

# Reaching a regional estimate of death registration completeness



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# Table of contents

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<b>Table of contents</b> .....	<b>2</b>
<b>Summary</b> .....	<b>3</b>
<b>Introduction</b> .....	<b>4</b>
<b>What data are available on death registration in Asia and the Pacific?</b> .....	<b>6</b>
<b>Methods to estimate unregistered deaths</b> .....	<b>9</b>
Results.....	12
Subregional estimates of completeness.....	13
Limitations .....	14
Who is not registered? The fight to leave no one behind.....	14
Concluding remarks .....	15
<b>Annex:</b> .....	<b>17</b>
Data sources and estimates of completeness of death registration and unregistered deaths.....	17

## List of tables and figures

Table 1 Data sources for death registration used in the analysis .....	6
Table 2: Latest year with publicly available data on death registration by country, as of August 2021 .....	7
Table 3: Completeness of death registration by region and level of completeness .....	10
Table 4: Estimated levels of death registration completeness in 2018 for five countries without data .....	11
Figure 1: Estimates of Death Registration Completeness .....	12
Figure 2: Estimated regional completeness, ESCAP, 2018 .....	12
Table 5: Estimates of completeness of death registration and numbers of unregistered deaths, by ESCAP subregion .....	13

# Summary

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**Death registration is key to measuring and implementing public health policies, responding to health emergencies and a key component of legal identity. Despite progress, many countries still do not have universal and inclusive death registration systems and measuring completeness is essential to understanding the extent to which these systems may be deficient. However, data on the level of completeness and the number of unregistered deaths is lacking and this paper represents the first attempt to estimate the level of death registration completeness at the regional level. Innovative methods are applied to estimate unregistered deaths in countries for which this data are not reported.**

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# Introduction

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The importance of registering deaths and recording causes of death has gained increased recognition because of the COVID-19 pandemic. Death registration is fundamental for measuring and mitigating critical health challenges, including for calculating excess mortality; a key metric in measuring the impact of a health emergency. More generally, a universal and well-maintained civil registration system is recognized as the best source of information on deaths. Statistics based on registration records, with accurate causes of death recorded, and disaggregated by key demographic characteristics, are critical to design, implement and monitor public health policies. They are also necessary for monitoring the 2030 Agenda, which includes at least 67 indicators benefiting from data from civil registration and vital statistics (CRVS) systems.<sup>1</sup>

Further, death registration represents a final and permanent record of the fact of death and provides documentation, which next of kin need to manage the legal or financial consequences of death. Death registration affords the legal basis for ensuring pensions and benefits are correctly disbursed or ceased and can help to limit identity fraud.

There is a strong commitment to CRVS in Asia and the Pacific, demonstrated by the Ministerial Declaration to “Get Every One in the Picture” adopted in 2014.<sup>2</sup> In the Ministerial Declaration, governments proclaimed the Asia and Pacific Civil Registration and Vital Statistics Decade (2015–2024). The Decade gives a clear timeframe for realizing the shared vision that all people in Asia

and the Pacific will benefit from universal and responsive CRVS systems. The Regional Action Framework for CRVS in Asia and the Pacific was adopted to monitor progress towards achieving the shared goals, including several targets related to death registration and publication of statistics on causes of death. Recently, the Ministerial Declaration on Building a More Resilient Future with Inclusive Civil Registration and Vital Statistics<sup>3</sup> adopted at the Second Ministerial Conference on Civil Registration and Vital Statistics in Asia and the Pacific in November 2021 reaffirmed these commitments while integrating lessons from the first half of the Decade, especially highlighting the impact of the COVID-19 pandemic.

Death registration is an essential component of the 2030 Agenda for Sustainable Development, with SDG indicator 17.19.2 specifically calling for the achievement of 80 per cent death registration completeness.<sup>4</sup> Death registration and the recording of causes of death is also relevant for the estimation of many other SDG indicators. However, in contrast to birth registration, evidence on levels of death registration is scarce, creating a void of reference points with which to evaluate progress, nationally, regionally and globally. For birth registration, UNICEF regularly publishes global tallies of the number of children under five whose birth has not been registered.<sup>5</sup> Bearing in mind the more restricted data availability, this paper will build on the methodology to produce estimates of the number

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- 1 Mills S., Abouzahr C., Hak Kim J., Rassekh B., Sarpong D. (2017). *Civil registration and vital statistics (CRVS) for monitoring the Sustainable development goals (SDGs)* (English). Washington, D.C.: World Bank Group. Available at <http://documents.worldbank.org/curated/en/979321495190619598/Civil-registration-and-vital-statistics-CRVS-for-monitoring-the-Sustainable-development-goals-SDGs>.
  - 2 *Get Every One in the Picture* (2014). Available at <https://getinthepicture.org/resource/ministerial-declaration-get-every-one-picture-asia-and-pacific>
  - 3 *Ministerial Declaration on Building a More Resilient Future with Inclusive Civil Registration and Vital Statistics* (2021). Available at [https://www.unescap.org/sites/default/d8files/event-documents/ESCAP\\_MCCRVS\\_2021\\_8\\_Add.1\\_ministerial\\_declaration\\_English.pdf](https://www.unescap.org/sites/default/d8files/event-documents/ESCAP_MCCRVS_2021_8_Add.1_ministerial_declaration_English.pdf).
  - 4 Registration completeness is the proportion of vital events occurring in a given place and time that are registered by an appropriate authority.
  - 5 UNICEF (2019). *Birth Registration for Every Child by 2030: Are we on track?*. Available at <https://data.unicef.org/resources/birth-registration-for-every-child-by-2030/>.

of registered and deaths in the Asia and the Pacific region.

Further, most countries record deaths through both their civil registration and health sector systems. Each system has its own strengths and

weaknesses, and both should be coordinated and integrated to ensure that all deaths are registered and avoid double-counting. To avoid mixing data sources, this paper will focus solely on death registration reported by the civil registration authority of each country.

# What data are available on death registration in Asia and the Pacific?

At the midpoint of the Asia Pacific CRVS Decade (2015-2024) in 2019, ESCAP distributed a questionnaire to countries in the region to collect information on the progress made towards achieving the goals and targets of the Regional Action Framework since the inception of the Decade in 2015, and to identify the efforts needed to achieve universal registration by its end. The midterm review contained questions on the different targets of the Regional Action Framework, including on death registration. Of the 58 members of ESCAP in Asia and the Pacific, 45 responded to the questionnaire, with 40 providing data on death registration.<sup>6</sup> The country-level estimates provided were too few to be able to produce a regional aggregate of death registration, which highlighted the need for a more complete overview of available data sources on the number of deaths registered in each country.

Consequently, a systematic review of sources was conducted, mostly by searching the websites of each country's national statistical office and civil registration authority.

The specifications of this search were to obtain data on the number of deaths occurring in the most recent year available and registered by the civil registration authority within a specific time, ideally one year. Data directly from health systems or from censuses were not considered. Nationally published data were prioritized, primarily because they are usually the source with the most up-to-date figures published on a regular basis. As a result, this study also serves as a review of efforts by countries to publish their CRVS data, one of the targets of the Regional Action Framework. Further, when discordant internationally and nationally published data were identified, preference was afforded to the national data.

**TABLE 1 DATA SOURCES FOR DEATH REGISTRATION USED IN THE ANALYSIS**

Type of publisher	Data source	Number of countries
National	National statistical office regular publication	29
	Civil registration authority regular publication	1
	Ad-hoc vital statistics report	3
International	UNSD Demographic Yearbook <sup>7</sup>	6
	ESCAP baseline and midterm questionnaires <sup>8</sup>	14

6 All responses to the questionnaire can be found and downloaded at <https://getinthepicture.org/regional-picture/midterm-reporting>

7 United Nations Statistics Division. Demographic Yearbooks collection. Available at <https://unstats.un.org/unsd/demographic-social/products/dyb/>.

8 Data received in the questionnaires has been published in: UNESCAP (2021). *Getting every one in the picture, A snapshot of progress midway through the Asian and Pacific Civil Registration and Vital Statistics Decade*. Available at <https://getinthepicture.org/midterm-report>.

Exceptions were made where the available documentation could explain the difference in the figures, enabling an informed choice. The different data sources and the number of countries for which each data source existed are listed in [Table 1](#).

Country-level data on death registration are most commonly provided by national statistical offices and are usually published through annual reports or tabulations made available on their website. A few countries report these data on a more frequent basis, monthly or even weekly, with the COVID-19 pandemic having increased the demand for more frequent and timely publication of such data. In some countries, especially where civil registration is not considered the most complete source of data on deaths, the civil registration authority itself publishes death registration data. However, countries without the capacity to publish in a timely and frequent manner, may disseminate data through vital statistics reports every few years, including many small island developing States in the Pacific. As a result, the latest available data can date back several years.

A couple of international organizations also publish data on deaths, although it should be noted that these data are also sourced from national statistical offices. These sources were

used in the current study if no nationally published data were found in the public domain. In particular, the Statistics Division of UNDESA collects official demographic and population data, including on deaths, from member States and disseminates them annually in the Demographic Yearbook collection. In line with the Principles and Recommendations,<sup>9</sup> the ideal source for these data is the CRVS system, therefore the yearbooks are a valuable repository for death registration data. In this context, several annual editions were consulted to ensure that all available data were collated.

Data collected through the midterm questionnaire distributed by ESCAP were used as an additional data source. Even for countries where another source was used, responses to the questionnaire were kept as a reference, as they often contained more metadata on death registration data than public sources. Where discordant data were available from both the Yearbook and the midterm questionnaire, reconciliation was attempted. However, if the reasons for the discrepancies were not evident, estimates from the ESCAP midterm questionnaires were used since exchanges with the data providers had been conducted to collect as many specifications as possible on the data.

**TABLE 2: LATEST YEAR WITH PUBLICLY AVAILABLE DATA ON DEATH REGISTRATION BY COUNTRY, AS OF AUGUST 2021**

	Pre-2016	2016	2017	2018	Total	No public data, but completeness estimated for 2018
East and North-East Asia				7	7	China; DPRK
North Central Asia				9	9	Turkmenistan
South and South-West Asia	1		1	8	10	
South-East Asia			1	10	11	Indonesia
The Pacific	3	2	2	14	21	Solomon Islands
<b>TOTAL ASIA &amp; PACIFIC</b>	<b>4</b>	<b>2</b>	<b>4</b>	<b>48</b>	<b>58</b>	

See text for description of how completeness was estimated for the five countries mentioned in the last column. Those countries are included in the count provided for 2018. For example, the total of 14 countries with data for 2018 in the Pacific region includes the Solomon Islands, even though the estimate for that country was derived using a different approach.

9 United Nations (2014). Principles and Recommendations for a Vital Statistics System, Rev. 3. ST/ESA/STAT/SER.M/19/Rev.3. Available at <https://unstats.un.org/unsd/demographic/standmeth/principles/M19Rev3en.pdf>.



In total, civil registration data on deaths were collected for 53 of the 58 countries in the Asia and Pacific region, representing, to the best of our knowledge, the first study of its kind to represent most countries in the region. These data were mostly recent, with the latest year available being prior to 2017 in just a few cases.

Table 2 shows that data are available for most countries in every sub-region. However, the lack of available data for two of the most populous

countries in the region (China and Indonesia) prevents the direct computation of a regional aggregate of completeness of death registration. In this paper, we apply simulation and cautious assumptions of the level of completeness of death registration in China and Indonesia to produce a fairly narrow estimate of the regional level of completeness.

These methods, and the caveats that come with them, are detailed in the next section.

# Methods to estimate unregistered deaths

Having collected data on the number of registered deaths in 53 countries of the region, an estimate of the total number of deaths in each country is required to estimate how many deaths are not registered. For each country this figure was sourced from the United Nations World Population Prospects (UNWPP, 2022 version)<sup>10</sup>. The estimates of the annual number of deaths produced by the UNWPP are based on multiple sources, with priority given to data from civil registration. Where civil registration systems were considered deficient, sources other than official vital statistics were used as input in the model. The lack of reliable vital statistics data results in various obstacles and shortcomings, particularly the risk of not being able to incorporate unforeseen demographic trends which occurred in the most recent years. Nevertheless, the UNWPP offers a solid basis and counterfactual against which to assess the completeness of death registration at a national level as well providing a coherent basis for sub-regional, regional, and international comparison.

Considering many countries were not able to provide data for 2019 and bearing in mind the significant but not yet fully quantified impact of the COVID-19 pandemic on mortality throughout the world in 2020 and 2021, we produce estimates of the number of unregistered deaths, and the associated measure of completeness of death registration, using the most recent data provided by each country up to 2018<sup>11</sup>. Of the 53 countries that were able to provide any data on death registration, 43 provided data for 2018, 4 for 2017, 2 for 2016, and 4 for years before 2016.

Reported numbers of registered deaths in each country were then compared to the expected

number of deaths estimated in the UNWPP for the corresponding year. The difference between the two quantities provides an estimate of the number of unreported deaths in each country, while the ratio of the reported to the expected number of deaths in each country provides an estimate of the completeness of death registration. In the few situations where the implied completeness exceeded 100 per cent (in other words, the reported deaths exceeded those indicated in the UNWPP), completeness was assumed to be 100 per cent. Completeness in excess of 100 per cent might be attributable to three different factors: first, reported deaths may erroneously include late registrations from previous years thereby inflating the estimate of deaths in a particular year; second, despite their high level of internal and external validity, the UNWPP may nonetheless have underestimated mortality slightly; and third, particularly for small island States, completeness in excess of 100 per cent may reflect random fluctuations between observed and expected numbers of deaths<sup>12</sup>. [Table 3](#) summarises the countries reporting completeness by sub-region and level of completeness.

In two instances, further country-specific information was incorporated before estimating the number of unreported deaths or the level of completeness of death registration:

- In Malaysia, the number of deaths reported in the midterm questionnaire was higher than that estimated in the UNWPP. Applying the default method would therefore have produced a registration completeness of 100 per cent. However, the Department of Statistics Malaysia does not consider death registration to be complete, and its estimates

10 The UNWPP are produced by the Population Division of the United Nations Department of Economic and Social Affairs. They are available at <https://population.un.org/wpp/>.

11 Although the 2022 release of the UNWPP incorporates estimates of deaths arising during the pandemic, these are subject to considerable uncertainty. This, combined with the fact that data on registered deaths were available for most countries up to 2018, further justifies restricting the estimation of completeness to years up to 2018.

12 For example, in 2017, American Samoa reported 310 registered deaths; the UNWPP estimate for that year was 295.

include an adjustment for under-registration. The Department estimated that completeness of death registration was 97.9% in 2018. Accordingly, when producing an estimate of unreported deaths in Malaysia for 2018, this estimate of completeness was applied to the UNWPP estimate of the number of deaths in that year.

- In Kiribati, the Vital Statistics Report only presented death registration data as a total for the period from 2012 to 2014. This figure was therefore compared to the total of estimated deaths for those three years in the World Population Prospects.

In the case of the Philippines, while data published by the national statistical office and data provided in the midterm questionnaire were available for 2018, reporting delays meant that the data for 2018 are not representative of the level of completeness in the country. Data from 2017 were therefore used instead to estimate registration completeness<sup>13</sup>.

To estimate the number of unregistered deaths in the region at an aggregate level, estimates of registration completeness were needed for

countries without reported civil registration data. Five countries lacked such data: China, Democratic People’s Republic of Korea, Indonesia, Solomon Islands and Turkmenistan. The cases of China and Indonesia were of particular interest due to impact of their population size on a regional estimate.

#### a) Democratic People’s Republic of Korea; Solomon Islands; Turkmenistan

No country-specific reported numbers of deaths were received from these three countries in response to the midterm questionnaire, nor was there recourse to alternative sources of reported deaths. To estimate regional completeness, it was decided to adopt the methodology applied in the UNICEF publication on birth registration<sup>14</sup> and to apply a method of regional averages. The average completeness of registration for countries with data in each country’s respective subregion were computed and then applied to the countries as their estimated registration completeness for 2018. This method assumes the situation in these countries to be the same as that of their neighbours which may not be true. However, it should be noted that

**TABLE 3: COMPLETENESS OF DEATH REGISTRATION BY REGION AND LEVEL OF COMPLETENESS**

	<b>Below 50%</b>	<b>50-&lt;75%</b>	<b>75-&lt;90%</b>	<b>Above 90%</b>	<b>Total</b>	<b>No public data, but completeness estimated for 2018</b>
East and North-East Asia		1	1	5	<b>7</b>	China; DPRK
North Central Asia		1	3	5	<b>9</b>	Turkmenistan
South and South-West Asia	2	3	3	2	<b>10</b>	
South-East Asia	3	2	2	4	<b>11</b>	Indonesia
The Pacific	2	3	7	9	<b>21</b>	Solomon Islands
<b>TOTAL ASIA &amp; PACIFIC</b>	<b>7</b>	<b>10</b>	<b>16</b>	<b>25</b>	<b>58</b>	

13 A paper from the Philippine Statistics Authority from 2021 indicates a level of completeness of around 90%. However, this estimate is based on the application of the Brass Growth Balance method applied to census data. The paper is available at [https://psa.gov.ph/sites/default/files/PM\\_Session%201-Marizza%20Grande\\_CRVS%20Mid%20Decade%20Report\\_FINAL\\_01Sept2021.pdf](https://psa.gov.ph/sites/default/files/PM_Session%201-Marizza%20Grande_CRVS%20Mid%20Decade%20Report_FINAL_01Sept2021.pdf).

14 UNICEF 2019 Birth Registration for Every Child by 2030: Are we on track, available at <https://data.unicef.org/resources/birth-registration-for-every-child-by-2030/>.

these subregions constitute rather coherent groupings, and that a comparison of birth registration rates suggests that each of these three countries' CRVS systems performs about as well as those of other countries in their regions. Additionally, each of these countries represents a very small proportion of deaths within their subregion, and errors in the estimation of their completeness are unlikely to have a material bearing on the estimates of the completeness of death registration at either a regional or a subregional level.

### b) China

A review of the literature revealed a paper estimating the completeness of the China Cause of Death Reporting System.<sup>15</sup> While this system is not equivalent to civil registration *per se*, measuring its performance was deemed to meet the objective of this paper for death registration, and appeared to be the only relevant document publicly available at the time of writing. The paper, using advanced statistical methods, found a national completeness of 74.2 per cent. Despite this, there is a moderate degree of uncertainty as to this level of completeness, or indeed the likely range of possible completeness. To estimate regional completeness, we assumed that the true level of completeness of death registration in China in 2018 was uniformly distributed (in other words with no prior assumption about the likely shape of the distribution of the estimate of completeness) between 65 and 80 per cent, with an implied mean completeness of 72.5 per cent. This range would locate the completeness of

death registration in China somewhere between that observed in Bhutan (at the lower end), and Macao, China (at the upper end). At the mean value, completeness would be comparable to that observed in India or Tajikistan.

### c) Indonesia

For Indonesia, a comprehensive desk review of available studies on the topic of death registration completeness yielded even more limited results. Estimates for the sample registration system and for registration by the health system were found, but with large disparities and no indication of congruence with the death registration completeness itself. The little evidence found also indicated significant differences with neighbouring countries. With even greater uncertainty as to the level of completeness than described above with respect to China, to estimate regional completeness, we assumed that the true level of completeness of death registration in Indonesia in 2018 was uniformly distributed between 40 and 65 per cent – these two extremes representing the considered view of the authors as to a plausible range of completeness. The lower bound would place completeness of death registration in Indonesia on a par with that in Lao PDR, while the upper bound would imply completeness similar to that in Bhutan. At the mean value of 52.5 per cent, completeness would be comparable to that observed in Nepal.

Table 4 summarises the results for the five countries for which the level of completeness could not be directly estimated.

**TABLE 4: ESTIMATED LEVELS OF DEATH REGISTRATION COMPLETENESS IN 2018 FOR FIVE COUNTRIES WITHOUT DATA**

Country	ESCAP Subregion	Assumed completeness rates (%)
Democratic People's Republic of Korea	East and North-East Asia	99.3
Solomon Islands	The Pacific	74.0
Turkmenistan	North and Central Asia	96.2
People's Republic of China	North and Central Asia	72.5 (range 65-80%)
Indonesia	South and South-East Asia	52.5 (range 40-65%)

15 Zeng, X., Adair, T., Wang, L. et al. (2020). Measuring the completeness of death registration in 2844 Chinese counties in 2018. *BMC Med* 18, 176. Available at <https://doi.org/10.1186/s12916-020-01632-8>.

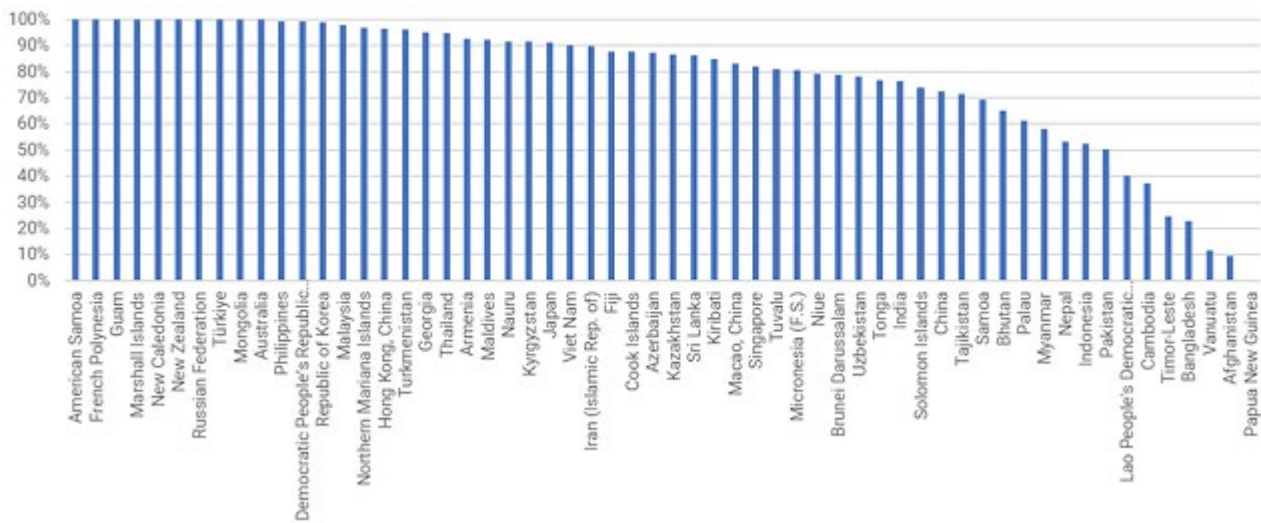
## Results

Adopting the approach described in the previous section, we estimate that of the approximately 32.1 million deaths in the 58 countries in the region, 23.8m were reported, resulting in a regional estimate of completeness of 74.3 per cent. Since estimates for 48 of the countries apply to 2018, with a further 4 to 2017, and 5 of the remaining 6 countries having fewer than 1,000

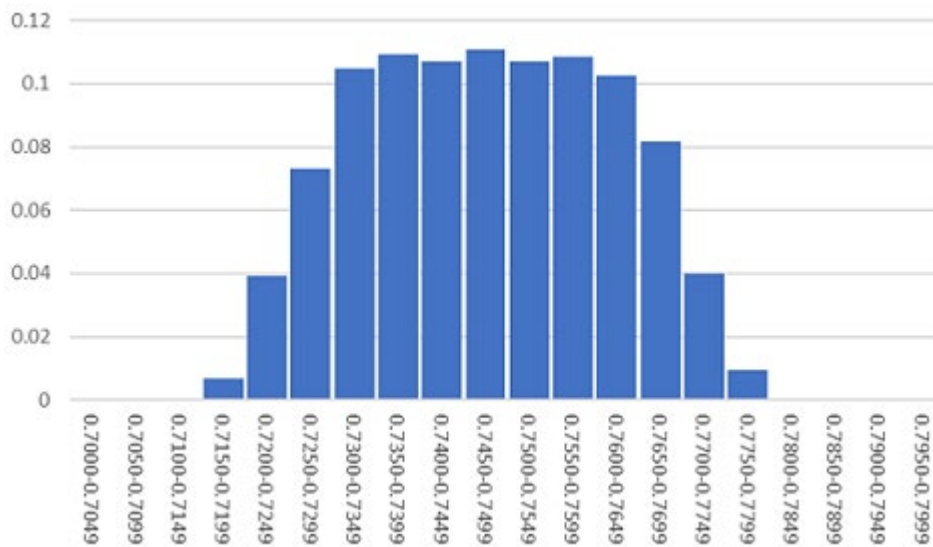
deaths<sup>16</sup> the estimate of completeness can be held to be a broadly (albeit probably slightly conservative<sup>17</sup>) indication of the completeness of death registration in the region in 2018.

Country-specific data are presented in the Annex. Completeness exceeded 99.9 per cent in 10 countries or territories and was below 50 per cent in 7 of them. The estimated level of completeness by country/territory is shown in [Figure 1](#).

**FIGURE 1: ESTIMATES OF DEATH REGISTRATION COMPLETENESS**



**FIGURE 2: ESTIMATED REGIONAL COMPLETENESS, ESCAP, 2018**



16 The exception is Sri Lanka with approximately 150 000 expected deaths in 2014.

17 The estimate is conservative because the implicit assumption here is that, in the countries with data prior to 2018, there had been no change in completeness in the intervening years. While this is indeed conservative, the 10 countries with data prior to 2018 account for less than 1.5 per cent of the estimated unregistered deaths in the region.

Given their population size and levels of completeness, it is not surprising that 87 per cent of unregistered deaths in the region are concentrated in five countries: China, India, Indonesia, Pakistan, and Bangladesh.

Accounting for the uncertainty as to the true level of completeness of death registration in China and Indonesia allows us to better estimate the likely range of completeness of death registration at a regional level. Thus, running simulations, as described above, the completeness in the two countries produces the distribution of the estimated regional completeness in 2018. This indicates a regional mean completeness of 74.2 per cent in 2018, with a 95 per cent of the simulations lying between 71.8 and 76.8 per cent.<sup>18</sup>

The distribution of estimated completeness of death registration for the entire ESCAP region is shown in Figure 2.

## Subregional estimates of completeness

For all ESCAP subregions except for South-East Asia, an estimate is available for all countries and a subregional picture can be drawn. The results reveal, as expected, a contrasting situation. North and Central Asia stands out as having only approximately 4 per cent of deaths that go unregistered. Despite this high completeness, it is

important to note that none of the countries in that region are estimated to have reached universal registration nor have they completed an inequality assessment to quantify the populations with lower registration rates. Moreover, five of the eight countries with direct estimates have a completeness below 90 per cent

More surprisingly, the three other subregions show comparable registration rates, with South and South-West Asia having the highest proportion of unregistered deaths with about one in three deaths going unregistered. This subregional average also masks significantly different situations at the country level, for example estimates for Sri Lanka showing 98 per cent completeness, and just 10 per cent completeness for Afghanistan. In addition to Sri Lanka, the Islamic Republic of Iran and Türkiye also show very high death registration completeness in the South and South-West Asia sub-region, demonstrating that countries in South Asia are at very different stages in their path to universal registration. It should however be noted that for countries with several data points, a clear upward trend is observed. For Afghanistan and Bangladesh, the midterm review suggested that registration completeness has been improving up to 2018. For India, nationally published data have also revealed impressive progress, with almost 700,000 more deaths being registered in 2019 than in 2018, an increase of 10 percent.<sup>19</sup>

**TABLE 5: ESTIMATES OF COMPLETENESS OF DEATH REGISTRATION AND NUMBERS OF UNREGISTERED DEATHS, BY ESCAP SUBREGION**

ESCAP subregion	Registered deaths	UNWPP deaths	Completeness (%)	Number of unregistered deaths (thousands)
East and North-East Asia	9 118 634	11 975 472	76	2 857
North and Central Asia	2 348 245	2 413 945	97	66
South and South-West Asia	8 957 570	12 896 592	66	3 939
South-East Asia	3 207 292	4 539 971	71	1 333
The Pacific	209 003	271 213	77	62
<b>TOTAL</b>	<b>23 840 743</b>	<b>32 097 193</b>	<b>74</b>	<b>8 256</b>

18 Assuming a particularly extreme range of estimates of the completeness of death registration for Indonesia of between 20 and 65 per cent complete does not greatly change the estimate of regional completeness. On that assumption, the regional completeness would be 73.6 per cent with a 95 per cent range from 70.7 per cent to 76.6 per cent.

19 Office of the Registrar General of India (2020). Vital Statistics of India based on the Civil Registration System, 2019. Available at <http://crsorgi.gov.in>

Interpreting the results of the Pacific and East and North-East Asia is a bit more complicated. In both cases, the vast majority of unregistered deaths belong to one country in each subregion, respectively Papua New Guinea and China. In the Pacific, most countries are yet to reach universal registration, and some still have a long way to go. It should also be noted that the methodology of comparing registered deaths with an estimate based on past records and demographic trends touches on its limits with small populations. Estimates for these countries should therefore be interpreted with caution, and achievement of truly universal registration cannot be assessed this way. East and North-East Asia shows a similar situation, with almost all unregistered deaths occurring in China. While only Japan is estimated to have achieved universal registration in this sub-region estimates for Mongolia; the Republic of Korea; Macao, China; and Hong Kong, China show high completeness rates albeit still short of 100 per cent estimated completeness.

In summary, the differences between ESCAP subregions in death registration completeness are not as great as those for birth registration.<sup>20</sup> Many countries have achieved high death registration completeness, above 95 per cent. However, comparing overall death registration numbers to indirect estimates does not necessarily provide an accurate measure of the existence and scale of the remaining gaps to universal registration. This highlights the need to conduct more targeted assessments of inequalities related to death registration to obtain a picture of the populations not covered by death registration and provide solutions to overcome these gaps

## Limitations

One of the main limitations of this paper is the absence of an international standard in data reporting from countries. Indeed, collecting nationally published data makes it difficult to verify that every country is measuring death registration in the same way. Often, the associated metadata was quite limited and not always available in English, obscuring specifications that could shed a light on discrepancies across countries.

Registration and reporting delays can greatly impact the annual estimates. Every country has a legal period for registration of deaths, during which registration is often free. Deaths registered during this period are considered timely registrations. Beyond this period, some countries impose fees while others have tolerance periods. Nevertheless, countries are advised to differentiate these deaths registered after the legal period between deaths registered within one year of occurrence (late death registration), and deaths registered after one year (delayed death registration). This helps standardize the evaluation of performance of the civil registration system, since it is important to make sure that most deaths are registered in a timely manner. However, many countries do not differentiate by registration delay in their published statistics which means these figures can include deaths registered years after their occurrence. In contrast, others do not include some of the late death registrations in their figures because of publication delay constraints. Furthermore, some countries report data by date of registration instead of the recommended date of occurrence. All of this may mean that the data used in this paper are not all measuring the exact same phenomenon in different countries.

An unavoidable limitation of the exercise conducted here relates to the unavailability of data from two of the most populous countries in the region, China and Indonesia. While we have attempted to provide both point and range estimates for the completeness of death registration in these two countries, they are – ultimately – uninformed by empirical data.

## Who is not registered? The fight to leave no one behind

While the method and exact estimates may be variable, clearly a considerable number of deaths occurring in Asia and the Pacific were unregistered in 2018. The unregistered deaths can have negative consequences for the families of the individuals who may be denied claims to some of their rights. It also creates a blind spot in the design and implementation of public policies

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20 UNESCAP (2021). *op.cit.*

in a wide array of topics related to deaths and their causes, especially evident with the Covid-19 pandemic. Studies have indeed shown that in most countries, the official toll of the pandemic was far lower than its actual impact, in part due to the shortcomings of death registration systems and recording of causes of death<sup>21</sup>. Finally, it impacts the implementation of public policies such as those related to pensions and social protections and increases the risk of identity fraud.

At the regional level, seven countries have death registration completeness below 50 percent: Afghanistan, Bangladesh, Cambodia, Lao People's Democratic Republic, Papua New Guinea, Timor-Leste and Vanuatu. The situations and dynamics of these countries are very different. On the one hand, there is a consistently improving trend in recent years in Bangladesh, Cambodia and Lao PDR and, if this continues, they will register more than half of the deaths in the coming years. On the other hand, the situation in the other countries indicates the urgent need to expand the coverage of the death registration system. These countries must be a priority in order to realize the vision of universal registration in the region.

In contrast, there are 25 countries in the region with death registration completeness above 90 percent. Due to assumptions and inaccuracies in the estimation method, it should be noted that a 100 per cent completeness rate might not necessarily mean that all deaths have been indeed registered. For example, despite an estimated 100 per cent completeness rate, local knowledge from the National Registration Department and the Department of Statistics Malaysia shows that in some regions of the country, some deaths are still not being registered. This information allows the registration department to target those areas to increase the completeness and the department of statistics to produce more accurate vital statistics by correcting them for under-registration. This approach highlights the importance of local and detailed knowledge to achieve universal registration

## Concluding remarks

While the approximately 8.2 million unregistered deaths each year is concerning, there has been significant progress. The midterm review of the Decade shows that most countries with low death registration completeness at the beginning of the Decade have seen their completeness increase since then, sometimes at a dramatic pace. Evidence suggests however, that the current level of improvement will not be enough for many countries to achieve universal civil registration by 2024, or even 2030. Increased efforts are therefore needed to build on progress made thus far.

Estimating the number of unregistered deaths also raises the question of who is not registered. Since there are very few large-scale attempts to estimate the general performance of death registration, it is unsurprising that there are even fewer studies on the categorization of unregistered deaths at the international level. Most of this literature discusses the performance by age-group, with a specific focus on infant and child mortality, reflecting the importance of those indicators in many development programs, and which highlights often lower level of completeness for these deaths.

Those most at risk of being excluded from death registration are hard to reach populations and people in vulnerable situations. People living in rural, remote, isolated or border areas, people with disabilities, minorities, indigenous people, migrants, non-citizens, asylum-seekers, refugees, stateless people, internally displaced persons, domestic workers, foundlings and people without documentation can face additional barriers in access to registration and therefore be denied this right for them and their families. Ensuring every death is registered is an integral part of ensuring no one is left behind. Women and girls may also be disproportionately excluded, and a separate paper has been written to examine this issue, looking at the availability of death registration data disaggregated by sex.

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21 WHO (2021). The true death toll of COVID-19, Estimating global excess mortality. Available at <https://www.who.int/data/stories/the-true-death-toll-of-covid-19-estimating-global-excess-mortality>.



Increasingly more countries are publishing their data, and digitization further facilitates more regular dissemination of data, cutting short delays and allowing for monthly or quarterly publication. However, a few countries, which represent an important proportion of the total population of the region, do not publish data. This obscures a critical element of public health monitoring. It should also be noted that many countries with available data do not publish directly but rely on international organizations to do so. Increased efforts in national data dissemination are needed to facilitate more regular publication and more detailed tabulations

Beyond death registration itself, this paper also constitutes an overview of the level of publication

of CRVS data in Asia and the Pacific. Regularly publishing birth and death registration data is part of the Regional Action Framework agreed to in 2014. The results emerging from this study are encouraging with 36 countries having published data recently, and 17 more having communicated their data to an international organization. The number of countries publishing vital statistics data is beyond what was reported by some countries in the midterm review. This surprising result illustrates the difficulty in finding some of those data and the lack of communication, including within government agencies. Nevertheless, it reflects progress made since 2014 and shows that countries are using their increasingly complete civil registration records to produce valuable data.

# Annex:

## Data sources and estimates of completeness of death registration and unregistered deaths

Country	Year	Source	Registered deaths	WPP 2022 deaths (for year)	Estimated completeness	Unregistered deaths
Afghanistan	2018	Midterm questionnaire	24 357	256 314	9.5%	231 957
American Samoa	2017	UNSD	310	295	100%	0
Armenia	2018	NSO	25 751	27 777	92.7%	2 026
Australia	2018	NSO	158 493	158 724	99.9%	231
Azerbaijan	2018	NSO	57 250	65 539	87.4%	8 289
Bangladesh	2018	Midterm questionnaire	196 610	858 712	22.9%	662 102
Bhutan	2018	Vital Statistics report	3 364	5 154	65.3%	1 790
Brunei Darussalam	2018	NSO	1 612	2 042	78.9%	430
Cambodia	2018	Midterm questionnaire	35 298	94 278	37.4%	58 980
China <sup>1</sup>	2018		7 167 967	9 886 851	72.5%	2 718 884
Cook Islands	2018	NSO	121	138	87.7%	17
Democratic People's Republic of Korea <sup>2</sup>	2018		222 044	223 609	99.3%	1 565
Fiji	2018	Midterm questionnaire	6 356	7 243	87.8%	887
French Polynesia	2018	NSO	1 616	987	100%	0
Georgia	2018	NSO	46 524	48 926	95.1%	2 402
Guam	2018	UNSD	1 056	1 053	100%	0
Hong Kong, China	2018	NSO	47 400	49 180	96.4%	1 780
India	2018	CRO	6 950 607	9 098 071	76.4%	2 147 464
Indonesia <sup>1</sup>	2018		1 050 990	2 001 885	52.5%	950 895
Iran (Islamic Rep. of)	2018	Midterm questionnaire	362 319	403 553	89.8%	41 234
Japan	2018	NSO	1 362 470	1 493 140	91.2%	130 670
Kazakhstan	2018	NSO	130 448	150 852	86.5%	20 404
Kiribati <sup>3</sup>	2012-14	Vital Statistics report	660	777	84.9%	117
Kyrgyzstan	2018	UNSD	32 989	36 078	91.4%	3 089
Lao People's Democratic Republic (the)	2018	Midterm questionnaire	19 238	48 028	40.1%	28 790
Macao, China	2018	NSO	2 069	2 496	82.9%	427
Malaysia <sup>4</sup>	2018	Midterm questionnaire	168 456	167 497	97.9%	3 517
Maldives	2018	NSO	1 263	1 370	92.2%	107
Marshall Islands	2016	NSO	353	346	100%	0
Micronesia (F.S.)	2003	UNSD	427	529	80.7%	102
Mongolia	2018	NSO	17 864	17 878	99.9%	14
Myanmar	2018	NSO	264 620	454 580	58.2%	189 960
Nauru	2011	NSO	75	82	91.5%	7

Country	Year	Source	Registered deaths	WPP 2022 deaths (for year)	Estimated completeness	Unregistered deaths
Nepal <sup>5</sup>	2017	Midterm questionnaire	104 265	196 726	53.0%	92 461
New Caledonia	2018	NSO	1 556	1 446	100%	0
New Zealand	2018	NSO	33 222	31 234	100%	0
Niue	2018	NSO	19	24	79.2%	5
Northern Mariana Islands	2017	NSO	232	240	96.7%	8
Pakistan	2018	Midterm questionnaire	760 494	1 508 129	50.4%	747 635
Palau	2018	NSO	143	233	61.4%	90
Papua New Guinea	2018	Midterm questionnaire	267	60 860	0.4%	60 593
Philippines	2017	Midterm questionnaire	600 730	604 642	99.4%	3 912
Republic of Korea	2018	NSO	298 820	302 318	98.8%	3 498
Russian Federation	2018	NSO	1 828 910	1 800 581	100%	0
Samoa	2018	Midterm questionnaire	777	1 118	69.5%	341
Singapore <sup>6</sup>	2018	NSO	21 282	25 978	81.9%	4 696
Solomon Islands <sup>2</sup>	2018		2 468	3 335	74.0%	867
Sri Lanka	2014	NSO	128 185	148 541	86.3%	20 356
Tajikistan	2018	UNSD	32 699	45 802	71.4%	13 103
Thailand	2018	NSO	473 541	499 760	94.8%	26 219
Timor-Leste	2018	Midterm questionnaire	2 187	8 867	24.7%	6 680
Tonga	2018	Vital Statistics report	562	731	76.9%	169
Türkiye	2018	NSO	426 106	420 022	100%	0
Turkmenistan <sup>2</sup>	2018		38 761	40 292	96.2%	1 531
Tuvalu	2016	UNSD	90	111	81.1%	21
Uzbekistan	2018	NSO	154 913	198 098	78.2%	43 185
Vanuatu	2018	Midterm questionnaire	200	1 707	11.7%	1 507
Viet Nam	2018	NSO	569 338	632 414	90.0%	63 076
<b>TOTAL</b>			<b>2 384 074</b>	<b>32 097 193</b>	<b>74.3%</b>	<b>8 298 091</b>

## Notes:

- 1 See text for details of estimation process for completeness of death registration in China and Indonesia
- 2 See text for details. Estimate of completeness derived from regional data
- 3 Reported data for Kiribati, though aggregated for a three-year period, are presented as annualized estimates
- 4 See text for details. Unregistered deaths estimated by applying NSO completeness estimate to the WPP estimates
- 5 Nepal's midterm questionnaire does not contain an absolute number of registered deaths, but a percentage of deaths registered according to a survey conducted in 2017 (53%)
- 6 It is expected that the level of completeness in Singapore approaches 100%. The WPP's numbers of death are likely over-estimated due to difference in reporting the de jure and de facto populations leading to an underestimated level of completeness. This does not impact the regional estimate.

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