Examining the Mortality of a Rough Sleeper Cohort from Boston, MA, 2000–2009

Jill S. Roncarati, ScD, MPH, PA-C

Nancy Krieger, PhD

Stephen W. Hwang, MD, MPH

E. Francis Cook, ScD

Glorian Sorensen, PhD, MPH

James J. O'Connell, MD

Harvard T.H. Chan School of Public Health

Boston Health Care for the Homeless Program

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Objectives

- Review homeless counts in the US
- Describe BHCHP Street Team model of care: study setting & study population
- Describe an unsheltered cohort from Boston
- Explain mortality rates and causes of death for the unsheltered cohort from Boston using two comparison groups
- Discuss strengthens, limitations, and conclusions of study

In January 2016, on one night...
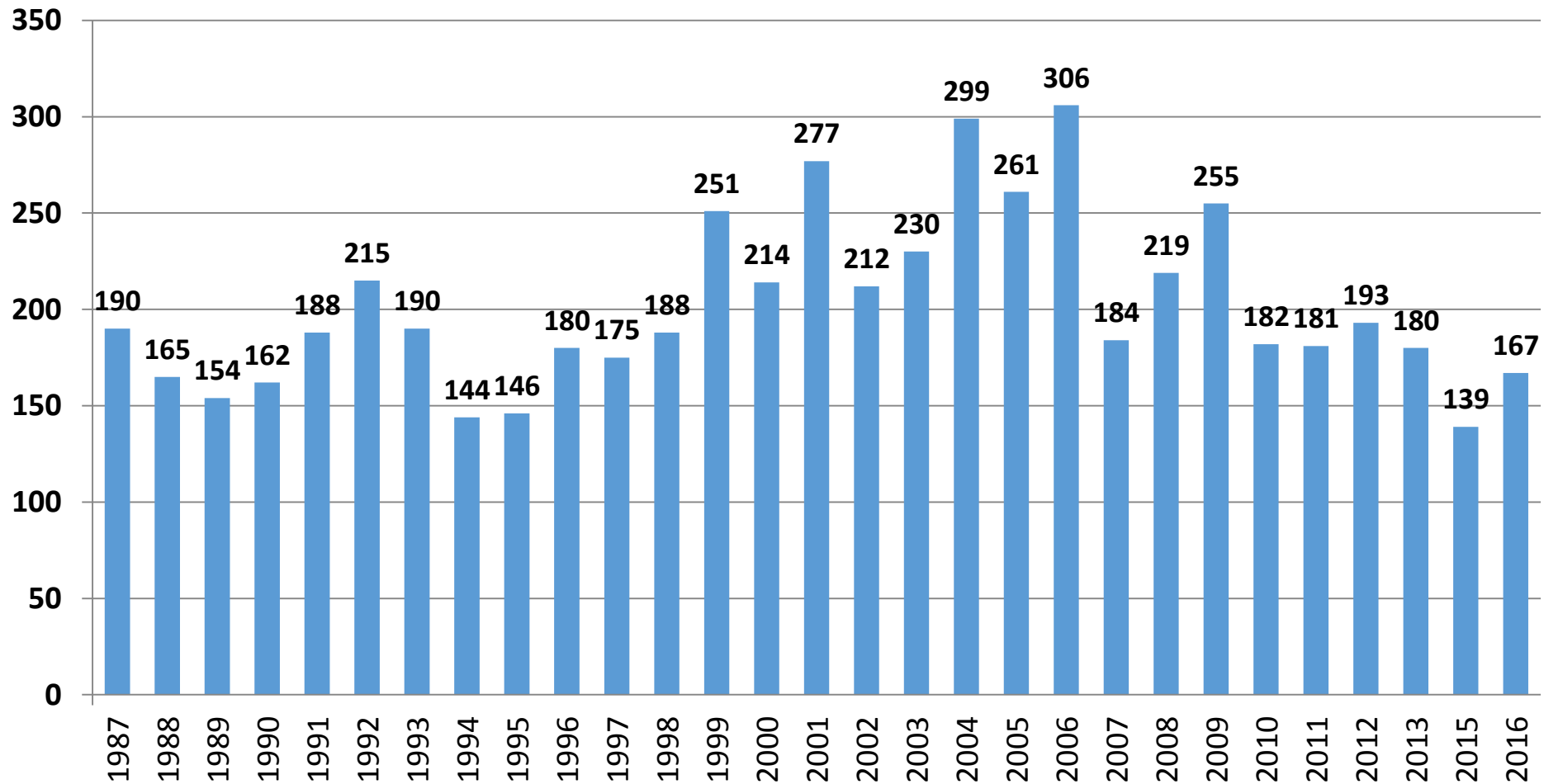
In the US

- All People   549,928

- Individuals   355,212 (65%)
  - Unsheltered 157,204   (44%)
  - Sheltered   198,008   (56%)

- Families   194,716 (35%)
  - Unsheltered 19,153   (10%)
  - Sheltered   175,563   (90%)

In Boston

- All People   7,549

- Individuals   3,384 (45%)
  - Unsheltered   167 (5%)
  - Sheltered   3,217 (95%)

- Families   4,165 (55%)

3

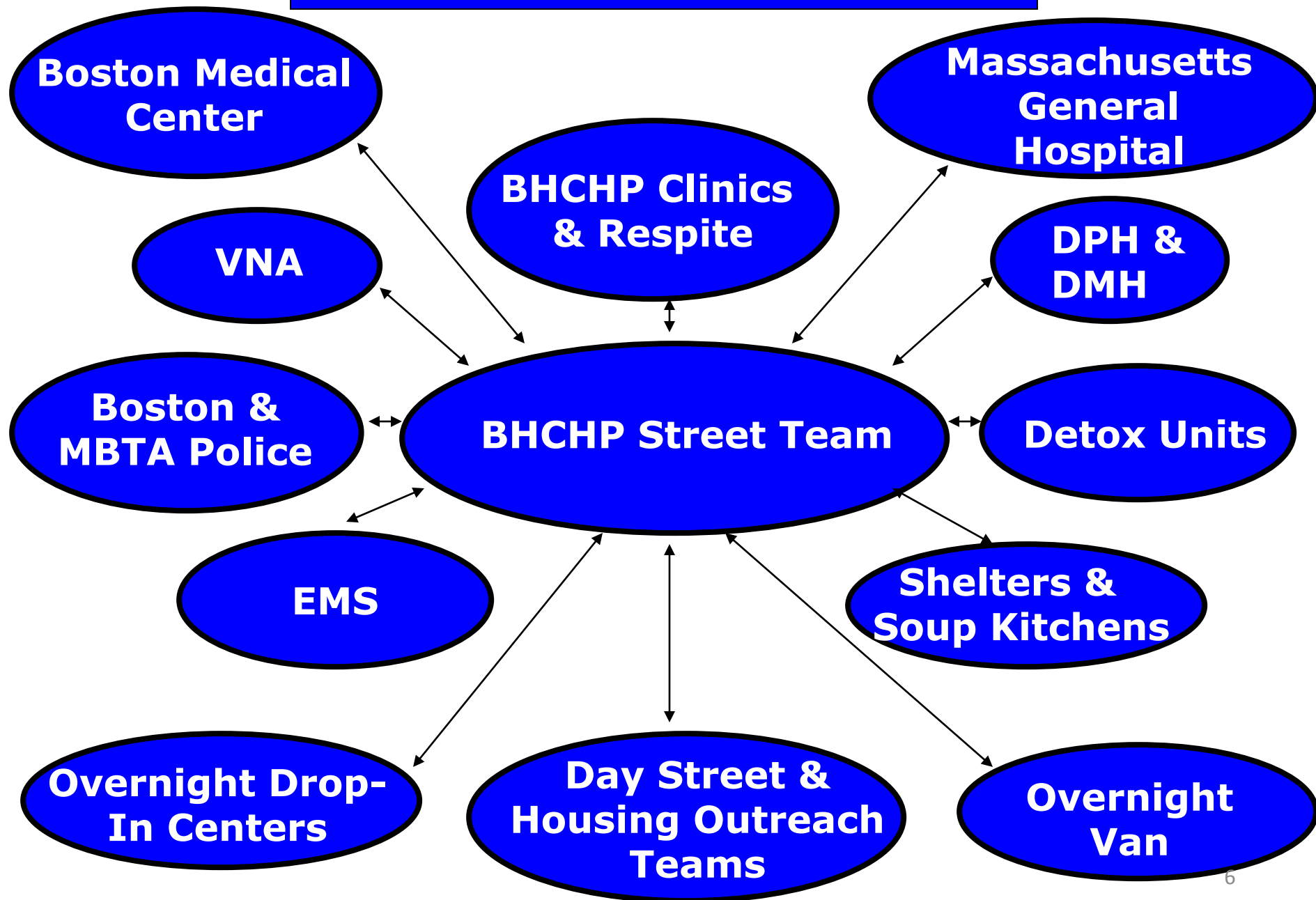# Annual Count of Boston's Rough Sleepers, 1987-2016*

*Homeless Census is conducted one night every January by Emergency Shelter Commission of Boston Public Health Commission

BHCHP's Street Team

- Multidisciplinary team providing care day & night to >500 rough sleepers/year
- Continuity of care from street to clinic to respite to home
- Documentation is a challenge
  - In 1997 Access database created to collect data from face-to-face encounters outside of clinic with rough sleepers
  - Over time replaced by BHCHP's EMR
- Initial database created for **clinical** purposes but has been used for **research** & **reporting**
- Foundation for dataset for this study

CITY WIDE COLLABORATION

Boston Medical Center

Massachusetts General Hospital

VNA

BHCHP Clinics & Respite

DPH & DMH

Boston & MBTA Police

BHCHP Street Team

Detox Units

EMS

Shelters & Soup Kitchens

Overnight Drop-In Centers

Day Street & Housing Outreach Teams

Overnight Van

6

Aims

1) Describe a Rough Sleeper cohort from Boston

2) Calculate age-standardized all-cause & cause-specific mortality rates

Methods

1) 10-year prospective study from 1/1/2000-12/31/2009
2) 445 unique rough sleepers from Boston
3) Data primarily from Access Db, but also from BHCHP EMR, MDPH death occurrence files from 2000-2009, limited NDI reports
4) Calculated age-standardized mortality rates using indirect standardization
   - Created Standardized Mortality Ratios (SMRs)
   - Rough Sleeper cohort was standard population
5) Used two comparison groups for calculations
   - Massachusetts population, 2000-2009
   - General homeless cohort from Boston, 2003-2008

Table 1: Characteristics of the Unsheltered Cohort, 2000-2009

	Cohort N = 445	Men N = 322	Women N= 123	Decedents N = 134	Boston 2000 Census >18 years old N = 472,582[a]	MA[b] 2000 Census >18 years old N = 4,849,033[c]
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Age						
18-44	248 (55.7)	165 (51.2)	83 (67.5)	56 (41.8)	306,658 (64.9)	2,569,111 (53.0)
45-64	176 (39.6)	140 (43.5)	36 (29.3)	65 (48.5)	104,588 (22.1)	1,419,760 (29.3)
>65	21 (4.7)	17 (5.3)	4 (3.3)	13 (9.7)	61,336 (13.0)	860,162 (17.7)
Race/Ethnicity						
White	299 (67.2)	223 (69.3)	76 (61.8)	108 (80.6)	283,109 (59.9)	4,180,644 (86.1)
Black	94 (21.1)	62 (19.3)	32 (26.0)	15 (11.2)	102,491 (21.7)	236,027 (4.9)
[d]Other	52 (11.7)	37 (11.5)	15 (12.2)	11 (8.2)	86,982 (18.4)	432,362 (8.9)
Gender [e]						
Men	322 (72.4)			116 (86.6)	224,078 (47.4)	2,289 ,671 (47.2)
Women	123 (27.6)			18 (13.4)	248,504 (52.6)	2,559,362 (52.8)

[a] Number reflects data on individuals ≥18 years old from Boston for the year 2000 from US Census Bureau: http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml
[b] MA refers to Massachusetts
[c] Number reflects data on individuals ≥18 years old from Massachusetts for the year 2000 from US Census Bureau: http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml
[d] Other Race/Ethnicity category contains individuals who reported their race/ethnicity to be American Indian, Hispanic, Asian, or race/ethnicity was unknown
[e] No missing data for Gender

Cox Proportional Hazard Model for Rough Sleeper Cohort from 2000-2009

	Hazard Ratio (95% CI)[a]	p-value (0.05)
Age (years)		
18-44	1.0	
45-64	1.5 (1.0, 2.2)	0.019
65-84	3.5 (1.9, 6.4)	<0.0001
Race/Ethnicity		
White	1.0	
Black	0.4 (0.3, 0.7)	0.002
[b]Other/Unknown	0.5 (0.3, 0.9)	0.039
Gender[c]		
Women	1.0	
Men	2.7 (1.6, 4.5)	<0.0001

[a] CI refers to Confidence Interval
[b] Other Race/Ethnicity category contains individuals who reported their race/ethnicity to be American Indian, Hispanic, Asian, or race/ethnicity was unknown
[c] No missing data for Gender

All-Cause and Leading Causes of Death Age-Standardized Mortality Ratios for Unsheltered Cohort, 2000-2009 Compared to Massachusetts Population, 2000-2009 and to General Homeless Cohort from Boston, 2003-2008

Underlying Cause of Death	N=134 (%)	SMR (95% CI) Unsheltered vs. MA	SMR (95% CI) Unsheltered vs. General Homeless
All Cause			
Entire Cohort	134 (100)	9.8 (8.2, 11.5)	2.7 (2.3, 3.2)
Men	116 (86.6)	9.2 (7.6, 11.0)	2.9 (2.4, 3.4)
Women	18 (13.4)	6.5 (4.0, 10.1)	2.0 (1.2, 3.0)
Natural Causes			
Cancer	21 (15.7)	4.8 (3.1, 7.3)	2.8 (1.8, 4.2)
Heart Diseases	18 (13.4)	6.4 (3.9, 9.9)	2.4 (1.4, 3.7)
Substance Use Disorder	16 (11.9)	88.9 (52.7, 141.5)	4.2 (2.5, 6.7)
Chronic Liver Disease	15 (11.2)	32.2 (18.7, 51.9)	4.5 (2.6, 7.3)
HIV/AIDS	10 (7.5)	63.8 (32.4, 113.8)	3.4 (1.7, 6.0)
Ill defined Conditions	5 (3.7)	26.8 (9.8, 59.3)	
External Causes			
Injuries (non poisoning)	19 (14.2)	33.3 (20.7, 51.1)	7.1 (4.4, 11.0)
Drug Overdose (poisoning)	8 (6.0)	14.1 (6.5, 26.7)	0.9 (0.4, 1.7)
Substance Use Causes			
Substance Use	39 (29.1)	43.6 (31.4, 58.9)	2.5 (1.8, 3.3)
Alcohol	30 (22.4)	110.2 (75.7, 155.3)	
Opioid	9 (6.7)	15.7 (7.6, 28.8)	

Limitations & Strengths

Limitations
1) Size of cohort
2) Lack of information on unknown patients
3) Unknown length of time homeless before or during study
4) Death data mostly from one state
5) Generalizability

Strengths
1) Addressed crucial gap in literature
2) Study design
3) No missing data for most variables
4) Two comparison groups

Conclusions

- Early presentation of illnesses; premature mortality
- All-cause & cause-specific SMRs were higher than non-homeless & homeless populations
  - Rates were high for causes related to substance use but also high for common causes such as cancer & heart disease
- Whites died disproportionately to all race/ethnicity categories in the study

Conclusions

- Rough Sleepers in Boston are a unique & unstudied sub-group of the homeless population that suffered marked disparities in mortality outcomes when compared to a general homeless cohort & a non-homeless population

- Outcomes occurred in setting of near universal health care & direct access to integrated care on the street

- More research is needed to understand the special needs & social determinants of health to inform future research and interventions

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Questions?