Using death registration completeness to adjust death data

Data analysis and Report writing workshop for Civil registration and vital statistics data.

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What is “good enough”?

- Generally, if at least 70-80% of deaths are captured, we can use the data to calculate mortality indicators by adjusting the completeness of our records upwards.

- CRVS data that is more than 90% complete can generally be used for analysis without adjustment (although the completeness should be reported for context).
  - However we must be careful, as this assumes that the under-reporting of events is general and not limited to particular sub-groups within the population.

- If our data are not adjusted for completeness, we may make assumptions about mortality rates that are not true

Test data death registration completeness

$$\text{Completeness of death registration (\%)} = \frac{\text{Number of registered deaths}}{\text{Actual number of deaths}} * 100$$

$$86\% = \frac{3000 \text{ registered deaths}}{3471 \text{ actual deaths}} * 100$$

Age group	Males	Females
0-4	68%	58%
5-24	81%	83%
25-74	93%	92%
75+	82%	78%
Total	**89%**	**84%**

- In our test data, our death registration completeness is 86%
- Completeness is low in children and older adult women
- We want to adjust our data up for more reliable mortality indicators
- We will use the census counts of male and female deaths to adjust up

Why do we need to assign ages to these new deaths?

- Mortality indicators such as infant and child mortality require data by age.

$$\text{Infant mortality rate} = \frac{\text{number of deaths to children under age 1 in a year}}{\text{number of live births in a year}} * 1000$$

- These rates will be artificially low if we use only registered deaths and deaths with known age

- How could this affect public policy?

Redistribute total deaths by sex for each age group

- We will use the final census numbers of 1925 male deaths and 1566 female deaths for our adjusted number of deaths

- Because completeness varies by age group, we will do adjustments by sex for each age group we examined.

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Total	**89%**	**84%**

Adjusting deaths for children aged 0-4 years

	Registered Females	% distribution Females	New count Females	Registered Males	% distribution Males	New count Males
Under 1 month	21	0.73	36	19	0.55	27
1 month - 11 months	5	0.19	9	9	0.26	13
1 year	1	0.04	2	4	0.13	6
2 years	0	0.00	0	1	0.03	2
3 years	0	0.00	0	1	0.03	2
4 years	1	0.04	2	0	0.00	0
Total 0-4	28	1.0		34	1.0	
New total 0-4			**49**			**50**

Calculate the percent distribution of deaths for children aged 0-4 for each sex using the original total as the denominator

Apply this percentage to the new count of 49 deaths

= .73 x 49

=36 deaths to girls under 1 month

Adjusted vs unadjusted rates

$$\text{Infant mortality rate} = \frac{\text{number of deaths to children under age 1}}{\text{total number of live births}} * 1000$$

Unadjusted infant mortality rate of **9.2** $= \frac{53}{5800} * 1000$

Adjusted infant mortality rate of **14.8** $= \frac{86}{5800} * 1000$

Policy makers may erroneously believe that the under 5 mortality rate had declined if the unadjusted rate was presented.

Report both adjusted and unadjusted rates

- It’s important to report both the original registered counts of deaths by age and sex as well as adjusted numbers
- Be transparent about how numbers were adjusted
  - Did you use percent distribution from vital statistics?
  - Did you adjust by completeness by age group? By sex?
  - Was another imputation method used?

Exercise: Adjusting death data

- Using test data, calculate the new counts of deaths by sex for each age group using the percent distribution from your vital statistics data.
- You will need to use the census counts to re-distribute deaths by 5 year age group for the following age groups:
  - 0-4
  - 5-24
  - 25-74
  - 75+

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2 years	0	0.00	0	1	0.03	2
3 years	0	0.00	0	1	0.03	2
4 years	1	0.04	2	0	0.00	0
Total 0-4	28			34		
New total 0-4			49			50
Added deaths	21					
5 - 9 years	2	0.15	3	2	0.05	3
10 - 14 years	2	0.15	3	5	0.12	7
15 - 19 years	3	0.23	4	14	0.32	17
20 - 24 years	7	0.46	8	23	0.51	28
Total 5-24	14			45		
New 5-24			17			55
25 - 29 years	12	0.02	13	23	0.02	25
30 - 34 years	11	0.02	12	25	0.02	27
35 - 39 years	22	0.04	24	36	0.04	39
40 - 44 years	32	0.05	34	47	0.05	50
45 - 49 years	36	0.06	39	96	0.09	103
50 - 54 years	58	0.10	63	95	0.09	102
55 - 59 years	73	0.12	79	133	0.13	143
60 - 64 years	102	0.17	111	160	0.16	172
65 - 69 years	131	0.22	142	217	0.21	233
70 - 74 years	124	0.21	134	192	0.19	206
Total 25-74	600			1025		
New 5-74			650			1100
75 - 79 years	148	0.22	189	175	0.30	214
80 - 84 years	180	0.27	230	141	0.24	172
85 - 89 years	152	0.23	195	139	0.24	170
90 - 94 years	117	0.18	149	102	0.17	124
95 - 99 years	44	0.07	56	28	0.05	35
100 years and over	25	0.04	32	4	0.01	5
Total 75+	665			588		
New 75+			850			720