Problem Set 3: Solutions

Demography Camp

Summer 2013

Question 1

In 2010, the United States had a CDR of 8 per 1000, while Tunisias was slightly lower at 6 per 1000. However, USA has a slightly higher life expectancy (79 versus 75). What could explain the switch?

The United States probably has a relatively older population than Tunisia but generally better overall health, and since mortality is concentrated in the upper ages, the United States has a lower CDR but higher life expectancy.

Question 2

Table 1: ${}_nM_x$ and ${}_nc_x$

	Pop A		Pop B	
Age	${}_nM_x$	${}_nC_x$	${}_nM_x$	${}_nC_x$
0-1	0.002	30%	0.002	10%
1-2	0.002	20%	0.001	10%
2-3	0.002	20%	0.002	10%
3-4	0.003	10%	0.002	20%
4-5	0.003	10%	0.003	20%
5-6	0.003	10%	0.003	30%

Part A

Calculate the CDR for each population.

Pop A: CDR = 2.3 per 1000

$$\sum {}_nm_x \cdot_n c_x = 0.0023$$

Pop B: CDR = 2.4 per 1000

$$\sum {}_n m_x \cdot_n c_x = 0.0024$$

Part B

Calculate the CDR for each population if they had a standardized age distribution (use the average of the two population's ${}_n c_x$).

Pop A: CDR = 2.5 per 1000

$$\sum {}_n m_x \cdot_n c_x^s = 0.0025$$

Pop B: CDR = 2.2 per 1000

$$\sum {}_n m_x \cdot_n c_x^s = 0.0022$$

Part C

Discussing the differences with Pop A and Pop B in terms of age structure and age specific mortality rates, explain why we see a reversal of CDR order when we use a standardized age distribution.

The age distributions differ between the two populations. Population B has more of its population gathered at the older ages (which have higher mortality), while Pop A has a relatively young population. Therefore, while Pop B has equal or lower mortality than Pop A in every age group, the age structure hides this in the non-standardized CDR.