, there is a systematic gap in the surveillance system. The rates displayed for conditions like asthma, COPD, heart attacks, and heat-related illness undercount visits from men and African Americans, the groups most overrepresented among California's homeless population.

Local health departments and community organizations that rely on these rates to identify disparities and direct prevention resources may underestimate the need in communities with large homeless populations.

The coding update has also opened new avenues for research. With homelessness now reliably identified in discharge data, condition-specific analyses are feasible, although not covered in this specific brief. Additional research that built on this work from Tracking California has calculated the disproportionate impact of heat on unhoused Californians for the first time, including breaking down the specific demographics of this vulnerable population.[7] Tracking California has begun disclosing information about excluded records on its web portal to provide data users with the context they need to interpret the displayed rates accurately.

Continued and expanded use of homelessness coding in hospital discharge data will be essential for monitoring health outcomes in this vulnerable population. As California addresses the intersecting challenges of homelessness, extreme heat, and health inequity, ensuring that surveillance systems capture the full burden of disease improves both data quality and the ability to direct resources where they are most needed.

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ABOUT THE DATA

This analysis uses 2019–2020 emergency department and inpatient hospitalization data from the California Department of Health Care Access and Information (HCAI). Homelessness is identified through patient zip code "ZZZZZ". Cells with fewer than 12 observations are suppressed to protect patient privacy.

REFERENCES

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