Indirect Standardisation of Rates

Overview:

This exercise introduces the idea of indirect standardisation of rates, using data on long-term health problems or disability from the 2011 census of England and Wales. You will need spreadsheet software such as Microsoft Excel to complete this task.

Practical Instructions:

Point your browser at the Nomis web site, which distributes data from the 2011 census (https://www.nomisweb.co.uk/census/2011/lc3101ewls). The census includes the following question, asked of all usual household residents: 'Are your day-to-day activities limited because of a health problem or disability which has lasted, or is expected to last, at least 12 months? Include problems related to old age'. The site summarises responses to this question.

As shown below, select 'England' as your target area, select 'age' as the characteristic to appear in the rows of your table, and select 'disability' as the characteristic to appear in the columns of your table:

Click *view* to see the resultant table and then click *download (.xls)* to download a copy to your computer. Go back to same start page again, but this time select '*Southampton'* as the area under 'local authority'.

Task 1: From the data you have downloaded, calculate the crude prevalence rate of long-term health problems or disabilities in the population of England. To do this, you should divide the count of people reporting 'day-to-day activities limited' across all age categories by the count of 'all categories'. See the back of this sheet for answers.

Task 2: Now calculate the crude prevalence rate of long-term health problems or disabilities for the Southampton local authority. Which is higher? (see back of this sheet for answers)

Task 3: Now let us calculate an indirectly standardised prevalence rate for long-term health problems or disabilities for Southampton. Using your England worksheet, work out the proportion of people reporting a health problem or disability in each age cohort (note: you do not need to calculate this proportion for the 'all categories: age' row – just the remaining rows) – see the example below:

Age	All categories: Long-term health problem or disability	Day-to-day activities limited	Day-to-day activities not limited	Proportion with activities limited
All categories: Age	52,059,931	8,936,954	43,122,977	
Age 0 to 4	3,315,865	70,922	3,244,943	0.021389
Age 5 to 9	2,970,186	117,464	2,852,722	0.039548

Copy and paste the whole of the Southampton worksheet into your England worksheet. Now let us work with this new, combined worksheet. For each age cohort in the Southampton spreadsheet, work out the expected number of cases of long-term health problems / disability, given the national pattern across the age cohorts in England. To do this, multiply the population counts for each age cohort in the 'All categories: Long-term health problem or disability' column for Southampton by the equivalent national rates of health problems / disability for England that you calculated above.

Proportion with activities limited - England		Age	All categories: Long-term health problem or disability	Day-to-day activities limited	Day-to-day activities not limited	Expected cases of disability / long-term health problems
	Southampton figures =>					
		All categories: Age	228,459	36,969	191,490	
0.021389		Age 0 to 4	15,398	362	15,036	329.343
0.039548		Age 5 to 9	11,846	533	11,313	468.482

Now sum up the expected cases in Southampton that you have just calculated, working out the total across all of the age cohorts. If you divide the observed number of cases (36,969) by this expected number and multiply by 100, this is the indirectly standardised prevalence rate for long-term health problems or disability for Southampton. Is the number of cases of long-term health problems or disability higher or lower than would be expected based on population age structure, given the patterns across England? (see back of sheet for answers).

Try the calculation again. What happens if you:

- Pick a different local authority. Is the change in the standardised prevalence rate relative to the crude rate similar to the one you saw for Southampton?
- Use the population of England and Wales (not England) as the reference population?

Answers

Task 1: The crude prevalence rate for England is 17.2%.

Task 2: The crude prevalence rate for Southampton is 16.2% and is lower than the national average.

Task 3: After accounting for age structure, you should find that Southampton, with its relatively young urban population, has a standardised morbidity rate of 106.4 relative to England. This suggests that given the age of Southampton's population, the prevalence of long-term health problems and disability is a little higher than would be expected based on the patterns for England (and after accounting for age, the prevalence is not lower as we assumed when looking at the crude rates at the start of this exercise).