Mortality in Niue: Trends from 1900–2025

INTRODUCTION

This project was the result of support from Bloomberg Philanthropies Data for Health Initiative Global Grants Program (GGP). The GGP provides support to government partners, through a competitive process, to implement discrete projects that improve the systems that collect, analyse and use data for public health decision-making.

Historical birth records from 1900 to 2025 were digitised by Ministry of Justice staff into a OpenCRVS application developed for this project. The data was then be analysed and the report prepared by Nicola Richards (Independent Consultant, Pacific Community). Invaluable support was provided by Fanuma Sioneholo (Niue Statistics), Darren Tohovaka (Ministry of Justice), Shez Farooq (OpenCRVS), Carla White and Jeff Montgomery (SPC) .

The report is issued without formal editing.

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MORTALITY IN NIUE, 1900–2025: KEY FINDINGS

People in Niue are living longer, and dying differently. Over the past 125 years, mortality patterns have transformed dramatically: reflecting better health, better healthcare, and a changing population.

People are living longer

- **Deaths have fallen sharply.** Niue recorded around 860 deaths in the 1900s, compared with just 83 deaths between 2020 and 2025. Even after accounting for population change, the death rate has dropped substantially.
- **Average age at death is rising.** A century ago, roughly 1 in 12 deaths was among an infant under one year old. Today, that figure has fallen to around 1 in 50, while deaths among people aged 75 years and over have doubled or tripled in most age brackets.
- **Child deaths have fallen dramatically.** The share of deaths occurring before age five has declined steeply since the 1970s, and the small gap that once existed between young boys and girls has largely disappeared.

Women are gaining more years than men

- In the most recent reporting period (2020–2025), women in Niue died at an average age of **77.9 years**, compared with **73.4 years** for men – a gap of about 4.5 years.
- Crude death rates for men and women, once quite different, are now **close to equal**.

The causes of death have shifted

- A century ago, infectious diseases (such as tuberculosis and respiratory infections) were the leading killers. In recent decades, **non-communicable diseases** (NCDs) – heart disease, cancers, diabetes, and similar conditions – have taken their place.
- Between 1970 and 2025, **nearly half (47%) of all recorded deaths were from NCDs**, up from a quarter in earlier decades.
- **Injuries and accidents are a particular concern for men**. Among men aged 5–64 years in recent decades, roughly 1 in 3 deaths was from an external cause such as an accident or injury – about three times the rate as seen among women.

Data quality is improving, but gaps remain

- **Historical records are incomplete**: information on age, sex, and cause of death is missing for many early records, particularly from before 1910.
- The share of deaths with an unclear or **"ill-defined" cause** has fallen over time - a sign of better record-keeping – but still affects more than a third of records overall and is **notably higher for older women**.
- **Timely registration has worsened**. Although law requires deaths to be registered within 24 hours, only around 1% of deaths in 2020–2025 met this target, with late registrations becoming more common.

What this means

Niue's mortality profile now resembles that of many high-income countries: fewer deaths overall, longer lives, and a growing burden of chronic disease. The main public health priorities going forward are preventing NCDs, reducing injury deaths among men, and strengthening timely, complete death registration so that future trends can be tracked accurately.

THE ANNUAL NUMBER OF DEATHS HAS DECREASED OVER TIME

Over 6,200 deaths were registered between 1900–2025 in Niue (see **Figure 1**). While year-on-year fluctuations are apparent in the data, the overall trend is one of a decrease, from over 860 deaths between 1900–1909, to just over 130 deaths between 2010–2019, to the current low of 83 deaths between 2020–2025. Noticeable peaks occurred in 1906 (particularly among males), 1918 (females), and 1943/44 and 1948 (both sexes).

Figure 1. *Number of registered deaths by sex of decedent, 1900–2025*

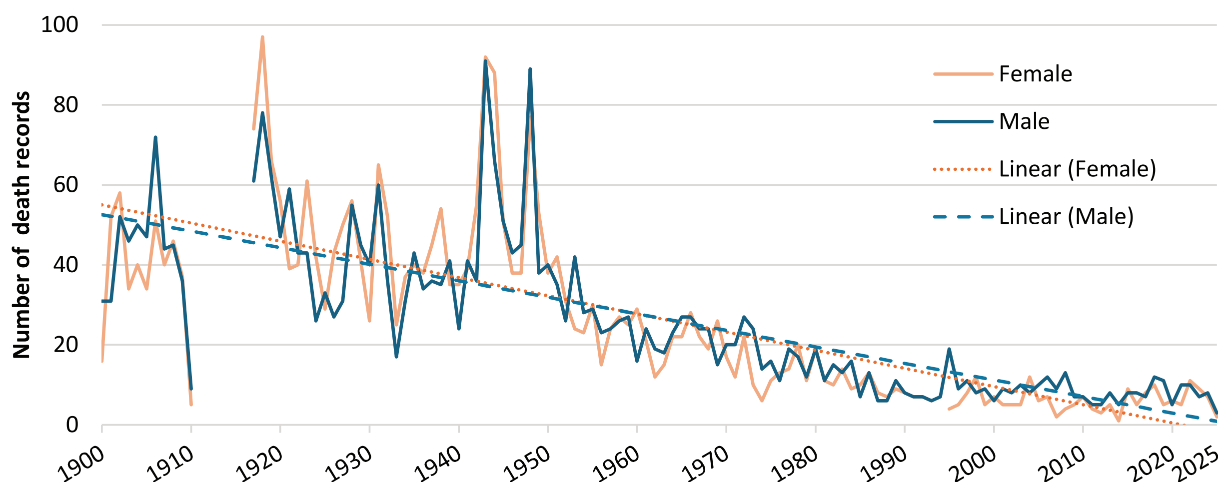


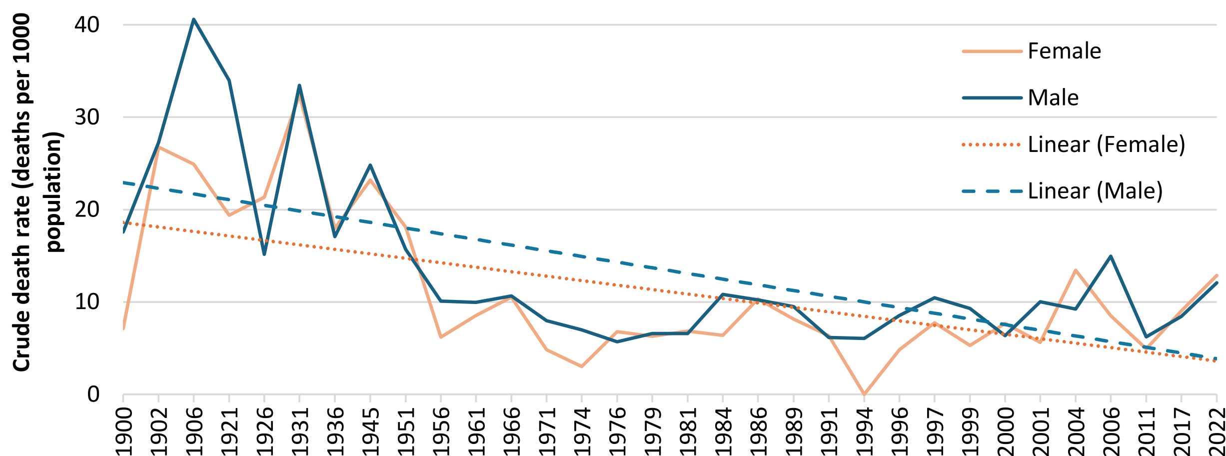
Figure notes: *No death records were provided for analysis between 1911–1916.*

CRUDE DEATH RATES HAVE ALSO DECREASED

This decrease in the annual number of deaths may be due to several reasons, including an actual decrease in mortality, along with system issues (late or non-registration, data availability constraints) and population dynamics (particularly emigration).

However, the crude death rate (CDR) (number of deaths per 1000 population) also shows a clear decrease over time (**Figure 2**), indicating a 'true' decrease in mortality. The average CDR for men over the period, at 13 deaths per 1000 population, is higher than that for women (11 deaths per 1000 population). While men have had a persistently higher CDR than women since 1900, this gap has decreased over time, with crude death rates for men and women at parity (or very similar) in recent years.

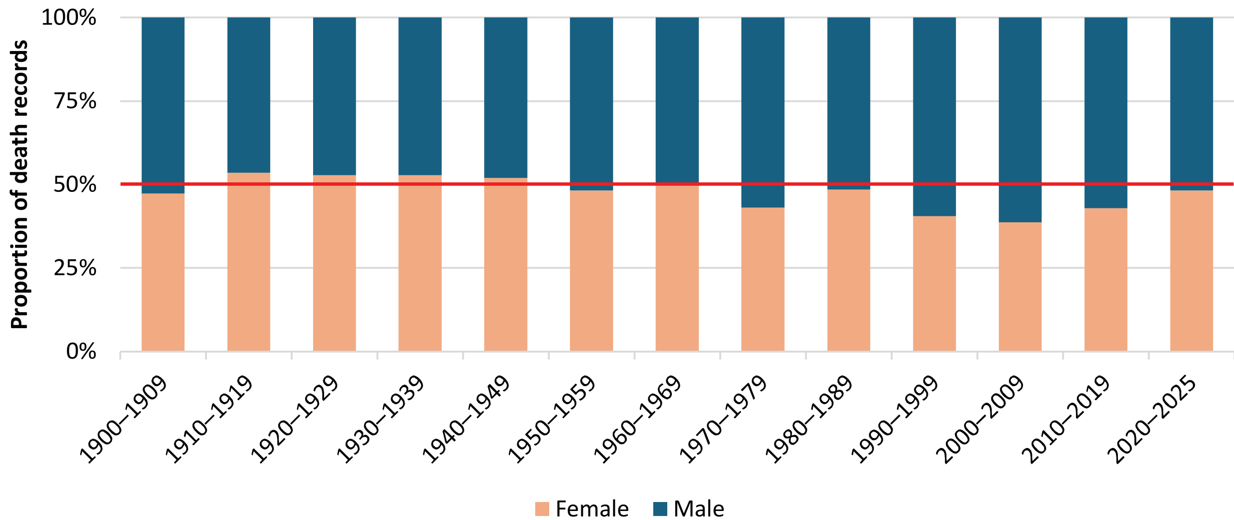
Figure 2. *Crude death rate by sex of decedent, 1900–2025*



APPROXIMATELY HALF OF ALL REGISTERED DEATHS WERE AMONG WOMEN

Of all registered deaths with information on sex of the decedent, approximately 50% were among females (**Figure 3**). While a slightly higher proportion of registered deaths were among females between 1910–1949, this has reversed in recent decades. Data from 1970–1979 and 1990–2019, in particular, show a higher proportion of deaths among males.

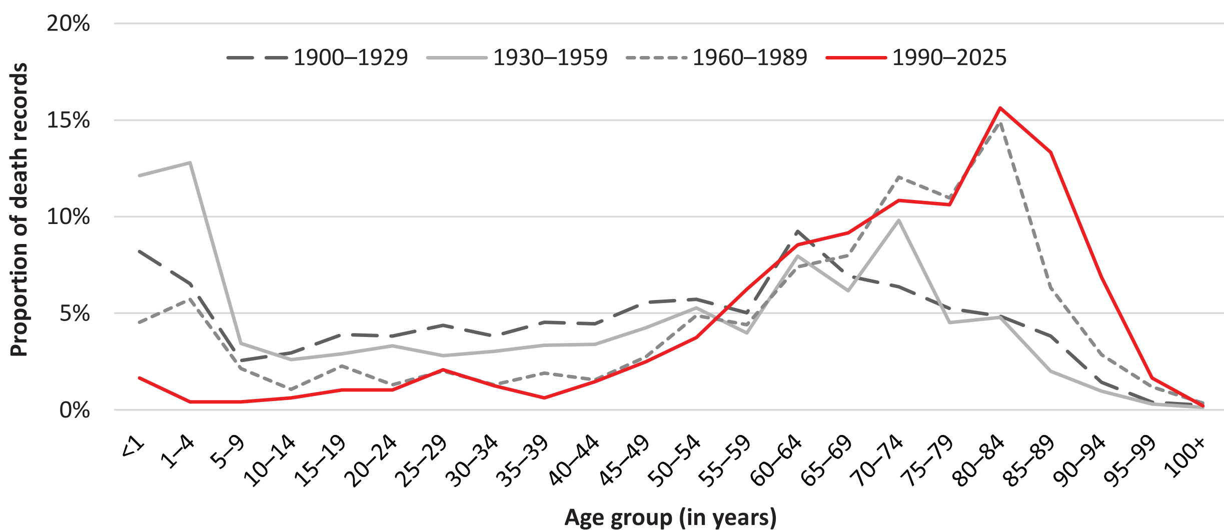
***Figure 3.** Proportion of death records by sex of decedent, 1900–2025*



AVERAGE AGE AT DEATH IS INCREASING

As shown in **Figure 4**, the average age at death has increased over time, with the proportion of deaths among infants (<1 year) reducing from 8–2% between 1900 and 2025, and the proportion of deaths among older adults (aged 75–99 years) doubling (and in some age groups, tripling) during the same period.

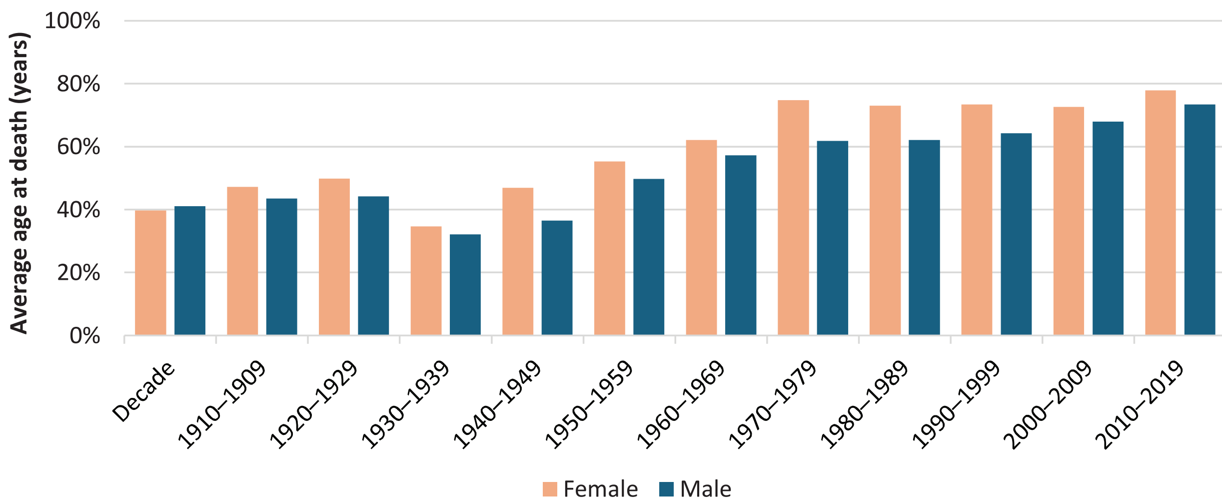
***Figure 4.** Average age at death, 1900–2025*



ON AVERAGE, WOMEN HAVE GAINED MORE EXTRA YEARS OF LIFE THAN MEN

While the average age at death was similar for males and females at the start of the reporting period, since the 1920s this gap has been widening, with females consistently dying at older ages than males (**Figure 5**). In looking at data from the most recent period (2020–2025), the average age at death for women was 77.9 years, while for men, it was 73.4 years.

Figure 5. *Average age at death, by sex of deceased, 1910–2025*



THE MORTALITY BURDEN HAS SHIFTED FROM INFANTS TO OLDER ADULTS

The age and sex distribution of deaths varies considerably depending on the size of the population currently alive at each age group, and the overall level of mortality in a country, which determines the risk of dying at each age. As shown in **Figures 6 & 7**, the distribution of deaths by age and sex in Niue between 1970–2025 follows a mostly typical pattern based on global epidemiological and demographic trends, with a lower proportion of deaths among the youngest age groups, and mortality among the youngest age groups (<5 years) showing no significant difference between girls and boys. The decrease in infant mortality, and corresponding increase in mortality among older adults, is also clearly visible between the two time periods analysed (1910–1969 and 1970–2025).

Figure 6. *Age-sex distribution of female deaths, 1910–1969 & 1970–2025*

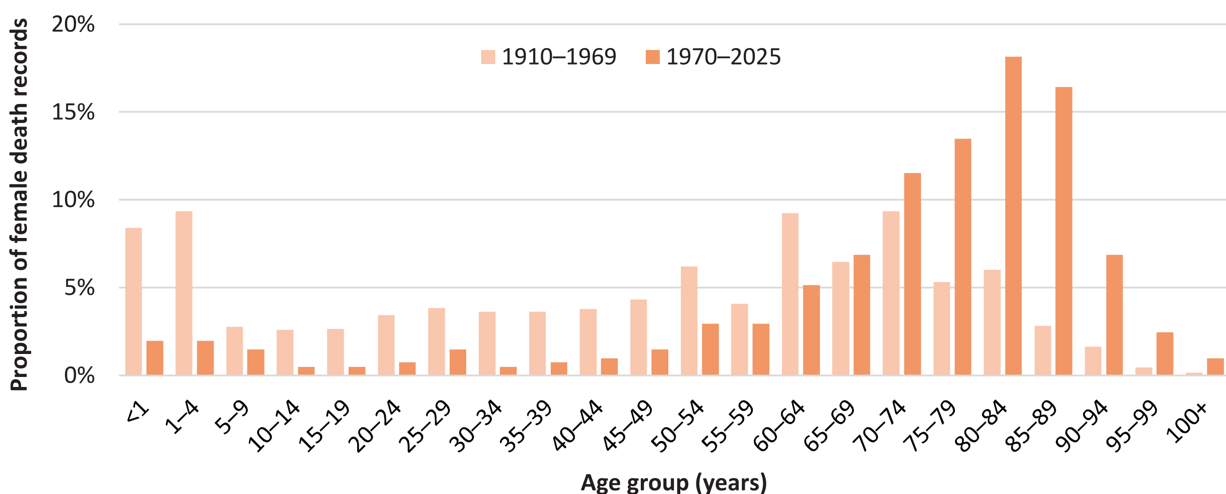
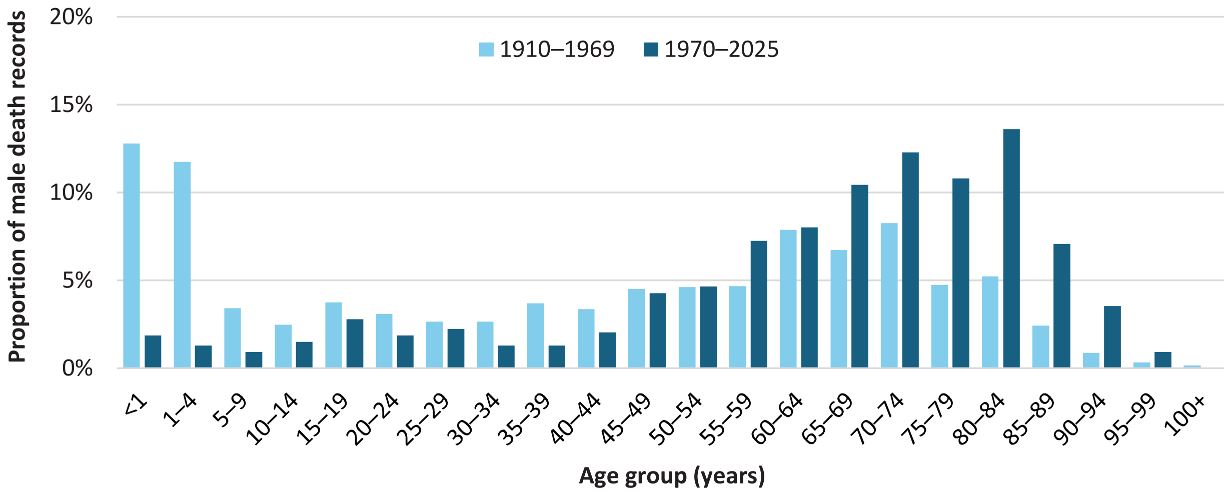


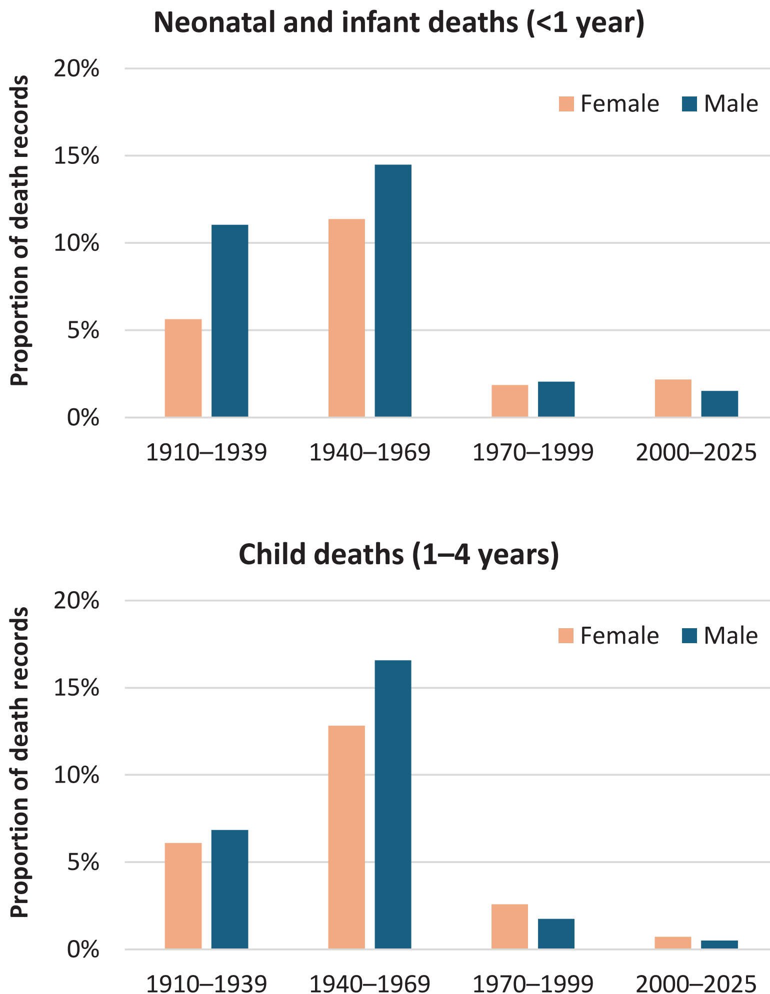
***Figure 7.** Age-sex distribution of male deaths, 1910–1969 & 1970–2025*



CHILD MORTALITY HAS DRAMATICALLY DECREASED

Out of all deaths among females since 1910, approximately 7% occurred among infants (aged less than one-year); while the proportion was slightly higher for males, at 10%. A similar sex-difference is noticed among child deaths, with 8% of females dying before the age of five-years, compared with 9% of males (**Figure 8**). Along with a dramatic decrease in the proportion of child deaths since the 1970s, these sex differences have also diminished.

***Figure 8.** Proportion of child deaths, by sex of the decedent, broad age group, and registration period, 1910–2025*



DEATHS DUE TO NCDS HAVE INCREASED

Note: the classification used for analysing cause of death data is intended for descriptive epidemiology only and should not be interpreted as nosologist-level ICD coding. For more information, refer to the methods.

The Global Burden of Disease (GBD) classifies causes of death into three broad groups:

- Group 1: Communicable, maternal, neonatal, and nutritional diseases ("infectious diseases")
- Group 2: Non-communicable diseases (NCDs), including mental health conditions
- Group 3: External causes and injuries (e.g., accidents, homicide, suicide, war deaths and natural disasters.[1]

Based on death records between 1910–2025,[2] approximately 31% of all registered deaths were due to infectious diseases, 29% due to NCDs, and 4% external causes, with the remaining 36% assigned an ill-defined cause (**Table 1**). There have been noticeable changes in the distribution of deaths over time: with deaths due to infectious diseases decreasing; while deaths due to NCDs and external causes have increased. The proportion of deaths due to ill-defined causes has also decreased, indicating improvements in data quality.

Table 1. *Number and proportion of deaths by GBD cause group, 1910–2025*

GBD broad cause group	Number of registered deaths (%)		
	1910–1969	1970–2025	1910–2025
Group 1: Communicable, maternal, perinatal, and nutritional conditions	1,412 (33)	233 (22)	1,645 (31)
Group 2: Non-communicable diseases	1065 (25)	490 (47)	1,555 (29)
Group 3: External causes and injuries	96 (2)	102 (10)	198 (4)
Ill-defined diseases (unusable codes)	1,658 (39)	223 (21)	1,881 (36)
All causes	**4,231 (100)**	**1,048 (100)**	**5,279 (100)**

Table notes: *The total number of death records shown in this table includes those missing sex and/or age.*

DEATHS DUE TO EXTERNAL CAUSES AND ACCIDENTS ARE A PARTICULAR ISSUE FOR MEN

As shown in **Figures 9 & 10**, there are important differences in the broad distribution of causes of death by sex. While Group 2 (NCDs) and Group 3 (external causes and injuries) deaths have increased over time for women and men, the burden due from these cause groups is higher among men. Deaths due to external causes and injuries, at 12% for males during 1970–2025, is three-times that of similar deaths among females in the same period.

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1 *Murray CJL, Lopez AD (eds.). The Global Burden of Disease. A comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020. Boston, USA: Harvard School of Public Health on behalf of the World Health Organization and The World Bank; 1996.*

2 *Death records from 1900–1909 were not included in cause-specific analyses, as 99% of records for females and 98% of records for males had an ill-defined cause of death.*

The proportion of ill-defined causes of death, while an issue for all deaths, appears particularly problematic for women: with 42% of all female deaths assigned an ill-defined cause during 1910–1969, compared with 32% of male deaths during the same period. While this had decreased to 26% for females during 1970–2025; this was still higher than the corresponding proportion for men (at 16%).

Figure 9. *Proportion of female deaths by major cause group, 1910–1969 & 1970–2025*

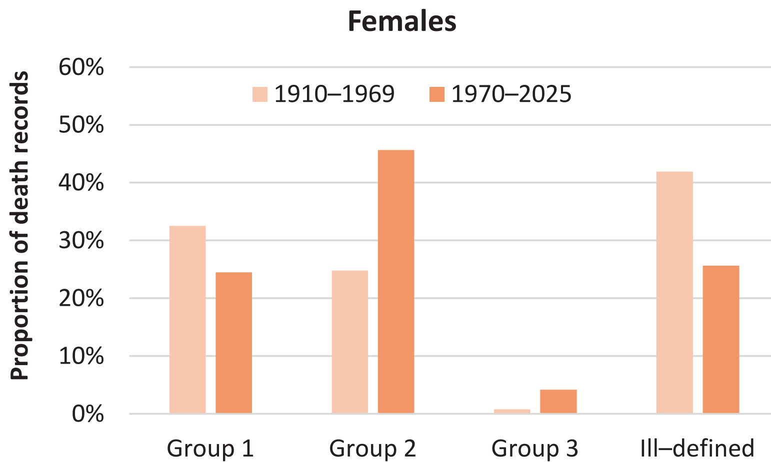


Figure 10. *Proportion of male deaths by major cause group, 1910–1969 & 1970–2025*

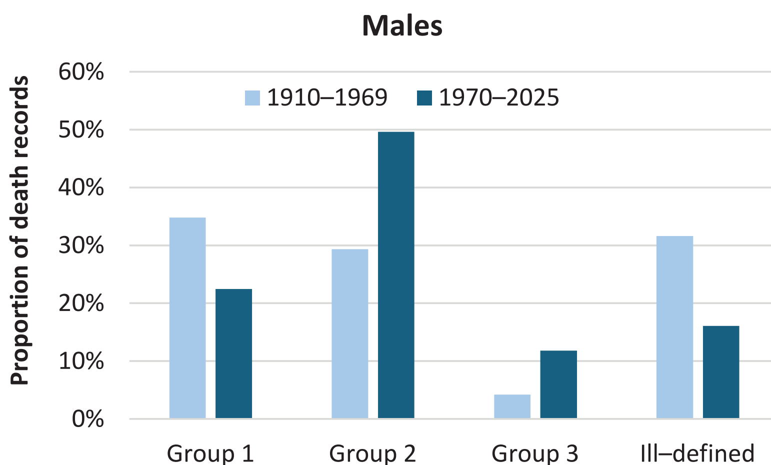
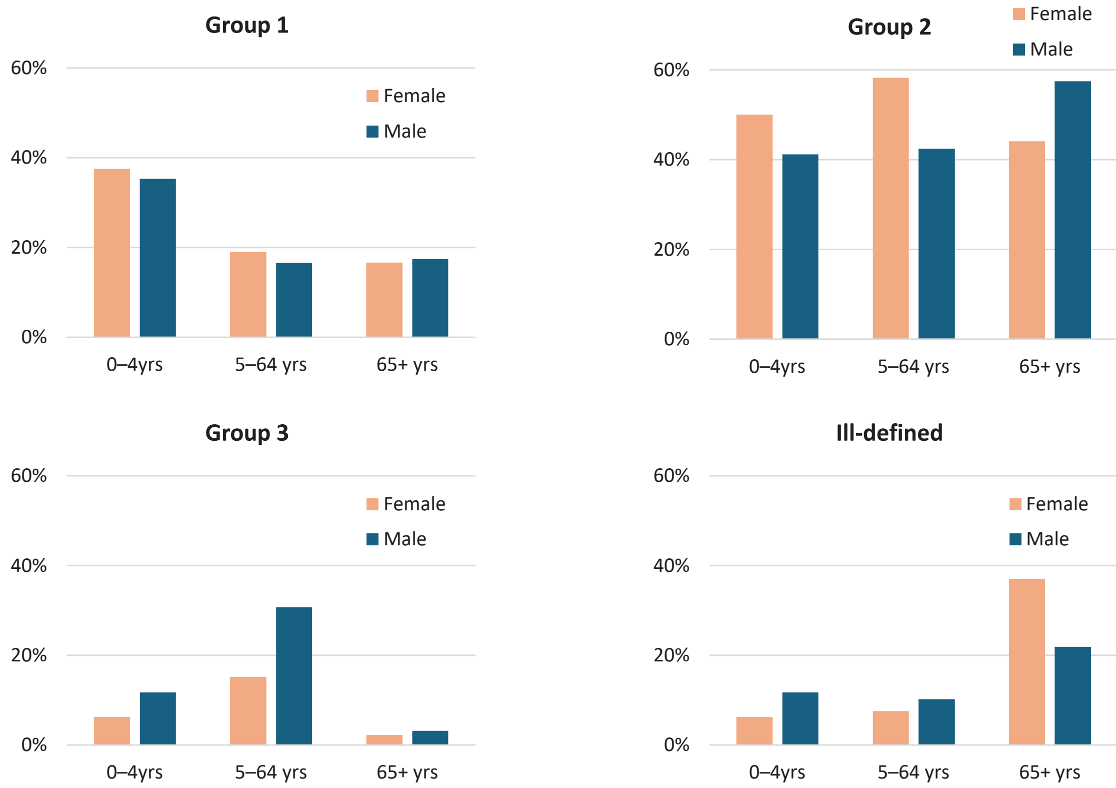


Figure 11 shows the age pattern of deaths found for each of the three groups by sex, for the most recent reporting period. As mentioned previously, there are minimal differences by sex and age for deaths due to infectious diseases (Group 1). Deaths due to external causes and injuries are of particular concern across all age groups for males: accounting for 12% of deaths among male children, 31% of men aged 5–64 years, and 3% of deaths among older men aged 65+ years. While there is a higher proportion of deaths due to ill-defined causes among male children and adults; this trend clearly reverses among older adults, with 37% of deaths among females aged 65+ having an ill-defined cause, compared with only 22% of males of the same age.

***Figure 11.** Proportion of deaths by GBD Group by sex, 1970–2025*



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ANNEX 1. METHODS

1.1 Data sources

1.1.1 Population data

Population data between 1900 and 2022 were obtained from census records, available at https://niuestatistics.nu/population/population/.

1.1.2 Death records

Most deaths in Niue occur at the hospital or are reported to the hospital soon after occurrence. According to regulations, the medical practitioner issuing a death certificate must provide the registrar with the particulars of death (including a medical certificate of cause of death) within 24 hours of occurrence of the event, after which the death is registered. The registrar then issues authority for burial of the deceased, without which burial is in contravention of the law. The birth and death regulations further require that every minister of religion or person who performs any religious or funeral service for or at the burial forwards a written notice of the burial to the registrar within seven days.

A total of 6,249 death records were supplied for analysis. As part of initial data cleaning, two records with a date of registration (DOR) prior to 1900 were removed; along with an additional 45 records that had no DOR or date of death (DOD). Of the remaining 6,202 potential records for analysis, 68 were removed as they were missing sex of the decedent; 1,341 were removed as they were missing age of the decedent; and another 49 were removed as they were missing cause of death of the decedent.

This left a total of 4,793 complete records for fact of death analyses by age and sex; and 4,744 complete records for cause of death analyses by age and sex – approximately 76% of the original records provided (**Figure 12**). Of the records with age of the decedent, only 349 records included a date of birth (DOB) and DOD, to allow for direct calculation of age. For the remaining 4444 records, age at death was taken from the column "deceased.ageInYears".

Figure 12. *Number of death records available at each analysis phase*

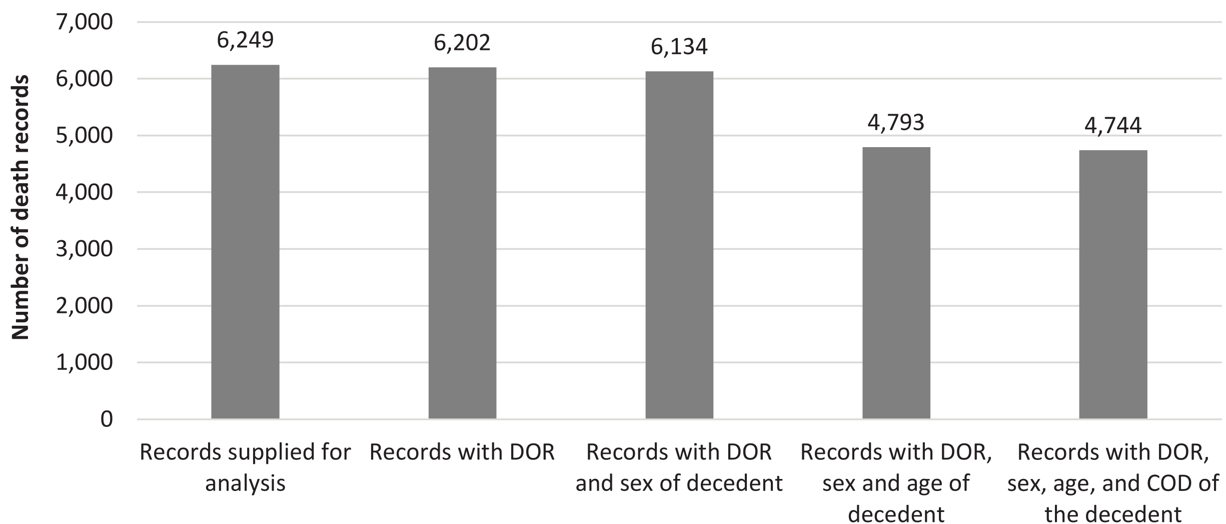


Figure notes: *DOR = Date of registration; COD = Cause of death.*

1.2 Data preparation

1.2.1 Cause of death data

Free-text cause of death entries (n = 6,202; 1900–2025) were coded to ICD-10 chapter and to the Global Burden of Disease (GBD) four-group mortality classification (Group I: communicable, maternal, perinatal and nutritional conditions; Group II: noncommunicable diseases; Group III: injuries; and a residual "ill-defined" category). Coding was performed using a rule-based keyword classifier applied to each record, using AI (https://claude.ai/new).

Multi-cause entries were segmented on punctuation and numbered/lettered list markers (e.g. "1)", "A)", ";", ",", " - ", "&"), and each record was coded to the last-listed segment, consistent with the analytic approach specified for this dataset. Where the terminal segment contained only procedural information (e.g. coroner confirmations, dates, "not seen by doctor"), the classifier fell back to the last substantive cause segment. Within each segment, keyword rules were applied in a fixed priority order: external causes, perinatal and congenital conditions, maternal conditions, specific infectious diseases, neoplasms, endocrine/nutritional/metabolic disorders, mental and nervous-system disorders, and then organ-system diseases (circulatory, respiratory, digestive, genitourinary, musculoskeletal, skin, blood), with ill-defined terms (e.g. "senility", "cardiac failure" alone, "not stated") as the final fallback.

Historical and archaic terminology was mapped to contemporary ICD-10 categories following standard conventions: "phthisis" and "tabes mesenterica" were coded as tuberculosis (Chapter I); "marasmus" as a perinatal/nutritional condition (Chapter XVI, Group I); "cerebrovascular accident" as circulatory (Chapter IX) rather than external; bare "asphyxia" as external in adults and perinatal in infants; and "senile decay", "senility", and isolated terminal mechanisms such as "cardiac failure" or "syncope" as ill-defined (Chapter XVIII). Common misspellings were handled explicitly.

Each coded record retained an audit trail noting multi-cause segmentation, the matched keyword, and a flag where the last-listed segment represented a terminal mechanism potentially masking an antecedent cause. All records received a code; no records were left unclassified. This classification is intended for descriptive epidemiology and should not be interpreted as nosologist-level ICD coding.

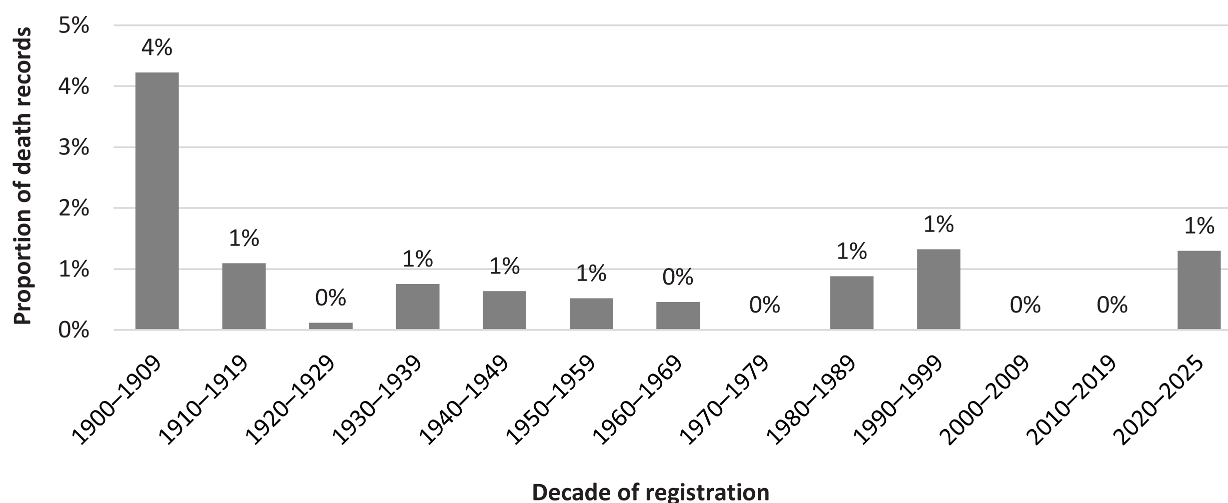
1.3 Data quality

1.3.1 Missing data

Sex of the decedent

Out of the 6,202 death records analysed, just over 1% (68 records) did not include the sex of the decedent. As shown in **Figure 13**, this issue is predominantly a historical one, with only one record registered between 2020–2025 not having the sex of the decedent recorded.

Figure 13. *Proportion of death records missing sex of the decedent, by decade of registration*

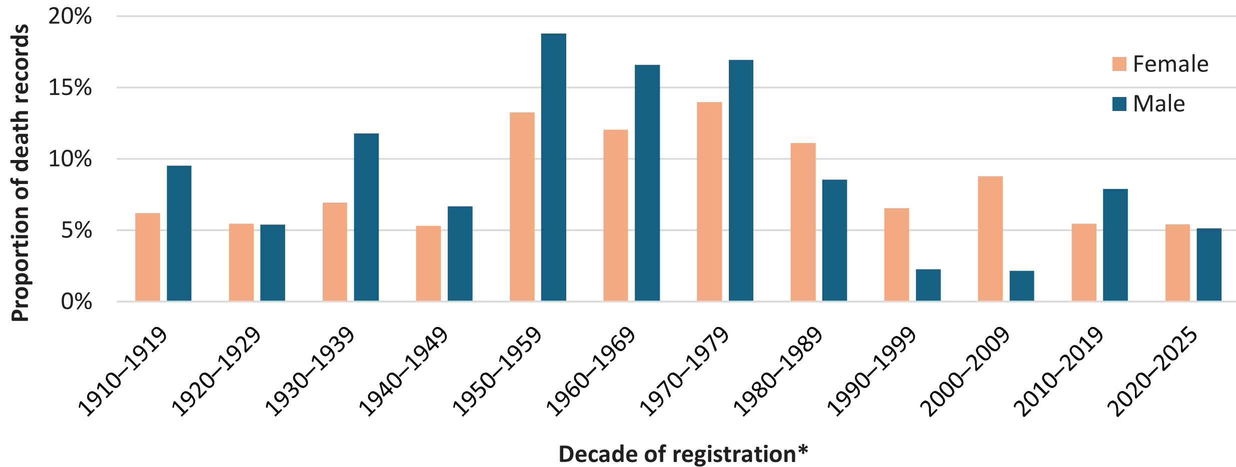


Sex and age of the decedent

Of the 6,134 records with sex of the decedent, 1,,341 records did not have the age of the decedent recorded or a date of birth (DOB) and DOD that could be used to calculate age. The majority of these records (98%) were from 1900–1909, with a low proportion of records missing this information since then.

Deaths among males were slightly more likely to not have their age at death recorded than females (an average of 23% of records versus 20%), with no clear trend over time (**Figure 14**).

Figure 14. *Proportion of death records missing age of the decedent, by sex and decade of registration*

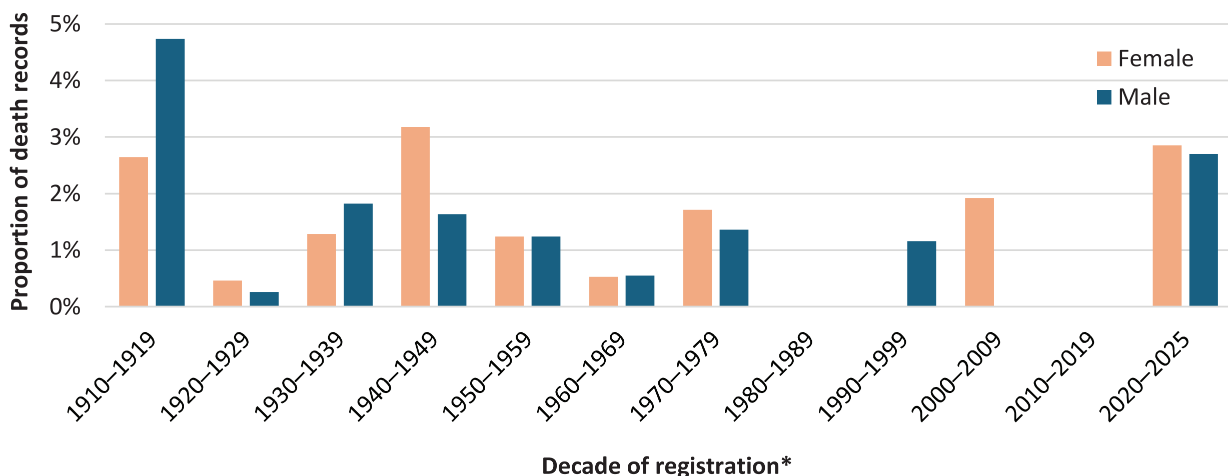


Decade of registration*: *Death records from 1900 – 1909 are not shown on this graph for clarity, as 98% of records were missing age of the decedent.*

Age, sex, and cause of death of the decedent

A total of 4,744 death records with information on sex and age of the decedent also included information on causes of death. While variations between females and males are observed, there is no clear trend over time regarding records missing this information (**Figure 15**).

Figure 15. *Proportion of death records missing age and causes of death of the decedent, by sex and decade of registration*



Decade of registration*: *Death records from 1900–1909 are not shown on this graph for clarity, as 100% of records were missing age and causes of death of the decedent.*

1.3.2 Registration timeliness

Current legislation states that persons responsible for reporting deaths should furnish particulars of the death to the registrar within 24 hours of the event.[3] Of the 5,261 death records that had both DOR and

3 Civil registration and vital statistics in Niue. *Noumea, New Caledonia: Pacific Community and United Nations Children's Fund; 2021.*

DOD, 29% were registered on the same day as the event and another 27% were registered within one day (**Figure 16**). Approximately 2% of records had an implausible time to registration – for many of these records, it appears the DOD and DOR have been transposed during data entry. There were no major differences in timeliness between females and males.

Figure 16. Proportion of death records by sex, and time to registration, 1910–2025

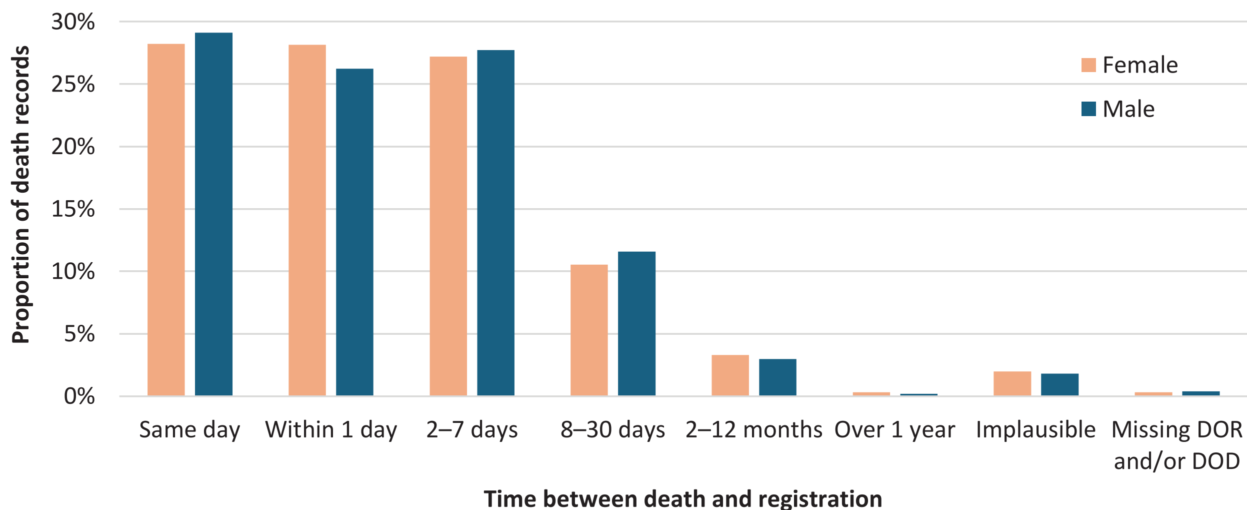
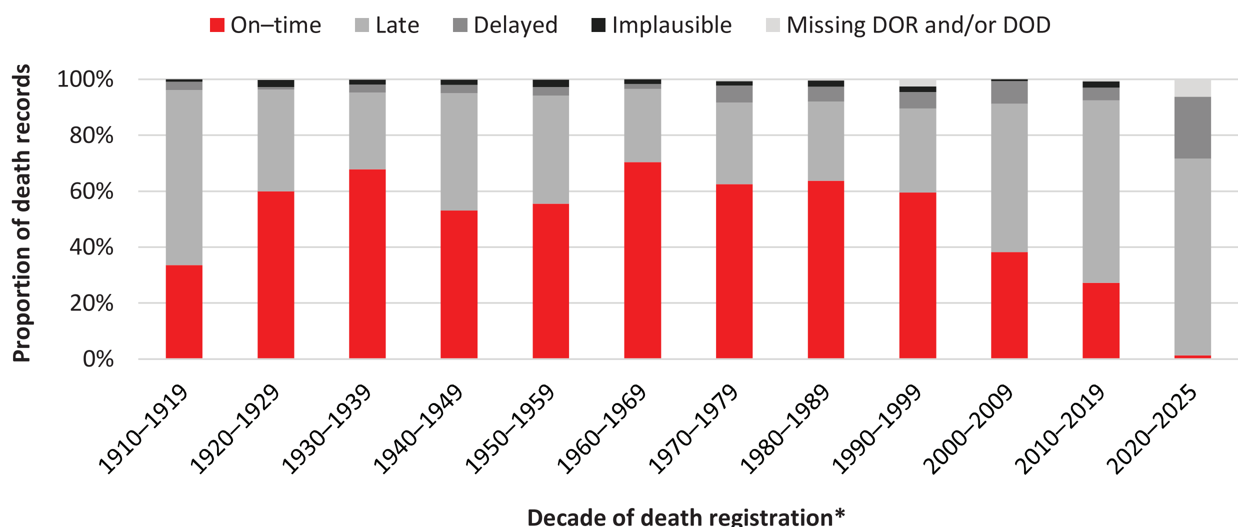


Figure notes: *DOR = Date of registration; DOD = Date of death.*

As the death records do not include information on the time of death or time of registration (in hours), there will be a certain number of timely death registrations included in the "within 1 day" category. As such, the total proportion of deaths that were registered on-time is likely between 27–56% for the period 1900–2025. The proportion of deaths registered on-time appears to have decreased dramatically in recent decades (**Figure 17**), with only 1% of deaths occurring between 2020–2025 registered within one day. Concurrently, late registrations (those occurring between 2–30 days after the death) appear to be increasing.

Figure 17. Proportion of death records by registration timeliness, 1910–2025



Decade of registration: Death records from 1900–1909 are not shown on this graph, as 100% of records were missing date of registration.*

Figure notes: *On-time = Deaths registered on the same day and within one-day; Late = Deaths registered between 2–30 days of the event; Delayed = Deaths registered after 31 days after the event*

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