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POSTER ABSTRACTS

906.OUTCOMES RESEARCH-MYELOID MALIGNANCIES

State-Level Acute Myeloid Leukemia Incidence and Mortality Trends and Association with Obesity in the United States

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Background : Acute myeloid leukemia (AML) is the most common type of leukemia among adults and carries a dismal prognosis. Recent evidence suggests increasing AML risk in obese individuals. However, state-level temporal trends and whether obesity is associated with temporal changes remain largely unknown.
Methods: We obtained data on age-adjusted AML incidence and mortality from 1999 to 2019 for all 50 states and the District of Columbia (DC) from the US Cancer Statistics database maintained by the Centers for Disease Control and Prevention (CDC). Using the JoinPoint regression program, we calculated the annual percent change (APC), average annual percent change (AAPC), and correspondent p values. A positive APC indicated an increasing trend, while a negative APC meant a decreasing trend. State-level obesity information was retrieved from the Behavioral Risk Factor Surveillance System maintained by CDC. Obesity was defined as a body mass index $\geq$30. Pearson correlation coefficients were used to test state-level correlations between obesity and AAPC of incidence and mortality.
Results: During 1999-2019, a total of 271,930 AML cases were diagnosed in the US yielding an incidence rate of 3.99 per 100,000 person-years (PYs). Non-Hispanic White population had the highest incidence of 4.1 per 100,000 PYs. Among Non-Hispanic Black, Hispanic, Asian, and American Indian population, AML incidences were 3.2-3.4 per 100,000 PYs. AML incidence varied across states. The incidence rate ratio between the highest and lowest incidence of states was 1.66. The three states with the highest incidences were Iowa (4.49 per 100,000 PYs), Wisconsin (4.41 per 100,000 PYs) and Maine (4.41 per 100,000 PYs). The lowest incidences were observed in DC (2.71 per 100,000 PYs), Wyoming (3.37 per 100,000 PYs), and New Mexico (3.41 per 100,000 PYs).
The national AML incidence decreased by 0.5% each year in 1999-2008 ($p = 0.05$), followed by an average yearly increase of 6.1% in 2008-2011 ($p=0.03$), then plateaued in 2011-2019. As shown in Figure 1, during 20-year period, among 45 states with non-suppress yearly incidence, incidence increased in 17 states, and plateaued in all other states. The states with the highest increases were in Kentucky (AAPC = 2.4%, $p < 0.01$), Tennessee (AAPC = 1.7%, $p = 0.01$), Virginia (AAPC = 1.4% $p<.01$), Utah (AAPC = 1.4%, $p = 0.01$) and North Carolina (AAPC = 1.4%, $p<.01$).
The US Cancer Statistics collected 190,193 AML deaths in 1999-2019 with a mortality rate of 2.77 per 100,000 PYs. Across race and ethnicity groups, mortality rate ranged from 1.8 per 100,000 PYs among American Indian or Alaska Natives to 2.9 per 100,000 PYs among Non-Hispanic White population. The mortality rate ratio between the highest and lowest mortality of states was 1.60. Iowa (3.36 per 100,000 PYs), Washington (3.32 per 100,000 PYs), North Dakota (3.29 per 100,000 PYs) and Wisconsin (3.26 per 100,000 PYs) had the highest mortality rates. The mortality rates were lowest in Hawaii (2.30 per 100,000 PYs), New Mexico (2.26 per 100,000 PYs), and DC (2.10 per 100,000 PYs).
National AML mortality plateaued in 1999-2009, then fell on average 0.4% per year over 2009-2019 ($p = 0.01$). Among 45 states with non-suppressed yearly mortality, mortality decreased in Montana (AAPC = -1.8%, $p=0.01$), Washington (AAPC = -1.0%, $p<0.01$), Iowa (AAPC = -0.8%, $p = 0.04$), and Florida (AAPC = -0.5%, $p = 0.03$); however, mortality increased in Virginia (AAPC = 0.6%, $p = 0.03$), Pennsylvania (AAPC = 0.7%, $p<0.01$), Nebraska (AAPC = 1.1%, $p < 0.01$), Kentucky (AAPC = 1.3%, $p < 0.01$), and Nevada (AAPC = 1.3%, $p = 0.02$) (Figure 2).
At state-level, AAPC of AML incidence was positively correlated with percentage of obesity ($r = 0.31$, $p = 0.04$). No correlation was observed between percentage of obesity and AAPC of AML mortality at state-level.
Conclusion: The findings of this cross-sectional study suggest that large state-level variation in AML incidence and mortality. Despite AML incidence plateauing in the US since 2011, it continued to increase in one-third of the states and may be connected with the differential distribution of obesity. Although AML mortality in the US has been significantly reduced since

2009, the AML mortality continued to increase in some states. Reduction of obesity should be investigated as a potential way to reduce AML incidence and related deaths.

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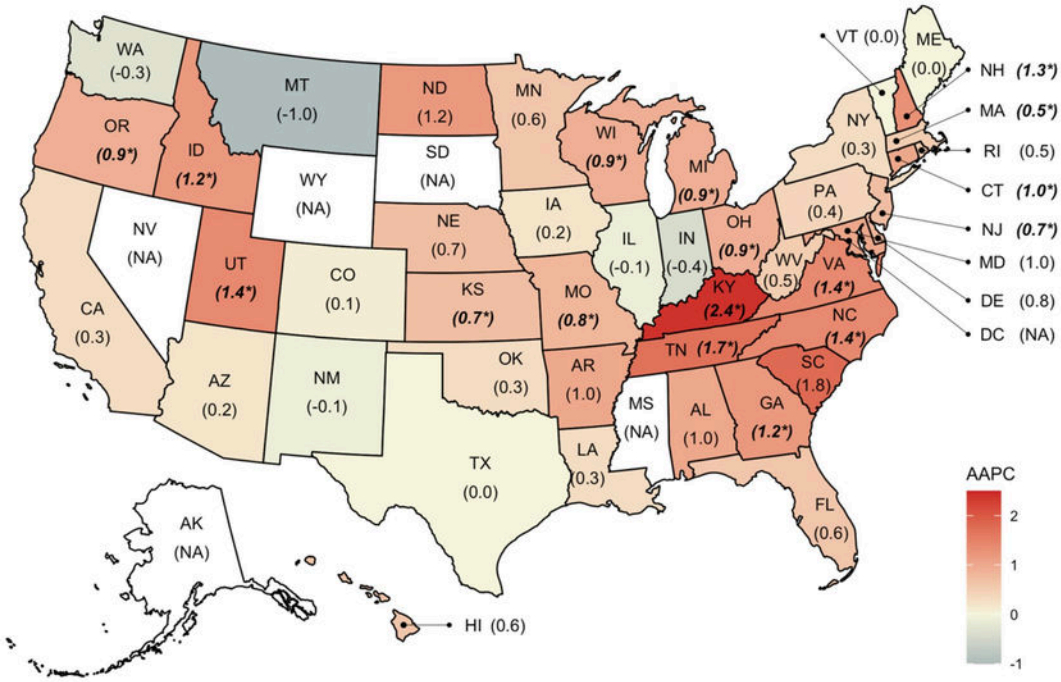

Figure 1 State-specific average annual percent change of age-adjusted AML incidence rate between 1999-2019

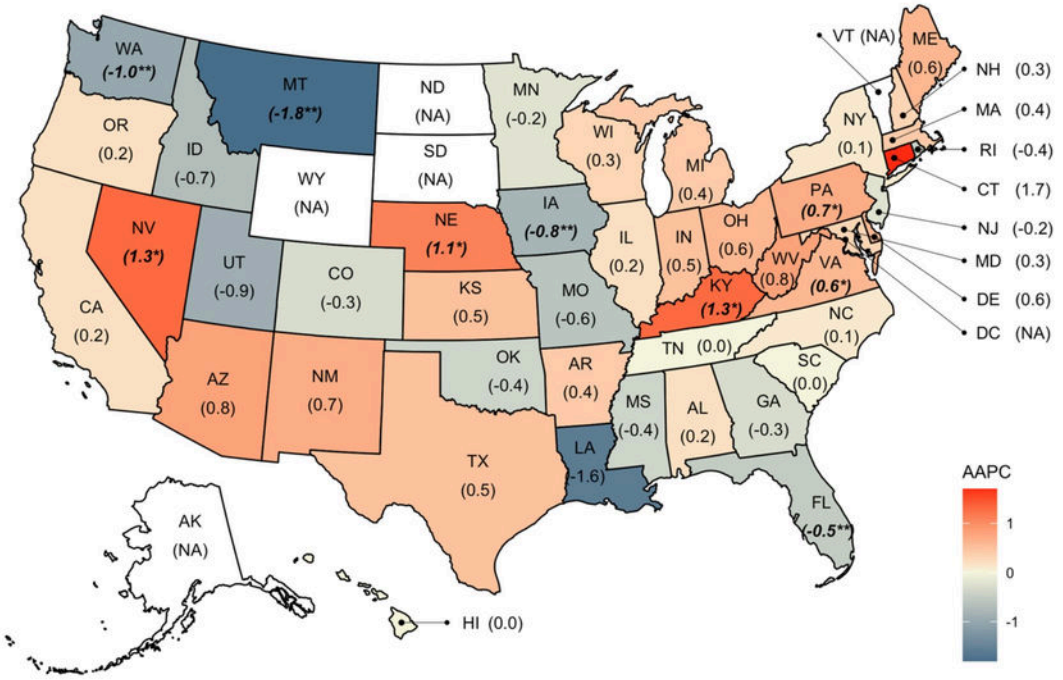

Figure 2 State-specific average annual percent change of age-adjusted AML mortality rate between 1999-2019

Figure 1

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