

longitudinal studies will further elucidate the shape and magnitude of these early trends.

There are many possible explanations for the paradoxical *reduction* in acute CV events with COVID-19. Acute CV complications associated with COVID-19 could have increased morbidity and mortality in the most susceptible populations, a so-called harvesting effect. Out-of-hospital arrests could have increased, which will continue to be vastly underreported due to autopsy delay. Other hypotheses include reductions in behavioral triggers such as smoking and strenuous physical activity; reductions in environmental triggers; or increased volume of stable patients being temporarily medically managed at home. The most likely scenario is the possibility that symptomatic patients are not seeking care, as suggested by our observation that patients waited an average of 3 days after symptoms before presentation. Patient delay may be due to fear of infection, fear of overburdening the healthcare system, and/or loss of financial stability. Such delays are known to increase STEMI/NSTE-ACS complications and deaths. As the US reopens, there may be a surge in the number and severity of cardiac conditions worsened by delay in presentation. National media campaigns<sup>8</sup> should be expanded to educate and reinforce the importance of recognizing and seeking immediate medical attention for cardiac-related prodromal symptoms so as not to delay timely, lifesaving intervention.

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## Racial and Gender Trends in Infective Endocarditis Related Deaths in United States (2004-2017)

Infective endocarditis (IE) is a deadly disease. Etiology is mostly a bacterial infection introduced through infected wounds or through use of Intravenous drugs. Currently, US has an aging population and is in midst of an opioid crisis that has led to increase in IE related deaths. The purpose of this analysis was to see racial, ethnic, and gender trends in deaths where IE was the primary cause of death.

We used the Centers for Disease Control and Prevention Wide-ranging Online Data for Epidemiologic Research database. Data of endocarditis related cause of mortality were extracted from year 2004 to 2017 using International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD

10 codes: I330 and I339). Data included age, ethnicity, race, and place of death. Trends were calculated across time using simple linear regression. Multiple logistic regression was for adjusted analysis between race, ethnicity and gender with other demographic characters. SPSS 26 was used for analyses.

Out of 21,210 records, 42.0% (8,912) were females, 81.3% (14,331) were white and 15.7% (2,772) were black. Over the years (2004 to 2017), deaths reported decreased in females (43.4% to 39.4%) and increased in males (56.6% to 60.6%), proportion of white in reported deaths has increased (80.0% to 83.8%), but the proportion of blacks has decreased (17.0% to 12.9%; [Figure 1](#)).

Among female decedents, 11.6% (1,032) belonged to age group <45 years, 18.8% (1,667) to 45-59 years, 29.9% (2,658) to 60-74 years and 39.7% (3,531) to 75+ years. Among males, 14.7% (1,806) were from <45 years, 26.0% (3,183) from 45 to 59 years, 28.7% (3,515) from 60 to 74 years and 30.6% (3,753) from 75+ years.

Among White decedents, 13.5% (1,927) belonged to age group <45 years, 20.6% (2,951) to 45-59 years, 28.8% (4,114) to 60-74 years and 37.1% (5,305) to 75 years or above. White decedents were less likely to be females (OR, 0.86 [0.78 to 0.95],  $p < 0.01$ ) and were more likely to die at home (OR, 1.92 [1.54 to 2.40],  $p < 0.01$ ). Among black decedents, 12.8% (1,790) belonged to age group <45 years, 35.4% (975) to 45-59 years, 32.6% (897) to 60-74 years and 19.2% (529) to 75 years or above. Black decedents were less likely to females (OR, 0.60 [0.59 to 0.74],  $p < 0.01$ ), were less likely at home as compared with hospital (OR, 0.52 [0.40 to 0.66],  $p < 0.01$ ).

IE incidence overall has been on an increase because of aging population and opioid epidemic.<sup>1,2</sup> We found that the proportion of males and whites have been increasing over the years, possibly pointing towards the death related to opioid epidemic that is primarily affecting white males. This epidemic has led to 18 fold increase in overall deaths along with decrease in average age expectancy in white Americans.<sup>1</sup> Previous studies from other living databases have pointed towards similar demographic trends as well.<sup>3</sup> We also noticed that whites were more likely to belong to the young (<45) and old age group (>75) in comparison to



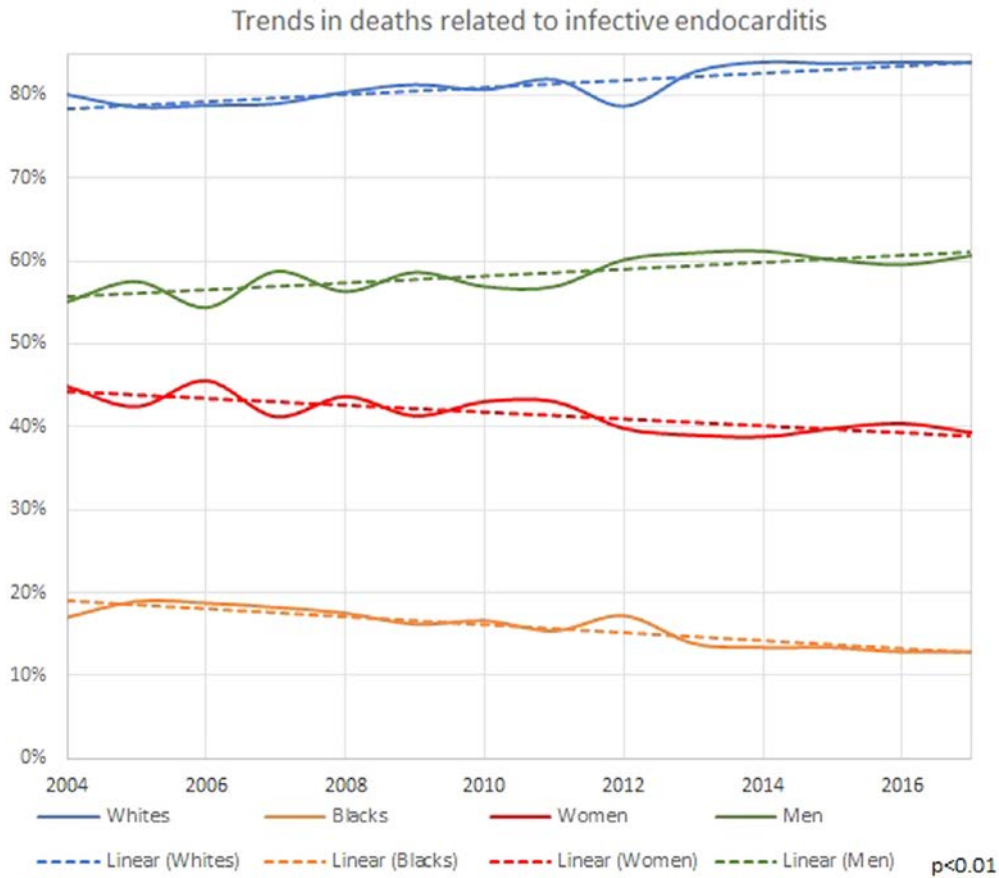


Figure 1. Trends in deaths related to infective endocarditis.

blacks where odds of belonging to middle age group was higher (45 to 59 and 60 to 74). This points toward a possible dichotomy in cases of IE due to opioid overdoses and elderly population with increasing co-morbidities.<sup>2</sup> The opioid epidemic initially started as prescription related overdoses, but with stringent prescription laws, there is growing

concerns that white Americans are now turning to IV heroine.<sup>4</sup>

In conclusion, there has been an increase proportion of whites in IE related deaths, belonging to younger age groups which points towards increasing death toll due to opioid crisis. This warrant expanding access of medication-assisted treatments, psychosocial

treatments, and relapse prevention to poor white communities. Unless we address existing racial disparities, inequalities will only get worse (Table 1).

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Table 1  
Association between age, gender, race, and place of death (Odds Ratio [95% CI])

Variable	White v All other races	Black v All other races	Women v Men
Age (years)			
<45 (Reference)	1	1	1
45-59	0.58(0.50-0.68)*	2.05(1.73-2.43)*	1.11(0.97-1.26)*
59-74	0.79(0.68-0.92)*	1.52 (1.28-1.81)*	1.56(1.38-1.76)*
75+	1.45(1.23-1.70)*	0.77(0.64-0.92)*	1.87(1.66-2.12)*
Gender			
Men (Reference)	1	1	-
Women	0.86(0.78-0.95)*	0.60(0.59-0.74)*	-
Place of death			
Hospital (Reference)	1	1	1
Home	1.92(1.54-2.40)*	0.52(0.40-0.66)*	0.93(0.81-1.07) <sup>†</sup>
Hospice	1.76(1.39-2.23)*	0.66(0.52-0.85)*	1.09(0.94-1.27) <sup>‡</sup>
Nursing home	1.90(1.46-2.47)*	0.44(0.33-0.60)*	1.09(0.93-1.28) <sup>§</sup>

\*  $p < 0.01$ ;

<sup>†</sup>  $p = 0.30$ ;

<sup>‡</sup>  $p = 0.26$ ;

<sup>§</sup>  $p = 0.27$ .

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