

## Evaluation of Civil Registration and Vital Statistics (CRVS) System in the Maldives – Mortality Cause Specific Approach

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### Abstract

**Background:** The coverage of the CRVS is quite high, causes of death registered in the system are unreliable. An assessment of vital registration systems of 148 countries conducted in 2015 by Mikkelsen et al, showed low performance (VSPI 48.3 for 2010-2012) of the death registration system in Maldives, suggesting the need for improvement. We aim to evaluate the performance of the CRVS system in Maldives from 2009 - 2018, with regard to mortality levels and patterns, quality of cause of death data, and completeness of death registration in order to identify areas for improvement.

**Methods:** Information on cause of death were transcribed from the Maldives CRVS system for the period 2009-2018 and GBD study for population estimates. The performance of the CRVS system was assessed using ANCONDA. The methods explored the life expectancy of the population and quality Vital Statistics Performance Index (VSPI-Q). ANACONDA is developed based on the composite metric developed by Phillips et al. 2014 and calculates five dimensions which include: quality of cause of death reporting, quality of age and sex reporting, internal consistency, completeness of death reporting and level of cause-specific detail.

**Results:** The completeness of death notification was higher than 95% in the period 2009-2018 and life expectancy was higher than what was reported in the national figures. The CRVS system performed well on most dimensions of the VSPI, however, 50% of all deaths over the period 2009-2018 assigned to ICD codes were considered as “major garbage codes”. Garbage coding was higher for men and for older age groups. The percentage of deaths with unspecified age or sex, and the percentage of deaths with causes of deaths considered impossible in some age–sex combinations was low but seen in the more recent years. The quality of death data was the weakest area with highest severity levels.

**Conclusion:** The results indicated that the CRVS system in Maldives is performing satisfactorily but needs improvement in evaluation of data quality and cause of death certification. The system allows for real-time mortality monitoring and has the potential to improve disease burden estimates as well as other indices. In response to monitoring mortalities as mandated by the Sustainable Development Goals, a significant and sustained government commitment and investment in strengthening the vital registration system in Maldives is recommended.

**Keywords:** Quality, CRVS, SDG, Vital Statistics Performance Index, empirical evidence

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### 1. Introduction

Civil registration and vital statistics (CRVS) systems, plays an important role in generating data for good governance, health outcomes and monitoring of sustainable development goals (SDGs). However, most low-and middle-income countries still have underdeveloped CRVS systems.<sup>1</sup> The CRVS system in the Maldives developed over 50 years (appendix 1). Maldives comprises of 344,023 people living in 187 islands.<sup>2</sup> The geography of the Maldives presents difficulty in timely exchange of information and pose problems for real-time analysis.<sup>3</sup>

As early as 1960s, births and deaths have been reported to the Ministry of Health (MoH) through a system of registration. This system was not properly enforced until birth and death registration law which was enacted in 1992.<sup>4</sup> This drastically improved birth and death reporting since a dead body cannot be buried in the Maldives without completing the Death Certificate (locally name: “Maru Saabithu Kuri kamuge Liyun”), and death must be certified by a doctor or medical practitioner. From 2003, a triplicate-copy system of reporting births and deaths through birth form and death certificate has been operational: the original copy for the parent or guardian; second copy for the island administrations; and the third copy for the Department to National Registration (DNR), which is used to input data in the CRVS database and coded by MoH.<sup>3</sup>

Since CRVS systems are the single most important source to acquire information on the causes of death as reported on the death certificate<sup>5</sup>, it is important to assess the completeness and quality of vital statistics (VS) data.<sup>6</sup> This paper reports the evaluation of the performance of Maldivian CRVS systems in terms of completeness, quality and internal consistency of Maldives mortality registry from 2009 – 2018.

### 2. Methodology

This is an ecological study, where we collected all the registered deaths from 2009 to 2018 in the CRVS system of the Maldives.

#### Information Sources

To estimate performance, we used two datasets: population estimates of Maldives from Global Burden of Diseases (GBD) group<sup>7</sup> and ICD coded deaths from the CRVS system for 2009 to 2018. Ethical approval was obtained from the National Health Research Council in Maldives to use the CRVS data.

To estimate the quality and internal consistency indicators, we used the entire mortality registry for the 2009 - 2018. Death certificates includes socio-demographic information (e.g., age, gender) and cause of death certified by a doctor. In case of Maldives, the death certificate is the only document used for death registration and also for cause of death. The MoH uses the information to determine the underlying causes of death (CoD) and code them using International Classification of Diseases and related Health problems -10<sup>th</sup> revision (ICD-10).<sup>8</sup>

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### Evaluation Methods

#### ANACONDA

This paper uses Analyses of Causes of National Death for Action (ANACONDA)<sup>9</sup>, developed by the Bloomberg Philanthropies Data for Health innovation program for analyses of the quality of mortality and Cause of Death Data. ANACONDA is an electronic tool that assesses the accuracy and completeness of mortality, cause of death data and computes Vital Statistics Performance Index (VSPI-Q), a composite of five dimensions of VS strength, each assessed by a separate empirical indicator.<sup>10</sup> The VSPI(Q) is an overall summary index of the quality of the mortality input data. It combines the following five components of data quality into one measure:<sup>11</sup>

- 1) completeness of death registration
- 2) amount and type of ‘garbage’ codes used to record the cause of death, including any non-ICD codes
- 3) the degree of cause-specific detail included in the input data
- 4) the frequency of biologically implausible causes of death in the dataset
- 5) the fraction of deaths for which neither the age nor the sex was recorded

#### Business Process Mapping

To understand the CRVS system of Maldives, we mapped the system using business process mapping. The mapping used the ten milestone approach<sup>12</sup> that helped to understand the bottlenecks, flaws in bureaucracies and time-lags from the onset of a death to registration, coding, data analysis and dissemination. This was then shared and validated through different stakeholders in MoH and DNR.

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### 3. Results

#### ANACONDA Results

The summary scores for VSPI(Q) over the years had varied over the period 2009-2018, with notable improvement from 2009-2010 to 2011-2012 (51.4% to 56.7%). The summary score of VSPI fell over the period the years 2013-2016 (55.8% in 2013-2014 to 51.2% in 2015-2016), but improved again in the period 2017-2018 to 50.9%. Hence, overall, VSPI(Q) has varied between low and medium during this period.

Table 1: VSPI (Q) component scores over the period 2009-2018

Component	2009 - 2010	2011- 2012	2013- 2014	2015- 2016	2017- 2018
Quality of age and sex reporting	100	100	100	100	100
Quality of cause of death reporting	58.7	63.1	63.8	58.7	63.8
Biologically plausible cause of death	100	100	100	99.1	100
Level of cause specific detail available	81.5	81.5	81.0	79.4	82
Completeness of death reporting	95.4	97.5	97.2	97.9	97.2

#### Completeness of death reporting and quality of age and sex reporting

Death reporting improved with a score of 95 to 97 over the period 2009-2018 (Table 1). However, the completeness of death reporting was higher for females 94.2% compared to 92.4% for male in 2010, but this improved in 2013-2014 (95.2% female and 94.2% male) and further to 98% female and 95.1% males in period 2017-2018. As seen from Table-1 the quality of age and sex reporting consistently 100 over the 10 years.

#### Quality of cause of death reporting

Over the period 2009-2018 the scores of quality of cause of death varied between 58 and 63. The component values do not show a trend pattern but scored lower in the period 2015-2016. Usable codes improved over the period from 37.3% in 2009-2010 to 42.4 in 2013-2014 to 43.5% in 2017-2018. The low quality of CoD reporting is attributed the high proportion of garbage codes. Only a small reduction is seen in the extent of garbage codes in CoD during the period 2011-2014 but increase over the recent periods (Table 2). Furthermore, garbage codes of “very high severity (level 1)” increased from 43.3% in 2009-2010 to 49.8% in 2017-2018. The garbage codes were more common in the 70 and over age group and among men over the whole period 2009-2018. The percentage of deaths with unspecified age or sex, and the percentage of deaths with causes of deaths considered impossible in some age–sex combinations was low but is observed in the more recent years.

When the garbage codes are redistributed to the GBD groups, about 50% were observed to be in the GBD group 2 (55.1% in 2009-2010 and 47.3% in 2017-2018).

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Table 2: Major GBD groups and garbage codes over the period 2009-2018

Major GBD groups and garbage codes	2009 - 2010	2011- 2012	2013- 2014	2015- 2016	2017- 2018
Group 1: Communicable diseases	6.7	5.3	3.7	4.5	4.8
Group 2: Non-communicable diseases	27.8	33.2	34.4	29	35.7
Group 3: External causes	3.3	3.6	4.3	3.8	3.2
Garbage codes including insufficiently specified causes with limited impact	62.2	57.9	57.6	62.7	56.3

On the component of biologically plausible cause of death VSPI scored 100 over the period 2009-2018.

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### Level of cause specific details

Level of cause specific details mirrors the pattern of the quality of death reporting with a score of about 81, and a small drop in the period 2015-2016 to 79.4 (Table 1). The results show the change in the top 10 leading causes of death over the ten year (2009-2018) is not significant, with majority of the codes belonging to GBD group 2 (Table 3). However, it is noteworthy that septicemia, unspecified, had continued to be among the top 10 cause of death over the 10-year period.

Table 3: Top 10 Causes of Death the period 2009-2010 and 2017-18

Leading ICD causes for Males 2017- 2018				Leading ICD causes for Females 2017 - 2018			
#	% of cause	ICD codes	Name of category	#	% of cause	ICD codes	Name of category
1	8.8	I46.9	Cardiac arrest, unspecified	1	9	I46.9	Cardiac arrest, unspecified
2	6.6	R99.-	Other ill-defined and unspecified causes of mortality	2	6.4	J44.9	Chronic obstructive pulmonary disease, unspecified
3	5.7	I21.9	Acute myocardial infarction, unspecified	3	5.7	R99.-	Other ill-defined and unspecified causes of mortality
4	5.3	R09.2	Respiratory arrest	4	5	R09.2	Respiratory arrest
5	3.9	I64.-	Stroke, not specified as haemorrhage or infarction	5	4.5	I10.-	Essential (primary) hypertension
6	3.7	I10.-	Essential (primary) hypertension	6	3.8	I21.9	Acute myocardial infarction, unspecified
7	3.2	A41.9	Septicemia, unspecified	7	3.2	A41.9	Septicemia, unspecified
8	2.8	J44.9	Chronic obstructive pulmonary disease, unspecified	8	2.2	I64.-	Stroke, not specified as haemorrhage or infarction
9	2.2	I25.9	Chronic ischaemic heart disease, unspecified	9	2.1	J18.9	Pneumonia, unspecified
10	1.9	I25.1	Atherosclerotic heart disease	10	1.7	I25.1	Atherosclerotic heart disease
Leading ICD causes for Males 2009 - 2010				Leading ICD causes for Females 2009 - 2010			
#	% of cause	ICD codes	Name of category	#	% of cause	ICD codes	Name of category
1	18.1	I10.-	Essential (primary) hypertension	1	15.9	I10.-	Essential (primary) hypertension
2	7.7	R99.-	Other ill-defined and unspecified causes of mortality	2	7.6	P96.4	Termination of pregnancy, fetus and newborn
3	5.1	I46.9	Cardiac arrest, unspecified	3	7.2	R99.-	Other ill-defined and unspecified causes of mortality

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4	4.2	P96.4	Termination of pregnancy, fetus and newborn	4	5.3	I46.9	Cardiac arrest, unspecified
5	3.9	I21.9	Acute myocardial infarction, unspecified	5	5.1	J44.9	Chronic obstructive pulmonary disease, unspecified
6	2.5	I64.-	Stroke, not specified as haemorrhage or infarction	6	2.6	P95.-	Fetal death of unspecified cause
7	2.5	J44.9	Chronic obstructive pulmonary disease, unspecified	7	2.3	I64.-	Stroke, not specified as haemorrhage or infarction
8	2	P95.-	Fetal death of unspecified cause	8	2.1	R54.-	Senility
9	1.8	I25.9	Chronic ischemic heart disease, unspecified	9	2	P01.8	Fetus and newborn affected by other maternal complications of pregnancy
10	1.6	A41.9	Septicemia, unspecified	10	1.3	A41.9	Septicemia, unspecified

The results show that priority areas for improving data quality remained more or less the same around 62% for cause of death reporting and 36% for the level of cause of specific details.

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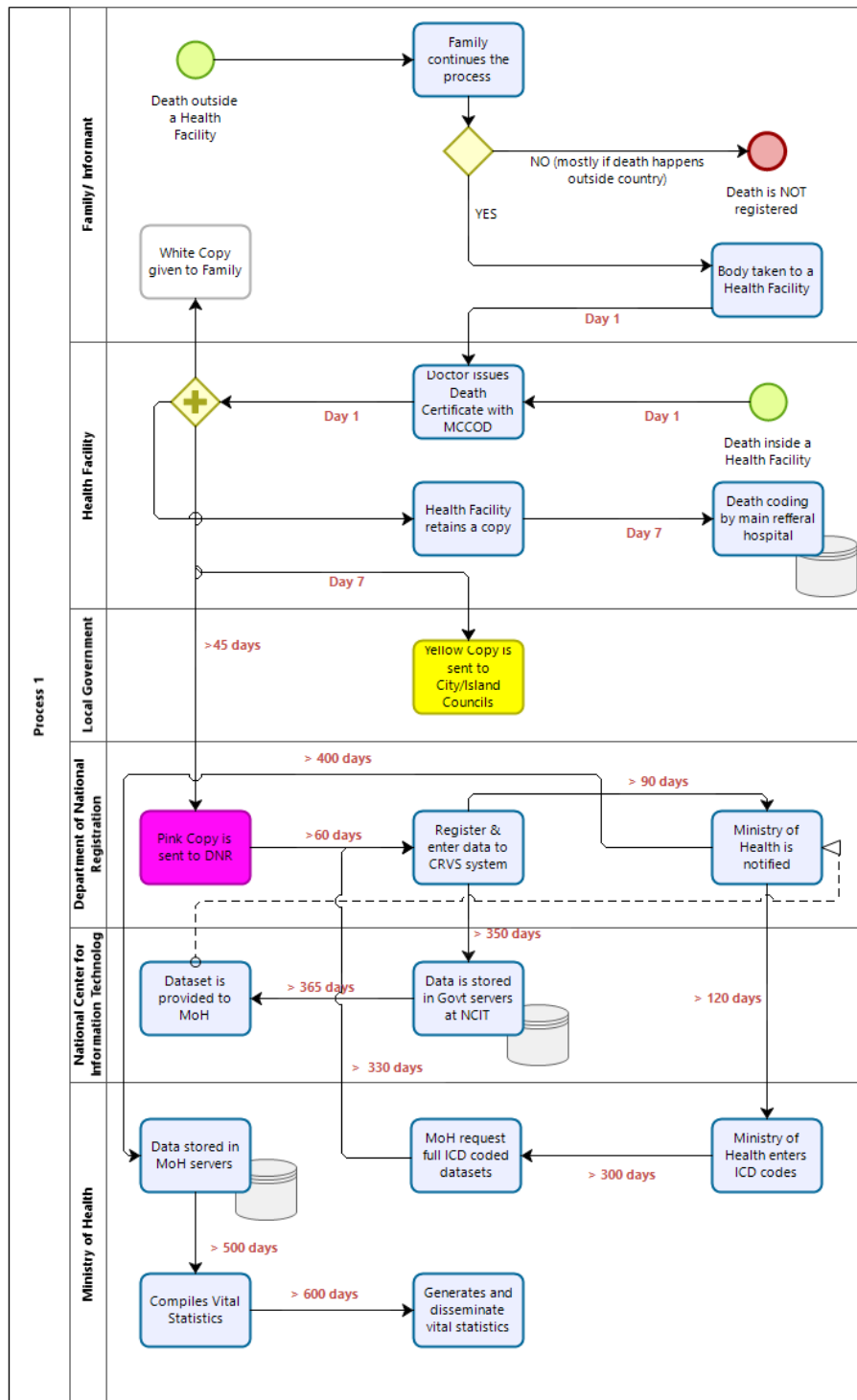
### Business process mapping

Business process mapping indicated time lags; duplication of effort resulting in wastage and inefficiency and inadequate standard of procedures for data access. It can be seen from Figure 1 (described in appendix

1), there is duplication in death coding, in that it is done at the main referral facility and also coded at the national level by the MoH.

A critical aspect observed is the time lags from the time a death is notified to the island council to the time it takes to reach DNR. This is driven by the geographic dispersion of the Maldives islands, use of paper records and non-existent time limits in the operating procedures. In addition, the data system is outdated and incompatible with current technologies and becomes a slow process. Although CoD is coded by MoH, the process to access the data involves bureaucratic process through request to the DNR who in turn requests the national centre for information technology to provide the data to the MoH for analysis.

Figure 1: Business process map of Maldives CRVS system





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### 4. Discussion, Conclusion and Recommendations:

It is well recognized that a well-functioning CRVS systems and investment to strengthening it is not only vital for individuals and societies, but also a development imperative that is critical for national health.<sup>13</sup> The functions of CRVS system in the Maldives, as in many other countries, is handled by multiple parties introducing an inherent risk of fragmentation that requires each party to play an important role to improve its functioning. Experiences from other countries show that no single agency can be expected to tackle the weaknesses of CRVS system.<sup>14</sup> The CRVS system in the Maldives has the opportunity for real-time mortality monitoring, if each party today plays its part in coordination with others, bringing new technology to transfer death certificates. Taken together, addressing bottlenecks identified, awareness-creation, and coalition-building efforts would bring an acceleration of momentum and digitization of CRVS. With the technological advancements in the country, there is potential for the Maldives to implement CRVS system on an online platform and needs to be considered as policy.<sup>15</sup>

Similar to what is reported in global studies<sup>16</sup>, there is little improvement in the VSPI(Q) over the period from 2009-2018 in the Maldives. A major concern is the garbage codes with more than half of these codes being categorized as very high severity codes (or about one-quarter of all deaths). The leading cause packages of very high severity include cardiac arrest and shock and deaths with an impossible cause. There are a handful of ICD codes that contribute to much of the garbage codes, these include cardiac arrest, unspecified, essential (primary) hypertension, other ill-defined and unspecified causes of mortality and septicaemia, unspecified, and respiratory arrest. This makes the overall quality of the data low and little use to policy makers.

Medical certification of cause of death (MCCOD) assessments<sup>17</sup>, in the Maldives has shown that in addition to illegible hand-writing, other guidelines of death certification were also of low quality.<sup>18</sup> This observation raises questions about whether the current practices to equip doctors with skills for MCCOD. Improving the quality of MCCOD solely rest within the mandate of the MoH in the Maldives and flows downstream to the health care providers. Since the CoD certification is by a medical doctor in the Maldives, there is a unique opportunity to improve the quality of CoD data. This can be achieved through training of doctors in standard death certification practices, which has been proven to reduce the errors,<sup>15</sup> and supplemented with strategies that can ascertain sustained commitment including local committees at hospital level to oversee VS activities.<sup>19</sup>

The findings indicate the efforts to improve the quality of VS has not been sustained over the 10 years. The results indicate the need for annual assessments to monitor the VS and understand the status of the current system,<sup>20</sup> and feedback to all the parties involved in the CRVS is critical for sustained improvement. A significant and sustained government commitment and investment in strengthening the CRVS in Maldives is recommended in response to monitoring mortalities as mandated by the SDGs.<sup>21</sup> With the expanded use of technology in civil service institutions and near universal death certification by doctors, Maldives has a unique opportunity to bring quick enhancements in the quality of CRVS.

#### Potential conflicts of interest

No known conflicts are reported.

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### References

1. Suthar AB, Khalifa A, Yin S, et al. Evaluation of approaches to strengthen civil registration and vital statistics systems: A systematic review and synthesis of policies in 25 countries. *PLOS Medicine*. 2019;16(9):e1002929.
2. National Bureau of Statistics. Statistical Yearbook of Maldives 2018. 2019; <http://statisticsmaldives.gov.mv/yearbook/2018/geography/>. Accessed 5 June, 2019.
3. Mohamed M, Razzag UA. Health statistics reporting in Maldives. Presentation presented at Third regional conference on production and use of Vital Statistics; 1 July, 2014; Daejeon, Korea.
4. Attorney General's Office. Law on birth and death registration of Maldives. In: President's Office, ed. 7/92. Vol 7/92. Maldives: President's Office,; 1992:6.
5. Sirken MG, Rosenberg HM, Chevarley FM, Curtin LR. The Quality of Cause-of-Death Statistics. *American Journal of Public Health*. 1987;77(2):137-139.
6. Patterson JE. Assessing the Quality of Vital Statistics. *American Journal of Public Health*. 1980;70(9):944-945.
7. GBD 2017 Mortality Collaborators. Global, regional, and national age-sex-specific mortality and life expectancy, 1950-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2018;392 North American Edition(10159):1684-1735.
8. World Health Organisation. International statistical classification of diseases and related health problems. 2007; 10th revision:<http://apps.who.int/classifications/apps/icd/icd10online> Accessed 17 June 2019, 2019.
9. Mikkelsen L, Moegaard K, Hegnauer M, Lopez AD. ANACONDA: A new tool to improve mortality and cause of death data. *BMC Medicine*. 2020.
10. Phillips DE, Lozano R, Naghavi M, et al. A composite metric for assessing data on mortality and causes of death: the vital statistics performance index. *Population Health Metrics*. 2014;12:2-30.
11. University of Melbourne. Tools specifically to assess mortality data quality - ANACONDA. 2019; <https://crvsgateway.info/Tools-specifically-to-assess-mortality-data-quality-ANACONDA~341>. Accessed 15 Oct, 2019.
12. Cobos Muñoz D, Abouzahr C, de Savigny D. The 'Ten CRVS Milestones' framework for understanding Civil Registration and Vital Statistics systems. *BMJ Glob Health*. 2018;3(2):e000673-e000673.
13. Phillips DE, AbouZahr C, Lopez AD, et al. Are well functioning civil registration and vital statistics systems associated with better health outcomes? *Lancet*. 2015;386 North American Edition(10001):1386-1394.
14. AbouZahr C, de Savigny D, Mikkelsen L, et al. Civil registration and vital statistics: progress in the data revolution for counting and accountability. *The Lancet*. 2015;386(10001):1373-1385.
15. Miki J, Rampatige R, Richards N, Adair T, Cortez-Escalante J, Vargas-Herrera J. Saving lives through certifying deaths: assessing the impact of two interventions to improve cause of death data in Perú. *BMC Public Health*. 2018;18(1):N.PAG-N.PAG.
16. Mikkelsen L, Phillips DE, AbouZahr C, et al. A global assessment of civil registration and vital statistics systems: monitoring data quality and progress. *The Lancet*. 2015;386(10001):1395-1406.
17. Rampatige R, Saman G, Nicola R, Ian R, Nandalal W. Assessing the quality of death certificates: Guidance for the rapid tool. 2019; <https://crvsgateway.info/file/9587/62>. Accessed 20 Oct, 2019.
18. Usman SK. *CRVS Fellowship profile: Assessing the quality of mortality data in the Maldives*. Bloomberg Philanthropies Data for Health Initiative: The University of Melbourne;2020.

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19. Hart JD, Sorchik R, Bo KS, et al. Improving medical certification of cause of death: effective strategies and approaches based on experiences from the data for health initiative. *BMC medicine*. 2020;18(1):1-11.
20. Rampatige R, Gamage S, Peiris S, Lopez AD. Assessing the reliability of Causes of Death reported by the Vital Registration System in Sri Lanka: Medical Records review in Colombo. *Health Information Management Journal*. 2013;42(3):20-28.
21. GBD SDG Collaborators. Measuring progress from 1990 to 2017 and projecting attainment to 2030 of the health-related Sustainable Development Goals for 195 countries and territories: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2018;392(10159):2091-2138.

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### Appendices

#### Appendix 1: CRVS of Maldives in past 50 years

Box 1: Major milestones in civil registration and vital statistics (CRVS) of Maldives throughout the past 50 years

1960	<ul style="list-style-type: none"><li>• Births and deaths have been reported to Ministry of Health. A compiled list of all births and deaths were sent mainly by Male' Municipality and the atoll and island offices.</li></ul>
1993	<ul style="list-style-type: none"><li>• Civil Registration law was enacted which mandated that all births and deaths of Maldivians (in Maldives or abroad) needs to be reported and registered. The act also mandated Ministry of Health to formulate and implement regulations to operationalize this process. Under this act Ministry of Health was also mandated to record births and deaths including vital statistics and death coding.</li></ul>
1999	<ul style="list-style-type: none"><li>• Microsoft Access database was established and birth and death data began to be entered into this system. Prior to this, reported birth and death data was entered to Microsoft Excel and later in to software known as "PC Edit" which was only used for a year. Cause of death classification was initiated based on ICD-10 classification system.</li></ul>
2008	<ul style="list-style-type: none"><li>• An online VRS module was incorporated into the eGov system by National Centre for Information Technology (NCIT) in collaboration with MOH and birth and death data began to be entered in to this system. Meanwhile, two dedicated, trained staff was allocated for coding of cause of deaths, and they were based in the Ministry of Health (then known as Ministry of health and Family)</li></ul>
2009	<ul style="list-style-type: none"><li>• Established an Online Birth and Death system</li></ul>
2010	<ul style="list-style-type: none"><li>• Under the decentralization act, local councils were mandated to keep a record of the birth and death registration at atoll and island level. Introduction of triplicate copying of reporting birth and deaths in Maldives.</li></ul>
2011	<ul style="list-style-type: none"><li>• Under a written policy direction from the president office, all data entry and coding process of birth and deaths were moved to Department of National Registration</li></ul>
2013	<ul style="list-style-type: none"><li>• Two death coding staff were transferred from Department of National Registration to Ministry of Health so that coding support could be provided to these staff from the health team.</li></ul>
2015	<ul style="list-style-type: none"><li>• VRS regulation was gazette which gave specific directions on the reporting mechanism in place</li></ul>
2019	<ul style="list-style-type: none"><li>• Development of population module in e-council system with digitization of birth and death form</li></ul>
2019	<ul style="list-style-type: none"><li>• Implementation of digitized of birth and death form</li></ul>

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### Appendix 2: Business Process Mapping

The registration of birth/ death is implemented in a well- coordinated manner between different agencies. Since the system was established in 1999, various improvements have been brought to the implementation of the registration process. Currently, birth and death forms are filled manually, the reporting process is known to all key stakeholders.

In the process of death notification, the original copies go to the parent or guardian, second copy is kept at the health facility, the third copy is sent through island councils or city council to atoll councils and from atoll councils to Department of National Registration (DNR) to enter it to the national Vital Registration System/VRS database. This copy is then brought to Ministry of health for coding purposes and returned when death coding is complete.

Currently the online VRS database is hosted in National Centre for Information Technology (NCIT). DNR enters birth and death records to VRS system through online portal. Coding staff at Ministry of Health (MoH) will enter ICD coding to the system. This is done per the WHO's ICD-10 coding principles [7]. Every year Ministry of Health request for VRS dataset from DNR. Department of National Registration will request for a database backup from NCIT as the database is hosted in NCIT. Since there is no module developed for reporting, it delays the time taken to get the backup database from NCIT.

When MoH receives the database, the IT staff restores the database and generate the dataset for what they need. Once the MoH receives the dataset, re-verification process is carried out by the Vital Statistics team. During this time, completion of coding of deaths will be carried out by MoH. Thus, the main problem is the death certificate data (un-coded) is that it is stored at NCIT without a means for reporting/access, then within 2 years, MOH completed the coding process, and then match and re-enter the ICD code to the dataset at NCIT. Once the changes have been completed, this dataset is again sent to DNR who will store it in their system.