

People Experiencing Homelessness in NC have Increased Mortality, Including High Overdose, Violence, Injury, and Chronic Disease Death Rates

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To the Editor—In 2020, over half a million Americans experienced homelessness on a given night [1]. Lack of adequate housing is a structural determinant of health associated with negative health effects including infectious diseases, respiratory illnesses, poor mental health, and mortality [2, 3]. Prior research shows higher overall and cause-specific mortality among people experiencing homelessness (PEH) [4], contributing to overall health inequities [5].

The Homelessness Management Information System (HMIS) maintains data on PEH, utilizing federally funded services. During this research period, there were two HMIS implementations in North Carolina: HMIS@NCCEH (81 counties) and NC HMIS (19 counties). Using methods from linkages of recently incarcerated North Carolina individuals [6], we linked HMIS@NCCEH data to five years of death records.

Methods

Data Sources

Death certificate data (N = 553,286) from 2014 to 2019 were obtained from the North Carolina Center for Health Statistics. HMIS data were obtained from the North Carolina Coalition to End Homelessness (NCCEH). Many individuals have multiple or repeating experiences of homelessness; we consolidated (n = 67,329) person-enrollment records from NCCEH from 2015 to 2019 into (n = 36,090) distinct person records. Population estimates for 81 counties in the service area were obtained from the US Census American Community Survey.

Linkage

To link death certificates and HMIS records, we harmonized linkage variables and derived homelessness-related place of death variables. We used the *fastlink* probabilistic linkage package [7]. Links were 100% hand-reviewed to iteratively improve and ensure linkage quality.

Statistical Analysis

Death certificate ACME (Automated Classification of Medical Entry [8]) code frequencies were used to compare

all-cause and cause-specific mortality rates of the 81-county North Carolina population using age-standardized mortality ratios (SMR) and 95% confidence intervals (CIs).

Results

1953 (5%) PEH were linked to death certificates. Using age-adjusted SMRs, PEH had 7.0 times the all-cause mortality rate of the North Carolina general population (95% CI: 6.7, 7.3). The most frequent single cause of death among PEH was a med-drug overdose, representing 238 (12.2%) deaths (versus 2.0% in the North Carolina population), 13.8 times the North Carolina mortality rate. Other frequent death causes included suicide/self-harm (4.1%, 9 times the rate); motor vehicle crash/pedestrian injuries (1.9%, 6 times the rate); and firearm assault (1.4%, 10 times the rate). We also found higher rates of chronic disease mortality, including heart disease (7 times), liver diseases (7 times), and lung cancers (6 times).

Discussion

This study demonstrates higher all-cause and cause-specific mortality rates among PEH than the broader North Carolina population, especially from injury and chronic disease causes. We corroborate other PEH studies that found PEH die from unintentional overdoses [9] and violent deaths [10] at higher rates than housed populations, even as many causes of death are shared between both populations.

Deaths marked pending investigation (R99) were also disparately high (13 times the North Carolina rate). Historically, 40% of these pending codes resolve to be med-drug overdoses [11], suggesting underestimated overdose rates. Non-injury causes of death can still be injury-related: bacterial sepsis can be associated with burns (such as heating with

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open flames or summer sunburns) and infected wounds and endocarditis can come from intravenous drug use.

This pilot study utilized HMIS data from 81 counties; the remaining 19 counties chose not to participate in the pilot, even with supportive funding and strict data security. Complete, cross-system, statewide HMIS data is essential but not currently possible in North Carolina. Collaborations and funding should support sustainable, statewide, accurate monitoring of PEH health.

Data governance enables or disallows research. Lengthy data governance and contract review lag times can leave PEH-centered epidemiology lessons out of date and hinder timely response. Academic, community, and government collaborations, like this project, may be essential to meet the US Department of Health and Human Services Public Health 3.0 goals of being timely, granular, and actionable [12].

Limitations

We expect mortality patterns among PEH to differ by race, gender, sheltered or unsheltered status, and insurance status. Future work should improve upon ours by disaggregating PEH mortality trends.

Public Health Implications

Future work could extend this linkage to the NC Violent Death Reporting System (VDRS) and State Unintentional Drug Overdose Reporting System (SUDORS) to explore the high rates of violence and overdose. Even without linkage, identifying PEH or deriving PEH-related variables in other public health datasets provides key context.

Routine linkage of homelessness service records and public health datasets is necessary to understand the disparate health burdens of PEH, including COVID-19 impacts. Interventions aimed at reducing mortality and improving health in North Carolina should consider the increased burden of med-drug overdoses, firearm assaults, and suicide deaths among PEH. Monitoring, along with collaborative meaning-making and intervention design, may enable improved response to the risks and needs of PEH. NCMJ

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