



AMERICAN SAMOA

American Samoa

VITAL STATISTICS REPORT 2010-2012



Pacific
Community
Communauté
du Pacifique

AMERICAN SAMOA VITAL STATISTICS REPORT: 2010-2012



Department of Health, Department of Homeland Security – Office of Vital Statistics,
Lyndon B. Johnson Tropical Medical Center (LBJ), and Department of Commerce,

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Original text: English

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Summary of Main Indicators, 2010-2012

2010 Census Population

| | |
|---------|--------|
| Total | 55,519 |
| Males | 28,164 |
| Females | 27,355 |

Fertility

| | |
|--|---------|
| Total number of births | 3797 |
| Average number of births per year | 1266 |
| Sex ratio at birth, male:female | 113:100 |
| Crude birth rate (per 1,000 population) | 22.7 |
| Total fertility rate | 3.4 |
| Adolescent birth rate (per 1,000 females aged 15-19) | 42.8 |

Mortality

| | |
|---|------|
| Total number of deaths | 810 |
| Average number of deaths per year | 270 |
| Crude death rate (per 1,000 population) | 4.8 |
| Age-standardized mortality rate (per 1,000 population)* | 7.4 |
| Under-5 mortality rate (per 1,000 live births) | 11.1 |
| Infant mortality rate (per 1,000 live births) | 8.7 |
| Neonatal mortality rate (per 1,000 live births) | 5.0 |
| Maternal deaths | 0 |
| Maternal mortality ratio (per 100,000 live births) | 0 |
| Life expectancy at birth (both sexes) | 73.8 |
| Life expectancy at birth (male) | 70.8 |
| Life expectancy at birth (female) | 77.4 |
| Life expectancy at age 40 (male) | 33.3 |
| Life expectancy at age 40 (female) | 39.4 |
| Adult mortality rate (45q15 male) | 20.4 |
| Adult mortality rate (45q15 female) | 12.9 |

Cause of Death

| | |
|---|-----|
| Percentage of deaths due to non-communicable diseases (NCDs) in adults aged 15-59 | 65 |
| Age-standardized mortality rate in adults aged 15-59 due to selected NCDs (per 100,000 adults aged 15-59)*^ | 214 |
| Probability of dying (%) from selected NCDs in adults 30-69 year old^ | 22 |

*Standardized using the WHO World Standard Population.

^ Selected NCDs were those best matching the NCDs selected for WHO international targets. See page 27 for more detail.

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<https://sphcm.med.unsw.edu.au/centres-units/international-ncd-research-group/downloads>

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Executive Summary

The purpose of this civil registration and vital statistics (CRVS) report is to provide vital statistics and the cause of death measures for American Samoa, as derived from the Lyndon B. Johnson (LBJ) Tropical Medical Center and the Department of Health data. This is the first vital statistics report which covers the years 2010 to 2012 in American Samoa. These statistics are an integral part of our territory's population structure and are crucial for planners and decision makers. They are also a key component of the health sector and are critical for evaluating health priorities and setting health policies.

There was an average of 1,266 births per year between 2010-2012, making the crude birth rate during this period 23 births per 1,000 population. The majority of births, 99.7%, were born in the hospital, and 95% of babies weighed 2500 grams or more at birth. About half of all babies were born to women aged 20-29, and another 20% to women aged 30-34. It is notable that 11% of births were to teenage mothers aged 15-19.

Fertility rates were highest in women aged 25-29, with 202 babies born each year per every 1,000 women in this age group. Women aged 20-24 experienced the second highest fertility rate (165 births per 1,000 women aged 20-24) followed by women aged 30-34 (159 births per 1,000 women aged 30-34). Teenage fertility was moderate at 43 births per 1,000 women aged 15-19, but this rate is notably higher than that of the mainland US, which experienced a teenage fertility rate of 26.5 in 2013.¹

The total fertility rate, or the average number of children a woman would have in her lifetime if she were to pass through her childbearing years experiencing the present day age-specific fertility rates, was 3.4 for the period 2010-2012. This level of fertility is above replacement level, and assuming the lack of substantial out-migration, the American Samoa population is expected to keep growing if current fertility rates continue.

There was an average of 270 deaths per year during the period 2010-2012, resulting in a crude death rate of 4.8 per 1,000 population. Life expectancy at birth was 71 years for males and 77 years for females. This mid-level life expectancy appears to be affected by both slightly elevated rates of early childhood mortality, and a high prevalence of non-communicable diseases (NCDs) in adults such as cancer, heart disease, and diabetes.

The infant mortality rate for American Samoa was 8.7, the neonatal mortality rate was 5.0, and the under-five mortality rate was 11.1 for the period 2010-2012. While these numbers are significantly lower than for the Oceania region as a whole, they trail the infant, neonatal, and child mortality rates of the U.S., indicating there is still room for improvement in the area of early childhood mortality.

Adult mortality in American Samoa is strongly impacted by NCDs. The three leading causes of death in both men and women aged 15-59 were heart disease, diabetes, and cancer; and 65% of all deaths in adults aged 15-59 were due to NCDs. A 30 year old adult in American Samoa has a 22% chance of dying from malignant neoplasms, diabetes, heart disease, cerebrovascular disease, hypertension, or chronic obstructive pulmonary and allied conditions before reaching the age of 70. There is compelling evidence for the American Samoa Government and its leaders to re-examine the existing health programs to better control NCDs.

¹ Martin. J et al, US NCHS, 2015, Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_01.pdf

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1. INTRODUCTION

Vital statistics for American Samoa are collected and maintained by various departments within its government. These statistics are used by the American Samoa Government, the legislature “Fono,” Department of Health, and other agencies, to provide evidence to inform decisions on health policy and planning, and to evaluate the effectiveness of programs for the benefit of the people of American Samoa.

This is the first vital statistics report which covers the years 2010 to 2012 in American Samoa. The Department of Commerce Statistics Division and the Civil Registry and Vital Statistics (CRVS) Committee compiled this report to assist with this initiative for planning and legislating necessary health assistance programs for its people. These programs in essence, will help prevent infectious and non-communicable diseases which could substantially affect birth and death rates.

The American Samoa Civil Registry data is the result of the collaboration by the LBJ Tropical Medical Center, the Department of Health, and the Department of Homeland Security Office of Vital Statistics. The creation of the unit records on births and deaths are initiated at the hospital after a medical review is completed for each event. This process includes all events at the medical center and elsewhere in the territory. These records are then forwarded to the Department of Health and the Office of Vital Statistics for further processing and actions as required by law. This data is reliable and considered nearly 100% complete, as it covers all events occurring in the territory.

American Samoa is comprised of seven islands (Tutuila, Aunuu, Ta’u, Ofu, Olosega, Swains, and Rose) and had a population of 55,519 at the 2010 Census. The majority of people live on the island of Tutuila (98%) and only slightly more than 1,000 (2%) reside in the islands of Manu’a and Swains.

With the main hospital located on Tutuila, people, particularly older ones from Manu’a and Swains, are compelled to relocate to the main island of Tutuila. Pregnant women from the territory’s outer islands also come to Tutuila for medical care. There is a belief that some pregnant women give birth on the outer islands. However, these births are eventually captured by the Department of Health and the Office of Vital Statistics when birth certificates are requested for purposes such as tax filing, social security benefits, and eligibility for social services.

2. METHODS

The American Samoa Civil Registry data is the result of the collaboration by the LBJ Tropical Medical Center, the Department of Health, and the Department of Homeland Security Office of Vital Statistics. The creation of the unit records on births and deaths are initiated at the hospital after a medical review is completed for each event. This process includes all events at the medical center and events occurring elsewhere in the territory. These records are then forwarded to the Department of Health and the Office of Vital Statistics for further processing and actions as required by law. This data is reliable and considered nearly 100 percent complete as it covers all events occurring in the territory.

The Office of Vital Statistics requires unit records on births and deaths from the LBJ Tropical Medical Center. These records however, must be assessed and verified by a medical physician or examiner in order to be cited as official record at the Office of Vital Statistics. These records are recorded and the information is used for creating official vital documents, such as birth certificates, death certificates, marriage certificates, and identification documents etc. for residents of American Samoa.

The current data collection process does a good job at capturing vital events and accurately recording the information. However, there is a need for the data to be reconciled prior to its dissemination to other departments as slight discrepancies often occur between the number of births and deaths reported by different departments. A standard format for reporting may be required to prevent or minimize any pertinent information being missed during the transfer of data. (See appendix 5 for details on recording births and deaths at the LBJ Tropical Medical Center).

The data from the 2010 Census is compared with vital statistics data for other purposes as required by local government operations. Mid-year population projections require birth and death data in addition to immigration data. Household Income and Expenditure Survey (HIES) results are also used in the process for better comparison.

The data captured at the LBJ Tropical Medical Center covers all residents and events on island. It does not, however, include deaths of people who were referred off island for medical treatment and subsequently die overseas.

American Samoa has a referral medical program whereby very critical patients are sent to Hawaii for medical treatment. When a patient does not recover as expected and dies, he/she may be buried in Hawaii or elsewhere outside of American Samoa. This event will not be captured as a record in the data set at the LBJ Tropical Medical Center. The exclusion of these deaths can artificially lower deaths rates and users should be aware of this when reviewing the data.

In order to minimize instability in the figures due to the small size of the population and subsequently the risk of misleading interpretation, data has been aggregated over a 3-year period for calculation of all rates and trend analysis. Rolling averages have not been presented, due to lack of data available at the time of this report.

95% confidence intervals are presented to highlight the uncertainty in the data. These were calculated using Poisson distributions for all rates due to the small number of events, except crude birth and death rates where confidence intervals were calculated using the normal distribution of the binomial.

Life tables were calculated from empirical data using the Chiang Method 2.² Confidence intervals for life expectancy, based on the variance of probability of surviving, were also calculated using the Chiang Method 2.³

Cause of death data was extracted from death records with medical certificates and was tabulated by the LBJ Tropical Medical Center to the International Classification of Diseases ICD-9.

² Chiang, C. L. (n.d.). Introduction to stochastic processes in Biostatistics. In *The life table and its construction* (pp. Chapter 9, 189-214). New York: John Wiley & Sons 1968.

³ Chiang, C. L. (1967). Vital Health Statistics 2. In C. L. Chiang, *Variance and covariance of life table functions estimated from a sample of deaths* (pp. 20:1 - 8).

3. BIRTHS AND FERTILITY

Number of births

The total number of births in American Samoa was 3,797 from 2010 to 2012, which includes all births occurring at the LBJ Tropical Medical Center and other locations on island such as at home and during transport to the hospital. Mothers are rarely referred off island to give birth, unless warranted by health complications or issues. In such cases, babies born by off- island referrals are not captured or recorded in the local registry.

Table 1. Total number of births per year by sex, 2010-2012

| Year | Female | Male | Total |
|--------------|-------------|-------------|-------------|
| 2010 | 595 | 641 | 1236 |
| 2011 | 644 | 754 | 1398 |
| 2012 | 545 | 618 | 1163 |
| Total | 1784 | 2013 | 3797 |

The average number of births per year was 1,266 from 2010-2012. Of the total live births from 2010 to 2012, there were 2,013 male babies and 1,784 female babies, giving an approximate male:female sex ratio of 113 male for every 100 female born.

Table 2. Average number of births per year by sex, 2010-2012

| 2010-2012 | Female | Male | Total |
|----------------|--------|------|-------|
| Average | 595 | 671 | 1266 |

Note: Rolling averages could not be calculated at this time due to data availability during the compilation of this report.

Crude birth rate

The crude birth rate (CBR) is the number of births per 1,000 population over a given period of time. CBRs are important because they tell us how much our population is increasing or decreasing. They can also help us plan for the future so we can know how many children will be entering school in the coming years, or how many adults will be entering the workforce.

The calculated CBR for American Samoa was 22.7 with 95% confidence intervals (95% Cis) of 21.4 to 23.9 in the period stated below. This means that there were 23 births per 1000 population in 2010-2012.

Table 3. Crude birth rate (per 1,000 population), 2010-2012

| | |
|-----------------------------------|--------------------------|
| Crude birth rate 2010-2012 | 22.7 (95%CI 21.4 - 23.9) |
|-----------------------------------|--------------------------|

95% CI (95% confidence interval)

Place of birth

Nearly all of the births in American Samoa, 99.7%, occurred at the LBJ Tropical Medical Center. Only a very small percentage of births occurred at home (0.1%) or other places such as en route to the hospital (0.2%) during 2010 to 2012.

Birth weight and other risk factors

Of all the babies born during the reported period, 95% weighed 2500 g or higher and only 5% weighed less than 2500g.

Table 4. Percent distribution of births by birth weight category, 2010-2012

| Period | Birth weight (%) | | Total |
|--------------------------|------------------|-----------------|-------|
| | <2500g | 2500g or higher | |
| 2010 | 3.7 | 96.3 | 100 |
| 2011 | 4.6 | 95.4 | 100 |
| 2012 | 5.2 | 94.8 | 100 |
| 2010-2012 Average | 4.5 | 95.5 | 100 |

Births by age of mother

Table 5 shows births by age group of the mother. Most babies (73%) were born to mothers ages 20 to 34. This trend was consistent in the three year period, 2010-2012.

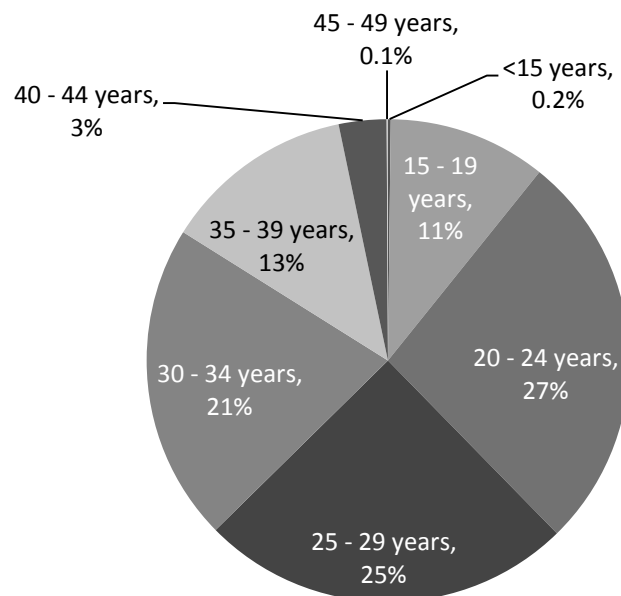
Table 5. Number of births by age-group of mother and year, 2010-2012

| Year | Age group (years) | | | | | | | | Total |
|---------------------------|-------------------|------------|-------------|------------|------------|------------|------------|----------|-------------|
| | <15 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | |
| 2010 | 2 | 119 | 302 | 325 | 275 | 171 | 42 | 0 | 1236 |
| 2011 | 1 | 154 | 406 | 336 | 287 | 175 | 37 | 2 | 1398 |
| 2012 | 4 | 129 | 314 | 286 | 246 | 140 | 43 | 1 | 1163 |
| Total by age group | 7 | 402 | 1022 | 947 | 808 | 486 | 122 | 3 | 3797 |

Child bearing age is generally considered to be from 15 to 49 years. Babies born to mothers outside this age range are possible but not common. The percent distributions of births by age group of mothers in American Samoa are given in Figure 1.

The largest percentage of births occurred to mothers aged 20-24 (27%) followed by mothers aged 25-29 (25%). It is notable that 11% of births were to teenage mothers aged 15-19. Just slightly more than 3% of births were to mothers aged 40 and above.

Figure 2: Percent distribution of births by age of mother, 2010-2012



Age-specific fertility rates

Fertility rates by age of mother, or age-specific fertility rates (ASFRs), are the number of births occurring to mothers of a certain age group per 1,000 women in that age group in a given period of time. ASFRs for American Samoa were calculated by dividing the average number of births in 2010-2012 to women in a given 5-year age group by the mid-year population (2011) of all women in that age group. This number was then multiplied by 1,000. 2011 population estimates came from the Secretariat of the Pacific Community, Statistics for Development Division.⁴

⁴ Available at: http://www.spc.int/sdd/index.php/en/downloads/doc_download/742-spc-sddpop2000-2018-by-1-and-5-year-age-groups-june2013

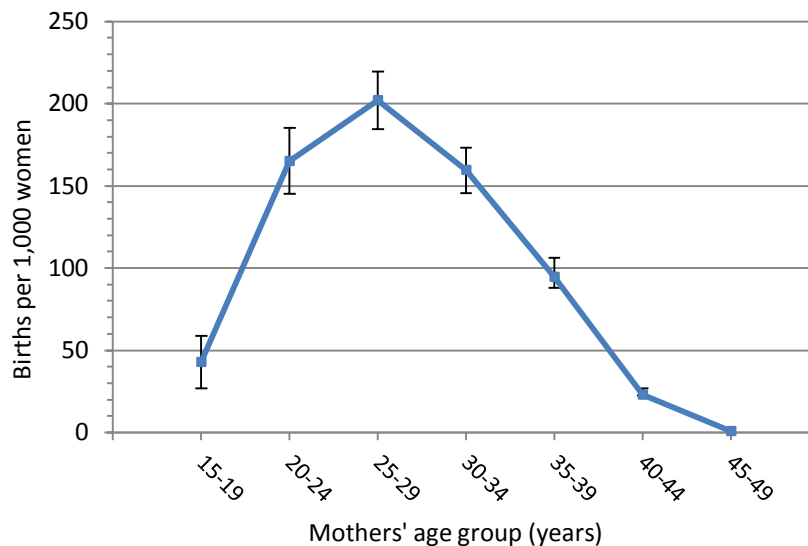
Table 6. Age-specific fertility rates (per 1,000 women), 2010-2012

| Age group | Age-specific fertility rate (95% CI) | |
|-----------|--------------------------------------|-----------|
| 15-19 | 43 | (36-50) |
| 20-24 | 165 | (149-181) |
| 25-29 | 202 | (182-222) |
| 30-34 | 159 | (142-177) |
| 35-39 | 94 | (81-108) |
| 40-44 | 23 | (17-35) |
| 45-49 | 1 | (0-4) |

95% CI (95% confidence interval)

Fertility rates were highest in women aged 25-29 but remained relatively high in women aged 20-24 and 30-34 before decreasing close to zero in women aged 40 and above. Teenage fertility was moderate in 2010-2012 with about 43 births per 1,000 women aged 15-19. This compares to a worldwide teen fertility rate of 48, 23 in developed countries, and 61 for the Pacific region in 2007.⁵ This teenage rate is notably higher than that of the mainland US, which experienced a teenage fertility rate of 26.5 in 2013.⁶ More historical data on births by age of mother are needed to determine fertility trends by age of mother over time.

Figure 2. Age-specific fertility rates, 2010-2012



Footnotes: Vertical bars around point estimates represent the 95% confidence intervals

⁵UNFPA, Available from: <http://www.unfpa.org/public/home/publications/pid/6526>

⁶Martin. J et al, US NCHS, 2015, Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_01.pdf

Total fertility rates

The total fertility rate (TFR) is the average number of children a woman would give birth to during her lifetime if she were to pass through her childbearing years experiencing the present day age-specific fertility rates. TFR is calculated by adding up all the age-specific fertility rates, multiply this sum by 5, and then divide by 1,000.

The TFR for the period 2010-2012 was 3.4, which means on average, a woman would have 3.4 children during her lifetime if current fertility rates did not change. This fertility rate means the population in American Samoa is increasing.

Table 7: Total fertility rate, 2010-2012

| Period | Total fertility rate (95%CI) |
|-----------|------------------------------|
| 2010-2012 | 3.4 (3.2 – 3.6) |

95% CI (95% confidence interval)

4. DEATHS AND SUMMARY MEASURES OF MORTALITY

Deaths and causes of death are recorded at the LBJ Tropical Medical Center. Whether the event occurs at the hospital or other places in the territory, all deaths are documented and recorded at the hospital. Upon completion of the examination by the medical doctor, the information pertaining to the deceased is then collected and routed to the Health Information System (HIS) division of the LBJ Tropical Medical Center for verification and certification. The data is then forwarded to the Department of Health and the Office of Vital Statistics. However, if the event occurred away from LBJ, an authorization from the Attorney General's Office is required for the release of the death certificate from LBJ. This data covers all deaths in the territory including deaths at the LBJ, in homes, and in other places. Patients who were referred overseas for treatment and died overseas were not captured in the records from LBJ Tropical Medical Center and are not included in the figures discussed below. Depending on how many deaths occurred overseas, there could be a possible undercount in the mortality indicators calculated as they do not account for all deaths of American Samoan residents.

Number of deaths

Table 8 shows the total number of deaths by sex and year from 2010 to 2012. On average, there were 270 deaths per year with more male (160) than female (110) deaths, as is typical worldwide.

Table 8. Number of deaths by sex and year, 2010-2012

| Year | Male | Female | Both sexes |
|--------------|------------|------------|------------|
| 2010 | 160 | 86 | 246 |
| 2011 | 157 | 125 | 282 |
| 2012 | 164 | 118 | 282 |
| Total | 481 | 329 | 810 |

Table 9: Average number of deaths by sex, 2010-2012

| Period | Male | Female | Both sexes |
|-----------|------|--------|------------|
| 2010-2012 | 160 | 110 | 270 |

Average number of deaths by sex and age

Table 10 displays the average number of deaths by sex and age for the period 2010-2012. Mortality by age will be discussed further in the section detailing age-specific death rates.

Table 10. Average number of deaths by sex and age group, 2010-2012

| Age Group | Male | Female | Both sexes |
|--------------|------------|------------|------------|
| <1 | 7 | 4 | 11 |
| 1-4 | 2 | 1 | 3 |
| 5 - 9 | 1 | 0 | 1 |
| 10 - 14 | 1 | 1 | 2 |
| 15 - 19 | 4 | 0 | 5 |
| 20 - 24 | 1 | 1 | 2 |
| 25 - 29 | 2 | 2 | 4 |
| 30 - 34 | 3 | 4 | 6 |
| 35 - 39 | 5 | 2 | 7 |
| 40 - 44 | 7 | 4 | 12 |
| 45 - 49 | 15 | 7 | 21 |
| 50 - 54 | 13 | 8 | 21 |
| 55 - 59 | 17 | 12 | 28 |
| 60 - 64 | 18 | 10 | 27 |
| 65 - 69 | 18 | 11 | 29 |
| 70 - 74 | 19 | 12 | 31 |
| 75-79 | 12 | 10 | 22 |
| 80-84 | 8 | 9 | 17 |
| 85+ | 9 | 11 | 20 |
| Total | 160 | 110 | 270 |

**Note: Numbers may not add up due to rounding*

Summary Measures of Mortality

Crude death rate and age-standardized mortality rate

The following table presents both the crude death rate (deaths per 1,000 population) and the age-standardized death rate. Age-standardized death rates are a country's age-specific death rates applied to a standard age distribution. Age-standardized rates allow the comparison of death rates over time or between two different populations without the age structure of the populations influencing the death rates. This is important as populations with a greater proportion of older people have higher crude death rates compared to populations comprised of young people under identical health and social conditions.

Data have been age-standardized using the WHO World Standard Population.⁷

The crude death rate for American Samoa was 4.8 deaths (95%CI 4.3–5.4) per 1,000 population for 2010-2012. The age-standardized death rate was 7.4 per 1,000 population (95%CI 6.5 - 8.3).

⁷ Ahmad et al, 2001, Available from: <http://www.who.int/healthinfo/paper31.pdf>

Table 11: Crude death rate and age-standardized death rate, 2010-2012

| Crude death rate | Age-standardized death rate (95%CI) |
|----------------------------------|-------------------------------------|
| 4.8 (4.3 - 5.4) | 7.4 (6.5 - 8.3) |
| 95% CI (95% confidence interval) | |

Age-specific mortality rates

It is important to know how many deaths occur in different age groups for health planning or monitoring. Additionally, deaths should be analyzed by sex and age as men and women tend to die of different things at different ages. As mentioned above, the crude death rate is heavily influenced by the age structure of the population. Countries with higher proportions of older people tend to have higher crude death rates. To generate meaningful comparisons of mortality between populations, age-specific mortality rates are used.

An age-specific mortality rate is the number of deaths per 1,000 people of a given age group in a given time period. These are often referred to as the age-specific central death rates and are denoted by the symbol M_x .

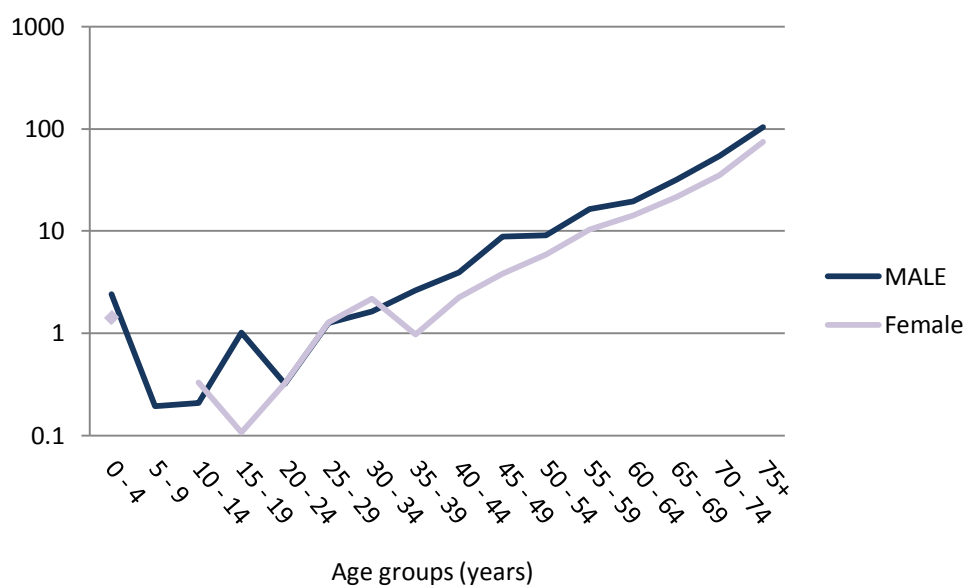
Generally mortality rates are high during infancy and early childhood (under age 5) and drop to their lowest levels between age 5 and 9 years. Subsequently, the rates start to increase with increasing age.

The data below shows a fairly typical pattern for age-specific mortality in American Samoa, which is in line with what is seen in the Pacific region. Mortality is higher among infants and young children under age 5, and then declines rapidly reaching its lowest point around the 5-9 year age group. It then gradually starts to edge up as young adults are at risk due to accidents and incidental causes such as suicide. Mortality continues to increase into the older adult age groups and generally starts to rise more rapidly among the oldest age groups. However, in the mid-adult years starting around age 40, instead of the typical 'J' shape seen in countries like Australia or New Zealand where the curve is more concave, the 'J' becomes inverted (convex) and there is a bulge indicating premature adult mortality, likely due to non-communicable diseases (NCDs) such as diabetes and heart disease.

Table 12: Age-specific mortality rates (deaths per 1,000 people) by 5-year age group and sex, 2010-2012

| Age Group | Male | Female | Total |
|-----------|-------|--------|-------|
| 0 - 4 | 2.4 | 1.7 | 2.1 |
| 5 - 9 | 0.2 | 0.0 | 0.1 |
| 10 - 14 | 0.2 | 0.3 | 0.3 |
| 15 - 19 | 1.3 | 0.1 | 0.7 |
| 20 - 24 | 0.5 | 0.3 | 0.4 |
| 25 - 29 | 1.3 | 1.3 | 1.3 |
| 30 - 34 | 1.6 | 2.2 | 1.9 |
| 35 - 39 | 2.8 | 1.4 | 2.1 |
| 40 - 44 | 4.1 | 2.4 | 3.3 |
| 45 - 49 | 8.7 | 3.8 | 6.2 |
| 50 - 54 | 9.6 | 5.4 | 7.5 |
| 55 - 59 | 15.8 | 10.7 | 13.2 |
| 60 - 64 | 22.5 | 12.4 | 17.5 |
| 65 - 69 | 34.1 | 22.2 | 28.3 |
| 70 - 74 | 55.9 | 37.1 | 46.5 |
| 75+ | 102.3 | 74.3 | 85.7 |

Figure 3: Logarithmic age-specific mortality rates by sex, 2010-2012



Life expectancy at birth

Life expectancy at birth indicates the average number of years a newborn infant would live if the current patterns of mortality at the time of his or her birth were to remain the same throughout his or her life. Life tables for American Samoa were calculated from empirical data using the Chiang Method⁸. Confidence intervals for life expectancy, based on the variance of probability of surviving, were also calculated using the Chiang Method 2.

In American Samoa, life expectancy at birth for males was 70.8 compared to 77.4 for females during the period 2010-2012. This is similar to the life expectancy reported 20 years ago for 1990 from the 2011 American Samoa Statistical Yearbook. This compares to a life expectancy of 76.4 for men and 81.2 for women in the mainland United States of America (USA) in 2013⁹. The lower life expectancy in American Samoa can likely be attributed to premature adult mortality from NCDs. Refer to Appendix 1 for the complete 2010-2012 life table.

Table 13: Life expectancy at birth (LE0) by period and sex, 1990 and 2010-2012

| Period | Male (95%CI) | Female (95%CI) | Both Sexes (95%CI) |
|-----------|------------------|------------------|--------------------|
| 1990 | 68.5 | 76.2 | - |
| 2010-2012 | 70.8 (68.9-72.6) | 77.4 (75.4-79.5) | 73.8 (72.5 - 75.2) |

95%CI (95% confidence interval); 1990 Estimate cited in the American Samoa Statistical Yearbook 2012.¹⁰

Neonatal, infant and child mortality

Neonatal, infant and child mortality are important measures of a population's health and development. The reduction of child mortality is the Millennium Development Goal 4, and is an important measure to collect and report. Table 14 shows the number of neonatal, infant, and under-five deaths by year as well as the total and average over the three year period. Table 15 lists the neonatal mortality rate, the infant mortality rate, and the under-5 mortality rate for 2010-2012.

Table 14. Number of deaths in neonates, infants and children by year, 2010-2012

| Year | Infants under age 1 | | | Children aged 1-4 years | Total children under age 5 years |
|--------------------------|---------------------|--------------------|---------------|-------------------------|----------------------------------|
| | Under 28 days | 28 days to <1 year | Total <1 year | | |
| 2010 | 12 | 6 | 18 | 1 | 19 |
| 2011 | 4 | 3 | 7 | 5 | 12 |
| 2012 | 3 | 5 | 8 | 3 | 11 |
| Total 2010-2012 | 19 | 14 | 33 | 9 | 42 |
| Average 2010-2012 | 6.3 | 4.7 | 11.0 | 3.0 | 14.0 |

⁸Chiang, C. L. (n.d.). Introduction to stochastic processes in Biostatistics. In *The life table and its construction* (pp. Chapter 9, 189-214). New York: John Wiley & Sons 1968.

⁹ US NCHS, 2015, Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf

¹⁰ American Samoa Statistical Yearbook 2012, Available from: <http://www.doc.as/wp-content/uploads/2011/06/2012-Statistical-Yearbook-1.pdf>

Infant mortality

The infant mortality rate (IMR) shows the number of infant deaths (deaths in children under age 1) per 1,000 live births during a specified period of time. The IMR for American Samoa was 8.7 for the period 2010-2012, meaning that for every 1,000 babies born during this time period, about 9 died before their first birthday. This compares to a rate of 42 infant deaths per 1,000 live births in 2013 for the Oceania region as a whole¹¹ but was notable higher than the USA infant mortality rate of 6.0 in 2013.¹²

Neonatal mortality

The neonatal mortality rate (NMR) is the number of neonatal deaths (deaths in newborns aged less than 28 days) per 1,000 live births during a specific period of time. Neonatal deaths account for a large proportion of child deaths, and is considered to be a useful indicator of maternal and newborn health and care. Generally, as IMR falls (for example through major improvements in environment, immunization and nutrition), and fewer deaths are attributed to infectious diseases and environmental influences, a greater proportion of infant deaths would be expected to occur in the neonatal period. The neonatal mortality rate, however, should not increase as this occurs.

For the period 2010-2012, the NMR in American Samoa was 5.0 meaning that for every 1,000 live births during this time period, 5 babies died before reaching 28 days. This compares to a NMR of 21 deaths per 1,000 live births in 2013 for the Oceania region.¹³ In comparison, the mainland USA experienced a NMR of 4.0 in 2013.¹⁴

Under-5 mortality rate

The under-5 mortality rate (U5MR) is measured as the number of deaths in children aged less than 5-years per 1,000 live births in a specific period of time. In American Samoa, the U5MR for 2010-2012 was 11.1. This means that for every 1,000 children born, 11 of those children would not live to reach their 5th birthday. Note this is significantly lower than the under-5 mortality rate of 54 deaths per 1,000 live births in 2013 for the region of Oceania as a whole¹⁵ but is higher than the USA rate of 7.0.¹⁶

Table 15. Neonatal, infant, and under-5 mortality rates per 1,000 live birth , 2010-2012

| NMR | IMR | U5M |
|-----------------|------------------|-------------------|
| 5.0 (3.0 - 7.8) | 8.7 (6.0 - 12.2) | 11.1 (8.0 - 15.0) |

95% CI (95% confidence interval).

¹¹ UNICEF et al., 2014, Available from:

http://www.data.unicef.org/fckimages/uploads/1410869227_Child_Mortality_Report_2014.pdf

¹² US NCHS, 2015, Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf

¹³ UNICEF et al., 2014, Available from:

http://www.data.unicef.org/fckimages/uploads/1410869227_Child_Mortality_Report_2014.pdf

¹⁴ US NCHS, 2015, Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf

¹⁵ UNICEF et al., 2014, Available from:

http://www.data.unicef.org/fckimages/uploads/1410869227_Child_Mortality_Report_2014.pdf

¹⁶ US NCHS, 2015, Available from: http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_02.pdf

Adult Mortality

Adult mortality (45q15)

Adult mortality is the probability of dying between the ages of 15 to 59 inclusive ($_{45}q_{15}$), also thought of as the probability of a 15-year-old dying before reaching the age of 60. The table below shows adult mortality in American Samoa by period and sex. Males have about a one in five chance of dying between the ages of 15 and 59, compared to a 13% chance for females. This is significantly lower than the neighboring country of Western Samoa whose estimated $_{45}q_{15}$ in 2011 was 35.7 for males and 38.4 for females¹⁷, but higher than the mainland USA in 2012 with a rate of 13.0 for males and 7.7 for females.¹⁸

Table 16: Adult mortality (%) by sex, 2010-2012

| Male $_{45}q_{15}$ (95%CI) | Female $_{45}q_{15}$ (95%CI) |
|----------------------------|------------------------------|
| 20.4 (15.1 - 25.8) | 12.9 (8.6 - 17.1) |

95% CI (95% confidence interval)

Life expectancy at 40 (LE40)

Life expectancy at 40 years of age is also an indicative measure on premature mortality. This is the number of years a person aged 40 would be expected to live, on average, if they continued to experience current mortality rates.

Table 17: Life expectancy at 40 (LE₄₀) by sex, 2010-2012

| Male (95%CI) | Female (95%CI) |
|------------------|------------------|
| 33.3 (31.6-34.9) | 39.4 (37.5-41.3) |

95% CI (95% confidence interval)

The table above shows that an American Samoan male at age 40 would be expected to live 33 more years, compared to 39 more years for an American Samoan female of the same age. In comparison, in 2010 the mainland USA life expectancy at 40 was 38.5 for males and 42.4 for females. While American Samoa's numbers are lower than those of the USA, they are comparable with other Pacific Island countries such as Western Samoa (33 males and 39 females) and Nauru (38 males and 46 females).¹⁹ The lower life expectancy at age 40 in many Pacific Islands is due to the rise of NCDs such as diabetes, heart disease, and cancer, and is not expected to increase until healthier lifestyle habits are consistently adapted.

¹⁷ SPC NMDIs, Available from: <http://www.spc.int/nmdi/MdiInset.aspx?indicator=PH-VS-1.5&country=Samoa>

¹⁸ WHO Global health observatory, 2015, Available from: <http://apps.who.int/gho/data>

¹⁹ WHO Global health observatory, 2015, Available from: <http://apps.who.int/gho/data/view.main.61410>

5. CAUSES OF DEATH

Leading causes of death (all ages)

The leading causes of death by sex are shown in Table 18. Disaggregated counts by age and sex were only possible for 20 causes of death; all other causes were pre-grouped in the 'all other causes' category. Thus, it is possible there are other leading causes of death that are masked by being consolidated in the 'all other causes' category. The acquisition of unit record death data and a re-examination of leading causes of death by age and sex is a priority for the future.

The ten leading causes of death in American Samoa from 2010 to 2012 are shown in Table 18 below. While cancer was the leading cause of death overall, the number one cause of death in men was heart diseases, and the leading cause of death in women was cancer. Diabetes was the second leading cause of death for both sexes.

Table 18. Ten leading causes of death (by ICD-9) by sex, 2010-2012

| ICD Codes | Cause of death | Number of deaths | | |
|--------------|---|------------------|------------|------------|
| | | Both sexes | Male | Female |
| 140 - 239 | Malignant Neoplasm | 122 | 65 | 57 |
| 250 | Diabetes Mellitus | 117 | 67 | 50 |
| 390 - 459 | Heart Disease | 115 | 73 | 42 |
| 430 - 438 | Cerebrovascular Disease | 57 | 33 | 24 |
| 487 / 486 | Influenza / Pneumonia | 57 | 37 | 20 |
| 401 | Hypertension | 52 | 26 | 26 |
| 038 | Septicemia | 51 | 30 | 21 |
| E800 - 999 | Accident | 37 | 32 | 5* |
| 460 - 519 | Chronic Obstructive Pulmonary & allied conditions | 34 | 23 | 11 |
| 780 - 799 | Ill-defined causes | 59 | 31 | 28 |
| | All other Causes | 109 | 64 | 45 |
| TOTAL | | 810 | 481 | 324 |

**Note: Accidents were not one of the 10 leading causes of death in women. They are shown here for comparative purposes only.*

While a relatively low percentage (7%) of deaths were classified as due to ill-defined causes, this could be one focus of improvement with the goal, for example, of bringing this number to less than 5%.

Causes of death by age and sex are discussed more in following sections as examining causes of death among all ages combined may be misleading. Causes of death generally differ by age and sex and thus should be examined in this manner.

Table 19. Number and percent distribution of the ten leading causes of death (by ICD-9), 2010-2012

| ICD Codes | Cause of death | Number of deaths | Percent distribution of deaths | Percent distribution of deaths excluding ill-defined causes |
|------------|---|------------------|--------------------------------|---|
| 140 - 239 | Malignant neoplasm | 122 | 15.1 | 16.2 |
| 250 | Diabetes mellitus | 117 | 14.4 | 15.6 |
| 390 - 459 | Heart disease | 115 | 14.2 | 15.3 |
| 430 - 438 | Cerebrovascular disease | 57 | 7.0 | 7.6 |
| 487 / 486 | Influenza / pneumonia | 57 | 7.0 | 7.6 |
| 401 | Hypertension | 52 | 6.4 | 6.9 |
| 038 | Septicemia | 51 | 6.3 | 6.8 |
| E800 - 999 | Accident | 37 | 4.6 | 4.9 |
| 780 - 799 | Ill-defined causes | 59 | 7.3 | - |
| 460 - 519 | Chronic obstructive pulmonary & allied conditions | 34 | 4.2 | 4.5 |
| | All other Causes | 109 | 13.5 | 14.5 |
| | TOTAL | 810 | 100 | |
| | TOTAL LESS ILL-DEFINED CAUSES | 751 | | 100 |

Causes of death in children aged 0-4 years

Causes of death for children aged under-5 years, both sexes combined, are listed in the table below. Cause-specific mortality rates were only calculated for perinatal conditions, which was the leading cause of death. Numbers of deaths from all other causes were too low to accurately calculate cause-specific rates.

There were a total of 42 deaths in children aged under-5 years during the period 2010-2012. The leading cause of death was perinatal conditions, accounting for 50% of deaths in children aged under-5 years, and resulting in a cause-specific mortality rate of 94.2 deaths per 100,000 children aged under-5 years. This is consistent with the fact that almost half (19) of the under-5 deaths were in neonates aged less than 28 days, and 33 of the under-5 deaths were in infants aged less than 1 year.

Table 20: Cause-specific mortality (by ICD-9) (deaths per 100,000 population), 0-4 year olds (both sexes combined), 2010-2012

| ICD Codes | Disease | Number of deaths in children under-5 years | % distribution of deaths by cause, excluding ill-defined causes (95% CI) | Cause specific mortality rate per 100,000 population (95% CI) |
|--------------------------------------|---|--|--|---|
| 760 - 779 | Perinatal conditions | 19 | 50.0 (30.1 – 78.1) | 94.2 (56.7 - 147.2) |
| E800 - 999 | Accidents | 4 | 10.5 (2.9 - 26.9) | - |
| 740 - 759 | Congenital anomalie | 4 | 10.5 (2.9 - 26.9) | - |
| 460 - 519 | Chronic obstructive pulmonary and allied conditions | 3 | 7.9 (1.6 - 23.1) | - |
| 487 / 486 | Influenza / pneumonia | 2 | 5.3 (0.6 - 19.0) | - |
| 390 - 459 | Heart disease | 1 | 2.6 (0.1 - 14.7) | - |
| 140 - 239 | Malignant neoplasm | 1 | 2.6 (0.1 - 14.7) | - |
| 038 | Septicemia | 1 | 2.6 (0.1 - 14.7) | - |
| 276.5 | Dehydration | 1 | 2.6 (0.1 - 14.7) | - |
| 780 - 799 | Ill-defined causes | 4 | - | - |
| | All other causes | 2 | 5.3 (0.6 - 19.0) | - |
| Total | | 42 | | |
| TOTAL LESS ILL-DEFINED CAUSES | | 38 | 100 | |

95% CI (95% confidence interval)

Causes of death in Children aged 5-14 years

The number of deaths in children aged 5 to 14 years is shown in Table 21 below. Note that due to the low number of deaths, both sexes are combined.

As is generally the case worldwide, the mortality rate is high for children aged under-5 years. The rate then declines rapidly reaching its lowest point in the 5-9 years age-group, and generally stays low for children aged 10-14 years. In American Samoa, there were 7 deaths in children aged 5-14 during the period 2010-2012. Cause-specific mortality rates are not shown for this age group due to the small number of deaths. Accidents accounted for 3 deaths while there was one death each from heart disease, cancer (malignant neoplasm), and septicemia.

Table 21: Cause-specific mortality (by ICD-9) (deaths per 100,000 population), 5-14 year olds (both sexes combined), 2010-2012

| ICD Codes | Disease | Number of deaths in children aged 5-14 | % distribution of deaths by cause excluding ill-defined causes (95% CI) |
|--------------------------------------|--------------------|--|---|
| E800 - 999 | Accident | 3 | 50.0 (10 - 100) |
| 390 - 459 | Heart Disease | 1 | 16.7 (0.5 - 92.8) |
| 140 - 239 | Malignant Neoplasm | 1 | 16.7 (0.5 - 92.8) |
| 038 | Septicemia | 1 | 16.7 (0.5 - 92.8) |
| 780 - 799 | Ill-defined causes | 1 | - |
| Total | | 7 | |
| TOTAL LESS ILL-DEFINED CAUSES | | 6 | 100 |

95% CI (95% confidence interval)

Causes of death in adults aged 15-59 years

Tables 22 to 23 display the leading causes of deaths in males and females aged 15-59 years. The leading causes of death were heart disease and diabetes, accounting for about one third of all deaths in males aged 15-59 years. An additional 11% of deaths were due to cancer, and another 10% were attributed to accidents. Other notable causes included cerebrovascular disease (8%), hypertension (7%), and septicemia (6%).

Table 223: Cause-specific mortality for males aged 15-59 years (by ICD-9) (deaths per 100,000 population), 2010-2012

| ICD Codes | Disease | Number of deaths in males aged 15-59 | Percent distribution of deaths by cause excluding ill-defined causes (95% CI) | Cause-specific mortality rate per 100,000 population (95% CI) |
|--------------------------------------|---|--------------------------------------|---|---|
| 390 - 459 | Heart disease | 34 | 17.4 (12 - 24) | 69.7 (48.3 - 97.4) |
| 250 | Diabetes mellitus | 31 | 15.9 (10.8 - 22.6) | 63.6 (43.2 - 90.2) |
| 140 - 239 | Malignant neoplasm | 21 | 10.8 (6.7 - 16.5) | 43.1 (26.7 - 65.8) |
| E800 - 999 | Accident | 20 | 10.3 (6.3 - 15.8) | 41.0 (25.1 - 63.4) |
| 430 - 438 | Cerebrovascular disease | 15 | 7.7 (4.3 - 12.7) | 30.8 (17.2 - 50.7) |
| 401 | Hypertension | 14 | 7.2 (3.9 - 12.0) | 28.7 (15.7 - 48.2) |
| 038 | Septicemia | 11 | 5.6 (2.8 - 10.1) | 22.6 (11.3 - 40.4) |
| 487 / 486 | Influenza / pneumonia | 8 | 4.1 (1.8 - 8.1) | - |
| 460 - 519 | Chronic obstructive pulmonary and allied conditions | 6 | 3.1 (1.1 - 6.7) | - |
| E960 - 969 | Homicide | 5 | 2.6 (0.8 - 6.0) | - |
| E950 - 959 | Suicide | 3 | 1.5 (0.3 - 4.5) | - |
| 571 | Chronic liver & cirrhosis | 2 | 1.0 (0.1 - 3.7) | - |
| 780 - 799 | Ill-defined causes | 6 | - | - |
| - | All other Causes | 25 | 12.8 (8.3 - 18.9) | - |
| Total | | 201 | | |
| TOTAL LESS ILL-DEFINED CAUSES | | 195 | 100 | |

95% CI (95% confidence interval)

The three leading causes of death in women aged 15-59 were cancer, diabetes, and heart disease, accounting for slightly more than half (54%) of all deaths. Other notable causes of death included hypertension (11%), and influenza/pneumonia (10%).

The cause-specific mortality rates for heart disease and diabetes in males (69.7 and 63.6 per 100,000 respectively) were almost twice those for females (37.1 per 100,000 for both diseases).

As shown in Table 7, mortality rates are lower in the 15-34 year age group compared to the 35-59 year age groups. The number of deaths among 15-59 year olds is heavily concentrated in the 35-59 year age group. However, it's important to determine if causes of death vary between these age groups. Tables 24 and 26 show the number and percent distribution of deaths less ill-defined causes in males and females aged 15-34 years. While the number of deaths in men and women aged 15-34 are too small to accurately determine cause-specific death rates, a general sense of the causes of death can be gleaned.

Table23: Cause specific Mortality for males aged 15-59 years by ICD-9 (deaths per 100,000 population, including 95% Confidence Intervals), 2010-2012

| ICD Codes | Cause of death | Number of deaths in females aged 15-59 | Percent distribution excluding ill-defined causes (95% CI) | Cause Specific Mortality Rate per 100,000 population (95% CI) |
|--------------------------------------|---|--|--|---|
| 140 - 239 | Malignant Neoplasm | 25 | 21.9 (14 - 32) | 51.5 (33.3 - 76.0) |
| 250 | Diabetes Mellitus | 18 | 15.8 (9.4 - 25.0) | 37.1 (22.0 - 58.6) |
| 390 - 459 | Heart Disease | 18 | 15.8 (9.4 - 25.0) | 37.1 (22.0 - 58.6) |
| 401 | Hypertension | 12 | 10.5 (5.4 - 18.4) | 24.7 (12.8 - 43.2) |
| 487 / 486 | Influenza / Pneumonia | 11 | 9.6 (4.8 - 17.3) | 22.7 (11.3 - 40.5) |
| 430 - 438 | Cerebrovascular Disease | 9 | 7.9 (3.6 - 15.0) | - |
| 460 - 519 | Chronic Obstructive Pulmonary & allied conditions | 5 | 4.4 (1.4 - 10.2) | - |
| 038 | Septicemia | 4 | 3.5 (1.0 - 9.0) | - |
| E800 - 999 | Accident | 2 | 1.8 (0.2 - 6.3) | - |
| E950 - 959 | Suicide | 2 | 1.8 (0.2 - 6.3) | - |
| 571 | Chronic liver & cirrhosis | 1 | 0.9 (0.0 - 4.9) | - |
| 780 - 799 | Ill-defined causes | 4 | - | - |
| - | All other Causes | 7 | 6.1 (2.5 - 12.6) | - |
| Total | | 118 | | |
| TOTAL LESS ILL-DEFINED CAUSES | | 114 | 100 | |

Among younger men aged 15-34, incidental and accidental causes such as accidents, homicide, and suicide, accounted for half of all deaths. Non-communicable diseases such as cancer, heart disease, and chronic obstructive pulmonary and allied conditions were the cause of about 30 percent of deaths. Conversely, among men aged 35-59, more than two-thirds of deaths (69%) were attributable to NCDs, with the top five leading causes of death falling into the NCD category and accounting for 65 percent of deaths in this age group. Comparatively, just 8 percent of deaths among men aged 35-59 were due to accidental and incidental causes.

The difference in types of death by age does not hold true for adult women. Among young women aged 15-34, almost three-quarters (74%) of deaths were due to NCDs. This proportion does not change much with age; 78 percent of deaths among women aged 35-59 were due to NCDs.

The high proportion of deaths in adults aged 15-59 are linked to several risk factors associated with NCDs. As reported in the American Samoa 2004 STEPS report²⁰, 99.6% of the population aged 25-64 were found to have one or more of the major risk factors for NCDs:

- smoking regularly,
- being overweight or obese;
- having high blood pressure or currently on medication for high blood pressure;

²⁰ American Samoa STEPS report 2004, Available from:
http://www.who.int/chp/steps/Printed_STEPS_Report_American_Samoa.pdf

- not eating sufficient quantities of fruit and vegetables in their diet, and
- having low levels of physical activity.

Alarmingly, 69.2% of the population aged between 25 and 44 years of age had three or more of the risk factors putting them in the high risk category.

Additionally, the 2004 STEPS report found that among adults aged 25-64:

- 47% were diabetic (one of the highest rates in the world)
- 30% were regular smokers
- 94% were overweight or obese and 75% are obese.
- 87% consumed less than 5 servings of fruit and vegetables per day.

These results are in line with a moderate life expectancy at 40 of 33 for males and 39 for females, indicating the impact of NCDs. This is reiterated in adult male mortality, with a 1 in 5 probability of a 15-year-old male dying before reaching the age of 60.

Table 24: Number and percent distribution of deaths for males aged 15-34 years by ICD -9 (including 95% Confidence Intervals), 2010-2012

| ICD Codes | Cause of death | Number of deaths in males aged 15-34 | Percent distribution of deaths by cause excluding ill-defined causes (95% CI) |
|--------------------------------------|---|--------------------------------------|---|
| E800 - 999 | Accident | 9 | 32.1 (15 - 61) |
| 140 - 239 | Malignant Neoplasm | 4 | 14.3 (3.9 - 36.6) |
| 390 - 459 | Heart Disease | 3 | 10.7 (2.2 - 31.3) |
| E960 - 969 | Homicide | 3 | 10.7 (2.2 - 31.3) |
| 487 / 486 | Influenza / Pneumonia | 2 | 7.1 (0.9 - 25.8) |
| E950 - 959 | Suicide | 2 | 7.1 (0.9 - 25.8) |
| 038 | Septicemia | 1 | 3.6 (0.1 - 19.9) |
| 460 - 519 | Chronic Obstructive Pulmonary & allied conditions | 1 | 3.6 (0.1 - 19.9) |
| 780 - 799 | Ill-defined causes | 2 | - |
| - | All other Causes | 3 | 10.7 (2.2 - 31.3) |
| Total | | 30 | |
| TOTAL LESS ILL-DEFINED CAUSES | | 28 | 100 |

Table 25: Cause specific Mortality for males aged 35-59 years by ICD-9 (deaths per 100,000 population, including 95% Confidence Intervals), 2010-2012

| ICD Codes | Cause of death | Number of deaths in males aged 35-59 | Percent distribution of deaths by cause excluding ill-defined causes (95% CI) | Cause Specific Mortality Rate per 100,000 population (95% CI) |
|--------------------------------------|---|--------------------------------------|---|---|
| 250 | Diabetes Mellitus | 31 | 18.6 (13 - 26) | 134.4 (91.3 - 190.7) |
| 390 - 459 | Heart Disease | 31 | 18.6 (12.6 - 26.3) | 134.4 (91.3 - 190.7) |
| 140 - 239 | Malignant Neoplasm | 17 | 10.2 (5.9 - 16.3) | 73.7 (42.9 - 118.0) |
| 430 - 438 | Cerebrovascular Disease | 15 | 9.0 (5.0 - 14.8) | 65.0 (36.4 - 107.2) |
| 401 | Hypertension | 14 | 8.4 (4.6 - 14.1) | 60.7 (33.2 - 101.8) |
| E800 - 999 | Accident | 11 | 6.6 (3.3 - 11.8) | 47.7 (23.8 - 85.3) |
| 038 | Septicemia | 10 | 6.0 (2.9 - 11.0) | 43.3 (20.8 - 79.7) |
| 487 / 486 | Influenza / Pneumonia | 6 | 3.6 (1.3 - 7.8) | - |
| | | 5 | 3.0 (1.0 - 7.0) | - |
| 460 - 519 | Chronic Obstructive Pulmonary & allied conditions | | | |
| 571 | Chronic liver & cirrhosis | 2 | 1.2 (0.1 - 4.3) | - |
| E960 - 969 | Homicide | 2 | 1.2 (0.1 - 4.3) | - |
| E950 - 959 | Suicide | 1 | 0.6 (0.0 - 3.3) | - |
| 780 - 799 | Ill-defined causes | 4 | - | - |
| - | All other Causes | 22 | 13.2 (8.3 - 19.9) | - |
| Total | | 171 | | |
| TOTAL LESS ILL-DEFINED CAUSES | | 167 | | 100 |

Table 26: Number and percent distribution of deaths for females aged 15-34 years by ICD -9 (including 95% Confidence Intervals), 2010-2012

| ICD Codes | Cause of death | Number of deaths in females aged 15-34 | Percent distribution of deaths by cause excluding ill-defined causes (95% CI) |
|--------------------------------------|---|--|---|
| 140 - 239 | Malignant Neoplasm | 4 | 21.1 (6 - 54) |
| 390 - 459 | Heart Disease | 4 | 21.1 (5.7 - 53.9) |
| 401 | Hypertension | 3 | 15.8 (3.3 - 46.2) |
| 460 - 519 | Chronic Obstructive Pulmonary & allied conditions | 2 | 10.5 (1.3 - 38.0) |
| 487 / 486 | Influenza / Pneumonia | 2 | 10.5 (1.3 - 38.0) |
| 038 | Septicemia | 1 | 5.3 (0.2 - 29.3) |
| 250 | Diabetes Mellitus | 1 | 5.3 (0.2 - 29.3) |
| E800 - 999 | Accident | 1 | 5.3 (0.2 - 29.3) |
| 780 - 799 | Ill-defined causes | 1 | - |
| - | All other Causes | 1 | 5.3 (0.2 - 29.3) |
| Total | | 20 | |
| TOTAL LESS ILL-DEFINED CAUSES | | 19 | 100 |

Table 4: Cause specific Mortality for females aged 35-59 years by ICD-9 (deaths per 100,000 population, including 95% Confidence Intervals), 2010-2012

| ICD Codes | Cause of death | Number of deaths in females aged 35-59 | Percent distribution of deaths by cause excluding ill-defined causes (95% CI) | Cause Specific Mortality Rate per 100,000 population (95% CI) |
|--------------------------------------|---|--|---|---|
| 140 - 239 | Malignant Neoplasm | 21 | 22.1 (14 - 34) | 90.5 (56.0 - 138.3) |
| 250 | Diabetes Mellitus | 17 | 17.9 (10.4 - 28.7) | 73.3 (42.7 - 117.3) |
| 390 - 459 | Heart Disease | 14 | 14.7 (8.1 - 24.7) | 60.3 (33.0 - 101.2) |
| 401 | Hypertension | 9 | 9.5 (4.3 - 18.0) | - |
| 430 - 438 | Cerebrovascular Disease | 9 | 9.5 (4.3 - 18.0) | - |
| 487 / 486 | Influenza / Pneumonia | 9 | 9.5 (4.3 - 18.0) | - |
| 038 | Septicemia | 3 | 3.2 (0.7 - 9.2) | - |
| 460 - 519 | Chronic Obstructive Pulmonary & allied conditions | 3 | 3.2 (0.7 - 9.2) | - |
| E950 - 959 | Suicide | 2 | 2.1 (0.3 - 7.6) | - |
| 571 | Chronic liver & cirrhosis | 1 | 1.1 (0.0 - 5.9) | - |
| E800 - 999 | Accident | 1 | 1.1 (0.0 - 5.9) | - |
| 780 - 799 | Ill-defined causes | 3 | - | - |
| - | All other Causes | 6 | 6.3 (2.3 - 13.7) | - |
| Total | | 98 | | |
| TOTAL LESS ILL-DEFINED CAUSES | | 95 | 100 | |

Maternal Mortality

A maternal death is defined by the WHO as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. The maternal mortality ratio (MMR) is the ratio of the number of maternal deaths during a given time period per 100,000 live births during the same time-period. A live birth is defined by the WHO as the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life - e.g. beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles - whether or not the umbilical cord has been cut or the placenta is attached. Each product of such a birth is considered live born.

There were no maternal deaths during 2010-2012 in American Samoa. See Table 28 for confidence intervals on the maternal mortality rate and ratio of zero.

Table 28: Number of maternal deaths, maternal mortality rate, and maternal mortality ratio (including 95% confidence intervals), 2010-2012

| Number of maternal deaths | Maternal Mortality Rate | Maternal Mortality Ratio |
|---------------------------|-------------------------|--------------------------|
| 0 | 0 (0 - 9.0) | 0 (0 - 97.2) |

Mortality in Older Adults (Aged 60+ Years)

The leading causes of death, along with cause-specific mortality rates in men and women aged 60 and above, are shown in the tables below. Cancer, heart disease, and diabetes were the leading causes of death in both men and women, accounting for about half of all deaths in adults aged 60 and above. As discussed in the adult mortality section, the high proportion of deaths to NCDs can be attributable to the high incidence of NCD risk factors found in the population.

Other notable causes in men included influenza/pneumonia accounting for 12 percent of deaths, followed by cerebrovascular disease (8%), septicemia (7%), chronic obstructive pulmonary & allied conditions (6%), and hypertension (5%).

Among women, other notable causes included septicemia (10%), cerebrovascular disease (9%), and hypertension (8%).

Table 29: Cause specific Mortality in Males Aged 60 and above by ICD-9 (deaths per 100,000 population, including 95% Confidence Intervals), 2010-2012

| ICD Codes | Cause of death | Number of deaths in males aged 60 and above | Percent distribution by cause excluding ill- defined causes (95% CI) | Cause-specific mortality rate per 100,000 population (95% CI) |
|--------------------------------------|---|---|---|---|
| 140 - 239 | Malignant Neoplasm | 43 | 18.6 (13 - 25) | 740.4 (535.8 - 997.2) |
| 390 - 459 | Heart Disease | 38 | 16.5 (11.6 - 22.6) | 654.3 (463.0 - 898.1) |
| 250 | Diabetes Mellitus | 36 | 15.6 (10.9 - 21.6) | 619.8 (434.1 - 858.1) |
| 487 / 486 | Influenza / Pneumonia | 28 | 12.1 (8.1 - 17.5) | 482.1 (320.4 - 696.8) |
| 430 - 438 | Cerebrovascular Disease | 18 | 7.8 (4.6 - 12.3) | 309.9 (183.7 - 489.8) |
| 038 | Septicemia | 17 | 7.4 (4.3 - 11.8) | 292.7 (170.5 - 468.7) |
| 460 - 519 | Chronic Obstructive Pulmonary & allied conditions | 14 | 6.1 (3.3 - 10.2) | 241.0 (131.7 - 404.4) |
| 401 | Hypertension | 12 | 5.2 (2.7 - 9.1) | 206.6 (106.7 - 360.9) |
| E800 - 999 | Accident | 8 | 3.5 (1.5 - 6.8) | - |
| 571 | Chronic liver & cirrhosis | 1 | 0.4 (0.0 - 2.4) | - |
| 581 - 583 | Nephritis & Nephrosis | 1 | 0.4 (0.0 - 2.4) | - |
| 707 | Chronic Ulcer of Skins | 1 | 0.4 (0.0 - 2.4) | - |
| 780 - 799 | Ill-defined causes | 20 | - | - |
| - | All other Causes | 14 | 6.1 (3.3 - 10.2) | - |
| Total | | 251 | | |
| TOTAL LESS ILL-DEFINED CAUSES | | 231 | 100 | |

Table 30: Cause specific Mortality in Females Aged 60 and above by ICD-9 (deaths per 100,000 population, including 95% Confidence Intervals), 2010-2012

| ICD Codes | Cause of death | Number of deaths in females aged 60 and above | Percent distribution by cause excluding ill-defined causes (95% CI) | Cause-specific mortality rate per 100,000 population (95% CI) |
|--------------------------------------|---|---|---|---|
| 250 | Diabetes Mellitus | 32 | 19.2 (13 - 27) | 527.6 (360.9 - 744.8) |
| 140 - 239 | Malignant Neoplasm | 31 | 18.6 (12.6 - 26.3) | 511.1 (347.2 - 725.5) |
| 390 - 459 | Heart Disease | 23 | 13.8 (8.7 - 20.7) | 379.2 (240.4 - 569.0) |
| 038 | Septicemia | 17 | 10.2 (5.9 - 16.3) | 280.3 (163.2 - 448.8) |
| 430 - 438 | Cerebrovascular Disease | 15 | 9.0 (5.0 - 14.8) | 247.3 (138.5 - 407.9) |
| 401 | Hypertension | 14 | 8.4 (4.6 - 14.1) | 230.8 (126.1 - 387.3) |
| 487 / 486 | Influenza / Pneumonia | 8 | 4.8 (2.1 - 9.4) | - |
| 460 - 519 | Chronic Obstructive Pulmonary & allied conditions | 6 | 3.6 (1.3 - 7.8) | - |
| 571 | Chronic liver & cirrhosis | 2 | 1.2 (0.1 - 4.3) | - |
| 276.5 | Dehydration | 1 | 0.6 (0.0 - 3.3) | - |
| 707 | Chronic Ulcer of Skins | 1 | 0.6 (0.0 - 3.3) | - |
| 780 - 799 | Ill-defined causes | 24 | - | - |
| - | All other Causes | 17 | 10.2 (5.9 - 16.3) | - |
| Total | | 191 | | |
| TOTAL LESS ILL-DEFINED CAUSES | | 167 | 100 | |

Adult Mortality from Non-Communicable Diseases (NCDs)

Non-communicable diseases are the leading cause of death in the world and in Pacific Island countries and territories. A number of NCD-related indicators can be used to measure progress against NCD-related mortality including cause-specific proportional mortality (% of deaths due to selected NCDs), cause-specific mortality rates from selected NCDs, age-standardized mortality from NCDs.

Worldwide, the ICD-10 classification system is the system most commonly used to classify deaths.²¹ Selected non-communicable diseases for reporting against WHO international targets by ICD General Mortality List 1 include 1-026 – Neoplasms, 1-052 – Diabetes, 1-064 Diseases of the Circulatory System, and 1-076 – Chronic Lower respiratory Disease. It may also be argued that 1-080 – Diseases of the Liver are important in the Pacific Region and should be considered when examining NCDs.

²¹ WHO, 2012, Available from: <http://www.who.int/classifications/icd>

Table 31: Selected Non-Communicable Diseases (NCDs) for Reporting Against International Targets by ICD General Mortality List 1

| List code | Disease | ICD Codes |
|-----------|------------------------------------|-----------|
| 1-026 | Neoplasms | C00–D48 |
| 1-052 | Diabetes mellitus | E10–E14 |
| 1-064 | Diseases of the circulatory system | I00–I99 |
| 1-076 | Chronic lower respiratory diseases | J40–J47 |

In American Samoa, the ICD-9 classification is used, making an exact match to the selected ICD-10 NCDs difficult. However, for the purposes of analysis, the causes of death in Table 32 were categorized to match the selected NCDs as best as possible. It is important to note that additional NCDs may have been lost when grouped into the “all other causes” category, but the ability to examine this was not possible given the data provided.

While neoplasms and diabetes translated directly, heart disease, cerebrovascular disease, and hypertension were classified as diseases of the circulatory system. Chronic obstructive pulmonary and allied conditions were classified as chronic lower respiratory disease.

Table 32: Comparability of selected non-communicable diseases for reporting against WHO international targets by ICD General Mortality List 1 to ICD-9 codes and causes

| General mortality list 1 code | Cause | ICD-9 code | Cause |
|-------------------------------|------------------------------------|------------|---|
| 1-026 | Neoplasms | 140 - 239 | Malignant Neoplasm |
| 1-052 | Diabetes Mellitus | 250 | Diabetes Mellitus |
| 1-064 | Diseases of the Circulatory System | 390 - 459 | Heart Disease |
| | | 430 - 438 | Cerebrovascular Disease |
| | | 401 | Hypertension |
| 1-076 | Chronic Lower Respiratory Disease | 460 - 519 | Chronic Obstructive Pulmonary & allied conditions |

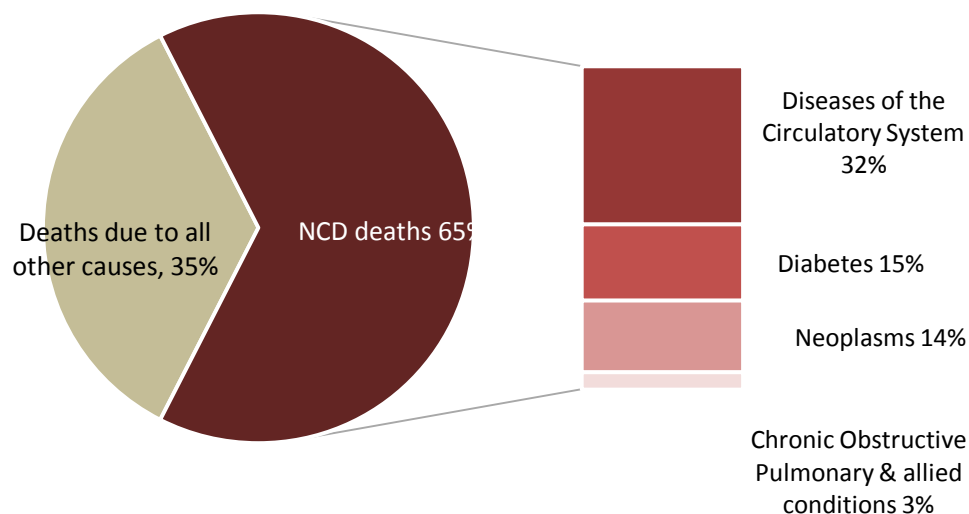
Cause-specific proportional mortality

Age-specific proportional mortality for adults aged 15-59 years from specific groups of NCDs shows the proportion of deaths due to these diseases. While proportional mortality shows the relative burden from NCDs compared to other causes of death and is easy to measure, it does not provide a measure of the overall impact of NCD related deaths and does not paint a complete picture.

For the purpose of this analysis, malignant neoplasms, diabetes, heart disease, cerebrovascular disease, hypertension, and chronic obstructive pulmonary and allied conditions were classified as NCDs. Deaths from chronic liver & cirrhosis were not included.

Figure 4 shows that among adults aged 15-59 years, 65 percent of deaths were due to NCDs. It's notable that almost one-third (32%) of adult deaths were due to causes categorized as diseases of the circulatory system, 15 percent of deaths were due to diabetes, and 14 percent were due to cancer.

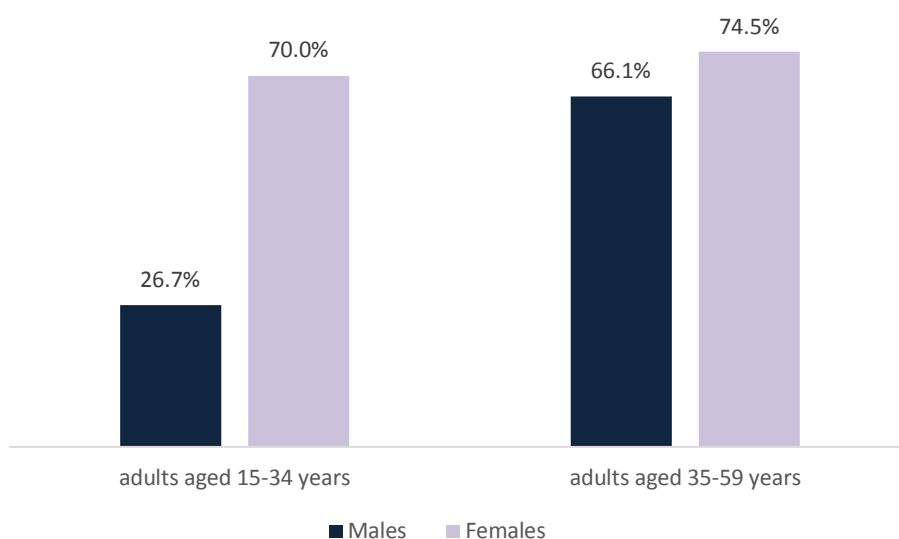
Figure 4: Percentage of deaths due to NCDs compared to all other causes in adults aged 15-59, 2010-2012



Note: Results may not add up due to rounding.

When broken down by sex and broad age group, NCDs are the cause of 70 percent of deaths among young women aged 15-34. However, for women aged 35-59, NCDs account for 3 out of every 4 deaths (75%). While deaths due to NCDs are not particularly high in young men (27%), among men aged 35-59, NCDs account for about two out of every three deaths (66%).

Figure 5: Percentage of deaths in adults aged 15-59 due to NCDs by sex and age group, 2010-2012



Cause-specific mortality rates from selected NCD's

Cause-specific mortality rates provide a direct measure of the overall impact of NCD-related deaths on the population. While these rates cannot be used to provide a comparison either between countries or over time as they will be affected by the age structure of the population, rates for 15-34 year olds and 35-59 year olds can be useful in providing more detailed information for targeting specific NCD-related interventions.

Table 33 shows cause-specific mortality rates for selected NCDs by sex and broad age group. There were too few deaths among young men and women aged 15-34 to display cause-specific rates with certainty, and even the combined rate for all selected NCDs among young men should be interpreted with caution as it is based on just 8 deaths. Among adults aged 35-59, men experienced higher rates of death from diabetes and circulatory diseases compared to women, and bore a heavier burden from NCDs in general.

Table 33: Cause-specific mortality rates for adults aged 15-59 years for selected NCDs by sex and broad age group (deaths per 100,000 population), 2010-2012

| Sex and age group | Neoplasms (95% CI) | Diabetes (95% CI) | Circulatory diseases* (95% CI) | Chronic obstructive pulmonary & allied conditions (95% CI) | Total selected NCDs (95% CI) |
|--------------------|-----------------------|---------------------|--------------------------------------|---|------------------------------------|
| Males 15-34 | - | - | - | - | 31 (13 - 61)** |
| Males 35-59 | 74 (43 - 118) | 134 (91 - 191) | 260 (198 - 335) | - | 490 (404 - 589) |
| Males 15-59 | 43 (27 - 66) | 64 (43 - 90) | 129 (99 - 165) | - | 248 (206 - 297) |
| Females 15-34 | - | - | - | - | 55 (30 - 93) |
| Females 35-59 | 90 (56 - 138) | 73 (43 - 117) | 138 (94 - 195) | - | 315 (247 - 396) |
| Females 15-59 | 52 (33 - 76) | 37 (22 - 59) | 80 (57 - 110) | - | 179 (144 - 221) |
| Total 15-34 | - | - | 20 (9 - 36) | - | 43 (27 - 65) |
| Total 35-59 | 82 (58 - 113) | 104 (76 - 138) | 199 (160 - 244) | - | 402 (346 - 464) |
| Total 15-59 | 47 (35 - 63) | 50 (37 - 67) | 105 (85 - 127) | 11 (6 - 20) | 214 (186 - 245) |

Note: Rates are not shown for categories with less than 10 deaths

*Includes heart disease, cerebrovascular disease, and hypertension

**Based on just 8 deaths

Age-standardized mortality from NCD's

For comparison over time and across countries, age standardized rates should be used. Table 34 shows age-standardized death rates using the WHO World Standard Population²² for the selected NCD's. Using this standardization, for every 100,000 adults aged 15-59, 219 would die in a given year from the selected NCDs.

²² Ahmad et al, 2001, Available from: <http://www.who.int/healthinfo/paper31.pdf>

Table 34: Age-standardized mortality rates for adults aged 15-59 years from selected NCDs by sex (deaths per 100,000 population), 2010-2012

| Adults aged 15-59 years | Age-standardized mortality rates for selected NCDs (95% CI) |
|-------------------------|---|
| Males | 254 (208-299) |
| Females | 185 (146-224) |
| Both sexes | 219 (189-249) |

The probability of dying among adults aged 30-69 years (inclusive) from designated NCDs – WHO Indicator

The probability of dying among adults aged 30-69 years (inclusive) from specific causes has recently been introduced by WHO as an outcome indicator for the impact of NCDs. This is the probability that a person aged 30 will die from the selected disease before their 70th birthday. Estimates of mortality from selected non-communicable diseases for this age group are reported here for comparison with international reporting. This indicator does not include deaths from Diseases of the Liver (1-080). The probability of dying from these diseases is calculated using life table methods, entering in the number of deaths by 5 year age group from selected NCDs among males and females aged 30-69.

The results indicated that males aged 30 had about a one in four (26%) chance of dying before reaching age 70 and females had a one in five (20%) chance of dying before their 70th birthday from the selected NCDs. For both sexes combined, a 30 year old adult had a 22 percent chance of dying from the selected NCDs before reaching their 70th birthday, highlighting the impact of NCDs on adult mortality in American Samoa.

Table 35: Probability of dying (%) from selected NCDs in 30-69 year olds (inclusive) by sex, 2010-2012

| Sex | Probability of dying (%) from selected NCDs in 30-69 year olds (95% CI) |
|------------|---|
| Males | 26 (22-31) |
| Females | 20 (15-24) |
| Both sexes | 22 (19-25) |

6. CONCLUSIONS

Fertility rates are above replacement level, with women currently estimated to have an average of 3.4 children in their lifetime. Assuming the lack of substantial out-migration, the American Samoa population is expected to keep growing if current fertility rates continue. While teenage fertility is not elevated compared to the Pacific Region as a whole (43 births per 1,000 women aged 15-19), it is notably higher than the rate of the mainland US (27 births per 1,000 women aged 15-19). Policies targeting adolescents should be considered in order to bring the teenage birth rate down.

Collectively, the various mortality indicators show that non-communicable diseases are impacting life expectancy in American Samoa. They account for 70 percent of deaths among young women aged 15-34 and for 65 percent of death for all adults aged 15-59. Life expectancy at birth for both men and women is trailing that of the mainland US and other developed nations. The 2004 STEPS survey found that more than 99 percent of adults aged 25-64 either smoked regularly, were overweight or obese, had high blood pressure or were on medication for high blood pressure, did not eat sufficient quantities of fruits and vegetables, or had low level of physical activity. Almost 3 out of 4 adults aged 25-64 (72%) had at least three of these risk factors for NCDs, and 69 percent of younger adults aged 25-44 had at least three key risk factors. It is important that these risk factors are addressed and behavioral changes are enacted in order to stem the loss of life and early adult mortality due to NCDs.

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8. APPENDICES

Appendix 1: Statistical Tables

Population estimates by sex, 5 year age group, and year

| Age | 2010 | | | 2011 | | | 2012 | | |
|-------|-------|---------|--------------|-------|---------|--------------|-------|---------|--------------|
| | Males | Females | Total | Males | Females | Total | Males | Females | Total |
| 0 | 3403 | 3180 | 6583 | 3464 | 3257 | 6721 | 3531 | 3326 | 6857 |
| 5 | 3456 | 3050 | 6506 | 3445 | 3032 | 6478 | 3407 | 3014 | 6421 |
| 10 | 3210 | 3061 | 6271 | 3222 | 3032 | 6254 | 3267 | 3017 | 6283 |
| 15 | 3231 | 3095 | 6326 | 3275 | 3132 | 6406 | 3242 | 3104 | 6345 |
| 20 | 1935 | 1942 | 3877 | 2081 | 2064 | 4145 | 2297 | 2246 | 4544 |
| 25 | 1658 | 1643 | 3302 | 1580 | 1563 | 3142 | 1506 | 1495 | 3000 |
| 30 | 1716 | 1775 | 3491 | 1628 | 1687 | 3315 | 1542 | 1585 | 3127 |
| 35 | 1842 | 1757 | 3599 | 1780 | 1715 | 3494 | 1706 | 1677 | 3383 |
| 40 | 1797 | 1811 | 3608 | 1777 | 1773 | 3551 | 1756 | 1728 | 3484 |
| 45 | 1683 | 1727 | 3410 | 1695 | 1746 | 3440 | 1693 | 1748 | 3441 |
| 50 | 1342 | 1354 | 2696 | 1392 | 1413 | 2805 | 1442 | 1477 | 2919 |
| 55 | 1016 | 1050 | 2066 | 1054 | 1095 | 2149 | 1094 | 1136 | 2230 |
| 60 | 758 | 729 | 1488 | 787 | 778 | 1565 | 814 | 829 | 1643 |
| 65 | 503 | 462 | 965 | 528 | 495 | 1023 | 556 | 532 | 1088 |
| 70 | 324 | 333 | 657 | 334 | 333 | 666 | 345 | 340 | 685 |
| 75+ | 274 | 385 | 659 | 287 | 413 | 700 | 300 | 435 | 735 |
| Total | 28148 | 27355 | 55503 | 28328 | 27527 | 55856 | 28496 | 27688 | 56185 |

Source: Secretariat of the Pacific Community, Statistics for Development Division, 2013 Pacific Island Country and Territories' Populations Estimates by sex and age. [Available from:] http://www.spc.int/sdd/index.php/en/downloads/doc_download/742-spc-sddpop2000-2018-by-1-and-5-year-age-groups-june2013

BIRTHS

Total Number of Births by Age of Mothers in Age Groups: 2010-2012

| Year | Age Groups | | | | | | | | Grand Total |
|---------------------------|------------|------------|-------------|------------|------------|------------|------------|----------|-------------|
| | <15 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | |
| 2010 | 2 | 119 | 302 | 325 | 275 | 171 | 42 | 0 | 1236 |
| 2011 | 1 | 154 | 406 | 336 | 287 | 175 | 37 | 2 | 1398 |
| 2012 | 4 | 129 | 314 | 286 | 246 | 140 | 43 | 1 | 1163 |
| Total by Age Group | 7 | 402 | 1022 | 947 | 808 | 486 | 122 | 3 | 3797 |
| Average | | 134 | 340.7 | 315.7 | 269.3 | 162.0 | 40.7 | 1.0 | 1265.7 |

DEATHS

Total Number of Deaths by Sex and 5 Year Age group, and year: 2010-2012

| Age group | 2010 | | | 2011 | | | 2012 | | | 2010-2012 | | |
|-----------|-------|---------|-------|-------|---------|-------|-------|---------|-------|-----------|---------|-------|
| | Males | Females | Total | Males | Females | Total | Males | Females | Total | Males | Females | Total |
| <1 | 10 | 8 | 18 | 5 | 2 | 7 | 5 | 3 | 8 | 20 | 13 | 33 |
| 1-4 | 1 | 0 | 1 | 3 | 2 | 5 | 1 | 2 | 3 | 5 | 4 | 9 |
| 5-9 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 | 0 | 2 |
| 10-14 | 0 | 2 | 2 | 1 | 0 | 1 | 1 | 1 | 2 | 2 | 3 | 5 |
| 15-19 | 5 | 0 | 5 | 4 | 1 | 5 | 4 | 0 | 4 | 13 | 1 | 14 |
| 20-24 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 2 | 3 | 3 | 2 | 5 |
| 25-29 | 2 | 0 | 2 | 2 | 5 | 7 | 2 | 1 | 3 | 6 | 6 | 12 |
| 30-34 | 3 | 1 | 4 | 4 | 4 | 8 | 1 | 6 | 7 | 8 | 11 | 19 |
| 35-39 | 5 | 2 | 7 | 6 | 3 | 9 | 4 | 2 | 6 | 15 | 7 | 22 |
| 40-44 | 7 | 4 | 11 | 7 | 5 | 12 | 8 | 4 | 12 | 22 | 13 | 35 |
| 45-49 | 20 | 4 | 24 | 13 | 8 | 21 | 11 | 8 | 19 | 44 | 20 | 64 |
| 50-54 | 15 | 6 | 21 | 12 | 9 | 21 | 13 | 8 | 21 | 40 | 23 | 63 |
| 55-59 | 15 | 7 | 22 | 17 | 16 | 33 | 18 | 12 | 30 | 50 | 35 | 85 |
| 60-64 | 17 | 10 | 27 | 20 | 13 | 33 | 16 | 6 | 22 | 53 | 29 | 82 |
| 65-69 | 13 | 10 | 23 | 21 | 11 | 32 | 20 | 12 | 32 | 54 | 33 | 87 |
| 70-74 | 19 | 6 | 25 | 13 | 19 | 32 | 24 | 12 | 36 | 56 | 37 | 93 |
| 75-79 | 11 | 10 | 21 | 14 | 6 | 20 | 11 | 15 | 26 | 36 | 31 | 67 |
| 80-84 | 6 | 5 | 11 | 8 | 5 | 13 | 10 | 18 | 28 | 24 | 28 | 52 |
| 85+ | 10 | 11 | 21 | 6 | 16 | 22 | 12 | 6 | 18 | 28 | 33 | 61 |
| Total | 160 | 86 | 246 | 157 | 125 | 282 | 164 | 118 | 282 | 481 | 329 | 810 |

Number of early childhood deaths by age group and year, 2010-2012

| Year | Infants under age 1 | | | Children aged 1-4 years | Total children under age 5 years |
|-------------------|---------------------|--------------------|---------------|-------------------------|----------------------------------|
| | Under 28 days | 28 days to <1 year | Total <1 year | | |
| 2010 | 12 | 6 | 18 | 1 | 19 |
| 2011 | 4 | 3 | 7 | 5 | 12 |
| 2012 | 3 | 5 | 8 | 3 | 11 |
| Total | 19 | 14 | 33 | 9 | 42 |
| Average 2010-2012 | 6.3 | 4.7 | 11.0 | 3.0 | 14.0 |

Life table for both sexes, 2010-2012

| Age Group | x | nx | ax | pop (Nx) | deaths | mx | qx | lx | dx | Lx | Tx | ex |
|------------------|----------|-----------|-----------|-----------------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <1 | 0 | 1 | 0.1 | 1,471 | 11 | 0.0075 | 0.0074 | 100000 | 742.8 | 99331 | 7384216 | 73.8 |
| 1-4 | 1 | 4 | 0.5 | 5,250 | 3 | 0.0006 | 0.0023 | 99257 | 226.6 | 396576 | 7284884 | 73.4 |
| 5-9 | 5 | 5 | 0.5 | 6,478 | 1 | 0.0001 | 0.0005 | 99031 | 50.9 | 495026 | 6888309 | 69.6 |
| 10-14 | 10 | 5 | 0.5 | 6,254 | 2 | 0.0003 | 0.0013 | 98980 | 131.8 | 494569 | 6393283 | 64.6 |
| 15-19 | 15 | 5 | 0.5 | 6,406 | 5 | 0.0007 | 0.0036 | 98848 | 359.4 | 493341 | 5898714 | 59.7 |
| 20-24 | 20 | 5 | 0.5 | 4,145 | 2 | 0.0004 | 0.0020 | 98488 | 197.8 | 491948 | 5405373 | 54.9 |
| 25-29 | 25 | 5 | 0.5 | 3,142 | 4 | 0.0013 | 0.0063 | 98291 | 623.6 | 489894 | 4913426 | 50.0 |
| 30-34 | 30 | 5 | 0.5 | 3,315 | 6 | 0.0019 | 0.0095 | 97667 | 928.6 | 486014 | 4423531 | 45.3 |
| 35-39 | 35 | 5 | 0.5 | 3,494 | 7 | 0.0021 | 0.0104 | 96739 | 1009.8 | 481168 | 3937517 | 40.7 |
| 40-44 | 40 | 5 | 0.5 | 3,551 | 12 | 0.0033 | 0.0163 | 95729 | 1559.8 | 474744 | 3456349 | 36.1 |
| 45-49 | 45 | 5 | 0.5 | 3,440 | 21 | 0.0062 | 0.0305 | 94169 | 2875.3 | 463656 | 2981605 | 31.7 |
| 50-54 | 50 | 5 | 0.5 | 2,805 | 21 | 0.0075 | 0.0367 | 91294 | 3354.8 | 448081 | 2517948 | 27.6 |
| 55-59 | 55 | 5 | 0.5 | 2,149 | 28 | 0.0132 | 0.0638 | 87939 | 5612.2 | 425664 | 2069867 | 23.5 |
| 60-64 | 60 | 5 | 0.5 | 1,565 | 27 | 0.0175 | 0.0837 | 82327 | 6887.1 | 394416 | 1644203 | 20.0 |
| 65-69 | 65 | 5 | 0.5 | 1,023 | 29 | 0.0283 | 0.1324 | 75440 | 9985.4 | 352235 | 1249787 | 16.6 |
| 70-74 | 70 | 5 | 0.5 | 666 | 31 | 0.0465 | 0.2084 | 65454 | 13637.5 | 293178 | 897552 | 13.7 |
| 75+ | 75 | 23 | 0.5 | 700 | 60 | 0.0857 | 1.0000 | 51817 | 51816.8 | 604374 | 604374 | 11.7 |

Life table for males, 2010-2012

| Age Group | x | nx | ax | pop (Nx) | deaths | mx | qx | lx | dx | Lx | Tx | ex |
|------------------|----------|-----------|-----------|-----------------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <1 | 0 | 1 | 0.1 | 764 | 7 | 0.0087 | 0.0087 | 100000 | 865.4 | 99221 | 7076287 | 70.8 |
| 1-4 | 1 | 4 | 0.5 | 2,700 | 2 | 0.0006 | 0.0025 | 99135 | 244.5 | 396049 | 6977066 | 70.4 |
| 5-9 | 5 | 5 | 0.5 | 3,445 | 1 | 0.0002 | 0.0010 | 98890 | 95.6 | 494212 | 6581017 | 66.5 |
| 10-14 | 10 | 5 | 0.5 | 3,222 | 1 | 0.0002 | 0.0010 | 98794 | 102.1 | 493717 | 6086805 | 61.6 |
| 15-19 | 15 | 5 | 0.5 | 3,275 | 4 | 0.0013 | 0.0066 | 98692 | 650.8 | 491835 | 5593088 | 56.7 |
| 20-24 | 20 | 5 | 0.5 | 2,081 | 1 | 0.0005 | 0.0024 | 98042 | 235.3 | 489619 | 5101253 | 52.0 |
| 25-29 | 25 | 5 | 0.5 | 1,580 | 2 | 0.0013 | 0.0063 | 97806 | 617.1 | 487488 | 4611634 | 47.2 |
| 30-34 | 30 | 5 | 0.5 | 1,628 | 3 | 0.0016 | 0.0082 | 97189 | 792.9 | 483963 | 4124146 | 42.4 |
| 35-39 | 35 | 5 | 0.5 | 1,780 | 5 | 0.0028 | 0.0139 | 96396 | 1344.7 | 478620 | 3640182 | 37.8 |
| 40-44 | 40 | 5 | 0.5 | 1,777 | 7 | 0.0041 | 0.0204 | 95052 | 1940.9 | 470406 | 3161563 | 33.3 |
| 45-49 | 45 | 5 | 0.5 | 1,695 | 15 | 0.0087 | 0.0424 | 93111 | 3943.9 | 455694 | 2691157 | 28.9 |
| 50-54 | 50 | 5 | 0.5 | 1,392 | 13 | 0.0096 | 0.0468 | 89167 | 4170.8 | 435407 | 2235463 | 25.1 |
| 55-59 | 55 | 5 | 0.5 | 1,054 | 17 | 0.0158 | 0.0761 | 84996 | 6464.1 | 408820 | 1800056 | 21.2 |
| 60-64 | 60 | 5 | 0.5 | 787 | 18 | 0.0225 | 0.1063 | 78532 | 8347.0 | 371792 | 1391237 | 17.7 |
| 65-69 | 65 | 5 | 0.5 | 528 | 18 | 0.0341 | 0.1571 | 70185 | 11027.7 | 323355 | 1019445 | 14.5 |
| 70-74 | 70 | 5 | 0.5 | 334 | 19 | 0.0559 | 0.2453 | 59157 | 14510.2 | 259511 | 696089 | 11.8 |
| 75+ | 75 | 20 | 0.5 | 287 | 29 | 0.1023 | 1.0000 | 44647 | 44647.1 | 436579 | 436579 | 9.8 |

Life table for females, 2010-2012

| Age Group | x | nx | ax | pop (Nx) | deaths | mx | qx | lx | dx | Lx | Tx | ex |
|------------------|----------|-----------|-----------|-----------------|---------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <1 | 0 | 1 | 0.1 | 707 | 4 | 0.0061 | 0.0061 | 100000 | 609.8 | 99451 | 7742849 | 77.4 |
| 1-4 | 1 | 4 | 0.5 | 2550 | 1 | 0.0005 | 0.0021 | 99390 | 207.7 | 397145 | 7643398 | 76.9 |
| 5-9 | 5 | 5 | 0.5 | 3032 | 0 | 0.0000 | 0.0000 | 99183 | 0.0 | 495913 | 7246252 | 73.1 |
| 10-14 | 10 | 5 | 0.5 | 3032 | 1 | 0.0003 | 0.0016 | 99183 | 163.4 | 495504 | 6750340 | 68.1 |
| 15-19 | 15 | 5 | 0.5 | 3132 | 0 | 0.0001 | 0.0005 | 99019 | 52.7 | 494964 | 6254836 | 63.2 |
| 20-24 | 20 | 5 | 0.5 | 2064 | 1 | 0.0003 | 0.0016 | 98966 | 159.7 | 494433 | 5759872 | 58.2 |
| 25-29 | 25 | 5 | 0.5 | 1563 | 2 | 0.0013 | 0.0064 | 98807 | 630.3 | 492458 | 5265439 | 53.3 |
| 30-34 | 30 | 5 | 0.5 | 1687 | 4 | 0.0022 | 0.0108 | 98176 | 1061.1 | 488229 | 4772982 | 48.6 |
| 35-39 | 35 | 5 | 0.5 | 1715 | 2 | 0.0014 | 0.0068 | 97115 | 658.5 | 483930 | 4284752 | 44.1 |
| 40-44 | 40 | 5 | 0.5 | 1773 | 4 | 0.0024 | 0.0121 | 96457 | 1171.3 | 479356 | 3800822 | 39.4 |
| 45-49 | 45 | 5 | 0.5 | 1746 | 7 | 0.0038 | 0.0189 | 95286 | 1802.4 | 471922 | 3321466 | 34.9 |
| 50-54 | 50 | 5 | 0.5 | 1413 | 8 | 0.0054 | 0.0268 | 93483 | 2502.2 | 461160 | 2849544 | 30.5 |
| 55-59 | 55 | 5 | 0.5 | 1095 | 12 | 0.0107 | 0.0519 | 90981 | 4721.4 | 443101 | 2388384 | 26.3 |
| 60-64 | 60 | 5 | 0.5 | 778 | 10 | 0.0124 | 0.0602 | 86259 | 5194.5 | 418311 | 1945284 | 22.6 |
| 65-69 | 65 | 5 | 0.5 | 495 | 11 | 0.0222 | 0.1052 | 81065 | 8530.2 | 383999 | 1526973 | 18.8 |
| 70-74 | 70 | 5 | 0.5 | 333 | 12 | 0.0371 | 0.1697 | 72535 | 12308.0 | 331904 | 1142974 | 15.8 |
| 75+ | 75 | 20 | 0.5 | 413 | 31 | 0.0743 | 1.0000 | 60227 | 60226.7 | 811070 | 811070 | 13.5 |

Appendix 2: Key Concepts and Definitions

Adult Mortality: The probability of dying between the ages of 15 – 59 inclusive, that is, the probability of a 15 year old dying before reaching the age of 60, if subject to current age-specific mortality rates between those ages.

Age-specific fertility rates: The number of births occurring to mothers of a certain age group per 1,000 women in that age group in a given period of time.

Age Specific Mortality Rate: The number of deaths per 1,000 people of a given age group in a given time period.

Age-Standardized Death Rates: The number of deaths that would occur if subject to the same age structure as the standard population and the age-specific rate; one country's age specific death rates applied to a standard age distribution.

Crude Birth Rate (CBR): The annual number of births occurring per 1000 mid-year populations.

Crude Death Rate (CDR): The annual number of deaths occurring per 1000 mid-year population

Infant Mortality Rate (IMR): The number of deaths in infants under age 1 per 1000 live births in a given period.

Life Expectancy: The average number of additional years a person could expect to live if current mortality trends were to continue for the rest of that person's life.

Live birth: The complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life - e.g. beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles - whether or not the umbilical cord has been cut or the placenta is attached. Each product of such a birth is considered live born.

Maternal death: The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

Maternal mortality ratio (MMR): The ratio of the number of maternal deaths during a given time period per 100,000 live births during the same time-period.

Neonatal mortality rate: The number of deaths in live-born infants during the first 28 days of life per 1,000 live births over a specified time period.

Rate of Natural Increase: Rate at which a population grows (increase/decrease) during a given year, as the result of a surplus/deficit of births over deaths; expressed as a percentage of the base population.

Sex Ratio: Number of men per 100 women. Sex ratios over 100 indicate that there are more males than females, and sex ratios under 100 indicate more females than males.

Total Fertility Rate (TFR): The average number of children a woman would give birth to during her lifetime if she were to pass through her childbearing years experiencing the present day age-specific fertility rates.

Under 5 Mortality Rate: The number of deaths in children under age 5 per 1,000 live births in a given period.

Appendix 3: WHO World Standard Population Distribution

| Table 4. WHO World Standard Population Distribution (%), based on world average population between 2000-2025 | |
|---|-------------------------|
| Age group | World Average 2000-2025 |
| 0-4 | 8.86 |
| 5-9 | 8.69 |
| 10-14 | 8.60 |
| 15-19 | 8.47 |
| 20-24 | 8.22 |
| 25-29 | 7.93 |
| 30-34 | 7.61 |
| 35-39 | 7.15 |
| 40-44 | 6.59 |
| 45-49 | 6.04 |
| 50-54 | 5.37 |
| 55-59 | 4.55 |
| 60-64 | 3.72 |
| 65-69 | 2.96 |
| 70-74 | 2.21 |
| 75-79 | 1.52 |
| 80-84 | 0.91 |
| 85-89 | 0.44 |
| 90-94 | 0.15 |
| 95-99 | 0.04 |
| 100+ | 0.005 |
| Total | 100 |

Ahmad OB, Boschi-Pinto C, Lopez AD, Murray C, Lozano R, Inoue M, 2001, Age Standardization of Rates: A New WHO Standard. Geneva, World Health Organization (GPE Discussion Paper Series no. 31, IP/GPE/EBD), [Available from:] <http://www.who.int/healthinfo/paper31.pdf>

Appendix 4: LBJ Process for Birth/Death Certificate

The LBJ process for producing birth and death certificates is as follows:

Newborns born in the hospital:

1. The baby's identifying information is completed by the nurse and then signed by the Attending Physician.
2. Health Information Management (HIM) Department clerk collects birth certificates from the Nursery.
3. HIM interviews mothers at the ward to get baby's name and to confirm the accuracy of the information.
4. An Electronic birth certificate is printed out and sent to the Attending Physician and the Chief Medical Officer for their signature.
5. Once the birth certificate is signed the original is forwarded to the Vital Statistics Office.

Newborns born outside of hospital are reported to Department of Health.

1. Department of Health (DOH) provides the birth certificate to LBJ HIM Department for processing.
2. HIM confirms patient information and then enters information electronically
3. Birth certificate is printed out and sent to DOH for signature of the Attending Person and DOH Chief Medical Officer.
4. DOH then sends it back to LBJ and then LBJ forwards the original to Vital Statistics Office.

Deaths in the hospital:

1. The patient's identifying information is completed by the nurse.
2. The Attending Physician completes the cause of death and signs it.
3. HIM then receives the written death certificate, confirms information and processes the death certificate (type).
5. After certificate is typed it is sent for Signature of the Attending Physician and the Chief Medical Officer.
5. After signature the death certificate is forward to Vital Statistics Office.

Deaths outside of hospital:

1. Deceased is brought to the Emergency Room to confirm date/time of death.
2. The Attending Physician completes a death certificate then forwards it to the HIM Department.
3. HIM Department confirms patient information and then types up the death certificate.
4. Death certificate is sent for the Attending Physician and Chief Medical Officer's signatures.
6. Death certificate is held until a letter from the Attorney General's office is received to release the body.
6. HIM then forwards the death certificate to Vital Statistic Office.

Figure 1A: Diagram of the notification and reporting of births at LBJ.

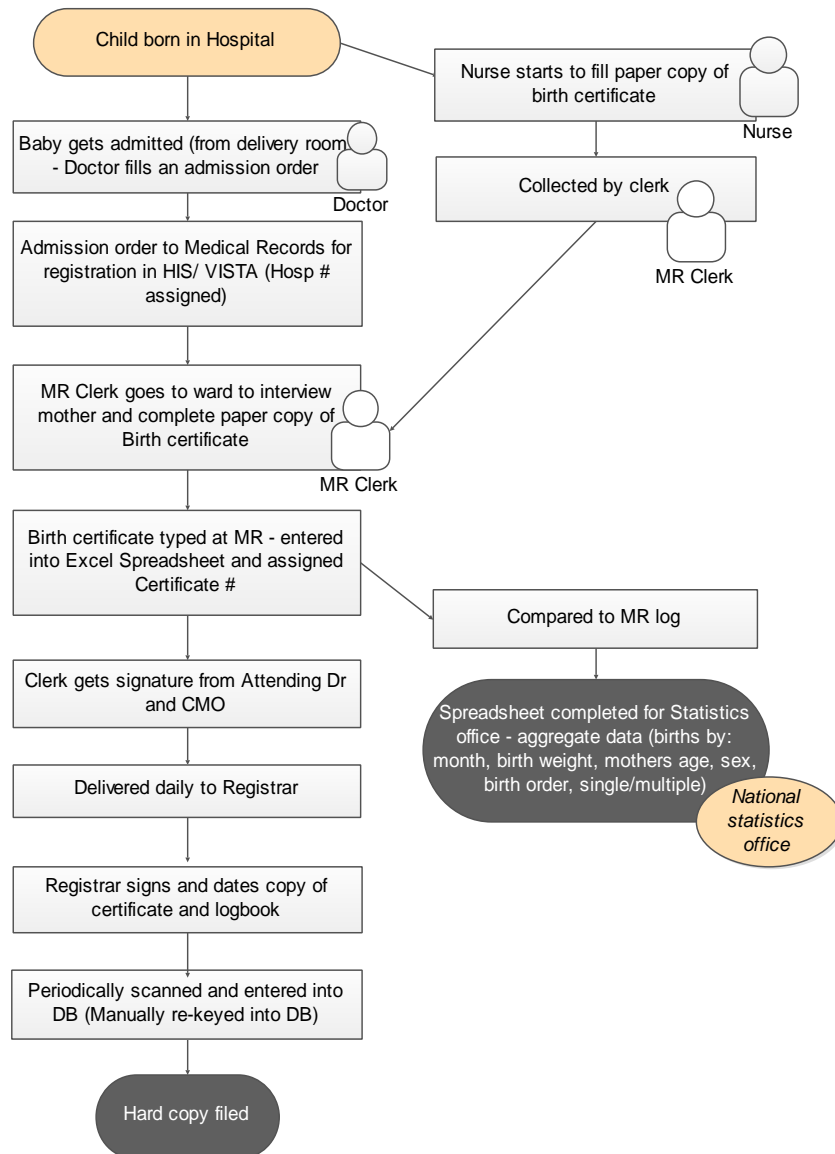


Figure 2A: Diagram of the notification and reporting of deaths.

