Comparison of State Hospital Visits With Housing and Urban Development Estimates of Homeless: Illinois, 2011–2018

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Objectives. To assess the value of hospital records in augmenting information on homelessness counts at a state level.

Methods. We used data from the Illinois Hospital Discharge Database (2011–2018) to identify outpatients and inpatients identified as affected by homelessness. We used probabilistic linkage methodology to estimate unique individuals rather than visits and compared them with US Department of Housing and Urban Development annual estimates of homelessness based on point-in-time counts.

Results. Department of Housing and Urban Development point-in-time estimates indicate a substantial decline of approximately 24% in homelessness in Illinois; however, estimates of unique individuals visiting the hospital with a code for homelessness more than doubled in this same period.

Conclusions. Other data sources, such as hospital records, are increasingly able to identify and report information related to homelessness. Using these additional data sources may help to augment the Department of Housing and Urban Development point-in-time estimates to provide more accurate estimates of homelessness that are used to direct resources and assess policy and support services for those affected by homelessness. (*Am J Public Health.* 2020;110:391–393. doi:10.2105/AJPH.2019.305492)

As antihomeless rhetoric has increased in recent years, there is a growing imperative for accurate data to inform policies that address homelessness.[1–3] Annually, the US Department of Housing and Urban Development (HUD) publishes the results of an annual point-in-time (PIT) estimate of those suffering from homelessness by state. This estimate is the most widely used estimate of homelessness nationally and drives policy and funding, but it has been acknowledged that this count of sheltered and unsheltered individuals experiencing homelessness is an undercount.[4] Alternative data sources can be used to provide information to supplement these estimates. We aimed to evaluate hospital records for their value in augmenting homelessness counts at the state level.

METHODS

We used data from the Illinois Hospital Discharge Database for years 2011 to 2018 to identify outpatient and inpatient visits in which patients were identified as having a lack of housing or being affected by homelessness. The outpatient database includes all patients treated in emergency departments for less than 24 hours who were not admitted to the hospital. The inpatient database includes all patients treated for 24 hours or more for any medical reason. Based on the annual state audit of hospitals, the hospitals included in the data sets used for this analysis comprise 96.5% of all patient admissions statewide.[5] We used data from HUD annual estimates of homelessness based on PIT counts for Illinois as a comparison.[6]

We identified patient visits with a billing code of V60.0 for "lack of housing" (*International Classification of Diseases, Ninth Revision* [Geneva, Switzerland: World health Organization; 1980]) or the equivalent code of Z59.0 for "homelessness" (*International Classification of Diseases, Tenth Revision* [Geneva, Switzerland: World health Organization; 1992]) as cases in accordance with previous studies using hospital data to examine homelessness.[7] We did not include alternative codes for inadequate housing (V60.1), which refers to poor infrastructure, and unspecified housing or economic circumstances (V60.9), despite their inclusion in broader definitions[8] because HUD uses a narrow definition for its estimates and we were unable to verify unstable or lack of housing as opposed to inadequate housing.

We used probabilistic linkage methodology to estimate unique individuals using direct matching.[9] Because individuals affected by homelessness are more likely to be highly transient geographically, we provide 3 estimates for unique cases: (1) we treated cases per year that match by date of birth, gender, race/ethnicity, and zip code as the least conservative estimate of unique individuals because they allow someone that moved to a different zip code within that year but had multiple visits to be counted as separate individuals; (2) we used matched cases on date of birth, gender, and race/ethnicity to identify a moderate estimate of unique individuals; and (3) we used matched cases by date of birth and gender to identify the most conservative

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estimate of unique individuals, as it is likely that multiple individuals could have the same date of birth and gender and would be counted as 1 unique person. We chose these variables because they were nearly universally reported and they were not specific to a reason for the visit, which may change within the year. We ran crude autoregressive models using maximum likelihood estimation to test significance of temporal trend. We did not observe evidence of serial correlation based on the Durbin–Watson statistic. We analyzed data using SAS version 9.4 (SAS Institute, Cary, NC).

RESULTS

HUD PIT estimates indicate a substantial decline of approximately 24% in homelessness in Illinois from 2011 to 2018 (Table 1; $P < .001$). However, hospital visits with a code for homelessness tripled in this same period (Table 1; $P < .001$). Similarly, estimates of unique individuals visiting the hospital with a code for homelessness more than doubled in this period (Table 1; $P < .001$). Beginning in 2015, the estimated number of unique individuals classified as homeless using the moderate estimate exceeded the HUD estimates, and the gap continues to widen through 2018 (Table 1).

DISCUSSION

Hospital billing data indicate that the estimated number of unique individuals experiencing homelessness is increasing, whereas HUD estimates show a significant average annual decline of 544 individuals experiencing homelessness per year. The hospital data exceeded the HUD estimates by the year 2016 even when we used the most conservative deduplication strategy. This implies a substantial undercount in HUD estimates based on PIT counts even though it is unlikely that every homeless individual would be treated in a hospital in any given year. In 1 study, approximately one third of those in a health care program for the homeless were hospitalized and two thirds had an emergency department visit.[10] Hospital data will likely miss healthier and younger individuals experiencing homelessness who are unsheltered, living in vehicles, or temporarily homeless because of socioeconomic conditions.

There may be many explanations for the increase in Illinois hospital visits of those identified as homeless, such as better identification of these individuals by providers and enhanced reporting within hospital systems. As identification and reporting improve, hospital claims become a more viable source to estimate counts of homelessness that could augment current HUD PIT estimates. Hospital claims data also present opportunities to determine the impact of policy changes on those affected by homelessness.[7]

Another explanation for the rise in visits is increased hospital utilization by individuals experiencing homelessness. Individuals experiencing homelessness have been reported to be more likely than the nonhomeless to seek care at an emergency department.[11] Increased Medicaid coverage through the Patient Protection and Affordable Care Act, implemented January 1, 2014, may allow increased access of care outside emergency departments. This population has still shown higher rates of hospitalization visits despite Medicaid and universal health care coverage, which may be because of a lack of alternative services.[10,11]

HUD PIT estimates provide critical data, but because of limitations in defining and accessing the homeless population, supplementing their estimates with alternative data sources would enhance surveillance. Different sources have been proposed, such as Department of Education, American Community Survey, and other data to help augment measures for specific subpopulations of the homeless.[4,12] Although using hospital data may not adequately capture healthy individuals or those who seek care elsewhere, it

TABLE 1—Comparison of Estimated Unique Patients in Illinois Hospitals Affected by Homelessness With HUD Estimates: 2011–2018

Year	Total Visits, No.	Least Conservative Estimates of Unique Cases,[a] No	Moderate Estimates of Unique Cases,[b] No	Most Conservative Estimates of Unique Cases,[c] No	HUD Estimates, No
2011	9 882	8 207	7 304	6 613	14 009
2012	13 359	11 231	9 875	8 756	14 144
2013	15 850	12 971	11 263	9 877	13 425
2014	18 094	14 807	12 845	11 054	13 107
2015	19 946	15 998	13 875	11 902	13 177
2016	22 251	18 508	15 750	13 212	11 590
2017	25 026	20 341	17 200	14 335	10 798
2018	29 765	23 758	19 447	15 815	10 643
Average annual change[d]	+2 602	+2 050	+1 620	+1 228	−544

Note. HUD = US Department of Housing and Urban Development.

[a]Linked on date of birth, gender, race/ethnicity, and zip code.

[b]Linked on date of birth, gender, and race/ethnicity.

[c]Linked on date of birth and gender.

[d]All $P < .001$ are based on the unadjusted autoregressive model, and no autoregressive term was used, as the Durbin-Watson statistic did not indicate autocorrelation.

could capture estimates for larger geographical areas, provide a way to measure some of those often missed in PIT counts, and continuously capture data throughout the year through a data system in existence in almost every state.

There are several limitations in this study. First is the lack of unique identifiers to deterministically identify the number of individuals seen in Illinois hospitals who are affected by homelessness. Additionally, there may be misclassifications because of the use of billing records and variations by facility in identifying and reporting homelessness in the billing records.

PUBLIC HEALTH IMPLICATIONS

Although HUD estimates suggest that homelessness is decreasing in Illinois, hospital records show that the numbers of those suffering from homelessness is increasing. As other data sources, such as hospital records, are increasingly able to identify and report information related to homelessness, using these additional data sources may help to augment HUD PIT estimates to provide more accurate estimates of homelessness. These estimates are of critical public health importance because they are used to direct resources and assess the reach and efficacy of policy and supportive services for those affected by homelessness. AJPH

CONTRIBUTORS

D. Madigan and L. S. Friedman performed the analysis. All authors conceptualized and designed the study and drafted the brief.

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CONFLICTS OF INTEREST

The authors have no competing interests.

HUMAN PARTICIPANT PROTECTION

This study received University of Illinois at Chicago institutional review board approval (protocol no. 2008-0060).

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