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Estimating civil registration completeness

Workshop on data analysis and report writing for civil registration based vital statistics

Nadi, Fiji
30 January – 03 February 2023

Bloomberg Philanthropies
DATA FOR HEALTH INITIATIVE
Pacific Community
Communauté du Pacifique
Australian Bureau of Statistics
UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Estimating completeness

- There are different methods to estimate completeness, depending on the purpose of your analysis:

  - Birth/death registration completeness by year

$$\frac{Number\ of\ vital\ events\ occurring\ in\ year\ x\ that\ are\ registered}{Total\ number\ of\ vital\ events\ in\ year\ x}\ x\ 100$$

  - Registration within 1 year of time of occurrence of event

$$\frac{Number\ of\ vital\ events\ occurring\ in\ year\ x\ that\ were\ registered\ within\ 1\ year\ of\ occurrence}{Total\ number\ of\ vital\ events\ in\ year\ x}\ x\ 100$$

Estimating completeness cont.

- Registration within the legally stipulated time (as defined by the law)

$$\frac{Number\ of\ vital\ events\ occurring\ in\ year\ x\ that\ were\ registered\ within\ the\ legally\ stipulated\ time}{Total\ number\ of\ vital\ events\ in\ year\ x}\ x\ 100$$

- In the case of birth registration, registration by age 5 years (in line with SDG Indicator 16.9.1: Proportion of children under 5 years whose births have been registered with a civil registration authority)

$$\frac{Number\ of\ children < 5\ years\ whose\ birth\ is\ registered}{Total\ number\ of\ children < 5\ years}\ x\ 100$$

Tabulating civil registration completeness

Calculating the completeness of registration can be used to monitor the performance of the CRVS system in capturing all vital events and allows for adjustment of incomplete data.

The below table is one of the first tables that usually features in a vital statistics report (as well as the same table for deaths). In addition to year, it should also be computed for geographical area (place of usual residence) if possible, to determine if there are any discrepancies by place.

Civil registry data

HIS data

Table 3.4 Birth registration completeness by year of occurrence and sex of newborn

Year of occurrence	Registered live births			Estimated total live births			Completeness (%)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Year 1									
Year 2									
Year 3									
Year …									
Most recent									
Grand total									

Note: estimated total births were sourced from Click or tap here to enter text.

Registered when?

- Estimates of civil registration completeness by year of occurrence of vital event do not infer much about when a vital event was registered (timeliness)
  - i.e. a birth occurring in 2017 may not be registered until 2018, especially if the birth occurs towards the latter part of the year

- It may be useful to produce a table such as the below which shows births by year of occurrence and year of registration:

Table 3.3 Matrix of the Births by Year of Occurrence and Year of Registration, 2016-2020

Year of occurrence	Year of registration							Total
	Years	2016	2017	2018	2019	2020	2021	Year Not stated	
	2016	4,536	4,838	325	15	27	322	394	10,457
	2017	0	5,162	4,615	56	23	326	430	10,612
	2018	0	0	6,002	4,678	76	223	389	11,368
	2019	0	0	0	5,463	4,240	182	301	10,186
	2020	0	0	0	0	4,533	5,551	156	10,240
	Total	4,536	10,000	10,942	10,212	8,899	6,604	1,670	52,863

Source: Vital Statistics Report Bhutan (2021)

Adjusting for incomplete registration

- If the number of registered events in a population are significantly underreported, indicators of fertility and mortality will be incorrect and may have misleading effects on policies
- If there are reasonably reliable estimates of the completeness of registration, indicators and absolute numbers may be adjusted for incompleteness
- Although there is no agreement among experts on when to adjust data, some argue that data should be adjusted if completeness is below 50-90 per cent
- If adjusting the data, both adjusted and unadjusted numbers and indicators should be published in the final report

Adjusting for incomplete registration cont.

- If, for example, it has been found that 55% of deaths are registered, the adjusted number of deaths is found by dividing the registered number of deaths (here 50,000) by 0.55:

$$\textit{Adjusted number of deaths} = \frac{\text{Registered deaths}}{\text{Completeness}} = \frac{50{,}000}{0.55} = 90{,}909$$

- Other indicators, such as crude birth rate and crude death rate, may be adjusted in the same way.
  - Note that life expectancy cannot be adjusted in this simple way, since it is derived from a complex formula. To do this, each age- and sex-specific death rate would have to be adjusted before producing a new life table with adjusted life tables.

Adjusting for incomplete registration cont.

- If data are available on death registration completeness by age group (for example, from a recent census or household survey), then sex- and/or age-specific completeness rates should be applied to the data
- In the example below, deaths from the census were used to calculate registration completeness by sex and broad age groups. This was then applied to the original data to provide an adjusted number of deaths by sex and age group

Table 3.1
Adjusting deaths for incomplete registration by age and sex

Age at death (years)	Registered deaths		Completeness of registration (%)		Adjusted deaths	
	Males	Females	Males	Females	Males	Females
0–4	34	28	68	58	50	48
5–24	45	14	81	83	56	17
25–74	1025	600	93	92	1102	652
75+	588	665	82	78	717	853
Total	1692	1307	89	84	1925	1570

Note that the total number of adjusted deaths is the sum of each of the age-specific adjusted deaths (and it may differ slightly from dividing the total number of registered deaths by overall completeness, as was shown in the previous slide.

Adjusting for incomplete registration cont.

- Pre-prepared tables for adjusting for incomplete registration can be found in the Excel workbook for this workshop in **Sheet T3.10**

- Once you have computed birth and death registration completeness, please discuss with your facilitator about the most suitable way for adjusting data (if needed). Whilst we may not have time to adjust the data during this workshop, we can continue to work with you after the workshop to identify the best method of doing this.

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Q&A