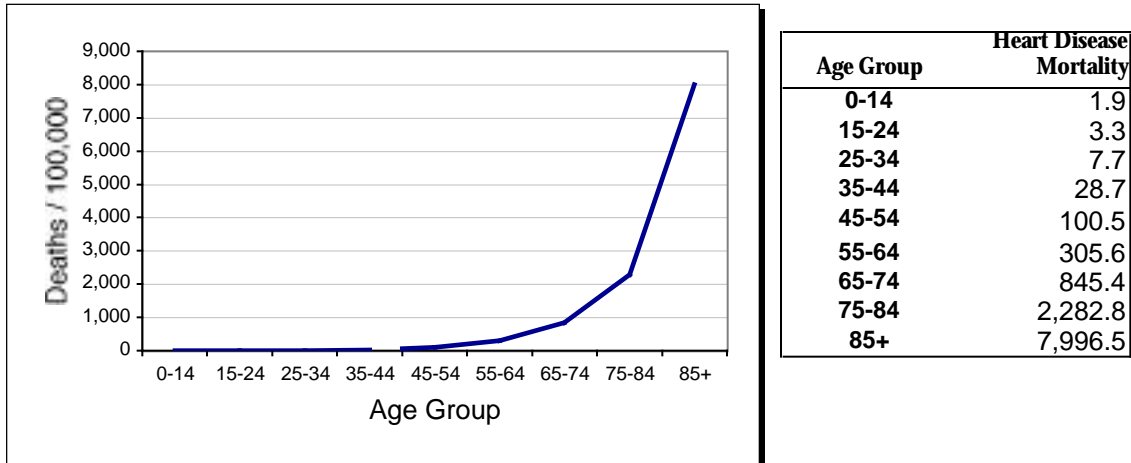


Why (and How ?) Do We Calculate Age-adjusted Rates ?

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- 1) Many causes of death vary with age. (Figure 1)

Figure 1. Deaths from Heart Disease per 100,000 Population



- 2) The age structure of populations differs both between areas and across time.
(see Figure 2 a, b)
- 3) Failing to account for differences in population age structure can result in inaccurate comparisons of death rates between populations or within a population across time.
- 4) The solution is to adjust rates to a standard population structure (see Figure 3), producing 'age-adjusted' rates.

What do we use as a reference population ?

Sometimes varies by agency

- 1) Cancer mortality: Use 1970 U.S. Population
- 2) NYS Vital Records: Use 1990 N.Y.S. Population

- 5) Calculation of an Age-adjusted rate is demonstrated in Table 1.
- a. Calculate age-specific rates
 - b. Weight (i.e., multiply) each of these by the proportion of the reference population in that age range
 - c. Total these weighted rates across all age groups

Figure 2a. Populations in 1997: New York City and Rest of State

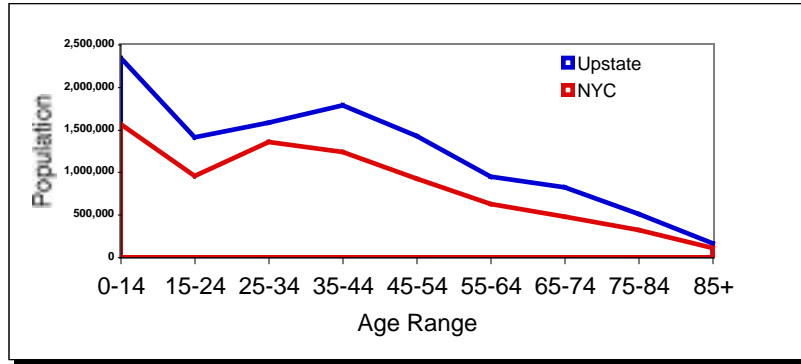


Figure 2b. Population Proportions in NY State: 1990 & 1997 Estimate

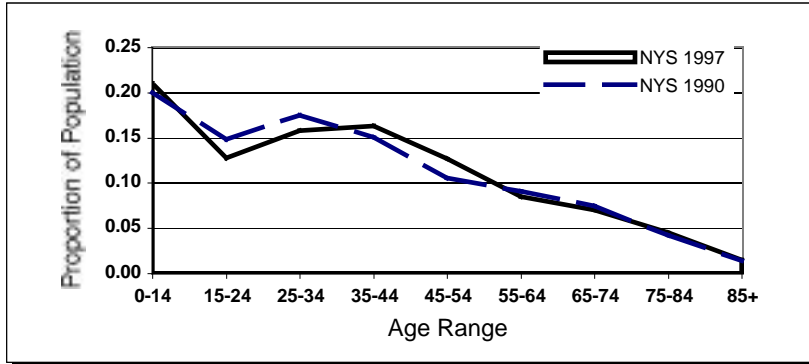
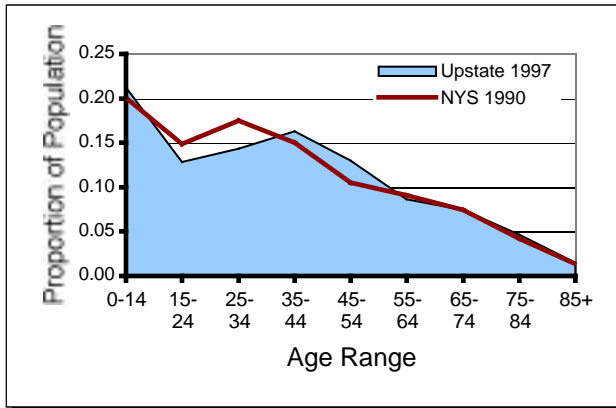


Figure 3. Population Proportions: Upstate 1997 and N.Y.S.1990 †



Age Group	US 1990	Upstate1997
0-14	0.200	0.213
15-24	0.148	0.128
25-34	0.175	0.144
35-44	0.150	0.163
45-54	0.105	0.130
55-64	0.091	0.087
65-74	0.074	0.075
75-84	0.042	0.046
85+	0.013	0.015

† reference population

Table 1. Calculating Age-adjusted Rates

In 1997, the age-adjusted death rate from heart disease was **311.3 deaths per 100,000** in NYS
Reference population: 1990 N.Y.S. Population

Problem: Calculate the comparable 1997 rate for NYS exclusive of NYC ('Upstate')

AGE	1997 Data		# Upstate Deaths/ 100,000	(proportion from 1990 NYS)	Weighted rate	Sum over all ages
	# Upstate Heart disease deaths	1997 Estimated Upstate Population		Weight		
0-9	36	1,564,665	2.3	0.137	0.315	↓
10-19	21	1,491,841	1.4	0.132	0.186	
20-24	26	695,873	3.7	0.079	0.296	
25-34	122	1,579,947	7.7	0.175	1.349	
35-44	296	1,788,674	16.5	0.150	2.490	
45-54	1,339	1,428,300	93.7	0.105	9.876	
55-64	2,688	951,966	282.4	0.091	25.649	
65-74	6,305	821,265	767.7	0.074	57.146	
75-84	10,785	508,707	2,120.1	0.042	89.552	
85+	12,693	165,562	7,666.7	0.013	102.706	
	34,311	10,996,800	312.0		289.6	

Individual lines are age-specific rates
 e.g., 45-54 year olds

Crude Rate Age-adjusted Rate

all rates are expressed as deaths per 100,000 population

How do the rates compare ?			
True Rate-Ratio	Upstate NYS	$\frac{289.6}{311.3} =$	0.93
<i>If (incorrectly) used Upstate Crude rate:</i>		$\frac{312.0}{311.3} =$	1.00 incorrect !!