RECENT TRENDS IN MORTALITY RATES AND CAUSES OF DEATH AMONG PEOPLE EXPERIENCING HOMELESSNESS IN LOS ANGELES COUNTY

OCTOBER 2019

Introduction

Homelessness is a major and growing crisis in Los Angeles (LA) County and across many other regions of the country. The homelessness epidemic reflects a fundamental failure of society to meet the most basic needs of its people. Many who become homeless face conditions that greatly imperil their health. Multiple studies have documented mortality rates from three to eight times higher among those who are homeless compared to those in the general population.[1-5] In addition, persons who are homeless die at much younger ages on average than those who are housed.[6]

These sobering mortality statistics underscore the need for urgent action to move those who are homeless into stable housing and to identify effective strategies to reduce the flow of individuals and families into homelessness. In addition, information on mortality rates and causes of death among the homeless is important for planning services and prioritizing resource allocations to better meet the health needs of this extremely vulnerable and diverse population.

This policy brief presents data on recent trends in all-cause and cause-specific mortality rates among people experiencing homelessness in LA County. These rates are compared among gender and racial/ethnic sub-groups of the homeless population. Homeless mortality rates are also compared to rates in the general LA County population.

Methods

Enumerating Homeless Deaths

Calculating homeless mortality rates requires accurate estimates of the number of homeless individuals who die each year. California death certificate data do not provide a definitive indication of whether a decedent is homeless. The LA County Medical Examiner-Coroner (MEC) investigates 15-20% of deaths each year and has the option of indicating "homeless" as the residence type of the decedent, but this information is not always pertinent to the investigation and is thus not always complete. Also, while the MEC's case investigation criteria are likely to capture most homeless deaths, an unknown number of homeless deaths each year are not investigated by the MEC.

To get as accurate and complete a count of homeless deaths as possible given these data limitations, MEC case records coded as homeless comprised an initial list that was augmented through systematic searches of MEC and death certificate data. First, for all MEC case records not coded as homeless, address fields were searched to identify records with addresses of LA County homeless shelters and interim housing facilities for the homeless*,

**Homeless shelter addresses were obtained from the Los Angeles Homeless Services Authority (LAHSA) and addresses of interim housing facilities, including stabilization housing and recuperative care facilities, were obtained from the Housing for Health (HFH) program.*

1 Nordentoft M, Wandall-Holm N. 10 year follow up study of mortality among users of hostels for homeless people in Copenhagen. BMJ. 2003;327(7406):81. doi:10.1136/bmj.327.7406.81

2 Ivers J-H, Zgaga L, O'Donoghue-Hynes B, Heary A, Gallwey B, Barry J. Five-year standardised mortality ratios in a cohort of homeless people in Dublin. BMJ Open. 2019;9(e023010):1-5. doi:10.1136/bmjopen-2018-023010

3 Aldridge RW, Story A, Hwang SW, et al. Morbidity and mortality in homeless individuals, prisoners, sex workers, and individuals with substance use disorders in high-income countries: a systematic review and meta-analysis. Lancet. 2017;391:241-250. doi:10.1016/S0140-6736(17)31869-X

4 Auerswald CL, Lin JS, Parriott A. Six-year mortality in a street-recruited cohort of homeless youth in San Francisco, California. PeerJ. 2016;4(e1909):1-13. doi:10.7717/peerj.1909

5 Fazel S, Geddes JR, Kushel M. The health of homeless people in high-income countries: descriptive epidemiology, health consequences, and clinical and policy recommendations. Lancet. 2014;384(9953):1529-1540. doi:10.1016/S0140-6736(14)61132-6

6 Culhane DP, Metraux S, Byrne T, Stino M, Bainbridge J. The age structure of contemporary homelessness: evidence and implications for public policy. Anal Soc Issues Public Policy. 2013;13(1):228-244. doi:10.1111/asap.12004

and these records were added to the count. Next, a systematic text search of MEC address and case note fields was performed to identify records with key words indicating homelessness.† Each of these MEC records was independently reviewed by two research staff and those agreed upon as homeless were added to the count.

Death certificate data were searched to identify homeless deaths not investigated by the MEC. Because death certificate data do not explicitly indicate homelessness and do not include any case notes, only the address fields could be searched for indications of homelessness. In addition to homeless key words and addresses of shelter and interim housing facilities, address fields were also searched for instances of descriptive text indicating a physical location other than a street address. This is what individuals authorized to complete death certificates are instructed to enter in the address field for decedents known to be homeless. These descriptions typically indicated a street intersection closest to where the decedent was located at the time of death. Records with these types of descriptions were independently reviewed by two research staff and those agreed upon as homeless were added to the count.

Demographic Characteristics and Causes of Death

Comparing homeless mortality rates among homeless sub-groups and with rates in the general population requires estimates of total population counts and demographic characteristics. Estimates of the total LA County homeless population and its demographic characteristics were obtained from the annual point-in-time homeless count and demographic survey conducted by the Los Angeles Homeless Services Authority (LAHSA).‡ General LA County population and demographic information was obtained from Hedderson Demographic Services.§

Death certificate data contain International Classification of Disease (ICD) codes indicating the underlying cause of death. In order to determine the ICD-coded causes of homeless deaths identified from MEC case records, these records were matched to death certificate data based on common identifiers across the two datasets. Causes of death in the general population were also obtained from death certificate data.

Comparing Age- and Gender-Adjusted Mortality Rates

When comparing mortality rates across different populations, it is important to control for differences in the population age structures because mortality is so closely related to age. To compare mortality trends across racial/ethnic and gender sub-groups of the homeless population, age-specific mortality rates for each subgroup were applied to the age structure of the 2010 census population for LA County (i.e., the standard population) to produce direct age adjusted rates. The age categories used for these age adjustments were dictated by the categories used by LAHSA in its homeless count demographic survey (<18; 18-24; 25-54; 55-61; 62+). For comparisons of mortality rates between the homeless population and the general population of LA County, direct adjustment was performed using the same standard population. The rates were adjusted for both age and gender because the gender balance in the homeless population is significantly different from that in the general population, and gender is also highly related to mortality.

†Key words and phrases included: homeless, transient, indigent, vagrant, shelter, lives in van, lives in car, lives in vehicle, no fixed abode, no known residence, encampment, and skid row.

‡When calculating a mortality rate for a specific year, it is customary to use a mid-year population estimate as the denominator. Since the homeless count is always conducted in January, we used the average of the count for the index year and the subsequent year as the denominator (e.g., the denominator for the 2018 rate was the average of the 2018 and 2019 counts).

§Hedderson Demographic Services produces population estimates on an annual basis for the Los Angeles County Internal Services Department and Information Technology Service Division.

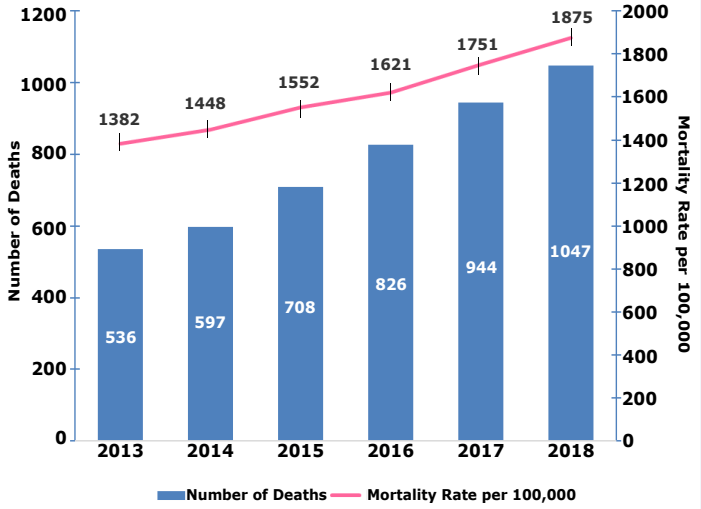
Results

Mortality Trends and Leading Causes of Deaths Among People Experiencing Homelessness

The number of deaths among people experiencing homelessness increased each year studied from 536 in 2013 to 1,047 in 2018 (Figure 1). The all-cause mortality rate, which accounts for increases in the total homeless population over that 6-year period, also increased each year, from 1,382 deaths per 100,000 to 1,875 deaths per 100,000 (Figure 1).

The leading causes of homeless deaths from 2013-2018 are shown in Table 1.* Coronary heart disease (CHD) accounted for 22% of all deaths, closely followed by drug/alcohol overdose, accounting for 21% of all deaths. However, 156 of the liver disease deaths were coded as alcoholic liver disease and an additional 3% of all deaths were coded as alcohol abuse/dependence. Thus, a total of 27% of all homeless deaths were attributable to alcohol and drug use. Another 24% of deaths were caused by injury and violence, with 9% of those from transportation-related injuries, 6% from homicide, 5% from suicide, and 4% from other unintentional injuries.

FIGURE 1: LA County Homeless Deaths and Mortality Rates, 2013-2018



*ICD codes could not be obtained for 917 MEC case records that could not be matched to death certificate data. These cases comprise 20% of all homeless deaths identified from 2013-2018. Analysis of MEC manner of death codes for these 917 deaths suggests that they did not differ substantially from the other 80% of deaths in terms of the proportion of natural vs. unnatural causes.

TABLE 1: Leading Causes of Death in LA County Homeless Persons by Race/Ethnicity and Gender, 2013-2018

	TOTAL Number (%)	Race/Ethnicity Number (%)				Gender Number (%)	
		Latino	African American	White	Asian/PI*	Male	Female
Coronary Heart Disease	811 (22)	163 (15)	224 (26)	376 (23)	36 (32)	717 (23)	94 (14)
Drug/Alcohol Overdose (Unintentional)**	795 (21)	226 (21)	164 (19)	376 (23)	15 (13)	628 (20)	167 (25)
Transportation-Related Injury (Unintentional)***	318 (9)	110 (10)	64 (8)	123 (8)	13 (12)	235 (8)	83 (13)
Homicide	222 (6)	97 (9)	60 (7)	57 (4)	†	193 (6)	29 (4)
Suicide	185 (5)	65 (6)	15 (2)	91 (6)	10 (9)	164 (5)	21 (3)
Liver Disease/Cirrhosis‡	177 (5)	84 (8)	15 (2)	67 (4)	†	151 (5)	26 (4)
Other Unintentional Injury	137 (4)	49 (4)	27 (3)	59 (4)	†	116 (4)	21 (3)
Other Heart Disease§	120 (3)	27 (2)	39 (5)	48 (3)	†	88 (3)	32 (5)
Alcohol Abuse/ Dependence‡	77 (2)	32 (3)	†	32 (2)	†	73 (2)	†
Hypertensive Heart Disease§	70 (2)	15 (1)	24 (3)	28 (2)	†	57 (2)	13 (2)

†Causes with fewer than 10 deaths are not reported. This includes all causes among American Indians/Alaskan Natives.
**PI - Pacific Islander. Asians and Pacific Islanders are reported together due to small numbers of deaths.*
***88% of **drug/alcohol overdose** deaths were coded as drug overdoses and 12% were coded as alcohol overdoses.*
******Transportation-related injury** includes motor-vehicle and railway train related injuries. 82% of these deaths were among pedestrians & cyclists.*
*‡88% of **liver disease/cirrhosis** deaths were from alcoholic liver disease. **Alcohol abuse/dependence** deaths are related to alcohol abuse/dependence but are not the result of an acute overdose of alcohol.*
*§**Other heart disease** includes: acute and subacute endocarditis; diseases of pericardium and acute myocarditis; heart failure; and all other forms of heart disease. **Hypertensive heart disease** is a discrete ICD category of heart disease that is not included in CHD or other heart disease.*

Figure 2 shows time trends in cause-specific mortality rates for the top six causes of death. These trends indicate that the overall increase in the rate of homeless mortality (Figure 1) was driven largely by increases in mortality from drug/alcohol overdoses, transportation-related injuries and homicide. The mortality rates for transportation-related injuries and homicide approximately doubled between 2013 and 2018. The rate for drug/alcohol overdose increased by 50%, and had the greatest absolute increase, from 196 per 100,000 to 294 per 100,000.

Racial/Ethnic and Gender Differences in Leading Causes of Death and Mortality Among People Experiencing Homelessness

Table 1 also shows the leading causes of death by racial/ethnic sub-groups of the homeless population. Coronary heart disease, drug/alcohol overdoses, and transportation-related injuries were the top three causes of death among all racial/ethnic sub-groups, although CHD was the leading cause among African Americans and Asians/Pacific Islanders while drug/alcohol overdose was the leading cause among Latinos.

FIGURE 2: LA County Cause-Specific Homeless Mortality Rates, 2013-2018

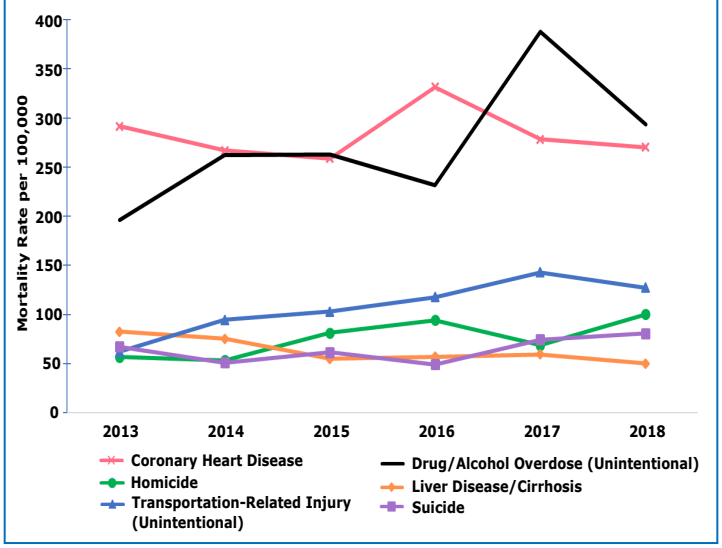
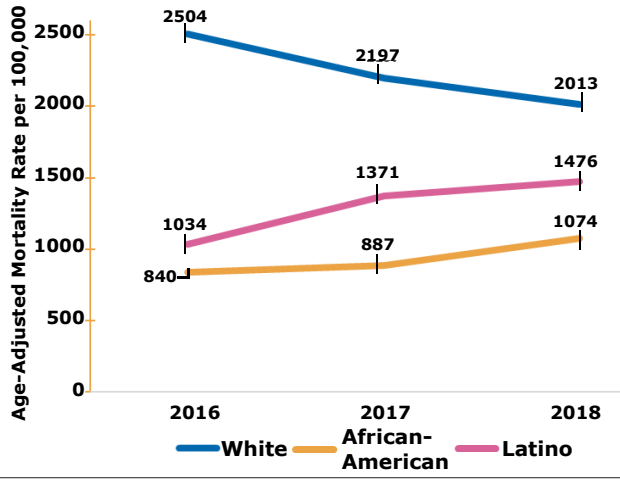


FIGURE 3: Age-Adjusted LA County Homeless Mortality Rates by Race/Ethnicity, 2016-2018*

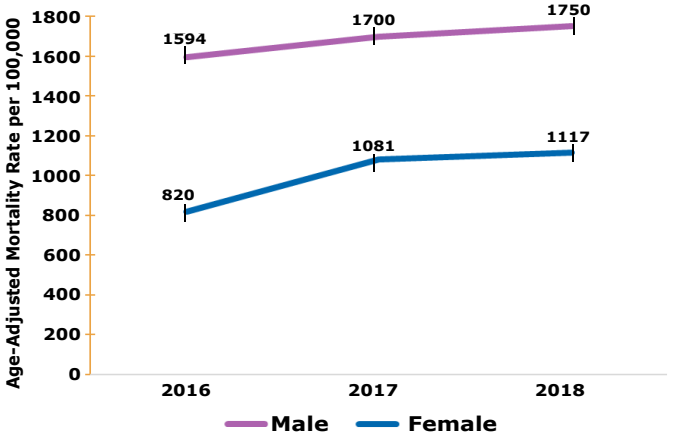


** 2010 Population Estimates and Projections System (PEPS) data for Los Angeles County were used as the standard population for age adjustment. For each year displayed, January homeless count data for the subsequent year were used for homeless population denominator data (e.g., January 2019 count data were used for 2018).Small numbers prevented inclusion of Asians, Pacific Islanders, American Indians and Alaskan Natives in these estimates.*

Figure 3 compares age-adjusted trends in mortality rates among the three largest racial/ethnic sub-groups. Since demographic data on age and race/ethnicity of the homeless population were only available for 2016-2018, we were only able to calculate age-adjusted mortality rates by race/ethnicity for these three years. The mortality rate for homeless whites was greater than that for homeless African Americans and Latinos across all years. However, while the rate for whites decreased from 2016-2018, the rates for both African Americans and Latinos increased.

Coronary heart disease, drug/alcohol overdoses, and transportation-related injuries were the leading causes of death among both males and females experiencing homelessness (Table 1), although CHD was the leading cause among males while drug/alcohol overdose was the leading cause among females. Age-adjusted mortality rates increased from 2016 to 2018 among both males and females, although males had higher mortality rates across all three years (Figure 4, next page).

FIGURE 4: Age-Adjusted LA County Homeless Mortality Rates by Gender, 2016-2018*



** 2010 Population Estimates and Projections System (PEPS) data for Los Angeles County were used as the standard population for age adjustment. For each year displayed, January homeless count data for the subsequent year were used for homeless population denominator data (e.g., January 2019 count data were used for 2018).Small numbers prevented inclusion of Asians, Pacific Islanders, American Indians and Alaskan Natives in these estimates.*

Comparisons of Mortality Rates Among People Experiencing Homelessness with Mortality Rates in the General Population

Adjusting for differences in the ages and genders of the homeless population versus the general LA County population (which could only be done for 2016-2018), the all-cause mortality rate in the homeless population was 2.3 times greater than the rate in the general population (Table 2). The mortality rate ratios (MRRs) were even higher for the five leading causes of death among the homeless.

TABLE 2: Age- and Gender-Adjusted Mortality Rate Ratios (MRR) for LA County Homeless Persons Compared to the General Population, by Cause of Death, 2016-2018

	MRR*
All Causes of Death	2.3
Coronary Heart Disease	2.6
Drug/Alcohol Overdose (Unintentional)	25.9
Transportation-Related Injury (Unintentional)	10.7
Homicide	9.8
Suicide	5.1

**MRR = Homeless Mortality Rate / General Population Mortality Rate*

People experiencing homelessness were 26 times more likely to die from drug/alcohol overdose, 11 times more likely to die from transportation-related injuries, 10 times more likely to die from homicide, 5 times more likely to die from suicide, and 3 times more likely to die from CHD than people in the general population. The average age at death was 51 among the homeless and 73 among the general population.

Discussion

This report presents results of the first comprehensive analysis of mortality among people experiencing homelessness in LA County. A principal finding is that the overall homeless mortality rate has steadily increased over the past six years. This means that increases in the number of homeless deaths recently reported in the media cannot be attributed solely to the fact that the total number of homeless people has also been increasing. Put simply, being homeless in LA County is becoming increasingly deadly.

The cause that has contributed most to the overall increase in the homeless mortality rate is drug/alcohol overdose. The absolute increase in overdose deaths was considerably higher than that of any other leading cause of death in this population. Coronary heart disease, a chronic condition associated with aging and the leading cause of death in the general LA County population, is also a leading cause of death among the homeless. However, the CHD mortality rate among the homeless has remained relatively stable over the past six years. Mortality rates for both transportation-related injuries and homicide, though considerably lower than those for CHD and drug/alcohol overdoses, approximately doubled from 2013 to 2018, and thus also contributed to the overall increase in mortality among the homeless.

Whites experiencing homelessness had higher mortality rates than African Americans and Latinos across all years. While the African American-white difference may appear counterintuitive, given that African Americans have a higher mortality rate than whites in the general population and are grossly overrepresented in the homeless population, it is consistent with other studies of racial differences in homeless mortality.[7-9] The leading explanatory theory is that African Americans and whites experience different pathways to becoming homeless, with white homelessness being precipitated more often by physical and mental disability and African American homelessness being precipitated more often by poverty and discrimination.[10] Thus, whites may be sicker, on average, than African Americans at the time they become homeless. Latino individuals in the general LA County population have slightly lower overall mortality rates than whites, but the difference is not nearly as large as the difference in the homeless population. This Latino-white homeless mortality difference may be driven by the same theory as that proposed for African Americans.

Perhaps more important than the overall homeless mortality differences by race/ethnicity is that the trend among whites is decreasing while those of African Americans and Latinos are increasing. If the overall rate were decreasing, one might hypothesize that successful placement of homeless individuals in permanent supportive housing (PSH) was shifting deaths that would have occurred among the homeless to deaths occurring among those recently housed. However, if whites experiencing homelessness present as sicker than African Americans and Latinos, then they may be more likely to meet the health-related criteria used for placement in PSH, which could explain the differential trend in homeless mortality by race/ethnicity.

While females made up a relatively smaller but consistent proportion of the total homeless population (31% across all three years examined), their mortality rate has increased at a slightly faster pace than that of males. Data on leading causes of death by gender suggest that drug/alcohol overdose and transportation injury-related deaths are particularly high in this population.

The 2.3-fold difference between the homeless and general population mortality rates in LA County is somewhat lower than what has been reported in other studies, but these studies were conducted with different methodologies at different times and in cities in the Northeastern U.S. or in other countries with different homeless population characteristics. The sheer size and diversity of LA County's current homeless population likely produce unique patterns of mortality.

Comparisons of the total population rates also likely mask greater disparities by age group. The mortality rate among younger homeless people is likely much more than twice that of younger people in the general population. By the same token, ten to twenty-six-fold differences in mortality from homicide and drug/alcohol overdoses are even more striking when one considers that these differences cover the entire age span of the populations.

Finally, while mental health conditions are rarely coded as underlying causes of death, they often co-occur with alcohol substance use disorders, particularly among the homeless.[5] Suicide is also commonly precipitated by mental health problems. Thus, a substantial portion of LA County homeless deaths may be linked to mental health disorders, indicating a critical service need for this population.

7 Baggett TP, Hwang SW, O'Connell JJ, et al. Mortality among homeless adults in Boston: shifts in causes of death over a 15-year period. JAMA Intern Med. 2013;173(3):189-195. doi:10.1001/jamainternmed.2013.1604

8 Roncarati JS, Baggett TP, O'Connell JJ, et al. Mortality among unsheltered homeless adults in Boston, Massachusetts, 2000-2009. JAMA Intern Med. 2018;178(9):1242-1248. doi:10.1001/jamainternmed.2018.2924

9 Jones MM. Does race matter in addressing homelessness? A review of the literature. World Med Health Policy. 2016;8(2):139-156. doi:10.1002/wmh3.189

10 Levinson D, ed. Encyclopedia of Homelessness. Vol 2. Thousand Oaks, CA, USA: Sage Publications; 2004.

Recommendations

The findings of this report have important implications for homeless services policy and practice in LA County, which are summarized in the following recommendations:

1. **Establish a Homeless Death Review process to better understand the circumstances contributing to homeless deaths and to inform strategies for preventing future homeless deaths.**

- A Homeless Death Review Team, modelled after similar efforts in other large cities and consisting of representatives from relevant county departments, should select an annual sample of homeless deaths from each of the top five causes identified in this report and describe relevant co-occurring conditions and other circumstances relevant to prevention efforts.

2. **Conduct direct outreach to people experiencing homelessness to assess their health and mental health service needs and the challenges they face in accessing these services.**

- Deploy county public health staff to conduct targeted assessment of needs and barriers based on geographic hot spotting of homeless deaths and their causes.

3. **Review data on characteristics of homeless clients placed in different housing programs; Consider adjusting eligibility screening criteria to account for any racial/ethnic differences in client needs.**

- Determine if there are any racial/ethnic disparities in placements in any housing programs for the homeless. If so, identify equity-related factors that might explain these disparities and, if necessary, adjust eligibility criteria to eliminate inequities.

4. **Tailor strategies for reducing traffic fatalities (i.e., Vision Zero) to the unique needs of the homeless population.**

- Implement traffic calming and other pedestrian and cyclist safety measures in areas near homeless encampments. Conduct geographic analysis to identify concentrations of homeless deaths due to transportation-related injuries; utilize findings to focus traffic safety improvements.

5. **Determine rates and causes of mortality among formerly homeless individuals placed in permanent supporting housing and other housing programs for the homeless.**

- Compare results with those from this report to identify differences and similarities, and use the results to inform service delivery to recently homeless individuals who have been housed.

6. **Establish a cross-department workgroup to refine and improve methods for ongoing monitoring of mortality among the homeless.**

- Departments of Public Health, Medical Examiner Coroner (MEC), Chief Information Office and LAHSA should codify methods for identifying homeless deaths, optimize matches of MEC investigation file data to death certificate data, and optimize use of homeless count and demographic data for routine monitoring of homeless mortality in LA County.

Center for Health Impact Evaluation

Better policies for healthy communities

ACKNOWLEDGEMENTS

We thank **Jonathan Lucas**, MD, the Los Angeles County Chief Medical Examiner-Coroner; **Louise Rollin-Alamillo** and **Alex (Yiuwah) Ho** of the Los Angeles County Department of Public Health's Office of Health Assessment and Epidemiology; **Stephanie Wolahan** of the Los Angeles Homeless Services Authority; and **Benjamin Henwood** and **Stephanie Kwack** of the University of Southen California for their contributions to this brief.

County of Los Angeles Public Health

Los Angeles County
Department of Public Health
313 N Figueroa Street, Room 608
Los Angeles, CA 90012

Suggested Citation: Los Angeles County Department of Public Health, Center for Health Impact Evaluation, Recent Trends In Mortality Rates and Causes of Death Among People Experiencing Homelessness in Los Angeles County, October 2019

For additional information about the Center for Health Impact Evaluation, visit http://publichealth.lacounty.gov/chie