

## **Trends in underlying cause of death among HIV-infected persons in Michigan, 1994-2001**

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The introduction of highly active antiretroviral therapy (HAART) in 1996 prolonged the lives of both men and women infected with the human immunodeficiency virus (HIV). This resulted in a decrease in the number of deaths in HIV positive individuals. Along with this decrease we expected underlying cause of death might also change. We examined the causes of deaths in persons 13 years of age and older at diagnosis of HIV/AIDS in Michigan for any changes over time, since the widespread use of HAART. Several studies have suggested that antiviral drug toxicity may contribute to increases in deaths due to non-infectious organ diseases, such as diseases of the liver, kidney and heart<sup>1-3</sup>. Therefore, we analyzed trends in underlying cause of death as listed on the state death certificate among persons reported with HIV/AIDS in Michigan who died between 1994 and 2001.

Between 1994 and 2001, there are 4,432 deaths reported in Michigan's HIV/AIDS Reporting System. Among these, 70% (3,116) had HIV/AIDS as an underlying cause of death; 18% (809) of deaths had an underlying cause of something other than HIV/AIDS and 11% (507) were missing cause of death information. There was no significant difference in race, sex, and county of death between those with complete and missing cause of death information. The number of HIV/AIDS related deaths declined significantly in 1996 and 1997, but decreased very little thereafter (Figure 1). The decline in these deaths is mostly attributed to the widespread use of HAART. However, those who died with an underlying cause other than HIV/AIDS remained constant during this time period.

We further examined the 809 deaths among individuals with an underlying cause of death not related to HIV/AIDS (Figure 2). These causes of death include infectious disease, other than HIV, (22%), non-AIDS cancers (15%), general chronic or systemic disease (not including heart, renal, and non-infectious liver diseases) (19%), heart disease (13%), non-infectious liver disease (4%), renal disease (4%), drug or alcohol related (12%), and accidental death, suicide, or injury (11%). There was a significant difference between those dying of infectious diseases, other than HIV, and all other causes ( $p < 0.0001$ ). These infectious diseases as an underlying cause of death decreased from 29 deaths in 1994 to 5 deaths in 2001. The probability of dying from a general chronic or systemic disease (not including heart, renal, and non-infectious liver diseases) increased significantly from 18 deaths in 1994 to 25 deaths in 2000 (right-sided  $p = 0.0302$ ). This analysis did not demonstrate a significant increase in the proportion of deaths due to heart, renal, and non-infectious liver disease after the advent of HAART.

Our data are limited by the accuracy of underlying cause of death recorded on death certificates, and by the completeness of reporting of HIV/AIDS and deaths to the Michigan HIV/AIDS Reporting System. In addition, grouping of causes of death into the categories presented was not done by a Nosologist.

References:

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