HIV and mortality in Oregon

HIV mortality in Oregon, 1981–2013

Of 9,430 cumulative cases of HIV infection diagnosed in Oregon from 1981 to 2013, 3,990 (42 percent) had died by Dec. 31, 2013. The advent of antiretroviral medications in the mid-1990s dramatically improved treatment outcomes. The probability of surviving five years after diagnosis was approximately 42% among people diagnosed in 1990. The probability of surviving 10 years after diagnosis was 88% for people diagnosed with HIV in Oregon from 2004 to 2013. Over the last decade, an average of 260 people were diagnosed with HIV infection in Oregon each year, and an average of 89 people with HIV died each year in Oregon (Figure 1).

Ten-year survival among HIV cases in Oregon

The Oregon Public Health Division examined mortality among people diagnosed with HIV in Oregon using survival analysis techniques. These estimate probability of survival for a selected period of time after diagnosis. We found that the probability of surviving 10 years after diagnosis among people with HIV in Oregon during 2004–

HIV and mortality facts at a glance

- The number of deaths among people with HIV declined from 354 deaths during 1995 to 82 cases during 2013.
- Oregonians diagnosed with HIV infection during 2004–2013 had an 88% probability of surviving 10 years after diagnosis.
- The following groups had a lower probability of surviving 10 years after diagnosis then their comparison group:
  - » American Indians or Alaska Natives relative to white non-Hispanics;
  - » People aged >36 years at diagnosis relative to people in younger age groups;
  - » People with CD4 counts <200 cells/mm^3 at diagnosis relative to people with higher CD4 counts at diagnosis;
  - » People who acquired HIV via injection drug use (IDU) relative to people with other modes of transmission;
  - » People with reported chronic hepatitis B infection or chronic hepatitis C infection relative to people without hepatitis.
- During 2004–2013, HIV disease remained the leading underlying cause of death (43 percent) among people with HIV. Cancer (15 percent of deaths) was the second most common underlying cause.

Oregon cases of HIV infection, diagnoses and deaths, 1981–2013

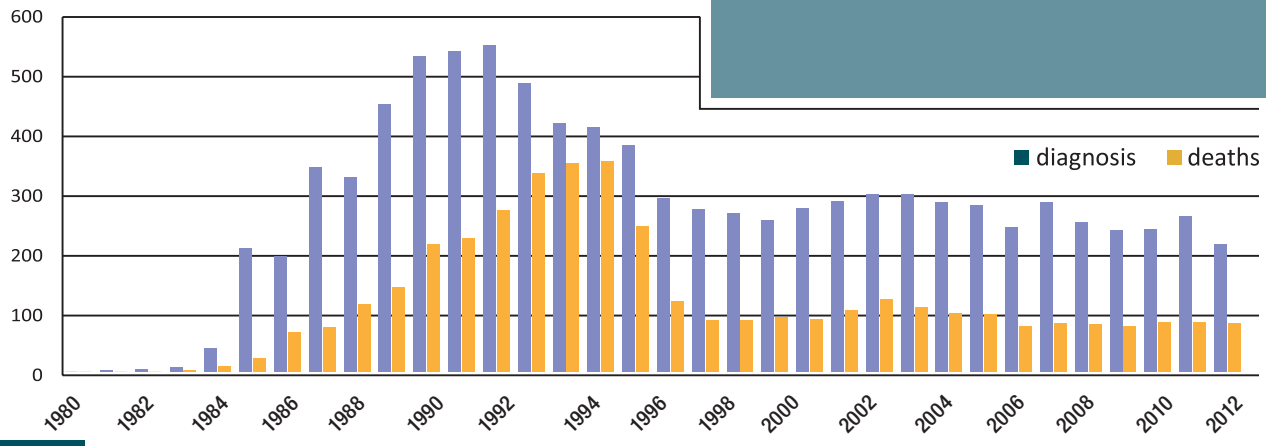

Figure 1

2013 was 88 percent. We then examined survival by sex, race, foreign-born, age group at diagnosis, severity of disease at diagnosis, chronic hepatitis B infection, chronic hepatitis C infection, and likely mode of HIV infection acquisition.

Survival probability varied significantly by race/ethnicity with 10-year probability of survival being highest among blacks/African Americans (97 percent) and Asians (96 percent) (Figure 2). Probability of survival was similar among Hispanics, whites, Asians, American Indian/Alaskan Natives, Native Hawaiian/Pacific Islanders and multiracial cases. As expected, we found that the higher the age group at the time of HIV diagnosis, the lower the probability of surviving 10 years (Figure 3).

Again predictably, severity of disease at diagnosis, as indicated by CD4 count, was also significantly related to probability of survival (Figure 4). HIV cases whose first CD4 count* following diagnosis was less than 50 cells/mm^3 had a lower probability of surviving 10 years (73 percent) than people with a CD4 count from 50 to 199 cells/mm^3 (83 percent). In turn, those with a CD4 count of at least 200 cells/mm^3 had a 92 percent probability of surviving 10 years.

Then, we examined probability of surviving 10 years by likely mode of transmission of HIV infection (Figure 5). We found that those who likely acquired HIV infection through injection drug use (IDU) had a much lower probability of surviving 10 years (67 percent) than men who acquired infection via sex with other men (92 percent), or men and women who acquired infection by heterosexual contact (93 percent). Those with chronic hepatitis C co-infection had a lower probability of surviving 10 years (70 percent) than people without hepatitis co-infection (88 percent). Similarly, people with chronic hepatitis B co-infection had a lower probability of surviving

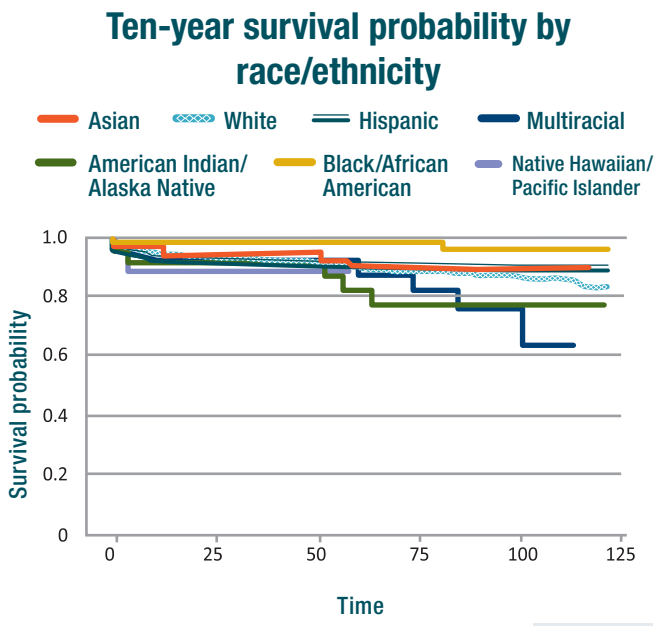

Figure 2

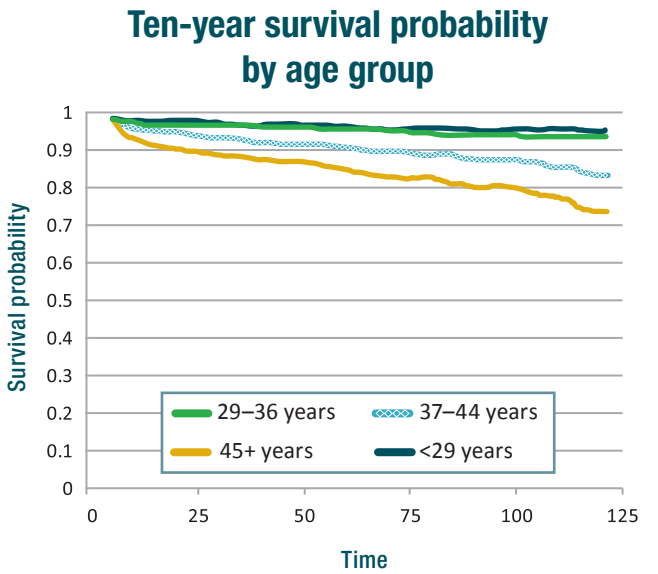

Figure 3

* CD4 cells are a type of white blood cells that fight infection. The CD4 count shows the strength of the immune system. A count less than 200 copies/mm^3 is definitive for AIDS. The normal range of CD4 counts among healthy individuals is 750–1,500 copies/mm3.

10 years (74 percent) than people without chronic hepatitis B co-infection (88 percent).

Next, we used another statistical technique to assess whether sex, race/ ethnicity, age group, mode of transmission or severity of disease at diagnosis and co-morbidities were related to probability of surviving 10 years after diagnosis after adjusting for the effects of the other factors (Table 1). The risk of mortality within 10 years from diagnosis was:

- 13 times higher among cases with a first CD4 < 50 count relative to cases with a first CD4 > 200 count;
- 5.5 times higher among whites relative to African American/blacks;
- 2.9 times higher among American Indian/Native Alaskans relative to whites;
- 2.1 times higher among cases with concurrent chronic hepatitis B relative to cases without; and
- 1.6 times higher among IDU relative to non-IDU when adjusted for the effects of age and year of diagnosis.

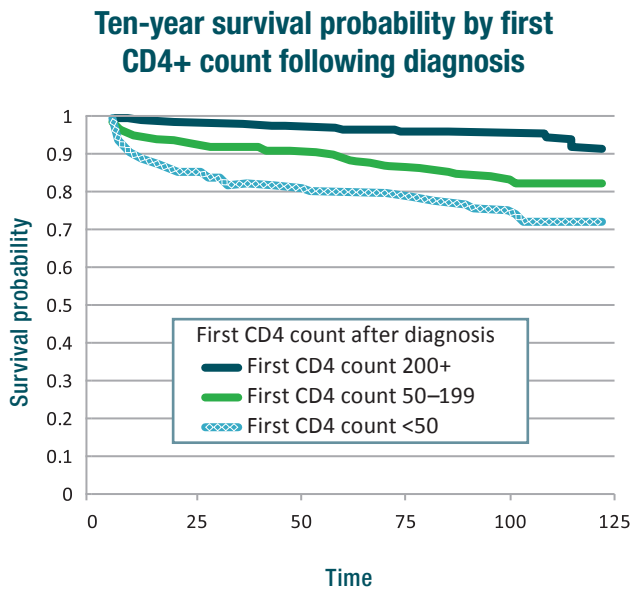

Figure 4

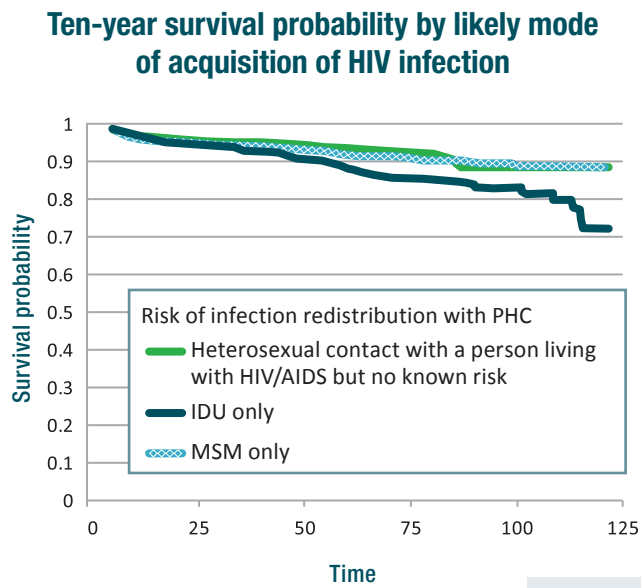

Figure 5

Underlying cause of death among people with HIV/AIDS infection in Oregon, 2008–2012

Data from Oregon Vital Statistics on underlying causes of death among people with HIV who died in Oregon during 2009–2013 show that HIV disease was the underlying cause of death in 48 percent (228/477) of deaths among people with known HIV infection (Table 2). As a proportion of deaths among people with known HIV disease, cancer increased (73/477 cases) as a primary cause. Among the 73 people who died from cancer, 34 percent (25/73) were reported to have died of lung cancer. Other leading underlying causes of death included suicide, 4.4 percent (21/477); unintentional injury, 4.4 percent (21/477); and heart disease, 5.2 percent (25/477).

Table 1

Risk of mortality among Oregon residents diagnosed with HIV/AIDS, 2004–2013

Parameter	Hazard ratio	95% Confidence Interval	p-value
Age at diagnosis			
< 29 years	ref		
29–36 years	1.14	0.57–2.28	0.72
37–44 years	2.14	1.16–3.95	0.02
45+ years	4.14	2.32–7.39	<0.01
First CD4+ following diagnosis			
< 50 count	13.31	7.09–24.98	<0.01
50–199 count	5.18	3.01–8.92	<0.01
200+ count	ref		
Race			
AI AN	2.89	1.17–7.15	0.02
Asian	0.88	0.27–2.80	0.82
Black/AA	0.18	0.05–0.74	0.02
NH PI	2.2	0.30–16.21	0.44
Hispanic	1.02	0.67–1.54	0.94
Multiracial	1.69	0.74–3.85	0.22
White	ref		
Injection drug use	1.59	1.03–2.44	0.04
Chronic hepatitis B	2.11	1.23–3.61	0.01

Table 2

Underlying cause of death among people reported with HIV infection who died in Oregon, 2004–2013 †, ‡

Underlying cause of death	Total	Percent
HIV Disease	464	52.3%
Cancer	120	13.5%
All other causes	100	11.3%
Unintentional injury	47	5.3%
Heart disease	36	4.1%
Suicide	30	3.4%
Chronic liver disease	25	2.8%
Chronic lung disease	20	2.3%
Diabetes mellitus	14	1.6%
Viral hepatitis	8	0.9%
Hypertension	7	0.8%
Pneumonia or influenza	6	0.7%
Cerebrovascular disease	5	0.6%
Benign neoplasm	5	0.6%
Total	887	100.00%

† Only deaths for which HIV was listed as the underlying cause or for which HIV was among the other conditions reported at death were included.

‡ These deaths include people with HIV/AIDS that died in Oregon and may have been diagnosed with HIV/AIDS outside of Oregon.

Oregon Health Authority
PUBLIC HEALTH DIVISION

Epidemiologic resources:

Oregon Health Authority, HIV/AIDS epidemiology:
http://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/DiseaseSurveillanceData/HIVData/Pages/index.aspx

Centers for Disease Control and Prevention:
www.cdc.gov/hiv

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OHA 9992 (05/2015)