

Frequently Asked Questions: Age-adjustment

What is age-adjustment?

Age-adjustment is a way to estimate what the rate would be if the age distribution of two populations were the same. Age-adjustment is used to make meaningful comparisons of mortality over time and among populations. Age-adjustment is used to reduce the effect of having older individuals in one group (where the risk of mortality is naturally higher) compared to another group which has younger persons. Age-adjusted death rates should only be used for comparative purposes and should not be interpreted as an actual or absolute risk of death. **Age-adjusted rates can only be compared to other age-adjusted rates that use the same standard population.**

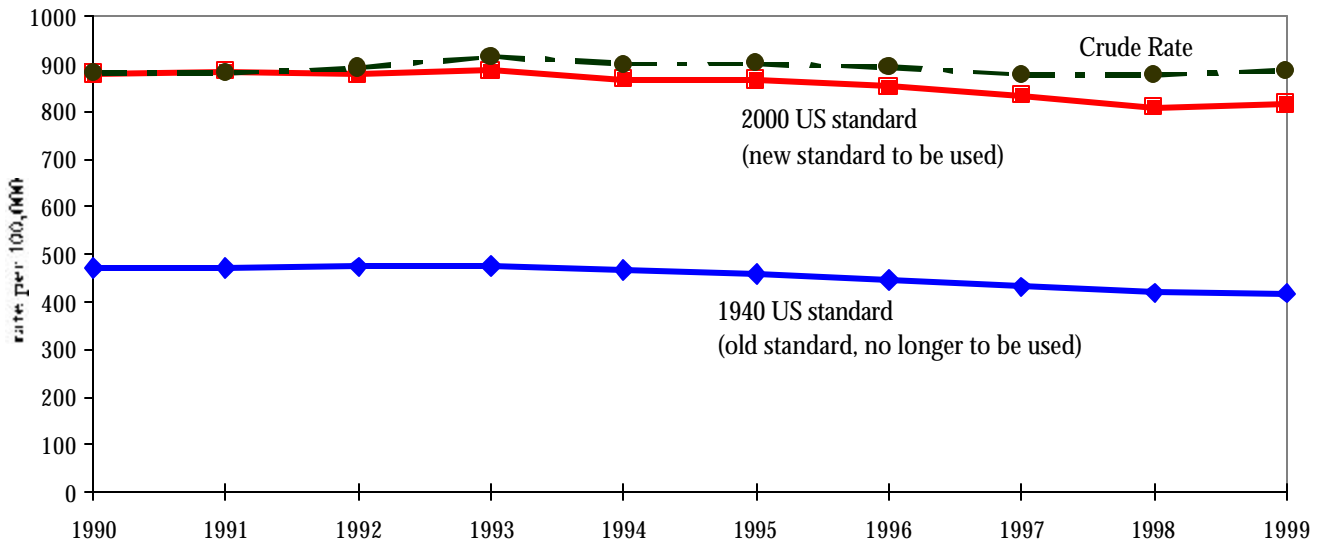
Why has the standard population changed?

Beginning with 1999, a new standard population is being used to age-adjust rates. The 2000 US projected population is the new standard population for age-adjustment of mortality rates. Previously, the 1940 US projected population was used as the standard population for mortality statistics by the National Center for Health Statistics (NCHS). However, other Federal agencies used different standard populations such as the 1970 or 1980 US standard population. The new standard has been adopted by Federal agencies to promote uniformity and comparability of data from many organizations. While there is no strong technical argument for the use of the 2000 US population, there are some practical reasons for the adoption of the new standard. For example, the year 2000 standard population more closely resembles the current age distribution of the total population and the year 2000 is a date that data users can relate to.

How does the new standard affect age-adjusted death rates?

Using the 2000 US population as the standard population for age-adjustment of death rates will affect the magnitude of age-adjusted death rates. Older age groups are weighted more heavily using the 2000 US standard population. Therefore, the magnitude of the age-adjusted death rate will be greater in those populations who have older individuals, and for chronic diseases, where the mortality is greater in older individuals than younger individuals.

Age-adjusted and Crude Mortality Rates, Total Population, Massachusetts: 1990-1999



How does the new standard population affect age-adjusted death rates by race and ethnicity?

As seen in Table 1, the ratio of white: black 1999 death rates using the 1940 US standard is 1:6 (410.5 vs. 659.6). However, using the 2000 US standard population, the white: black ratio is 1:3 (814.2 vs. 1,098.4). This is a statistical artifact, and does not represent any actual improvement in reducing health disparities.

Table 1. Massachusetts Death Rates Using the 1940 and 2000 standard populations, by race and ethnicity: 1990-1999

Year	Total		White, non-Hispanic		Black, non-Hispanic		Asian/Pacific Islander, non-Hispanic		Hispanic	
	1940	2000	1940	2000	1940	2000	1940	2000	1940	2000
1990	470.6	878.4	464.1	875.7	698.1	1,113.7	293.8	570.8	280.0	409.9
1991	470.7	884.2	464.4	882.7	681.1	1,104.6	255.6	462.7	298.2	435.5
1992	474.2	877.4	467.8	875.5	714.6	1,139.2	258.3	463.8	306.4	440.5
1993	475.3	885.7	467.7	882.8	710.3	1,115.3	305.2	613.4	326.6	488.5
1994	467.3	868.2	458.8	864.2	734.0	1,176.7	267.6	521.2	342.7	482.7
1995	458.4	866.2	447.4	860.1	752.4	1,193.0	301.1	565.2	359.4	504.7
1996	446.0	853.0	439.6	852.2	695.8	1,141.1	286.5	534.5	301.6	430.0
1997	432.0	834.8	426.2	835.1	694.6	1,142.1	266.6	512.0	275.3	391.0
1998	419.0	808.8	413.0	808.5	653.3	1,076.6	244.2	500.7	322.3	463.8
1999	418.0	815.9	410.5	814.2	659.6	1,098.4	279.8	511.5	344.2	503.1
% change 1990-1999	-11.2	-7.1	-11.5	-7.0	-5.5	-1.4	-4.8	-10.4	22.9	22.7

Rates are per 100,000.

How does the new standard population affect trends in cause-specific mortality?

As seen in Table 2, the use of a standard population will affect trends by cause of death. For example, there was an 8% decline in cancer rates using the 1940 standard, and a 6% decline using the 2000 standard.

Table 2. Massachusetts Death Rates Using the 1940 and 2000 standard populations, Selected causes of death: 1990-1998

Year	Total (all causes)		Heart Disease		Cancer		Homicide		HIV diseases	
	1940	2000	1940	2000	1940	2000	1940	2000	1940	2000
1990	470.6	878.4	138.4	294.6	136.8	221.5	4.5	4.1	7.1	7.5
1991	470.7	884.2	134.0	286.0	140.4	230.0	4.6	4.2	9.8	10.1
1992	474.2	877.4	132.1	277.4	144.0	234.2	3.9	3.5	10.8	11.3
1993	475.3	885.7	132.2	278.3	140.4	228.1	4.2	3.8	11.9	12.6
1994	467.3	868.2	125.2	265.3	138.2	224.7	3.9	3.6	14.2	15.0
1995	458.4	866.2	119.4	259.4	137.5	225.6	3.8	3.4	14.1	14.8
1996	446.0	853.0	118.6	257.1	133.6	221.2	3.3	3.0	9.0	9.6
1997	432.0	834.8	114.6	249.0	129.2	215.4	2.3	2.1	3.5	3.9
1998	419.0	808.8	106.2	231.0	125.9	209.0	2.1	1.9	3.1	3.3
%change 1990-1998	-11.0	-7.9	-23.3	-21.6	-8.0	-5.6	-53.3	-53.7	-56.3	-56.0

Rates are per 100,000.