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How Hospital Discharge Data Can Inform State Homelessness Policy

Technical Appendices

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Appendix A: Sources of Information on California's Homeless Population

Point-in-Time counts

The PIT count is conducted annually by local entities – called Continuums of Care (CoC). These local homeless assistance agencies are planning bodies responsible for coordinating the full range of homelessness services in a geographic area, which may cover a city, county, metropolitan area, or an entire state. The CoCs typically include local government agencies and non-profit organizations that receive funding from HUD as well as state and local government, to address homelessness. For more information about the role of CoCs in California, refer to Homelessness Response 101 For Health Care Providers and Stakeholders.

TABLE A1

Point-in-time homeless counts by region/county, 2020 and available 2022

County/Region (Continuum of Care CoC)	2020 homeless count	2022 homeless count	% change
Santa Clara	9,605	10,028	4.4%
Alameda	8,137	9,747	19.8%
Sacramento	5,511	9,278	68.4%
San Diego	7,638	8,427	10.3%
San Francisco	8,124	7,754	-4.6%
Orange	6,978	5,718	-18.1%
Fresno and Madera	3,641	4,216	15.8%
San Bernardino	3,125	3,333	6.7%
Riverside	2,884	3,316	15.0%
Contra Costa	2,277	3,093	35.8%
Sonoma	2,745	2,893	5.4%
San Joaquin	2,677	2,319	-13.4%
Ventura	1,787	2,238	25.2%
Santa Barbara	1,897	1,962	3.4%
Stanislaus	2,107	1,857	-11.9%
Shasta, Siskiyou, Lassen, Plumas, Del Norte, Modoc, Sierra	1,529	1837	20.1%
San Mateo	1,572	1,808	15.0%
Kern	1,580	1,603	1.5%
Humboldt	1,701	1,309	-23.0%
Tulare and Kings	1,297	1,235	-4.8%
Butte	1,274	1,156	-9.3%
Marin	1,032	1,121	8.6%
Imperial	1,527	1,057	-30.8%
Merced	636	855	34.4%
Mendocino	751	830	10.5%
Placer	744	750	0.8%

County/Region (Continuum of Care CoC)	2020 homeless count	2022 homeless count	% change
Tuolumne, Amador, Calaveras, Mariposa	834	618	-25.9%
Napa	464	494	6.5%
Lake	357	339	-5.0%
Colusa, Glenn, Trinity	261	340	30.3%
Alpine, Inyo, Mono	184	140	-23.9%
Subtotal, Regions with 2022 counts	**84,876**	**91,671**	**8.0%**
Los Angeles	66,436	Not available	
Monterey	2683	Not available	
Santa Cruz	2,256	Not available	
San Luis Obispo	1,423	Not available	
Solano	1162	Not available	
Yuba/Sutter	721	Not available	
El Dorado	663	Not available	
Yolo	641	Not available	
Tehama	300	Not available	
Nevada	387	Not available	
Statewide	**161,548**	Not available	

SOURCES: U.S. Department of Housing and Urban Development; 2022 counts are from press releases and/or local continuum of care or county agency websites.

NOTES: Includes 2022 homeless counts released as of August 1, 2022.

Comparing homeless counts from discharge data and local homeless assistance program data

To assess the potential of using hospital discharge data to inform policies aimed at people experiencing homelessness (PEH) in the state, we compared estimates generated from the discharge data with the point-in-time annual counts and the data reported in HMIS/HDIS for individuals who receive services through local homeless assistance agencies. All of the estimates presented in Table A2 reflect unduplicated counts of individuals, though the definition of homelessness and the way the number of PEH is calculated does vary somewhat across sources.

The most important distinction between these estimates is that the PIT annual count (as the name implies) is based on data collected at a single "point-in-time" – typically a specific day(s) in January/February. This differs from estimates generated from discharge data and the HDIS that reflect PEH who access services at a hospital or through local homeless programs throughout the year. Additionally, the estimates derived from the hospital discharge data indicate if a person was ***ever*** identified as homeless during any hospital visit during the year.[1] In this way, the newly available HDIS data is more conceptually similar to the discharge data as it is collected throughout the year. The advantage of the PIT, however, is that it attempts to enumerate everyone who may be experiencing homelessness in a particular community – regardless of whether they access services. Nonetheless, the ability to identify PEH throughout the year can bolster our understanding of the scope of homelessness in California and thus it is important to consider each of these data resources.

[1] As we discuss later in this section, many patients who are identified as PEH make multiple visits over the course of the year and are not always identified as experiencing homelessness. Nonetheless, if a patient was recorded as experiencing homelessness at one of their hospital visits during the year, it is likely they do not have stable housing and could be considered at-risk of homelessness.

TABLE A2

Comparing estimates of California PEH counts across data sources

Year	Discharge data		PIT annual count		HMIS/HDIS
	ED Patients identified as homeless	ED patients identified as homeless – impute missing	Unsheltered	Total	People receiving homelessness services
2020	--	--	113,660	161,548	255,188
2019	128,692	142,946	108,432	151,278	240,086
2019*	60,967	69,292	108,432	151,278	240,086
2018*	52,136	58,549	89,543	129,972	214,753
2017*	38,320	42,787	91,642	134,278	188,363

SOURCES: HCAI hospital discharge data (EDD and PDD); U.S HUD Point-in-Time annual counts; California Homeless Data Integration System (HDIS).

NOTES: PEH counts reflect unduplicated counts of individuals. In the discharge data, we use unique patient identifiers that allow hospital visits to be linked across time at the patient-level. These patient identifiers are missing for about 10% of visits made by adults 18 and older and in the 2nd column we impute the number of patients represented by the visits with missing patient IDs that were identified as PEH. See Technical Appendix B for more information. Estimates from the discharge data in 2017, 2018, and 2019 with * are based only on inpatient visits and do not include information from ED outpatient visits.

Statewide, we estimate about 143,000 homeless patients accessed ED care in 2019 from the discharge data (Table A2). This compares to about 151,300 total PEH captured in the 2019 PIT count and about161,500 from the 2020 PIT count. Not surprisingly, the HDIS data indicate higher numbers of PEH -- about 240,000 unique individuals -- accessed services through local homelessness programs at some point during 2019.

With the zip code homeless data flags that became available for outpatient ED visits in 2019, we identified more than double the number of individuals identified as homeless compared to using only hospital inpatient data. When we look at trends over the past few years using only inpatient discharge data, we see far fewer patients identified as PEH though that number steadily increased between 2017 and 2019, likely due to increased reporting on the part of hospitals and guidance from HCAI on the collection of this information. It could also, however, reflect a growing homeless population as the PIT and HDIS counts indicate a 20% and 27% increase in PEH in California over the same period.

Table A3 compares the homeless counts derived from discharge data with the counts from the point-in-time counts and the HMIS/HDIS database that capture people served by local homeless assistance programs. On average, the counts of homeless from HMIS/HDIS are about 1.6 times larger than those generated from the PIT counts. And the discharge data identify about 40% fewer PEH compared to the estimate from the HDIS, though again there are variations across counties.

TABLE A3

Comparisons of homeless counts across discharge data and homeless assistance program data by county/region, 2019

County/Region	Discharge data		PIT annual count		HMIS/HDIS	
	ED Patients identified as homeless	ED patients identified as homeless – impute missing	Total	Unsheltered	People accessing homeless assistance	Homeless ED patients as share of HDIS counts
Alameda	6997	7628	8022	6312	7456	102%
Butte	1494	1528	1266	838	1734	88%
Contra Costa	2083	2274	2295	1627	5822	39%
El Dorado	437	444	613	480	309	144%
Fresno/Madera	3552	3873	2508	2069	2518	154%
Humboldt	1192	1221	1702	1402	1598	76%

County/Region	Discharge data		PIT annual count		HMIS/HDIS	
Imperial	383	402	1413	1225	979	41%
Kern	2403	2554	1330	805	5433	47%
Lake	273	280	408	382	254	110%
Los Angeles	37960	44190	58936	44214	91735	48%
Marin	460	500	1034	708	1204	42%
Mendocino	372	392	785	538	737	53%
Merced	618	656	608	288	3182	21%
Monterey/San Benito	1490	1617	2704	1998	2454	66%
Napa	323	343	322	150	946	36%
Nevada	290	297	415	251	526	56%
Orange	7331	8493	6860	3961	12221	69%
Placer	970	1001	617	296	1564	64%
Riverside	5598	6184	2811	2045	8034	77%
Sacramento	7663	7980	5561	3900	11059	72%
San Bernardino	6277	6974	2607	1920	7940	88%
San Diego	13910	14723	8102	4476	16027	92%
San Francisco	7447	8485	8035	5180	7810	109%
San Joaquin	2243	2403	2631	1558	10965	22%
San Mateo	1042	1257	1512	901	3789	33%
Santa Barbara	1453	1539	1803	1133	2721	57%
Santa Clara	3231	3762	9706	7922	11839	32%
Santa Cruz	1355	1526	2167	1700	2436	63%
San Luis Obispo	779	825	1483	1172	2049	40%
Solano	1359	1421	1151	932	1660	86%
Sonoma	1909	2077	2951	1957	3741	56%
Stanislaus	2563	2662	1923	1088	6268	42%
Tehama	265	275	288	215	377	73%
Tulare/Kings	1061	1126	1064	775	3517	32%
Ventura	1662	1851	1669	1258	2010	92%
Yolo	408	431	655	397	1191	36%

SOURCES: HCAI Patient Discharge Data and Emergency Department data, 2019; HUD Point-in-time Annual Counts, 2019; HDIS, 2019.

NOTES: Includes all types of visits (ED outpatient, admission, and inpatient only) and no restrictions on hospital inclusion. For hospital visits where the patient ID was missing, we estimated the unique number of patients based on the mean number of visits for patients identified as PEH in that region with non-missing patient IDs.

There are many reasons why these estimates would vary across counties beyond how they measure homelessness. Both the PIT and HDIS are collected by various organizations and partnerships across different regions. These entities do rely on similar guidelines from HUD to develop their counts and enter information in their HMIS, but differences in organizational capacity and funding, for example, have been raised as concerns around data collection (GAO 2021). Similarly, hospitals across the state also may vary in the resources they have available to screen and identify patients who are homeless.

Appendix B: Hospital Discharge Analysis

We use hospital discharge data collected by the California Department of Health Care Access and Information (HCAI) – formerly the Office of Statewide Health Planning and Development to conduct our quantitative analysis. We examined non-public versions of the patient discharge data (PDD) and emergency department (ED) data from 2017 through 2019. The discharge data include all encounters or visits (we use these terms interchangeably) that occurred at any hospital licensed by the State (e.g. excludes federal VA hospitals).The primary year of analysis is 2019, the most recent for which the PDD and ED non-public data files are available. This is also the first year in which people experiencing homelessness (PEH) can be identified in the ED data using specific codes provided for patient zip code.

In most analyses, we focus on ED visits made at hospitals that operated an ED throughout 2019. The discharge data includes information on hospitals that do not operate EDs, most of which are either long-term care/rehabilitative hospitals or acute psychiatric and chemical dependency treatment hospitals. While many of these facilities also report encounters by PEH, we focus on hospitals that operate an ED because they provide 24-hour access to services and must meet federal requirements under EMTALA to treat all patients in need of medical care.

We also distinguish between ED visits we describe as outpatient visits because the patient is treated and released and those where the patient is admitted to the hospital as a result of their ED visits. We use information from the discharge data related to the source of admission for all inpatient visits that indicate if the patient came through the hospital ED. A small share of hospital visits we classify as inpatient only because they do not seem to originate from the ED according to the source of admission data included in the discharge records.

Identifying hospital visits made by people experiencing homeless (PEH)

We use zip code level information that indicates if a person was identified as PEH and coded as "ZZZZZ". We also looked at zip codes that were categorized as missing or unknown to assess whether their inclusion would change our analysis of PEH. In the 2019 data, the share of encounters/discharges that did not have zip code data was very small (less than 0.2%) and did not seem to follow any discernable patterns related to patients identified as PEH using the "ZZZZZ" codes.

We also looked at diagnostic codes that indicate social determinants of health, specifically Z-59 which is used to indicate that a person is experiencing homelessness and/or facing economic hardships among other things. Relatively high shares of patients identified as PEH using zip codes had Z-code diagnoses signaling homelessness; more than 50% of ED outpatient visits and over 80% of ED visits that resulted in hospital admission. Conversely, Z-code diagnoses for patients that were never identified as PEH through zip code data had very small/negligible (0.1% of non-PEH visits were coded with Z-59). We chose to rely solely on the zip code indicators to identify PEH, though the inclusion of additional visits/patients identified as PEH using only diagnostic information does not change our results or interpretation.

Examining differences in homeless ED visits across hospitals

In section 3 of the report, we examine differences across types of hospitals broken down by hospital ownership. For non-profit and for-profit hospitals, we also categorized hospitals based on their size (as measured by licensed beds). We did not separate county/UC or district hospitals by size as the former are mostly large hospitals with

over 200 beds while the latter are mostly small hospitals with fewer total beds. We linked information on hospital ownership and size characteristics from HCAI annual financial and utilization data sets, which are publicly available. We linked this information to the discharge data based on hospital IDs.

TABLE B1

Some hospitals across ownership types report high shares of ED visits by homeless patients

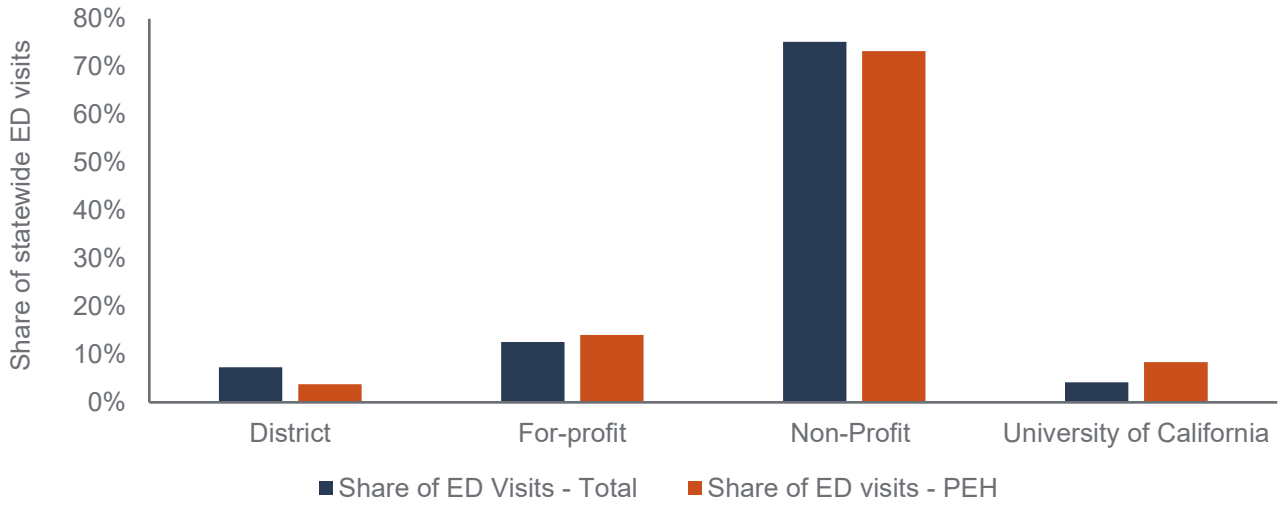
Hospitals, by type of ownership	Total ED visits	ED visits, Homeless	Share of ED visits by homeless				Number of hospitals
	Mean	Mean	Mean	Median	Min	Max	N
County-operated hospitals	43,697	3,203	6.3%	5.0%	2.1%	24.6%	19
Non-profit hospitals, over 200 beds	40,949	1,688	4.3%	2.9%	0.5%	26.9%	103
Non-profit hospitals, 200 or fewer beds	19,678	554	2.7%	2.0%	0.0%	12.9%	80
District hospitals	15,836	368	1.7%	1.2%	0.1%	6.1%	27
For-profit hospitals, over 200 beds	30,874	1,285	5.3%	3.2%	0.1%	28.0%	23
For-profit hospitals, 200 or fewer beds	19,130	460	3.0%	1.8%	0.1%	14.8%	39
UC hospitals	38,037	2,841	7.1%	6.4%	2.4%	14.3%	6
All hospitals with ED	29,408	1,190	3.7%	2.5%	0.0%	28.8%	297

SOURCES: HCAI hospital discharge data, 2019; HCAI Hospital Annual Financial Data, 2019.

NOTES: Includes hospitals that operated an ED throughout 2019 and had a principal service of General Medical/Surgical. ED visit measures are for non-elderly adults aged 18 to 64 and are first calculated at the hospital-level and then summarized by hospital type.

FIGURE B1

In counties that do not operate hospitals, non-profit and for-profit hospitals provide higher shares of ED visits for patient identified as homeless



SOURCE: Authors' calculations from HCAI hospital discharge data and hospital annual financial data, 2019.

NOTE: Includes ED visits made by patients aged 18 to 64 at hospitals that operated an ED throughout year and were designated as a General Medical/Surgical hospital.

TABLE B2

Regional distribution of Total ED visits and ED visits by patients identified as experiencing homelessness

	Statewide	Bay Area	Sacramento region	Central Valley	Central Coast	Los Angeles	Other SoCal	Inland Empire	All other
Total hospital visits	9,425,779	1,565,634	652,425	1,185,816	509,583	2,493,991	1,249,779	1,221,304	547,247
Outpatient ED	7,739,221	1,287,432	551,925	983,573	424,808	2,014,787	995,281	1,011,715	469,700
ED Admission	994,920	147,796	58,746	121,149	49,392	285,383	139,266	145,485	47,703
Inpatient only	691,638	130,406	41,754	81,094	35,383	193,821	115,232	64,104	29,844
Homeless visits	366,386	76,977	24,963	33,768	16,802	107,202	59,265	30,463	16,946
Homeless, outpatient ED visit	280,717	61,763	20,391	25,613	12,687	80,490	45,058	20,777	13,938
Homeless, ED admission	72,779	12,874	4,304	5,801	3,483	22,894	11,657	9,074	2,692
Homeless, inpatient only	12,890	2,340	268	2,354	632	3,818	2,550	612	316
Means, hospitals									
% homeless, ED total	3.7%	5.0%	3.8%	2.3%	3.0%	4.5%	4.8%	2.3%	2.4%
% homeless, ED outpatient	3.3%	4.7%	3.4%	2.1%	2.7%	3.9%	4.1%	1.9%	2.2%
% homeless, ED admission	6.6%	7.8%	6.5%	3.8%	5.9%	6.9%	7.9%	4.6%	4.5%
Number of hospitals	297	55	15	31	23	69	34	33	37
Share total ED visits	100.0%	16.6%	6.9%	12.6%	5.4%	26.5%	13.3%	13.0%	5.8%
Share ED visits, homeless	100.0%	21.1%	7.0%	8.9%	4.6%	29.2%	16.0%	8.4%	4.7%

SOURCES: HCAI Patient Discharge Data and Emergency Department data, 2019.

NOTES: Includes visits by patients aged 18 to 64 at hospitals that operated an ED and had their principal service as General Medical/Surgical. Bay Area includes Alameda, Contra Costa, San Mateo, San Francisco, Santa Clara, Marin, Sonoma, and Napa; Sacramento region includes Sacramento, Yolo, Solano, Sutter and Yuba; Central Valley includes Kern, Fresno, Madera, San Joaquin, Stanislaus, Kings, Merced, Mariposa, and Tulare; Central Coast includes Santa Cruz, Monterey, San Benito, San Luis Obispo, Santa Barbara, and Ventura; Other Southern California includes Orange, San Diego, and Imperial counties. Inland Empire includes Riverside and San Bernardino counties. For hospital-level means and share of visits, we first calculate the share of homeless visits at each hospital and then take the mean value across hospitals in the region.

Examining demographic and clinical characteristics of ED visits by homelessness status

The tables below present visit-level information from the HCAI discharge data. Descriptive statistics examining demographic characteristics, coverage sources, and diagnostic information by whether a patient was identified as experiencing homelessness and in some cases, by expected coverage source which we use as a proxy for low-income, are included.

TABLE B3

Descriptive statistics of all hospital visits by homeless status, 2019

	Homeless	Not Homeless	All Hospital Visits
Total hospital visits	**431,310**	**16,242,223**	**16,673,543**
Visit type			
ED outpatient	72.7%	77.2%	77.0%
ED admission	21.4%	12.9%	13.1%
Inpatient only	5.9%	10.0%	9.9%
Sex			
Female	29.2%	55.1%	54.4%
Male	70.8%	44.9%	45.6%
Unknown/missing	0.0%	0.0%	0.0%
Age			
Under 12	0.5%	16.1%	15.7%
Age 12 - 17	0.2%	5.0%	4.9%
Age 18 - 24	5.7%	9.0%	8.9%
Age 25 - 34	20.0%	14.9%	15.0%
Age 35 - 50	30.6%	16.9%	17.3%
Age 50 - 64	34.5%	17.2%	17.6%
Age 65+	8.4%	20.9%	20.6%
Unknown/missing	0.0%	0.0%	0.0%
Race/ethnicity			
White	45.8%	36.6%	36.8%
Black	22.7%	10.0%	10.3%
Latino	22.6%	39.7%	39.2%
Asian	1.5%	6.6%	6.4%
AIAN/NHPI	0.9%	1.0%	1.0%
Multi-racial/Other	5.8%	5.6%	5.6%
Unknown/missing	0.9%	0.7%	0.7%
Expected Payer			
Medi-Cal	63.8%	40.0%	40.6%
Medicare	14.9%	15.7%	15.7%
Private insurance	7.0%	35.0%	34.2%

	Homeless	Not Homeless	All Hospital Visits
Uninsured	13.2%	7.4%	7.5%
Other	1.1%	2.0%	1.9%
Unknown/missing	0.0%	0.0%	0.0%

SOURCES: Authors' calculations from HCAI patient discharge data and emergency department data, 2019.

NOTES: Includes all hospital discharges; there are no restrictions on the type of hospitals included in terms of principal service or whether the hospital operated an ED.

TABLE B4

Descriptive statistics of ED visits by adults 18 to 64 by homeless status, 2019

	Homeless	Not Homeless	All ED Visits
Total ED Visits	**368,420**	**8,622,106**	**8,990,526**
Visit type			
ED outpatient	77.9%	88.6%	88.1%
ED admission	22.1%	11.5%	11.9%
Sex			
Female	29.0%	55.8%	54.7%
Male	71.0%	44.2%	45.3%
Unknown/missing	0.0%	0.0%	0.0%
Age			
Age 18 - 24	6.2%	15.9%	15.5%
Age 25 - 34	21.8%	24.6%	24.5%
Age 35 - 50	33.7%	29.4%	29.6%
Age 50 - 64	38.4%	30.1%	30.5%
Race/ethnicity			
White	45.2%	34.4%	34.9%
Black	22.9%	12.2%	12.6%
Latino	23.0%	40.9%	40.2%
Asian	1.5%	5.4%	5.2%
AIAN/NHPI	0.9%	1.0%	1.0%
Multi-racial/Other	5.8%	5.4%	5.5%
Unknown/missing	0.8%	0.7%	0.7%
Expected Payer			
Medi-Cal	69.2%	46.1%	47.1%
Medicare	10.1%	5.5%	5.7%
Private insurance	6.3%	35.5%	34.3%
Uninsured	13.4%	10.2%	6.0%
Other	1.1%	2.7%	2.6%
Unknown/missing	0.0%	0.0%	0.0%

SOURCES: Authors' calculations from HCAI patient discharge data and emergency department data, 2019.

NOTES: Includes only ED visits – both outpatient and admissions – by adults age 18 to 64.

TABLE B5

Top 10 Primary Diagnoses, ED visits by adults aged 18 to 64 by homelessness status and insurance coverage, 2019

Homeless			Not Homeless		
	Medi-Cal/ Uninsured	All ED visits		Medi-Cal/ Uninsured	All ED Visits
Schizophrenia and other psychotic disorders	8.2%	9.0%	Abdominal pain	5.5%	5.4%
Alcohol-related	7.3%	7.0%	Non-specific chest pain	3.9%	4.6%
Skin infections	5.4%	5.1%	Sprains and strains	3.3%	3.4%
Substance-related	4.7%	4.6%	Back problems	3.3%	3.3%
Mood disorders	3.4%	3.9%	Upper respiratory infection	3.2%	2.8%
Suicide/self-injury	2.9%	3.1%	Skin infections	3.1%	2.7%
Other connective tissue disease	2.9%	2.9%	UTI	3.1%	2.8%
Superficial injury	2.8%	2.8%	Superficial injuries	3.0%	3.1%
Non-specific chest pain	2.5%	2.5%	Headache	2.8%	2.9%
Abdominal pain	2.4%	2.4%	Pregnancy complications	2.8%	2.3%
All other diagnoses	57.5%	56.8%	All other diagnoses	66.6%	66.8%
Total ED visits	**304,148**	**368,420**		**4,852,928**	**8,619,221**

SOURCES: Authors' calculations from HCAI patient discharge data and emergency department data, 2019.

NOTES: Includes only ED visits – both outpatient and admissions – by adults aged 18 to 64. Detailed ICD-10 codes are categorized using the Clinical Classification Software (CCS) into more meaningful categories.

TABLE B6

Clinical characteristics of ED visits by adults 18 to 64 by homelessness status and insurance coverage, 2019

	Homeless		Not homeless	
	Medi-Cal or Uninsured	All ED Visits	Medi-Cal or uninsured	All ED visits
Total ED visits	**304,148**	**368,420**	**4,852,928**	**8,619,221**
Primary diagnosis				
Diabetes	1.8%	1.8%	1.3%	1.2%
Hypertension	1.7%	1.8%	1.2%	1.3%
Asthma	0.9%	0.9%	1.2%	1.1%
COPD	1.1%	1.1%	0.8%	0.8%
Hepatitis	0.0%	0.0%	0.0%	0.0%
Liver disease	0.2%	0.2%	0.2%	0.2%
Any behavioral health	28.2%	29.2%	6.9%	6.5%
Any mental health disorder	16.7%	18.2%	4.2%	4.2%
Schizophrenia	8.2%	9.0%	1.1%	1.0%
Suicide/self-injury	2.9%	3.1%	0.6%	0.6%
Mood disorder	3.4%	3.8%	0.8%	0.9%
Alcohol disorder	7.3%	6.9%	1.9%	1.6%
Drug disorder	4.1%	4.1%	0.9%	0.7%

	Homeless		Not homeless	
Any diagnosis				
Diabetes	11.0%	11.7%	11.2%	12.1%
Hypertension	20.4%	21.3%	16.5%	18.5%
Asthma	6.0%	6.0%	5.8%	5.8%
COPD	6.2%	6.6%	2.7%	2.8%
Hepatitis	4.3%	4.2%	0.9%	0.8%
Liver disease	4.1%	4.0%	2.6%	2.7%
Any behavioral health	59.0%	60.0%	19.7%	19.3%
Any mental health disorder	35.7%	38.1%	12.8%	13.6%
Schizophrenia	17.0%	18.6%	2.5%	2.3%
Suicide/self-injury	9.8%	10.4%	1.6%	1.7%
Mood disorder	16.5%	17.6%	5.5%	6.2%
Alcohol disorder	17.3%	16.9%	4.6%	4.1%
Drug disorder	29.7%	29.3%	6.5%	5.3%

SOURCES: Authors' calculations from HCAI patient discharge data and emergency department data, 2019.
NOTES: Includes only ED visits – both outpatient and admissions – by adults aged 18 to 64.

Analyzing patient-level data among people experiencing homelessness

The non-public discharge data files include a record linkage number (RLN) that is a patient identifier allowing hospital visits made by the same patient to be linked over time. We use this RLN along with birthdate to collapse the visit-level information to individual patients. We use this patient-level data to develop the unique counts of PEH presented in Appendix A focused on comparisons with other data sources.

In the homeless counts developed from the discharge data we classify a person as homeless if they had at least one hospital visit during the year where they were identified as experiencing homelessness and made at least one ED visit. While many patients ever identified as PEH have multiple ED visits during the year, often times they are not flagged as PEH for all of their visits. Unfortunately, there is no way to know if changes to PEH status is a data issue (e.g. the hospital didn't ask/record correctly) or if a person's housing status may have changed since their previous hospital visit. Despite this concern, we used the "ever PEH" to develop our state and county estimates using the discharge data because even if a person may no longer be experiencing homelessness at the time of a particular hospital visit, they likely lack stable housing or could be considered at risk of homelessness.

For our homeless population counts using discharge data, we allocated the approximately 10 percent of ED visits made by adults that did not have a valid patient RLN. Fortunately, ED visits where a patient was identified as PEH did not have higher shares of missing patient RLNs compared to other adult ED patients – actually the share of visits with missing RLNs was smaller in cases where the patient was recorded as homeless. Nonetheless, about 41,000 ED visits made by patients identified as homeless were missing patient IDs. In these cases, we estimated the number of individual homeless patients by dividing ED visits by 3 – the average number of visits made by patients identified as PEH who were not missing a patient RLN.

We also use the patient-level data to analyze frequency of ED use (Table B7) and for our statistical analysis of whether the same patient is identified as homeless across ED visits and hospitals. For these patient-level analyses, we exclude ED visits where patients are missing a valid RLN, though they are included in our above analyses of ED visits.

TABLE B7

Distribution of ED visits across frequency of ED use by homeless status, 2019

	1 ED visit	2-3 ED visits	4-6 ED visits	7-10 ED visits	More than 10	Total ED patients
Patients ever identified as homeless	26,252	34,469	25,148	13,721	15,724	115,314
% ED patients	23%	30%	22%	12%	14%	100%
Total ED visits	26,252	83,632	120,890	112,806	361,352	704,932
% of ED visits	4%	12%	17%	16%	51%	100%
ED visits identified as homeless	26252	48,457	52,785	43,813	146,430	317,737
% ED visits identified as homeless	100%	58%	44%	39%	41%	45%
Ever admitted from ED	6090	13074	13086	8743	11943	52,936
% with ED admission	23%	38%	52%	64%	76%	46%
Avg. number of hospitals	1.0	1.7	2.5	3.4	5.7	2.5
Low-income patients never identified as homeless	1,040,048	535,673	149,372	35,985	14,902	1,775,980
% ED patients	59%	30%	8%	2%	1%	100%
Total ED visits	1,040,048	1,232,843	691,647	287,920	253,347	3,505,805
% of ED visits	30%	35%	20%	8%	7%	100%
Ever admitted from ED	88,792	97,265	45,978	16,023	8,807	256,865
% with ED admissions	9%	18%	31%	45%	59%	14%
Avg. number of hospitals	1.0	1.4	1.8	2.2	3.0	1.2

SOURCES: Authors analysis of HCAI hospital discharge data, 2019

NOTES: Includes patients age 18 – 64 that made at least one ED visit during 2019. Low-income patients are defined as having Medi-Cal or uninsured as their modal coverage source across their ED visits.

Examining identification of homelessness across ED visits

To further probe the likelihood of being identified as homeless during an ED visit, we use individual-level fixed effects models. In these models, the outcome indicates whether the ***same*** patient was recorded as homeless at any particular ED visit during the year. Keep in mind that in the report and in Tables A2 and A3 above we identify someone as experiencing homelessness in the discharge data if they were ***ever*** recorded as homeless during any ED visit. While many patients ever identified as homeless have multiple ED visits during the year, many are not flagged as homeless during all of their visits – though this varies across the number of times they visit the ED as shown in Table B7.

In this analysis, we only include homeless ED patients who made at least 4 ED visits over the course of the year, which includes about half of all non-elderly adults identified as homeless. We use the diagnostic information included for all visits as the primary explanatory variables, along with whether the ED visit resulted in a hospital admission. We also include hospital fixed effects to allow for differences in reporting homelessness across hospitals.

Specifically, we model the following equation, where *Identified as Homeless* is the outcome variable of interest for patient p at hospital h during visit i

$$Homeless_{ihp} = patient_p + hospital_h + \beta * diagnosis_i + \varepsilon_{ihp}$$

This model includes patient fixed effects which control for things like sex, age, race and importantly underlying health status by comparing – for each individual patient – whether they are identified as homeless during a particular ED encounter. The parameters of interest are the coefficients on the vector of diagnosis indicator

variables which include the top diagnoses for homeless and non-homeless ED visits. In some models, we include only primary diagnoses while in others we use all diagnoses available for the ED visit. We include hospital fixed effects in our preferred models, which controls for constant differences in hospital identification of PEH—for example, number of social workers. We also ran these models separately for outpatient ED visits and ED admissions to account for differences in the relationship between diagnoses and identification of homelessness to vary across ED visit-type. All of these models support the finding that patients diagnosed with behavioral health conditions during an ED visit are more likely to be identified as homeless, especially outpatient ED visits when the patient is not admitted. (See Table B9 for results for different model specifications).

In essence we are using differences in diagnoses across one individual's ED visits to identify whether identification of PEH status differs when someone presents with a condition that is diagnosed as behavioral health versus physical health. It is important to note that we do not know whether a patient may not be experiencing homelessness at a previous or subsequent ED visit, so these results should not be interpreted as causal. Unfortunately, there is no way to know if changes to homeless status may be a data issue (e.g. the hospital did not record the information accurately) or if a person's homelessness status may have changed between visits. Nonetheless, we include anyone ever identified as homeless during the year based on the reasoning that even if they may be housed during an ED visit, the fact they were identified as homeless at an earlier or later visit suggests they are still likely at risk of homelessness.

TABLE B8

Demographic and clinical characteristics of homeless ED patients by frequency of ED use, 2019

	Number of annual ED visits, 2019			
	1-3 ED visits	4+ ED visits (Frequent Users)	10+ ED visits (Heavy Users)	All homeless patients
Total Patients	60,721	54,593	15,724	115,314
Sex				
Female	30.8%	34.9%	34.0%	32.7%
Male	69.2%	65.1%	66.0%	67.3%
Age				
Age 18 - 24	7.8%	6.4%	5.2%	7.1%
Age 25 - 34	24.8%	22.9%	20.7%	23.9%
Age 35 - 50	33.8%	34.0%	34.7%	33.9%
Age 50 - 64	33.7%	36.7%	39.4%	35.1%
Race/ethnicity				
White	46.8%	46.8%	45.6%	46.8%
Black	19.8%	22.4%	24.9%	21.1%
Latino	24.0%	23.0%	22.2%	23.5%
Asian	1.8%	1.4%	1.4%	1.6%
AIAN/NHPI	1.0%	1.0%	1.0%	1.0%
Multi-racial/Other	6.5%	5.4%	5.0%	6.0%
Modal Payer Source				
Medi-Cal	71.7%	76.5%	75.8%	74.0%
Medicare	7.1%	11.3%	13.8%	9.1%
Private insurance	6.1%	7.1%	7.3%	6.5%
Uninsured	14.1%	4.8%	2.8%	9.7%

	Number of annual ED visits, 2019			
Other	1.0%	0.4%	0.3%	0.7%
Ever primary diagnoses				
Diabetes	1.9%	6.3%	9.3%	4.0%
Hypertension	2.3%	7.9%	12.5%	4.9%
Asthma	1.1%	4.4%	6.9%	2.7%
COPD	1.4%	6.4%	10.8%	3.8%
Hepatitis	0.1%	0.3%	0.5%	0.2%
Liver disease	0.2%	1.4%	2.6%	0.8%
Any mental health disorder	20.1%	45.4%	62.6%	32.1%
Schizophrenia	11.2%	28.2%	41.9%	19.2%
Mood disorders				
Suicide/self-injury				
Alcohol disorder	6.4%	21.8%	35.0%	13.7%
Drug disorder	5.4%	16.6%	26.0%	10.7%
Ever any diagnoses				
Diabetes	11.1%	24.5%	34.3%	17.5%
Hypertension	21.0%	43.7%	57.8%	31.8%
Asthma	7.4%	20.1%	28.1%	13.4%
COPD	6.3%	19.9%	30.7%	12.7%
Hepatitis	4.8%	12.7%	17.0%	8.6%
Liver disease	5.5%	17.4%	27.4%	11.1%
Any mental health disorder	37.1%	71.2%	87.2%	53.3%
Schizophrenia	16.9%	39.1%	55.2%	27.4%
Mood disorders	11.0%	32.7%	49.0%	21.3%
Suicide/self-injury	19.7%	50.7%	69.3%	34.4%
Alcohol disorder	15.5%	35.8%	50.2%	25.1%
Drug disorder	39.4%	69.2%	80.1%	53.5%

SOURCES: Authors' calculations from HCAI patient discharge data and emergency department data, 2019.

NOTES: Includes ED patients age 18 to 64 identified as homeless in at least one visit during 2019. Excludes visits with missing patient identifiers. Payer source is based on the most commonly reported coverage across all ED visits.

TABLE B9

Regression results from patient fixed effects models

	Model 1		Model2		Model 3		Model 4		Model 5		Model 6	
	Behavioral health conditions - Primary diagnosis				Behavioral health conditions – Other diagnosis				ED Outpatient only		ED Admissions only	
Outpatient ED visit	-0.1928	***	-0.2208	***	-0.1567	***	-0.1867	***	N/A		N/A	
Primary diagnosis												
Abdominal pain	-0.0141	***	-0.0147	***	-0.0185	***	-0.0195	***	-0.0156	***	-0.0499	
Chest pain	-0.0117	***	-0.0132	***	-0.0204	***	-0.0218	***	-0.0142	***	-0.0082	
Sprains/Strains	-0.0377	***	-0.0295	***	-0.0384	***	-0.0310	***	-0.0279	***	-0.0801	
Back pain	-0.0144	***	-0.0158	***	-0.0164	***	-0.0184	***	-0.0155	***	0.0696	*
Superficial injury	-0.0015		0.0025		-0.0073	*	-0.0033	*	0.0027		-0.0180	
Headache	-0.0087	**	-0.0107	**	-0.0135	**	-0.0159	**	-0.0104	*	-0.0389	
Upper respiratory infection	-0.0167	**	-0.0160	**	-0.0183	**	-0.0182	**	-0.0128	*	0.0459	
Skin infection	0.0079	*	0.0044		0.0036		0.0004		-0.0021		0.0212	*
Schizophrenia	0.0239	***	0.0323	***					0.0362	***	0.0739	***
Mood disorder	0.0532	***	0.0600	***					0.0666	***	0.0662	***
Suicide/self-injury	0.0721	***	0.0581	***					0.0544	***	0.0250	
Alcohol disorder	0.0275	***	0.0265	***					0.0221	***	0.0350	***
Drug disorder	0.0379	***	0.0386	***					0.0383	***	0.0285	*
Other diagnoses												
Schizophrenia					0.0354	***	0.0205	***				
Mood disorder					0.0454	***	0.0287	***				
Suicide/self-injury					0.0377	***	0.0441	***				
Alcohol disorder					0.0348	***	0.0293	***				
Drug disorder					0.0605	***	0.0592	***				
Constant	0.5619		0.5358		0.5109		0.4894		0.2899		0.5430	
Hospital FE	No		Yes		No		Yes		Yes		Yes	
N	607,069		607,069		607,069		607,069		507,644		99,425	

SOURCES: Authors' calculations from HCAI patient discharge data and emergency department data, 2019.

NOTES: Includes only ED visits – both outpatient and admissions – by adults age 18 to 64.

Appendix C. Interviews with Hospital Staff

In addition to our quantitative analysis of hospital discharge data, we also wanted to learn more about how hospital emergency departments collect and record information on people experiencing homelessness. To accomplish this, we selected five hospitals across different regions of the state to target for semi-structured interviews with key front-line staff that engage with PEH including ED patient registration, ED nursing, and ED social service/social worker staff.

We completed interviews with 17 people who work in these positions at the following hospitals:

- LA County-USC Hospital
- Chan Zuckerberg San Francisco General Hospital
- St. Joseph Hospital, Eureka
- Dignity Heath California Hospital Medical Center, Los Angeles
- Scripps Mercy Hospital - Hillcrest, San Diego

We had also planned to interview staff at Community Regional Hospital in Fresno, but unfortunately were not able to complete any interviews in the Central Valley region.

Hospital selection

To identify hospitals to target for interviews, we first analyzed hospital-level statistics that summarized the number of ED visits where patients were identified as PEH, the share of ED visits that led to hospital admissions for PEH, along with other hospital characteristics including size and ownership type (e.g. county, non-profit, for-profit). We first reviewed this data for all hospitals in the state by ownership type – so comparing county/public hospitals with non-profit and for-profit hospitals – across each of our five regions of focus (Los Angeles, Other Southern California, Central Valley/San Joaquin, the Far North, and the Bay Area).

For each region (aside from LA), we first considered the counties in the region – whether they had a public hospital system and their size based on the number of licensed beds. We then compiled lists of hospitals located in select counties that included all public hospitals, along with non-profit and for-profit hospitals with relatively high shares of patients reporting PEH in the region. In some cases, we also looked at hospitals with particularly low share of patients reported as PEH especially if they were a county-based hospital system (i.e. Santa Clara Medical Center) or that were located in an area with a large homeless population like Dignity Health in LA located near Skid Row. Below we provide more details for each region.

- Bay Area: We focused on San Francisco and Santa Clara counties; the former because it has a relatively large homeless population and the latter because it is the largest county in the region. All of the large counties in the Bay Area operate public hospital systems so that criteria was less relevant for this region. We will be interviewing Zuckerberg San Francisco General Hospital as a pilot test for our protocols in the coming weeks. We also selected Santa Clara Regional Medical Center, also a county hospital, because they are a large, urban, public hospital with a very low share of ED visits identified as PEH (~2%) – the lowest share of any county hospital in the state.
- Los Angeles County: Given the large public hospital system operating in LA County, we selected LAC-USC, the largest county-run hospital in the state. LAC-USC has a relatively high share (~10%) of patients recorded as experiencing homelessness, however, given the large size of the homeless population in LA County this may be still reflect lower numbers of PEH than might be expected. If resources and time

allows, we are hoping to include an additional, non-profit hospital in LA County -- Dignity Health California Hospital Medical Center, located near Skid Row.

- Other Southern California: We chose to focus on Orange and San Diego counties. Neither of these large counties operate a public hospital system, but do have UC hospitals as well as a mix of non-profit and for-profit hospitals serving the region. We selected UC San Diego – Hillcrest Medical Center, which reported the highest share of PEH among ED patients in the region (11%). San Diego also stood out in our county analysis as having far higher estimates of PEH based on hospital discharge data compared to HUD PIT counts.
- Central Valley: In general, hospitals throughout this region report relatively lower shares of PEH compared to hospitals in other regions. We chose to focus on Fresno County because it is the largest county in the area and does not have a public hospital system instead relying primarily on non-profit hospitals to serve the region. Community Memorial Hospital Fresno is the largest hospital in the region and also reports the highest shares of ED patients experiencing homelessness (~8%). In addition, it has a relationship with UCSF for physician training programs that provided a point of contact to engage with ED staff and hospital leadership to secure interviews.
- Far North: We focused on hospitals in Humboldt, Shasta, and Butte counties in the Far North region of the state. These are among the larger counties that operate major medical centers and also have relatively high shares of poverty and Medi-Cal populations. We selected Shasta Regional Medical Center in Redding. It is a relatively large, for-profit hospital in the region and also reports a high share of PEH (~10%). We also considered Mercy Medical Center also in Redding, which is a non-profit hospital that reports relatively low PEH (~4%).

Interview Protocols

We conducted semi-structured interviews with both administrative and clinical staff at hospitals. Specifically, we will targeted four positions for interviews including ED patient registration front-line staff, administrative operations staff, ED nursing staff, and social service clinicians or case managers. The interviews were designed to solicit information on the process for determining a patient's housing and homelessness status, assess potential differences in reporting and collection across hospitals and across staff/departments within hospitals, broadly gauge the accuracy of our analysis of discharge flags on people experiencing homelessness, and discuss ways to improve the process.

The interviews were semi-structured in that we posed a set of broad questions, with distinct probes and let the discussion flow organically, while ensuring that we cover the same ground in each interview. The semi-structured approach will allow us to collect similar types of information across different hospitals and positions, while also providing the opportunity for people to provide additional details and nuance to their processes and approach to collecting information on PEH.

After discussing with our UCSF collaborators, we decided to develop two interview protocols – one for administrative staff and the other for clinical staff. While they contain some of the same questions, the clinical staff interviews include a few more questions geared towards accuracy of data on PEH, the discharge process, and challenges of serving PEH.

ED Patient Registration Staff

The main goal of this research project is to assess the information collected by hospital EDs and included in state discharge data about a patient's housing status and whether they are experiencing homelessness. We are interviewing administrative and clinical staff from a select group of hospitals to better understand how this data is collected and reported. It is designed to last about 30 minutes.

- Do you know if your department/hospital uses a specific set of criteria to define homelessness?
  PROBE:
  - Do you include transitional/supportive housing? Shelters?
  - What if someone is staying with relatives? Or sleeping in their car?
- Thinking about when you are registering/interacting with patients, is there a standard approach you use to screen for homelessness? If so, please describe. [Ask if any workflow documents they would be willing to share]
  PPROBE:
  - Do you screen all patients? At each visit? Does your approach change for patients well known to your system (e.g., frequent ED users)?
  - What do you do if a person is unable to provide information on their housing status (whether because they are impaired or in a medical crisis)? Do you rely on any visible cues (e.g. appearance/grooming, clothing) to assess homelessness?
  - Do you ask about the recent past or near future e.g. questions about frequency of moves, or concerns about losing your housing?
  - Is housing/homelessness screening done in combination with other screening (e.g., food insecurity, Medi-Cal eligibility)?
  - Do you think everyone in your position screens for homelessness in the same way?

- How/where do you record the information collected on a patient's housing status?
  PROBE:
  - Is it recorded in the address/residence information?
  - If a person is identified as experiencing homelessness during the ED registration process, does that information go to any other departments/systems (e.g. nursing staff/EHR, social service clinicians, financial/insurance eligibility)?
  - Can you access this information in future visits for the same patient at your hospital? Do patients get re-screened during each encounter or is there time-window for re-screening?
  - Are you involved with documenting the discharge planning for patients experiencing homelessness required under SB 1152?
    Iif "Yes" then following probes:
    PROBE:
    - How do SB 1152 requirements intersect with reporting PEH in discharge data?
    - What types of information do you record? Where do you maintain this data?
    - Do you provide/exchange info collected under SB 1152 with any local entities (e.g. county government, Medi-Cal managed care plans)
- According to hospital discharge data submitted to the state, XX% or about XX ED patients per week/month at your hospital are recorded as experiencing homelessness. Does that sound about right to you? Too high? Too low?
- In your opinion, what is the biggest challenge to documenting homelessness accurately?

        - If your organization could do one thing to make it easier for you to document homelessness, what would that be?
        - Has the pandemic created any additional difficulties or required a change in how you screen patients for homelessness?
    - Before we finish, is there anything we haven't talked about yet that you feel is important for us to understand how your hospital screens people for homelessness and records discharge plans.

Clinical staff – ED nurses and social workers

The main goal of this research project is to assess the information collected by hospital EDs and included in state discharge data about a patient's housing status and whether they are experiencing homelessness. We are interviewing administrative and clinical staff from a select group of hospitals to better understand how this data is collected and reported. It is designed to last about 30 minutes.

- Do you know if your department or the hospital use a specific set of criteria to define homelessness?

  PROBE:
  - Do you include transitional/supportive housing? Shelters?
  - What if someone is staying with relatives? Or sleeping in their car?
- Thinking about when you are triaging and interacting with patients, is there a standard approach you use to screen for homelessness? If so, please describe. [Ask if any workflow documents they would be willing to share]

  PROBE:
  - Do you screen all patients, at each visit? Does your approach change for patients well known to your system (e.g., frequent ED users)?
  - What do you do if a patient is unable to provide information on their housing status (whether because they are impaired or in a medical crisis)? Do you rely on any visible cues e.g. appearance/grooming, clothing to assess homelessness?
  - Do you think everyone in your position screens for homelessness in the same way?
  - Do you ask about the recent past or near future e.g. questions about frequency of moves, or concerns about losing current housing?
  - Is housing/homelessness screening done in combination with other screenings (e.g., food insecurity, violence prevention)?
- How/where do you record the information collected on a patient's housing status?

  PROBE:
  - Is there a place in the EHR? In clinical notes? In case manager notes/systems?
  - Can you access this information in future visits for the same patient at your hospital? Do patients get re-screened during each encounter or is there time-window for re-screening?
  - Are you aware of diagnostic Z codes for social needs? Do you use Z codes to indicate homelessness at the time of discharge?
- When a patient is identified as experiencing homelessness, how do you document the discharge planning process required by SB 1152 [state law that went into effect in 2019 that requires hospitals to document discharge planning for patients identified as experiencing homelessness]?

  PROBE:
  - What types of information do you record? Where do you maintain this data?
  - Do you know if SB 1152 data is shared with any local entities (e.g. county government, Medi-Cal managed care plans) or used by other departments at your hospital?

- According to hospital discharge data submitted to the state, 25% or about 1000 ED patients per month at your hospital are recorded as experiencing homelessness. Does that sound about right to you? Too high? Too low?
- In your opinion, what is the biggest challenge to documenting homelessness accurately?
  PROBE:
  - If your organization could do one thing to make it simple for you to document housing status, what would that be?
  - Has the pandemic created any additional difficulties or required a change in how you screen patients for homelessness? On how you plan for the discharge process?
- [TIME PERMITTING] Based on your experience, how does a person's homeless status impact ED based care, including decisions around admission/discharge and follow-up care?
  - PROBE: What community resources exist that help address homelessness in your patients? What types of resources do you think are needed and/or would be most helpful?
- Before we finish, is there anything we haven't talked about yet that you feel is important for us to understand how your hospital screens people for homelessness and records discharge plans.

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