Timor-Leste Population and Housing Census 2015

Analytical Report on Mortality

Volume 6

Timor-Leste Population and Housing Census 2015

Thematic Report Volume 6

Analytical Report on Mortality

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United Nations Population Fund (UNFPA)
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Foreword

The 2015 Timor-Leste Population and Housing Census with the theme **"Census from people to people: Be part of it"** was conducted in July 2015 on a *de facto* basis by the General Directorate of Statistics, Minister of Finance. The 2015 Census is the third after those conducted in 2004 and 2010 (post independent Timor-Leste) and fifth after the 1980 and 1990 Censuses, both taken in Indonesian times. This Census was undertaken within the provision of the Statistics Decree Law No. 17/2003 and the 2015 Population and Housing Census Government Resolution no. 11/2014 of 9 April 2014.

The main objective of the 2015 Census was to collect, analyze and effectively disseminate demographic and socio-economic information required for policy and programme formulation, decision making in planning and administrative processes, and research. The Census preliminary results were published in Volume 1 on 21 October 2015 and were launched by His Excellency the Prime Minister of RDTL Dr. Rui Maria de Araújo. The 2015 Census priority tables were published in three volumes: 2, 3 and 4, and launched by the Vice Minister of Finance Eng. Helder Lopes on 17 November 2016. The 'Sensus fo Fila fali' (returning back the results of the Census) was launched by His Excellency Minister of State Dr. Deonisio Babo Soares on behalf of the Prime Minister of RDTL on 2 March 2017. After that an ambitious "Sensus Fo Fila Fali" project was undertaken by the General Directorate of Statistics, Ministry of Finance that culminated in a Census report for each of the 442 sucos in the country.

This fourth phase comprises drafting of analytical reports covering Census thematic topics including fertility, marriage, mortality, migration, population projections, education, labour force, housing, agriculture, gender, youth and an atlas. The preparation of these reports was a collaborative effort between the Government of Timor-Leste, the United Nations Population Fund (UNFPA), the United Nations Children's Fund (UNICEF), the International Labour Organisation (ILO) and the Food and Agriculture Organisation (FAO). Drafting of the thematic reports involved local and international experts. The reports were authored under the supervision and guidance of the Census Technical Specialist from UNFPA. The authors were recruited on a competitive basis, ensuring that they had adequate knowledge of the topics they were to analyse.

All staff at the General Directorate of Statistics, Ministry of Finance and especially the Director General and the Director of System and Reports and his team are commended for their commitment and tireless efforts to successfully undertake all phases of the Census including the thematic analysis exercise.

The Government of Timor-Leste wishes to extend its sincere gratitude to the United Nations Population Fund (UNFPA), the United Nations Children's Fund (UNICEF), the International Labour Organisation (ILO) and the Food and Agriculture Organisation (FAO) for providing technical, financial and administrative support throughout the Census process, and in particular acknowledges the contribution of the authors of each thematic report.

Last but not least, all Timorese people deserve special praise for their patience and willingness to provide the requisite information which forms the basis of these reports and hence benchmark information for development. We in the Ministry of Finance and Government as a whole hope that the data contained in these thematic reports will be fully utilized in the national development planning process by all stakeholders for the welfare of the Timorese people.

GABINETE DA VICE MINISTRA

Sara Lobo Brites
Vice - Minister and Acting Minister of Finance

Executive Summary

Infant and child mortality

The evidence from the 2015 Census suggests that infant mortality in Timor-Leste has been on a downward trajectory since at least the early 2000s and most likely the 1990s. Declines in infant mortality have been greater for males. However, the rates for males were highest in the early 2000s and remained highest immediately prior to the 2015 Census, at 52.6 deaths per 1,000 live births as compared to 47.4 for girls (or 58.6 for males and 53.1 for females for the period 2010–2015). In the early 2000s, approximately one-in-ten children died before reaching their first birthday, whereas by the time of the 2015 Census, the probability of dying in infancy had dropped by half, such that approximately one-in-twenty children died before reaching one year of age. Despite this, comparisons of the latest data from the 2017 revision of World Population Prospects illustrates that Timor-Leste's infant (56 deaths per 1,000 live births) and child (72) mortality rates for 2010–2015 remain relatively high for South-east Asia and moderately high for a developing country.

Between 2003 and 2014, infant mortality declined for males and females in both rural and urban areas, and more consistently so in rural areas despite rural infant mortality rates (IMRs) being higher for both males and females in 2003 and in 2014. The urban-rural gap in the male IMR decreased whereas the gap in the female IMR stayed almost the same in 2003 and 2014. This demonstrates that despite improvements, there is a persistent problem with deaths of infants in rural Timor-Leste.

The analysis shows that in 2010–2015 infant and child mortality rates varied widely around the country, such that the range across Administrative Posts (69 points for IMRs and 111 points for under-five mortality) was larger than the national rates. This demonstrates that in certain locations, there is a persistent problem with deaths of infants and young children. The data for decrease in rates between 2004–2009 and 2010–2015 further emphasizes the persistence of the problem in specific Municipalities, especially Covalima, where there was no change for males and an increase for females. There is also some indication that child mortality rates are higher for the children of the least-well educated and unmarried mothers, indicating that the phenomenon is concentrated among vulnerable households.

Life expectancy

Data for 2010–2015 from the 2017 revision of World Population Prospects suggest that despite male life expectancy for Timor-Leste not being the lowest in the South-east Asian region, it was well below average.

Timor-Leste lagged even further behind other countries in the region for female life expectancy. Indeed, the analysis in this report yielded life expectancies of 63.6 years for males and 66.2 years for females respectively for the period 2010–2015, which although being lower than the World Population Prospects values for Timor-Leste during the same period (by 2.5 years for males and 3.3 years for females), these values were higher than the U.N. estimates for only two Asian countries: Afghanistan and Yemen (United Nations, 2017). This clearly demonstrates that Timor-Leste is not performing well for life expectancy, especially for females.

Nevertheless, comparison with estimates for 2002 from the 2004 Census mortality monograph suggests that male life expectancy increased by 6.2 years and female life expectancy increased by 7.3 years by 2010–2015, and the male-female gap in life expectancy increased from 1.5 to 2.6 years. Also, increases between 2000–2005 and 2010–2015 in U.N. estimates were entirely consistent with the comparison between the census results. Thereby demonstrating that Timor-Leste experienced significant improvements in life expectancy for males and females over the decade preceding the most recent estimates (2010–2015). A comparison of survivorship values from the 2002 and 2010–2015 life tables illustrates that for males and especially for females, reductions in mortality rates occurred for all age groups, but particularly in early childhood and at increasingly older ages.

The urban-rural gap in life expectancies in 2010–2015 was five years for both males and females and life expectancy varied widely around the country, with a large range across Municipalities and especially Administrative Posts (20.7 years for males and 22.7 years for females). Life expectancy was lowest for the least educated, men who had never married, widowed women, and the unemployed. Thus, life expectancy was lower in vulnerable households in remote areas of Timor-Leste in 2010–2015.

Maternal mortality

A ratio of 426 maternal deaths per 100,000 births for the period 2010–2015 represents a reduction on the values from the 2010 Census (570). Associated indicators are also tracking in the right direction. However, 426 is still an extremely high maternal mortality ratio. To place Timor-Leste in context, the MMEIG point estimate for 2015 was the third highest in Asia, behind Afghanistan and Nepal, equal to the value for Papua New Guinea, and 89 deaths per 100,0000 live births higher than in Indonesia (WHO, 2015). Age-specific rates exhibit the classic 'j-shape' of higher rates for adolescents and women in older reproductive ages, the age-groups that are generally at most at risk of maternal mortality.

Recommendations

Rates of infant and child mortality have been in decline in Timor-Leste for at least a decade. Therefore, the government and development partners must sustain interventions to reduce infant and child mortality rates. The evidence generated by this report clearly identifies the pockets where higher rates persist. This evidence should be used to target interventions so that the progress made in other locations can be achieved everywhere. In order to reduce these rates, improved access to healthcare services by all, especially the most vulnerable, is necessary.

Life expectancy has been increasing in Timor-Leste for at least a decade, mainly because of reductions in infant and child mortality rates, but also because of reduced mortality at all ages. The latter has been achieved through a broad range of public health interventions. As for infant and child mortality, the evidence generated by this report clearly identifies the pockets and sub-populations where improvements in life expectancy have been weaker and consequently particular targeting of interventions is necessary. The Government, and the Ministry of Health in particular, should re-double efforts to reduce mortality at all ages through existing interventions and development programmes so as to reach across the whole country. Additionally, the Government must recognize that with increased life expectancy comes increased morbidity and mortality through non-communicable disease – improving nutrition, reducing substance abuse (especially tobacco) and promotion of healthy lifestyles through awareness-building and other initiatives will contribute towards sustained improvements in life expectancy.

The commitment of the Government to reducing maternal mortality through interventions such as a reproductive health strategy, a national family planning programme, training for health providers on safe deliveries and emergency obstetric care, and the equipping of established health facilities, appears to be reducing the maternal mortality ratio. However, these efforts must be further intensified given the continued severity of the problem. A critical step concerns providing universal access to sexual and reproductive health services, including modern contraception to reduce higher-risk pregnancies (especially among adolescents and women in older reproductive ages and those in remote areas). It is vital that the government supports the extension of healthcare out-reach services to the remoter parts of the country so that all women, and especially the most vulnerable women can receive access to antenatal care, a safe childbirth and postnatal care.

The Sustainable Development Goals (SDG) framework offers a mechanism within which to implement, monitor and evaluate these interventions. The Government should focus on:

- SDG 2 (End hunger, achieve food security and improved nutrition and promote sustainable agriculture)

    - Target 2.2: By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons
        - Indicator 2.2.1: Prevalence of stunting (height for age <-2 standard deviation from the median of the World Health Organisation (WHO) Child Growth Standards) among children under 5 years of age;
        - Indicator 2.2.2: Prevalence of malnutrition (weight for height >+2 or <-2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age, by type (wasting and overweight).
- SDG 3 (Ensure healthy lives and promote well-being for all ages and at all times)
    - Target 3.1: By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births
        - Indicator 3.1.1: Maternal mortality ratio;
        - Indicator 3.1.2: Proportion of births attended by skilled health personnel.
    - Target 3.2: By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births
        - Indicator 3.2.1: Under-five mortality rate;
        - Indicator 3.2.2: Neonatal mortality rate.
    - Target 3.3: By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases
        - Indicator 3.3.1: Number of new HIV infections per 1,000 uninfected population, by sex, age and key populations;
        - Indicator 3.3.2: Tuberculosis incidence per 100,000 population;
        - Indicator 3.3.3: Malaria incidence per 1,000 population;
        - Indicator 3.3.4: Hepatitis B incidence per 100,000 population;
        - Indicator 3.3.5: Number of people requiring interventions against neglected tropical diseases.
    - Target 3.4: By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being
        - Indicator 3.4.1: Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease.
    - Target 3.7: By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes
        - Indicator 3.7.1: The proportion of women of reproductive age who have their needs for family planning satisfied with modern methods;
        - Indicator 3.7.2: Adolescent birth rate.
    - Target 3.8: Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all
        - Indicator 3.8.1: Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population).
    - Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
        - Indicator 3.9.1: Mortality rate attributed to household and ambient air pollution;
        - Indicator 3.9.2: Mortality rate attributed to unsafe water, unsafe sanitation and

lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services).

- Target 3.a: Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate
    - Indicator 3.a.1: Age-standardized prevalence of current tobacco use among persons aged 15 years and older.

- SDG 5: (Achieve gender equality and empower all women and girls)
    - Target 5.6: Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences
        - Indicator 5.6.1: Proportion of women aged 15-49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care.

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Chapter 1: Introduction

1.1 Background to the study

Mortality refers to the deaths that occur in a population. Together with fertility and migration, it is one of the three demographic processes that determine population changes. All people die eventually, but the probability of dying at a given age is related to several factors such as sex, income, occupation, marital status, life style, kind of food consumption, among others. Moreover, the level of mortality is one of the best indicators of a population's standard of living and access to health care. The mortality of children under age 1 or under age 5 years in particular is considered a good indicator of the general conditions of hygiene and primary health care in a population.

Although the process started in the 18th century in some European countries, in most of the world it was only during the past century that mortality was reduced significantly. Victory over many diseases, and especially over infant and child deaths, is one of the major advances ever made in the condition of human life. Although in many countries mortality has declined substantially, there is still room for further improvements. The two main determinants of mortality decline in the world are socio-economic development and medical and public health progress. The former include standard of living increases and better nutrition, but also awareness of personal hygiene, and adoption of adequate health practices. The latter comprises the development of preventive and curative technologies to fight diseases; among them, better public sanitation, immunization and the development of crucial therapies (Weeks, 2002; Rowland, 2003).

There is still considerable controversy about the relative contribution of socioeconomic versus public health and specific therapies in the reduction of mortality in the now developed countries. However, there is agreement that medical discoveries began to gain importance in mortality reduction only in the 20th century when many pandemics of infection had declined substantially. The decline in mortality in the present less developed countries took place especially during the second half of the past century. In these countries the considerable effects of imported medical technologies were even greater through implementation of massive health programmes. However, there is a limit to the mortality decline that can be achieved primarily through medical technologies, if socio-economic development remains stagnant (Ruzicka & Hansluwka, 1983). The relationship between socio-economic development improvements in the standard of living, public health programs and access to medical services on one hand and mortality on the other has been established in several studies (e.g. Vallin, Lopez & Behm, 1985).

The process of mortality decline experienced by many countries, and still being experienced by many more, is usually referred to as the *epidemiological transition* (Omran, 1971). This process not only resulted in mortality decline but also in changes in sex and age patterns of disease and mortality, as well as changes in the composition of causes of death as the prevalence of certain specific diseases was reduced by medical technology and public health interventions. In most countries the entire population has benefited from medical progress and improvements in the standard of living, but the declines in infant and child mortality have been most pronounced. Mortality at older ages has a more pronounced component of non-communicable and degenerative diseases (cardiovascular diseases, cancer, etc.) against which progress has been slower. In addition, in recent decades new health challenges have emerged such as HIV/AIDS which require new investments in prevention and in the development of cures and which, in some cases, have reverted the gains in life expectancy made until now.

As will be shown in this thematic report, mortality has experienced a substantial decline in Timor-Leste since Independence. This was as a result of the slow recovery of the health infrastructure destroyed in the run up to the 1999 Independence referendum, as well as the effect of support provided by some bilateral development partners and international agencies. A substantial increase of the per capita GDP may also have had a positive effect. However, mortality is far from being low and it needs to be improved considerably to reach an acceptable level. The analysis in this thematic report indicates that the life expectancy at birth for both sexes combined in the 2010–2015 period was 65 years. While this is undoubtedly a great improvement over what it was in the early 2000s, it should be borne in mind that this places Timor-Leste among the 25 per cent of countries with the lowest life expectancies in the world.

1.2 Sources of mortality data for Timor-Leste

In Timor-Leste, the statistics on birth and death provided by the civil registration system, as in other developing countries, are not complete and it is not possible to use them to estimate mortality levels and trends. The main sources of statistics on mortality in Timor-Leste are the Demographic and Health Surveys (TLDHSs) and censuses. The fact that the country has now conducted three consecutive censuses, in 2004, 2010 and 2015 makes this easier. In addition, three DHSs and one Multiple Indicator Cluster Survey (MICS) have been implemented.

As in most countries, survey results in Timor-Leste do not always coincide with those of the census. This is expected because the census considers the entire population, unlike surveys which use samples that often vary from one round of surveys to the other. This difference may also have been caused by the utilization of different data collection instruments (questionnaires) with different types of questions and even the data processing and analysis approaches. Sometimes, different results are magnified because of erroneous interpretations. A major error is to assign the survey or census mortality measure to the same year in which they were conducted. Surveys do not provide measures for the year in which the survey was implemented, but usually for a three or five-year period before the date of enumeration. A similar situation occurs with census measures. They are usually for some years before the census takes place. There are also quality issues. Because census enumerators are usually not highly trained for the interviews they conduct, census data are more error-prone than specialized surveys such as the DHS which rely on a much smaller, much more highly-trained team of interviewers. Therefore, the trend that emerges from the data collected from different sources is usually more important than the fact that there are differences between the sources.

The most comprehensive set of demographic statistics on all countries of the world is compiled every two years by the United Nations Population Division, in its World Population Prospects. These statistics also may be different from the ones derived in this thematic report because:

The most recent set of estimates from the Population Division (the 2017 Revision) does not contain any information based on the 2015 Census;

The United Nations considers other information sources besides censuses; and

The methods used in the estimation process are not always the same as the ones used in this thematic report.

The purpose of this thematic report is to estimate and analyze mortality in Timor-Leste according to the 2010 and 2015 Censuses. The population and housing census is the more complete source of population data required for administrative purposes, economic and social planning as well as research. It is the only source that provides information for the entire population of the country and not just a sample. This makes it possible to obtain information at highly disaggregated levels, something that a survey usually cannot do because of the limitations of the sampling frame. A census supplies data to estimate mortality that is not provided by any other source, both to calculate under-five and adult mortality. Therefore, mortality measures based on a population census should be given high consideration in the analysis of mortality.

1.3 Organization of the thematic report

This thematic report consists of five chapters, including this chapter. Chapter 2 covers under-five mortality by sex. The chapter includes an analysis of geographical and socioeconomic levels of early age mortality differentials. Chapter 3 deals with life expectancy by sex and also includes an analysis of geographical and socioeconomic differentials. Chapter 4 consists of an analysis of maternal mortality. Special questions to measure this variable were included in the census. Finally, Chapter 5 provides conclusions and recommendations. It is expected that this thematic report will provide a relevant contribution to the analysis of mortality and the improvement of policies directed to reduce it.

Chapter 2: Infant and child mortality

2.1 Overview

As mentioned in the previous chapter, infant and child mortality have received substantial attention especially in the less and least developed countries where a substantial number of deaths still occur in early life. Saving children less than 5 years of age, and especially less than 1 year, is a major public health concern, calling for accurate statistics and rigorous measures to identify the extent of the problem and to monitor its progress (Rowland, 2003). Timor-Leste is no exception. Another more practical reason why much of the attention in mortality analysis tends to be focused on infant and child mortality is that better methods are available than for the estimation of mortality at older ages. Thus it is not uncommon for the life expectancy of a country (which, in theory, involves the mortality at all ages) to be estimated purely on the basis of an extrapolation of infant and child mortality levels.

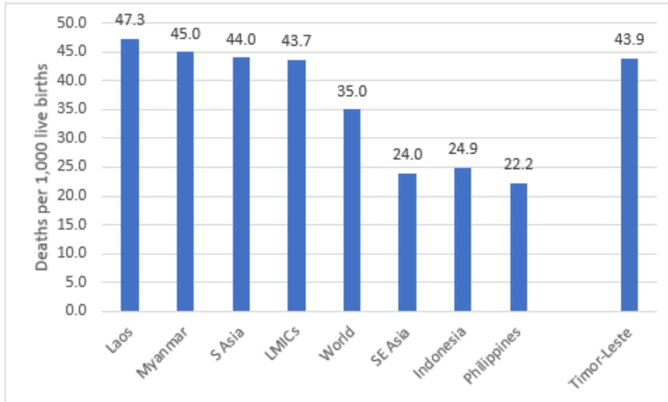
Because of the importance for understanding early-age mortality, it is essential to mention that fertility in Timor-Leste is still high. According to the 2010 Census, the Total Fertility Rate (TFR) was 5.9 children per woman in 2007–2008 (NSD and UNFPA, 2012a). According to the 2009–10 TLDHS, it was 5.7 during the period 2007 to 2010 (RDTL MoF, 2010). According to the 2004 Census it was over 7 children per woman (Neupert, 2006). However, as is shown in the fertility thematic report of the 2015 Census, there are consistent signs that a sustained decline is underway and the TFR was estimated at 4.5 in 2013–2015 (GDS, 2018). One would normally expect this drop to be associated with a simultaneous reduction in infant and child mortality rates, but infant mortality appeared to increase slightly between 2010 and 2015. The same phenomenon occurred in the analysis of the 2010 data and was removed through an adjustment (NSD and UNFPA, 2012b). This was the correct decision, because the 2015 analysis shows no sign of a mortality increase shortly before the 2010 Census. The same adjustment was made to the 2015 data.

2.2 Levels and trends of infant and child mortality

<u>International comparison of infant and under-five mortality rates</u>

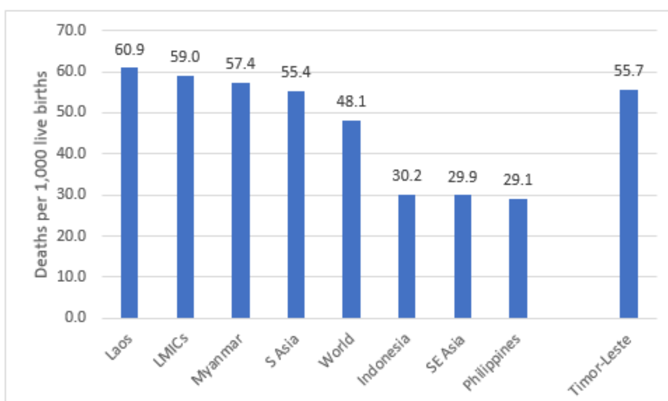
The 2017 revision of World Population Prospects estimated the IMR for Timor-Leste at 43.9 deaths per 1,000 live births for the period 2010–2015 (Figure 1). This value was similar to the values for two other countries in the South-east Asia region – Laos (47.3) and Myanmar (45.0) and very close to the value for lower-middle income countries (43.7) and the South Asian region (44.0). However, the rate was substantially higher than the rates for neighbouring countries (Indonesia: 24.9; Philippines: 22.2), the South-east Asian region (24.0), and also higher than the world average (35.0) for the 2010–2015 period (United Nations, 2017). This illustrates that Timor-Leste continues to have a moderately high rate of infant mortality compared with most other South-east Asian countries and the world average.

Figure 1: International comparison of infant mortality rates



The 2017 revision of World Population Prospects estimated the under-five mortality rate for Timor-Leste at 55.7 deaths per 1,000 live births for the period 2010–2015 (Figure 2). This value was lower that the values for two other countries in the South-east Asian region – Laos (60.9) and Myanmar (57.4) and the value for lower-middle income countries (59.0). The rate for Timor-Leste was very similar to the value for the South Asian region (55.4). However, the rate is substantially higher than the rates for neighbouring countries (Indonesia: 30.2; Philippines: 29.1), the South-east Asian region (29.9), and also higher than the world average (48.1) for the 2010–2015 period (United Nations, 2017). Despite being in a slightly better situation than for infant mortality, this illustrates that Timor-Leste continues to have a moderately high rate of under-five mortality compared with most other South-east Asian countries and the world average.

Figure 2: International comparison of under-five mortality rates



Methods

In the less developed countries, vital registration systems are normally incomplete or non-existent. Infant and under-five mortality is typically estimated with *indirect* methods, as opposed to *direct* methods based on vital registration data on the number of registered deaths by age and sex. Indirect methods are usually based on *retrospective* information provided at the time of the census. The 2015 Census of Timor-Leste contains a number of such questions that allow the reconstruction of past mortality conditions based on retrospective reports about children who were born alive but who may since have died or moved out of the mother's household. These retrospective reports typically contain certain expected errors, which can be corrected by means of indirect estimation methods.

How well these methods work depends on whether the kind of errors contained in the retrospective reports correspond to the assumptions made by the methods. A common assumption, for example, is that the retrospective reports on the date of birth of the last child that a woman had may be systematically biased, but that this bias is more or less the same for women of all ages, so that the Age-Specific Fertility Rates derived from this information have at least the right age pattern, although maybe not the correct level. This is an error that can be corrected in the analysis by using the appropriate correction method. However, as was explained in the fertility thematic report, there were indications in the 2015 Census some children were declared as the offspring of women who may in fact have been their grand-mothers (GDS, 2018). This is a more difficult error to deal with, for which there are no generally accepted correction methods.

Turning to infant and child mortality, the same information on the date of birth of the last child, combined with the current survival status and the sex of that child, makes it possible to estimate infant mortality, provided that the errors in this information have to do with the omission of some children and not with the systematic misdeclaration of the dates of birth of the children or of their survival status. A particular problem that affects the data of the 2015 Census and that cannot be easily corrected is that, of the 36,202 children that were either declared or assumed as having been born during the 12 months preceding the census[1], as many as 2,226 had code "9" for their survival status, meaning that it is unknown whether they were alive or dead, compared to only 1,192 confirmed deaths. This means that, depending on whether the children with code"9" are assumed alive or dead, the estimated infant mortality could vary by a factor of almost 3. One would expect that this situation occurred more frequently with children who were not living with their mothers and whose current status may therefore not have been known to the respondent. But the fact was that most of the cases with code "9" occurred in households that did not declare any children living elsewhere. If only children with a definite code "2" (deceased) are counted as confirmed deaths, the infant mortality rate comes out to an improbably low 29 per 1,000. If, on the other hand, all codes "9" are counted as child deaths, the infant mortality rate increases to 88, which is a much more plausible value. Consequently, it is more likely that the vast majority of code "9" cases should really have been marked as "2", but it is not known if this is true in all cases, nor why these cases were not marked correctly. Poor training and field supervision may be to blame for this problem. For the purposes of the analysis of infant and child mortality, therefore, this information cannot be used.

On a more positive note, there is evidence that the overall reporting of deaths in the household during the 12 months preceding the 2015 Census improved considerably on the 2010 Census, to the point where the reporting in 2015 was more than 90 per cent complete. This point is further elaborated on in Chapter 3.

Although the problem outlined in the previous paragraph is specific to the 2015 Census of Timor-Leste, it is not uncommon in other censuses for the information on the survival of the last child to have problems. For this reason, information on the survival of the last child is relatively little used in preparing standard estimates of infant and child mortality. The more commonly used method is based on the analysis of the proportion of surviving children among all the children ever born to women of different age groups. The older the women, the longer ago, on average, their children were born. So, by combining the information obtained from women in different age groups it is possible to get an idea about the evolution of infant and child mortality levels over time. The method was originally proposed by Brass and Coale (1968) and later reformulated by Sullivan (1972), Trussell (1975) and Feeney (1980), to make it easier to apply and more flexible in the face of changing mortality conditions. The analysis carried out here is based on the reformulation by Moultrie et al. (2013), which uses the average parities of women at ages 15–19, 20–24

[1] This includes 3,321 births that were coded with dates of birth after July 12th, 2015, but that could plausibly be reassigned to the second semester of 2014. More information on this topic is provided in the fertility thematic report.

and 25–29 to quantify how fast fertility increases with age and hence how long ago the births of children that have died or survived are likely to have been. This information is then consolidated through a logit mortality curve to obtain estimates that refer to different periods in time but to the same age-specific mortality indicators (the probability of dying before age 1 or before age 5 years).

The main assumptions that underlie the application of the method are the following (Moultrie et al., 2013: 148):

1. No correlation exists between mortality risks of children and survival of mothers (by mortality or migration) in the population;
2. Any changes in child mortality in the recent past have been gradual and unidirectional;
3. Cross-sectional average numbers of children ever born by age adequately reflect the appropriately-defined cohort patterns of childbearing; and
4. There have been no major changes in the age pattern of fertility during the past 20 years.

In addition, one needs to assume that the population age patterns of fertility and child mortality are adequately represented by the model patterns used in developing the method. An assessment was carried out in this respect which suggested that among the traditional Princeton set of life table families, it was the East model that yielded the most consistent results. Of course, these are not the only possibilities. It was found that the United Nations life table families known as the “Chilean pattern” and the “Far Eastern pattern” fit the data even slightly better. However, it was decided to use the East model, basically for two reasons:

1. This was the same life table family that was also used in the mortality thematic report of the 2010 Census; and
2. As explained by Moultrie at al. (2013), the estimation model, when applied with the United Nations life table families, requires the inclusion of the mean age of childbearing. This was problematic in the case of the 2015 Census because there was a lot of uncertainty regarding the actual age pattern of fertility (see the fertility thematic report) which made it difficult to specify this average age accurately.

Unadjusted and adjusted estimates of infant mortality

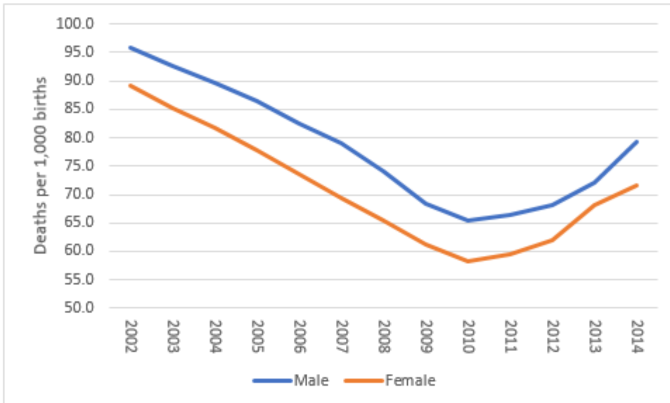
Based on the chosen life table model, the data were analyzed with the standard software provided by Moultrie et al. (2013). The IMR results are displayed in Table 1.

Table 1: Unadjusted IMRs by sex, 2001 to 2014, Timor-Leste, 2015 Census

Male		Female	
Year	Rate	Year	Rate
2014.4	83.1	2014.4	72.5
2013.3	73.6	2013.3	70.1
2011.7	67.1	2011.7	60.2
2009.7	65.1	2009.7	58.0
2007.4	77.5	2007.5	67.8
2004.8	87.1	2004.8	78.8
2001.6	97.2	2001.6	90.6

Figure 3 displays the interpolated IMRs for calendar years by sex.

Figure 3: Unadjusted calendar year IMRs by sex, 2002 to 2014, Timor-Leste, 2015 Census



The results indicate that IMR decreased between 2000 and 2010, but apparently increased between 2010 and 2015. The increase between 2010 and 2015 is probably because the mortality data for this period is based on the 15–19 age group which is not entirely representative and generally tends to yield exaggerated mortality estimates. A similar phenomenon was observed in the analysis of the 2010 Census where, the decline of infant mortality was fairly uniform but the estimates showed an increase in 2008 and 2009.

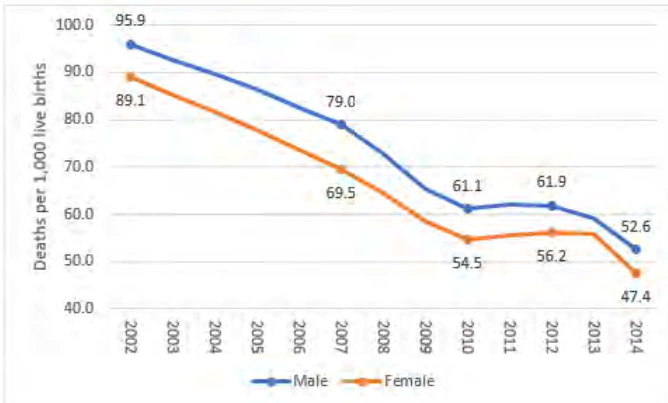
The adjustments that were applied to the 2010 estimates were based on the assumption that the 15–19 year age group data was 68 per cent too high, the 20–24 year age group data was 26 per cent too high and the 25–29 and 30–34 year age groups were 7 per cent too high (NSD and UNFPA, 2012b). The same corrections were applied to the unadjusted trend from the 2015 Census. The adjusted infant mortality rate (IMR) results are displayed in Table 2.

Table 2: Adjusted IMRs by sex, 2001 to 2014, Timor-Leste, 2015 Census

Male		Female	
Year	Rate	Year	Rate
2014.4	49.4	2014.4	43.2
2013.3	58.4	2013.3	55.7
2011.7	62.7	2011.7	56.3
2009.7	60.8	2009.7	54.2
2007.4	77.5	2007.5	67.8
2004.8	87.1	2004.8	78.8
2001.6	97.2	2001.6	90.6

Figure 4 displays interpolated IMRs for calendar years by sex based on exponential growth rates between the data points presented in Table 2.

Figure 4: Adjusted calendar year IMRs by sex, 2002 to 2014, Timor-Leste, 2015 Census



Between 2002 and 2014, adjusted estimates suggest that by the time of the 2015 Census, infant mortality rates had declined to just over half of their value in the early 2000s. The pace of decline between 2003 and 2013 was approximately -4 per cent for annum. This compares favourably with the estimated pace of decline from the 2017 revision of World Population Prospects of 3.8 per cent per annum between 2005–2010 and 2010–2015 (United Nations, 2017). The evidence therefore points towards sustained decline of the infant mortality rate in Timor-Leste.

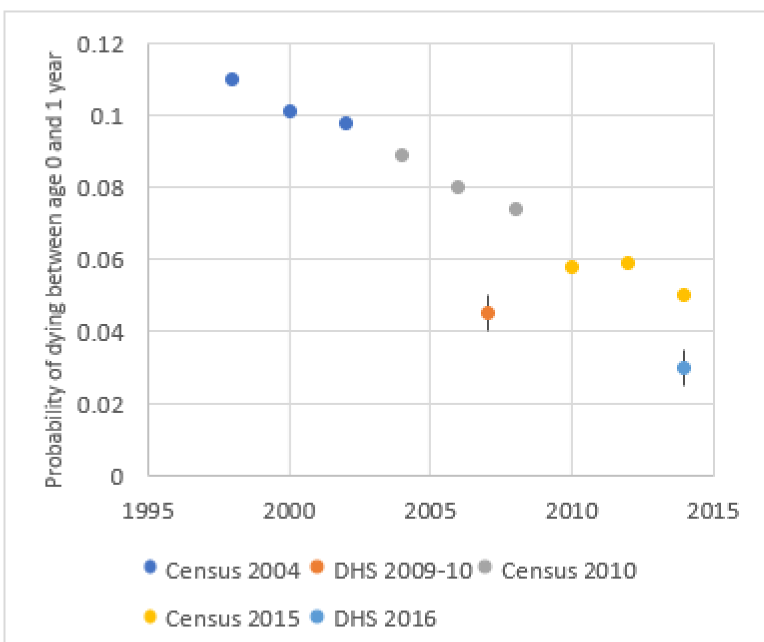
<u>Infant mortality according to several sources</u>

Table 3 presents several sources of infant mortality data covering the period 1991 to 2014. Each source provides three measures from different points in time. Data for 1998 to 2014 are graphically presented in Figure 5.

Table 3: Infant mortality according to several sources, Timor-Leste, 1991–2014

Year	Infant Mortality						
	MICS 2003	DHS 2003	Census 2004	DHS 2009-10	Census 2010	Census 2015	DHS 2016
1991		0.126					
1992							
1993							
1994							
1995							
1996	0.094	0.108					
1997				0.083			
1998	0.093		0.110				
1999							
2000	0.076		0.101				
2001		0.06					
2002			0.098	0.068			
2003							
2004					0.089		0.036
2005							
2006					0.080		
2007				0.045			
2008					0.074		
2009							0.030
2010						0.058	
2011							
2012						0.059	
2013							
2014						0.050	0.030

Figure 5: Infant mortality according to Censuses and DHSs, Timor-Leste, 1998–2014



In Figure 5, The Census and DHS data show a clear declining trend in the probability of dying between age 0 and age 1 year (infant mortality). It is notable that the census trend line is consistently higher than for the most recent measures from the 2009-10 and 2016 TLDHSs, even when the DHS confidence limits are accounted for (GDS, MoH and ICF, 2018). This is because surveys tend to collect data less consistently than censuses since they are based upon samples and infant mortality is a relatively rare event. This is consistent with differences between census and surveys across developing country contexts.

Period infant and child mortality rates

IMRs for the period 2010–2015 were 58.6 deaths per 1,000 live births for males and 53.1 deaths per 1,000 live births for females (Table 4). The child mortality rates (deaths between 1 and 4 years of age) for the period 2010–2015 were 14.7 deaths per 1,000 population for males and 18.7 deaths per 1,000 population for females. The under-five mortality rate for the period 2010–2015 was 72.4 deaths per 1,000 live births for males and 70.8 deaths per 1,000 live births for females.

Table 4: Infant and child mortality rates by sex, 2010–2015, Timor-Leste, 2010 and 2015 Censuses

2010-2015	Male	Female	Both sexes [1]
Infant Mortality Rate	58.6	53.1	56
Child Mortality Rate	14.7	18.7	17
Under-five Mortality Rate	72.4	70.8	72

[1] Modelled with male and female estimates and enumerated data

The total child mortality rate from the Censuses is five points higher than the 2016 TLDHS value (confidence range eight points), and the total under-five mortality rate is 31 points higher than the 2016 TLDHS value (confidence range 14 points) (GDS, MoH and ICF, 2018). This is because surveys tend to collect data less consistently than censuses since they are based upon samples and child mortality is a relatively rare event.

The total IMR for 2010–2015 was estimated at 56 deaths per 1,000 live births. This value is 14 points higher than the value of 44 for 2010–2015 from the 2017 revision of World Population Prospects (United Nations, 2017). The census IMR value of 56 is very similar to the value for the least-developed countries (56.1), and within Asia, the value generated from the census is only exceeded by U.N. estimates for Afghanistan (68.6) and Pakistan (69.8) (United Nations, 2017). Thus, despite a declining IMR, when the census estimate for 2010–2015 is compared to U.N. estimates, Timor-Leste continues to have a high rate of infant mortality.

In Chapter 3, the 2010-2015 infant and child mortality estimates in Table 4 are combined with estimates of adult mortality obtained by other means to define the first part of the life tables, up to age 5, and the parts of the life tables beyond age 5, respectively.

Infant and child mortality by urban and rural location

The same corrections were applied to the unadjusted trend for urban and rural data as were applied to the data in Table 1. The adjusted IMR results for urban locations are displayed in Table 5, and the adjusted IMR results for rural locations are displayed in Table 6.

Table 5: Adjusted IMRs by sex, 2003 to 2014, urban locations, 2015 Census

Male		Female	
Year	Rate	Year	Rate
2014.4	33.9	2014.3	32.6
2013.4	48.3	2013.3	49.6
2012.1	52.6	2012.0	46.6
2010.4	45.4	2010.5	40.9
2008.5	57.4	2008.6	51.6
2006.1	63.3	2006.3	60.1
2002.9	70.7	2003.2	70.4

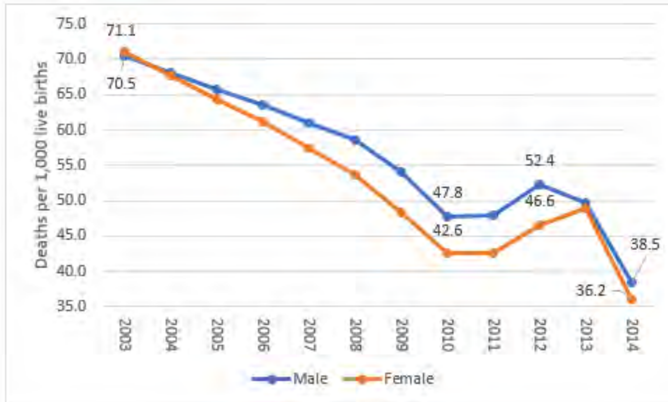
Table 6: Adjusted IMRs by sex, 2000 to 2014, rural locations, 2015 Census

Male		Female	
Year	Rate	Year	Rate
2014.5	54.5	2014.5	47.3
2013.3	61.8	2013.3	57.7
2011.5	66.5	2011.5	59.9
2009.3	66.8	2009.3	59.3
2006.7	84.1	2006.8	73.2
2003.9	93.5	2003.9	83.7
2000.7	103.2	2000.7	95.0

Figures 6 and 7 display interpolated IMRs for calendar years by sex for urban and rural locations respectively based on exponential growth rates between the data points presented in Tables 5 and 6.

In Figure 6, the urban male IMR was slightly lower (70.5 deaths per 1,000 live births) than the urban female IMR (71.1) in 2003. However, the female IMR decreased at a faster rate to reach 42.6 by 2010, compared with 47.8 for males. Since 2010, after a slight increase, the rates once again converged at 36.2 for females and 38.5 for males. Between 2004 and 2014, the urban male and female IMRs decreased by approximately 30 points.

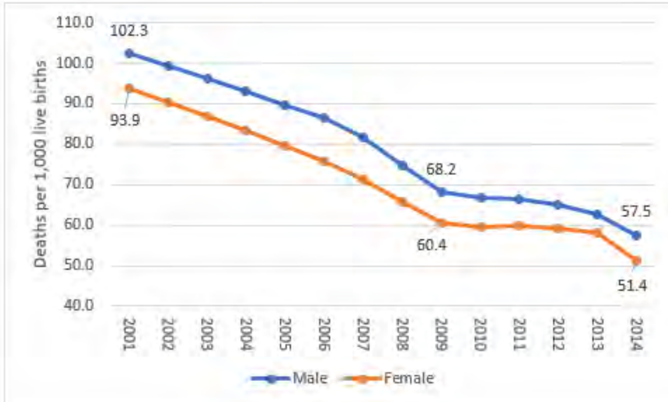
Figure 6: Adjusted calendar year IMRs by sex, 2003 to 2014, urban locations, 2015 Census



The trend in rural areas was more consistent than in urban areas, such that the male IMR was always higher than female IMR (Figure 7), with a slight reduction in the male-female gap in more recent years. The rural male IMR was 102.3 deaths per 1,000 live births in 2001, eight points higher than the rural female IMR (93.9). By 2009, the female IMR decreased to reach 60.4, compared with 68.2 for males. Between 2009 and 2013, the pace of decline was slower for males, and the rate was constant for females. In 2014, the male IMR was 57.5 and the female IMR was 51.4, a gap of 6.1 as compared with 8.4 in 2001. Between 2004 and 2009 rural IMRs decreased by over 30 points, and between 2009 and 2014 the decrease was approximately 10 points.

Figures 6 and 7 demonstrate that IMR has declined for males and females in both rural and urban areas. The decline was more consistent in rural areas, but rural IMRs were higher for both males and females in 2003 and in 2014. However, the urban-rural gap in male IMR reduced by almost seven points (from 25.8 in 2003 to 19 in 2014), whereas the gap in female IMR stayed almost the same (around 15 points) in 2003 and 2014.

Figure 7: Adjusted calendar year IMRs by sex, 2002 to 2014, rural locations, 2015 Census



Estimation of urban and rural under-five mortality for 2010–2015 was based on the Brass' logit transformation model (Brass, 1971) using the national male and female life tables computed in Chapter 3 as the standard. To generate the estimates of IMR, The United Nations Population Divisions software application for mortality estimation 'MortPak' (application MATCH) was used to produce a life table from life expectancy estimates and thereafter, IMRs were estimated by adjusting the life table estimates for the probability of dying at age 0 years by the proportional difference between the under-five mortality values presented here and the estimates from the calculated life table. Because of the method of estimation, the IMRs are presented as whole numbers. The results are presented in Table 7.

Table 7: Infant and child mortality rates by sex, 2010–2015, urban and rural locations, 2010 and 2015 Censuses

	Urban		Rural	
	Male	**Female**	**Male**	**Female**
Infant mortality rate	48	43	64	58
Under-five mortality rate	60.4	57.6	84.9	81.0

The estimated urban-rural gap in the infant mortality rate was 16 points for males and 15 points for females in 2010–2015. In urban areas, the male-female gap was 5 points, and in rural areas the gap was 6 points. The estimated urban-rural gap in the under-five mortality rate was 24.5 points for males and 23.4 points for females in 2010–2015. In urban areas, the male-female gap was only 2.8 points, whereas in rural areas the gap was slightly larger, at 3.9 points.

Infant and child mortality by Municipality

Table 8 presents infant mortality data for the Municipalities for 2010–2015. The same method was applied to obtain these estimates as for urban and rural areas. Similarly, the IMRs are presented as whole numbers because of the method of estimation.

Table 8: IMRs by sex, 2010–2015, Municipalities, 2010 and 2015 Censuses

Municipality	Infant Mortality Rate	
	Males	Females
Aileu	60	54
Ainaro	70	60
Baucau	67	52
Bobonaro	69	62
Covalima	78	72
Dili	46	43
Ermera	61	54
Lautém	53	48
Liquiça	59	56
Manatuto	66	64
Manufahi	59	56
Oecusse	48	44
Viqueque	64	59

In 2010–2015, the highest IMRs were in Covalima (78 for males and 72 for females), and the lowest IMRs were in Dili (46 for males and 43 for females), reflecting the fact that Dili's population is predominately urban. The range between the highest and lowest IMRs was 32 points for males and 29 points for females. The largest male-female gap in IMRs was in Baucau (15 points), and the lowest gaps were in Manatuto (2 points) and Manufahi (three points).

The IMRs for both sexes were estimated by applying the national differential to the Municipality data. In Figure 8, the range between the highest and lowest IMRs was 31 points and only three Municipalities (Dili, Oecusse and Lautem) had a lower IMR than the national average of 56 deaths per 1,000 live births. Manatuto, Ainaro and Bobonaro had values nine or ten points higher than the national average, and Covalima stands out as having an IMR 19 points higher than the national average.

Figure 8: IMRs, both sexes, 2010–2015, Municipalities, 2010 and 2015 Censuses

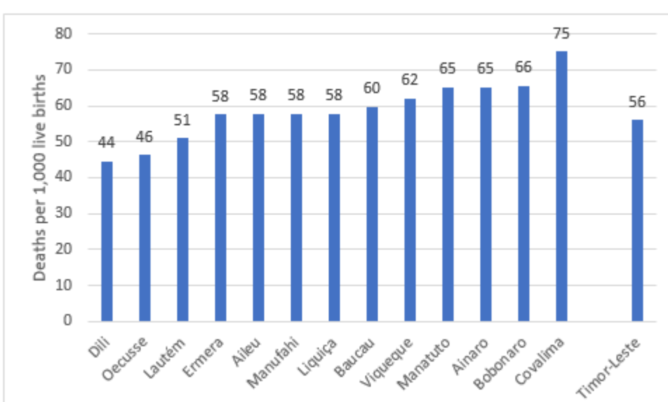


Table 9 presents under-five mortality data for the Municipalities for 2010–2015. The same method was applied to obtain these estimates as for urban and rural areas.

Table 9: Under-five mortality rates by sex, 2010–2015, Municipalities, 2010 and 2015 Censuses

Municipality	Under-five Mortality Rate	
	Males	Females
Aileu	79.3	75.6
Ainaro	94	84.5
Baucau	88.8	70.9
Bobonaro	91.6	88.8
Covalima	105.7	106.4
Dili	58.1	56.2
Ermera	79.8	74.6
Lautém	68.5	65.6
Liquiça	77.3	78.4
Manatuto	87.8	91.7
Manufahi	76.8	78.9
Oecusse	60.8	59.1
Viqueque	85.4	83.5

In 2010–2015, as for IMR, the highest under-five mortality rates were in Covalima (105.7 for males and 106.2 for females), and the lowest under-five mortality rates were in Dili (58.1 for males and 56.2 for females), reflecting the fact that Dili's population is predominately urban. The range between the highest and lowest under-five mortality rates was 47.6 points for males and 50.2 points for females. As for IMR, the largest male-female gap in under-five mortality rates was in Baucau (18 points). In Dili, Oecusse and Viqueque, male values were only two points higher than female values. In Covalima, Liquica, Manatuto and Manufahi, female under-five mortality rates were actually higher than male rates, with the largest difference in Manatuto (four points). Since IMRs were higher for males than females in every municipality, higher under-five mortality rates for females reflect higher rates of female child mortality in these Municipalities.

The 2010 Census thematic report on mortality estimated under-five mortality for three periods (2004–2005, 2006–2007 and 2008–2009). Whilst acknowledging the caveat that the methods used in the 2010 Census thematic report and this thematic report to estimate under-five mortality at the Municipality level were not identical, it is possible to gain some understanding of patterns of change in rates through comparison. It was determined that since the 2010 Census thematic report estimates span a five-year period (2004–2009), it was appropriate to average these values in order to make the most meaningful comparison with the estimates for the period 2010–2015. Tables 10 and 11 present data on the estimated change in rates for males and females respectively.

Table 10: Change in under-five mortality rates, males, 2004–2009 and 2010–2015, Municipalities, 2010 and 2015 Censuses

Municipalities	Decrease (deaths per 1,000 live births)
Covalima	0
Manatuto	-12
Aileu	-15
Ainaro	-18
Manufahi	-18
Viqueque	-21
Dili	-22
Liquiça	-22
Baucau	-23
Lautém	-27
Bobonaro	-30
Oecusse	-39
Ermera	-54
Timor-Leste	-31

In Table 10, the estimated decline of the male under-five mortality rate has a large range across the Municipalities, from no change in Covalima to a decrease of 54 points in Ermera. Only Ermera and Oecusse were estimated to have had a larger decrease in the male under-five mortality rate than the national decrease of 31 points.

In Table 11, the estimated decline of the female under-five mortality rate has a larger range (58 points) than for males (54 points). The largest decrease was in Ermera (49 points), which was also the case for males. In Covalima, the female under-five mortality rate is actually estimated to have increased. The decrease for females was only greater than the decrease for males in Viqueque and about equal in Manatuto. Five Municipalities (Ermera, Baucau, Viqueque, Oecusse and Bobonaro) were estimated to have had a larger decrease in the female under-five mortality rate than the national decrease of 29 points.

Whilst exercising caution in the interpretation of these results, the evidence here suggests that male improvements in survival of children to age five years have been more widespread than was the case for female children.

Table 11: Change in under-five mortality rates, females, 2004–2009 and 2010–2015, Municipalities, 2010 and 2015 Censuses

Municipalities	Decrease (deaths per 1,000 live births)
Covalima	9
Manufahi	-10
Liquiça	-10
Aileu	-12
Manatuto	-12
Ainaro	-17
Lautém	-19
Dili	-20
Bobonaro	-31
Viqueque	-35
Oecusse	-37
Baucau	-39
Ermera	-49
Timor-Leste	-29

Figure 9 presents under-five mortality rates for males by Municipality. The pattern is of lower rates in Dili and surrounding Municipalities to the south and west, and into Manufahi. Highest rates are found in the extreme south west and in Manatuto and Baucau. Lautem and Oecusse have lower rates.

Figure 10 presents under-five mortality rates for females by Municipality. There is more variation for females than for males, with no clear pattern. Dili, Lautem and Oecusse stand out with lower rates, and Covalima with the highest rates.

Figure 9: Under-five mortality rates, males, 2010–2015, Municipalities, 2010 and 2015 Censuses

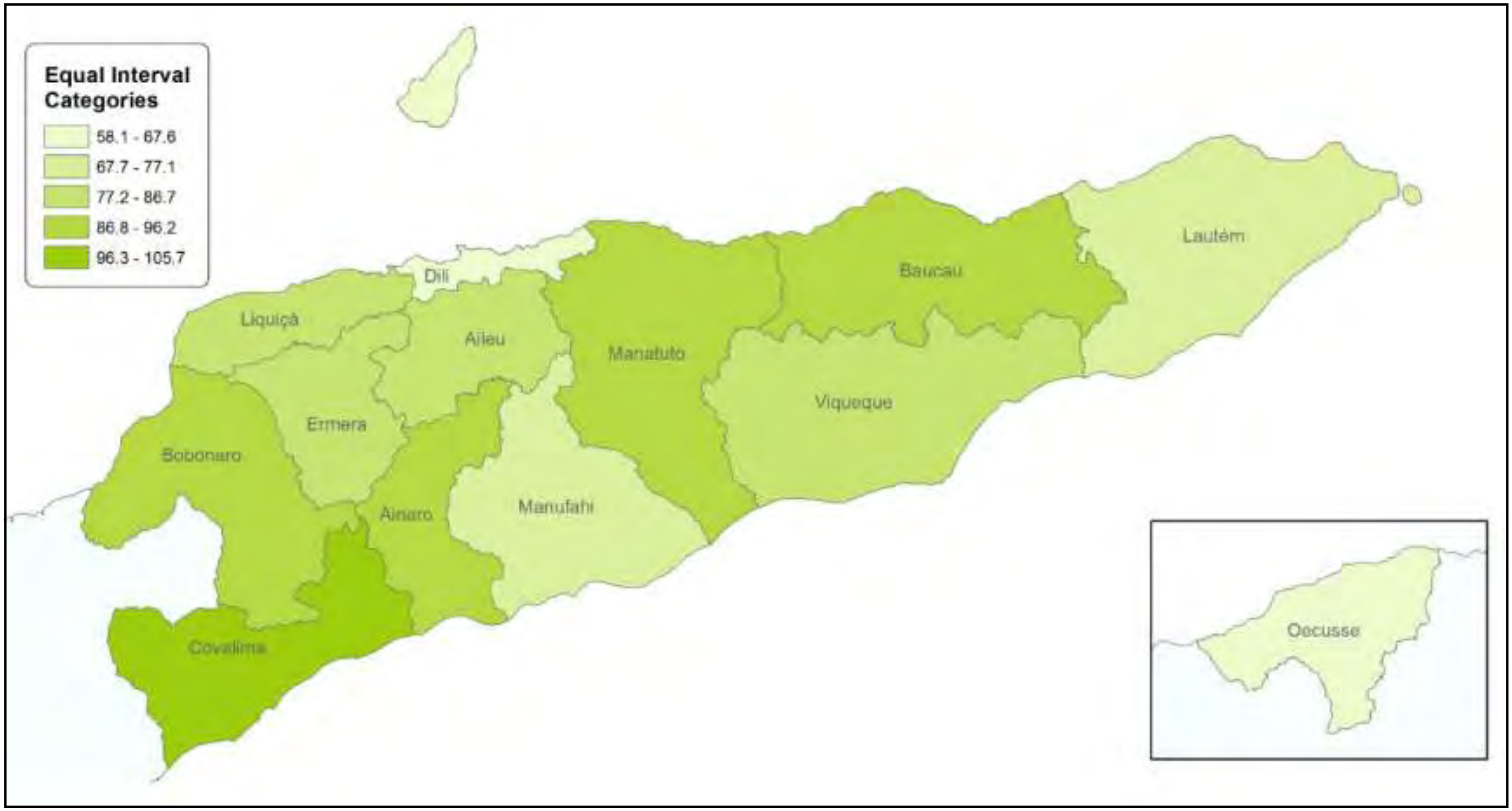
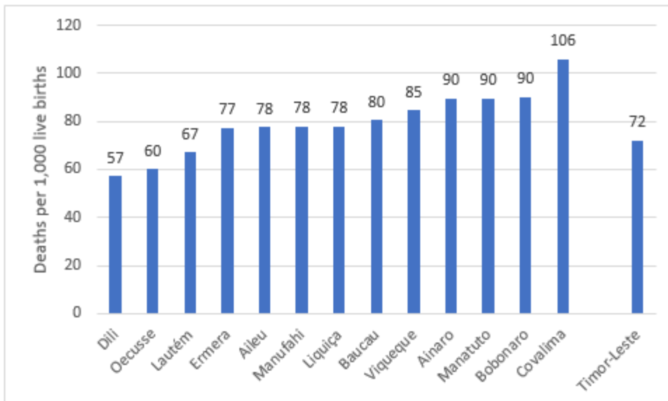


Figure 10: Under-five mortality rates, females, 2010–2015, Municipalities, 2010 and 2015 Censuses

The under-five mortality rates for both sexes were estimated by applying the national differential to the Municipality data. Because of the method of estimation, the data are presented as whole numbers. In Figure 11, the range between the highest and lowest under-five mortality rates was 49 points and only three Municipalities (Dili, Oecusse and Lautem) had a lower under-five mortality rate than the national average of 72 deaths per 1,000 live births. Manatuto, Ainaro and Bobonaro had values 18 points higher than the national average, and Covalima stands out as having an under-five mortality rate 34 points higher than the national average.

Figure 11: Under-five mortality rates, both sexes, 2010–2015, Municipalities, 2010 and 2015 Censuses



Infant and child mortality by Administrative Post

Table 12 presents infant mortality data for the Administrative Posts for 2010–2015. The same method was applied to obtain these estimates as for urban and rural areas and the Municipalities. The IMRs are presented as whole numbers because of the method of estimation.

Table 12: IMRs by sex, 2010–2015, Administrative Posts, 2010 and 2015 Censuses

Administrative Post	Infant Mortality Rate			Administrative Post	Infant Mortality Rate		
	Males	Females	Both sexes		Males	Females	Both sexes
Aileu Vila	63	58	61	Vera Cruz	49	59	54
Laulara	57	58	57	Atsabe	75	61	68
Lequidoe	49	41	45	Ermera Vila	47	51	49
Remexio	64	55	59	Hatulia	66	55	61
Ainaro Vila	70	60	65	Letefoho	66	52	60
Hato-Udo	70	63	67	Railaco	56	49	53
Hato-Builico	84	69	77	Iliomar	70	73	71
Maubisse	63	53	58	Lautém	57	49	53
Baguia	55	34	45	Lospalos	51	46	49
Baucau	67	53	60	Luro	35	30	33
Laga	55	46	51	Tutuala	49	39	44
Quelicai	77	53	66	Bazartete	65	54	60
Vemasse	83	66	75	Liquiça	56	61	58
Venilale	64	50	57	Maubara	55	54	54
Atabae	48	52	50	Barique	59	52	55
Balibo	66	54	60	Laclo	62	74	67
Bobonaro	73	63	68	Laclubar	79	61	70
Cailaco	51	48	50	Laleia	59	97	77
Lolotoe	85	86	86	Manatuto	62	58	60
Maliana	74	67	71	Soibada	62	60	61
Fatululic	110	93	102	Alas	44	48	46
Fatumean	54	27	41	Fatuberlio	63	64	63
Fohorem	96	66	82	Same	62	57	60
Maucatar	53	82	66	Turiscai	61	53	57
Suai	78	71	75	Nitibe	72	51	63
Tilomar	53	42	48	Oesilo	49	55	52
Zumalai	98	87	93	Pante Macassar	40	41	40
Autaro	72	53	63	Passabe	43	36	40
Cristo Rei	39	36	38	Lacluta	44	32	38
Dom Aleixo	45	39	43	Ossu	74	62	68
Metinaro	75	73	74	Uato Lari	73	66	70
Nain Feto	46	39	43	Uatucarbau	58	55	56
				Viqueque	61	62	62

In 2010–2015, the highest male IMRs were in Covalima (Fatululic - 110 deaths per 1,000 live births; Zumalai - 98; and Fohorem - 96). The lowest male IMR was in Luro in Lautem (35), followed by Cristo Rei in Dili (39), and Pante Macassar in Oecusse (40). The range between the highest and lowest male IMRs was very large, at 75 points. The highest female IMR was in Laleia, Manatuto (97), followed by Fatululic (93) and Zumalai (87) in Covalima. The lowest female IMR was in Fatumean in Covalima (27), followed by Luro in Lautem (30). The range between the highest and lowest female IMRs was slightly lower than for males at 70 points. The male IMRs exceeded female IMRs in 50 Administrative Posts, and most in Fohorem (30 points) followed by Fatumean (27 points), both in Covalima. Conversely, female IMRs exceeded male IMRs in 15 Administrative Posts, and most in Laleia, Manatuto, where the female IMR was 38 points higher than the male IMR.

The IMRs for both sexes were estimated by applying the national differential to the Administrative Post data. The range between the highest and lowest IMRs was 69 points and 40 Administrative Posts had a higher IMR than the national average of 56 deaths per 1,000 live births.

Table 13 presents under-five mortality data for the Administrative Posts for 2010–2015. The same method was applied to obtain these estimates as for urban and rural areas and the Municipalities.

Table 13: Under-five mortality rates by sex, 2010–2015, Administrative Posts, 2010 and 2015 Censuses

Administrative Post	Under-five Mortality Rate			Administrative Post	Under-five Mortality Rate		
	Males	Females	Both sexes		Males	Females	Both sexes
Aileu Vila	83.4	80.9	82	Vera Cruz	62.8	83.9	73
Laulara	73.7	82.1	78	Atsabe	100.9	87.1	94
Lequidoe	62.0	53.4	58	Ermera Vila	59.4	70.4	65
Remexio	84.0	76.0	80	Hatulia	87.2	76.2	82
Ainaro Vila	93.4	85.7	90	Letefoho	88.2	71.9	81
Hato-Udo	94.6	90.0	92	Railaco	73.0	66.8	70
Hato-Builico	115.1	100.6	108	Iliomar	93.2	107.6	100
Maubisse	83.5	73.0	79	Lautém	74.2	66.6	71
Baguia	71.0	43.2	58	Lospalos	65.2	62.2	64
Baucau	89.1	73.3	82	Luro	42.3	37.0	40
Laga	70.4	62.4	67	Tutuala	61.7	50.9	57
Quelicai	104.4	73.2	90	Bazartete	86.3	75.0	81
Vemasse	113.9	95.7	105	Liquiça	72.2	87.0	79
Venilale	84.8	67.4	77	Maubara	70.4	74.0	72
Atabae	61.5	71.8	66	Barique	77.0	70.6	74
Balibo	88.0	74.2	82	Laclo	81.4	108.9	94
Bobonaro	99.1	89.3	95	Laclubar	107.4	85.9	97
Cailaco	64.5	65.6	65	Laleia	77.1	152.0	112
Lolotoe	117.8	131.5	124	Manatuto	81.8	80.7	81
Maliana	100.4	97.6	99	Soibada	81.7	84.9	83
Fatululic	157.2	144.7	151	Alas	55.5	65.5	60
Fatumean	69.6	33.2	53	Fatuberlio	82.8	91.3	87
Fohorem	134.8	96.1	117	Same	80.9	80.3	81
Maucatar	67.8	123.7	94	Turiscai	80.7	72.7	77
Suai	106.3	104.3	105	Nitibe	97.6	70.5	85
Tilomar	68.2	55.0	62	Oesilo	61.7	76.3	69
Zumalai	137.6	134.3	136	Pante Macassar	49.0	52.9	51
Autaro	97.7	73.0	86	Passabe	53.8	46.4	50
Cristo Rei	48.1	45.8	47	Lacluta	55.0	40.4	48
Dom Aleixo	57.1	51.1	54	Ossu	100.2	88.5	95
Metinaro	101.5	108.1	105	Uato Lari	98.6	94.7	97
Nain Feto	57.5	50.5	54	Uatucarbau	75.3	75.8	76
				Viqueque	80.8	88.1	84

In 2010–2015, the highest under-five mortality rates for males were in Covalima (Fatululic – 157.2 deaths per 1,000 live births; Zumalai – 137.6; and Fohorem – 134.8). The lowest male rate was in Luro in Lautem (42.3), followed by Cristo Rei in Dili (48.1), and Pante Macassar in Oecusse (49). The range between the highest and lowest male rates was very large, at 115 points. The highest female under-five mortality rate was in Laleia, Manatuto (152), followed by Fatululic (144.7) and Zumalai (134.3) in Covalima. The lowest female rate was in Fatumean in Covalima (33.2), followed by Luro in Lautem (37) The range between the highest and lowest female under-five mortality rates was slightly higher than for males at 119 points. Male rates exceeded female rates in 45 Administrative Posts, and most in Fohorem (38.7 points) followed by Fatumean (36.4), both in Covalima. Conversely, female rates exceeded male rates in 20 Administrative

Posts, and most in Laleia, Manatuto, where the female rate was 75 points higher than the male rate and Maucatar in Covalima, where the female rate was 56 points higher than the male rate.

The under-five mortality rates for both sexes were estimated by applying the national differential to the Administrative Post data. In Table 11, these data are displayed as whole numbers because of the method of estimation. These data are presented graphically in Figure 12. The range between the highest and lowest under-five mortality rates was 111 points and 43 Administrative Posts had a higher rate than the national average of 72 deaths per 1,000 live births.

Figure 13 presents under-five mortality rates for males by Administrative Post. Higher rates are evident in the extreme south west, principally in the inland Administrative Posts of Covalima, Ainaro and Bobonaro. Higher rates are also found across Baucau and Viqueque. Generally speaking, there is no distinctive pattern, and there does not seem to be a correlation between access to higher order healthcare facilities and major roads and lower rates, which suggests that other factors are influencing rates than access to healthcare and other services.

Figure 14 presents under-five mortality rates for females by Administrative Post. The shading is darker, as higher proportions of Administrative Posts are in categories with higher rates than for males. In general, lower rates are found in the north and far east and west, and higher rates across the south and through the middle of the country. However, as for males, there does not seem to be a correlation between access to higher order healthcare facilities and major roads and lower rates, which suggests that other factors are influencing rates than access to healthcare and other services.

Figure 12: Under-five mortality rates, both sexes, 2010–2015, Administrative Posts, 2010 and 2015 Censuses

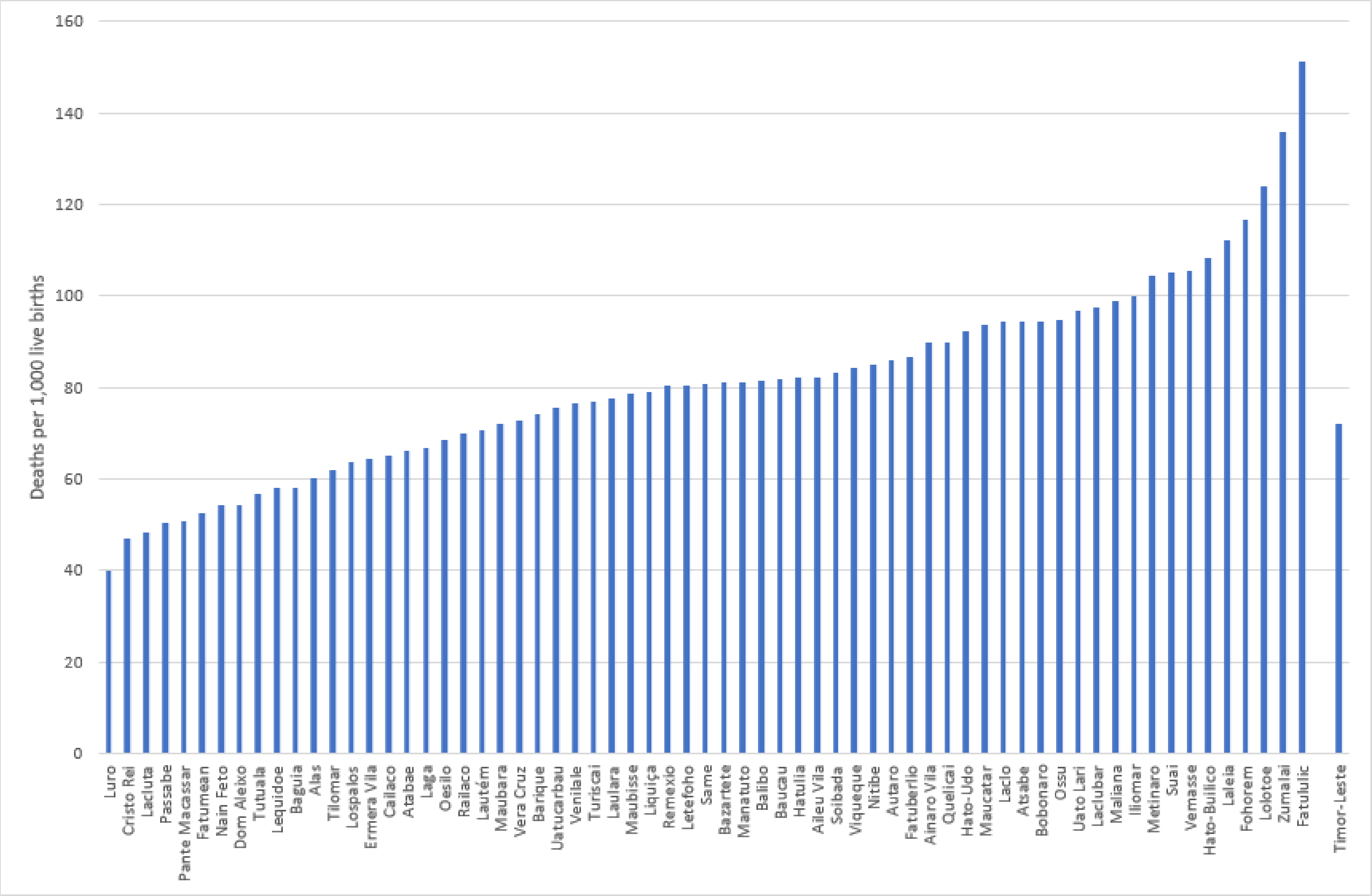


Figure 13: Under-five mortality rates, males, 2010–2015, Administrative Posts, 2010 and 2015 Censuses

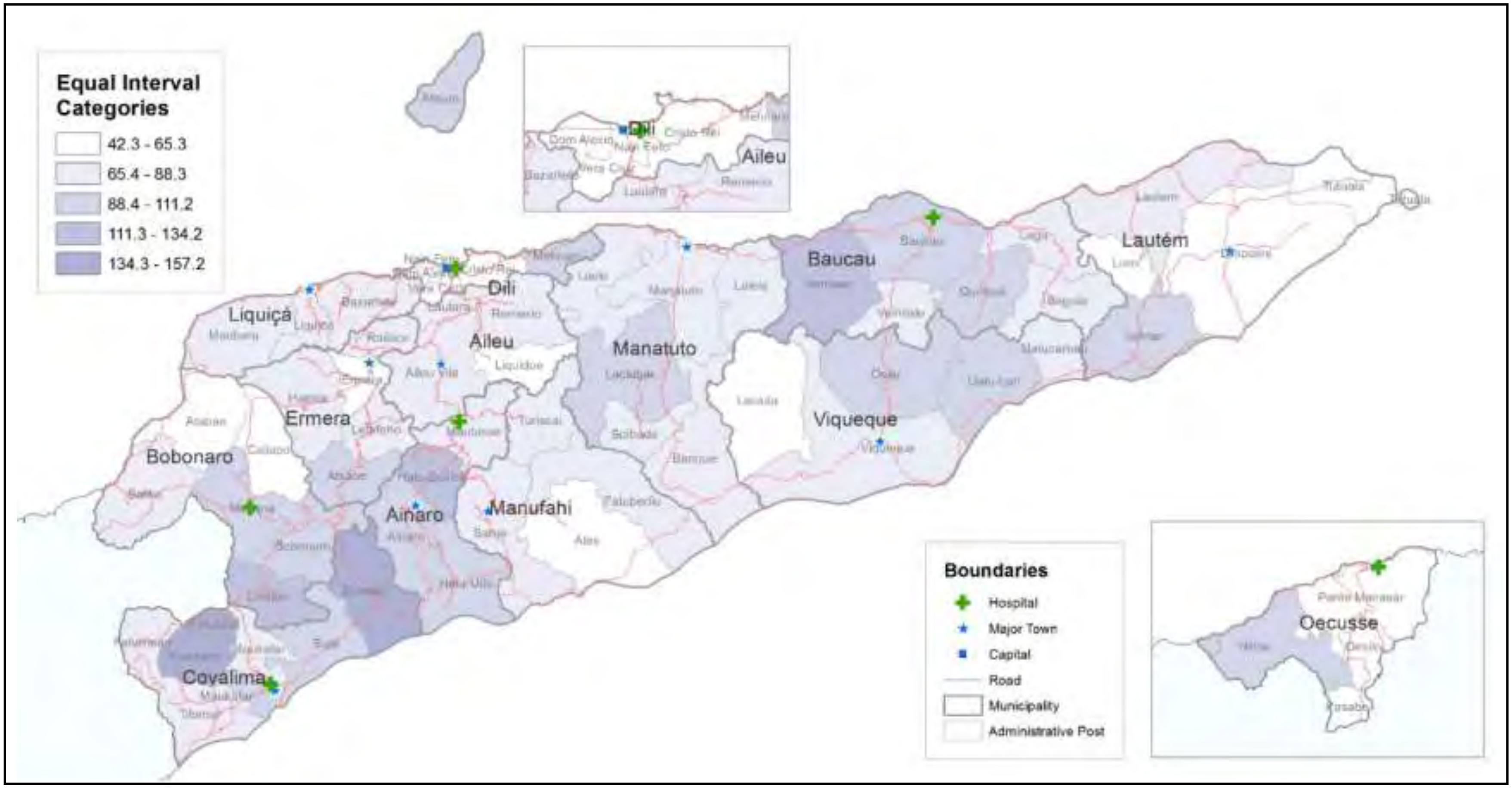
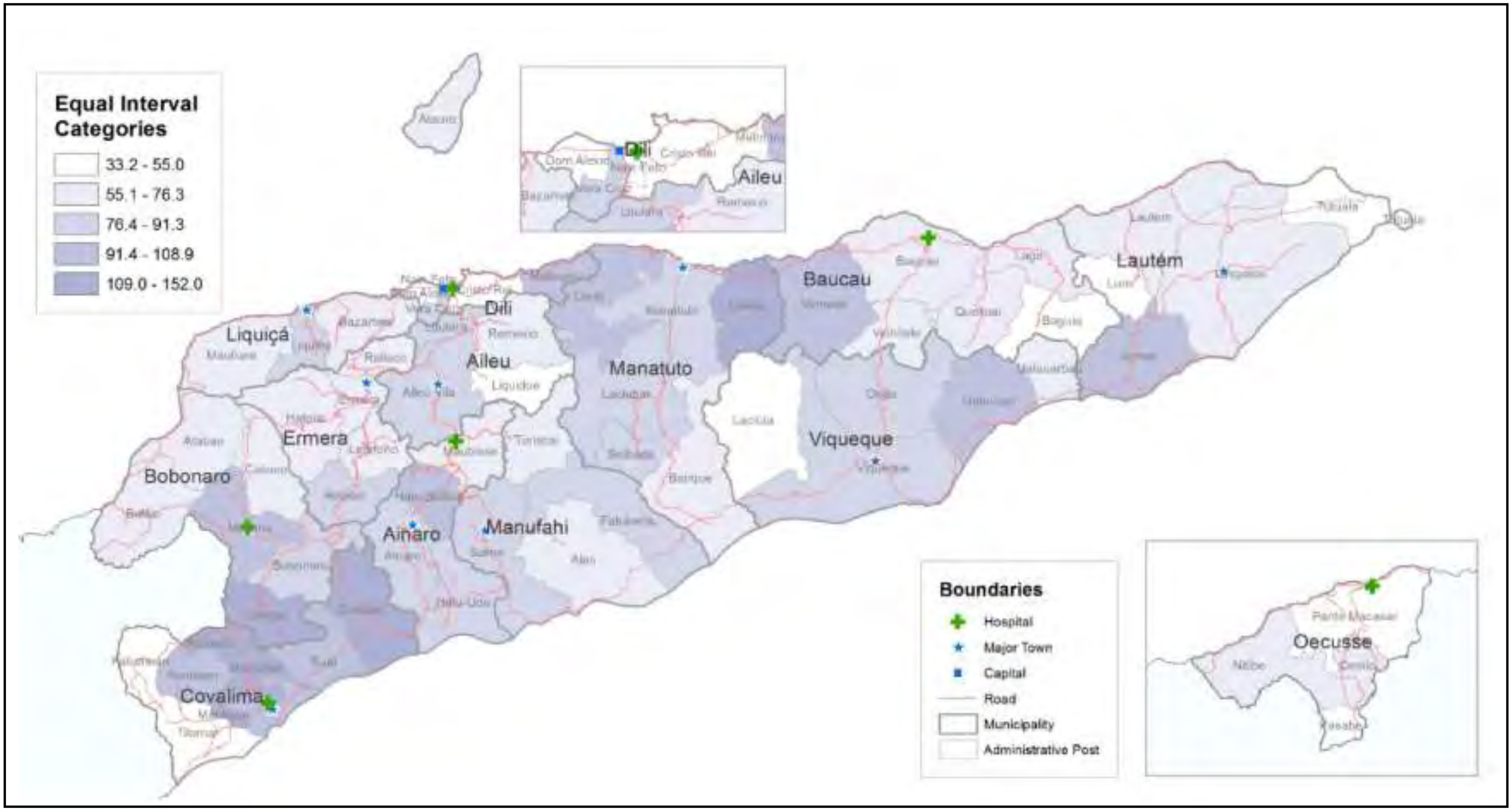


Figure 14: Under-five mortality rates, females, 2010–2015, Administrative Posts, 2010 and 2015 Censuses



Under-five mortality rates by background characteristics of the mother

The same methodology used to estimate under-five mortality for urban and rural locations, Municipalities and Administrative Posts for the period 2010–2015 was applied to derive mortality estimates for socio-economic groups. The socio-economic categories are those of the mothers of children. The under-five mortality rates for Timor-Leste were estimated by applying the differentials between urban and rural values and Timor-Leste values by sex. Because of the method of estimation, the data are presented as whole numbers. Total estimates from Tables 4 and 7 are provided for comparison purposes.

Table 14 displays the differences by level of education of the mother. There is a consistent pattern of urban-rural differences, whereby rates are higher in rural areas for males and females. Male rates are consistently higher than female rates in rural areas (except for non-formally educated mothers). The pattern is less-clear in urban areas. Male rates generally decline as the level of education increases, but this is less clearly the case for females.

Table 14: Male and female under-five mortality rates by education level of the mother, 2010–2015, rural and urban locations, 2010 and 2015 Censuses

Education level of mother	Under-five mortality rates					
	Urban		Rural		Timor-Leste [1]	
	Males	Females	Males	Females	Males	Females
Pre-primary	93.3	78.4	97.1	92.4	95	86
Primary	63.3	55.1	84.7	82.2	74	70
Pre-secondary	63.9	58.2	81.1	70.3	72	65
Secondary	55.6	55.8	77.0	76.3	66	67
Polytechnic / Diploma	70.1	71.6	100.2	75.4	85	74
University	63.0	56.0	92.5	79.7	77	69
Non-formal	43.1	66.7	69.0	84.9	56	77
Never attended school	60.9	64.2	89.1	87.2	75	77
Total estimates	60.4	57.6	84.9	81.0	72.4	70.8

[1] Modelled with male and female estimates and enumerated data

Table 15: Male and female under-five mortality rates by marital status of the mother, 2010–2015, rural and urban locations, 2010 and 2015 Censuses

Marital status of mother	Under-five mortality rates					
	Urban		Rural		Timor-Leste [1]	
	Males	Females	Males	Females	Males	Females
Never married	73.6	70.9	118.3	103.9	95	90
Married	58.3	55.6	82.5	79.0	70	69
Living Together	84.0	90.3	89.0	76.8	86	83
Widowed	61.5	76.5	113.9	107.7	87	94
Divorced	117.7	65.5	82.9	107.0	100	89
Separated	64.7	63.7	91.1	107.7	78	89
Total estimates	60.4	57.6	84.9	81.0	72.4	70.8

[1] Modelled with male and female estimates and enumerated data

Table 15 displays the differences by marital status of the mother. The lowest mortality rate is found among the children of married women. It is reassuring from a data quality perspective that these values are close to the total estimates, since most women in Timor-Leste who would have given birth and subsequently lost a child would have the status of 'married'. The children of never married women or women living together with a partner did not fare as well, possibly due to greater familial instability and/or lower family incomes.

Table 16: Male and female under-five mortality rates by economic activity of the mother, 2010–2015, rural and urban locations, 2010 and 2015 Censuses

Economic activity of mother	Under-five mortality rates					
	Urban		Rural		Timor-Leste [1]	
	Males	Females	Males	Females	Males	Females
Employed	60.6	59.6	83.9	79.8	72	71
Unemployed	67.6	60.9	102.3	87.6	85	76
Economically Inactive	59.9	56.3	85.9	82.8	73	71
Total estimates	60.4	57.6	84.9	81.0	72.4	70.8

[1] Modelled with male and female estimates and enumerated data

Table 16 shows mortality differentials by economic activity status of the mother. In this case, male values were always higher than female values and rural values were always higher than urban values, which is as would be expected. Under-five mortality appears to be slightly higher for children of women who were unemployed. Values for employed and economically inactive mothers were similar to each other and to the total estimates, which is reassuring since these economic activity states are the most commonplace.

Since under-five mortality is a relatively rare event, affecting approximately one in every fourteen births on average between 2010–2015, the overall impression is that the rates presented here are a product of the frequency of different background characteristics. Thus, there is more deviation from total estimates for children of mothers with less common-place background circumstances. Therefore, the data should be viewed with considerable caution.

<u>Summary</u>

The evidence from the 2015 Census suggests that infant mortality in Timor-Leste has been on a downward trajectory since at least the early 2000s and most likely the 1990s. Declines in infant mortality have been greater for males. However, the rates for males were highest in the early 2000s and remained highest immediately prior to the 2015 Census, at 52.6 deaths per 1,000 live births as compared to 47.4 for girls (or 58.6 for males and 53.1 for females for the period 2010–2015). In the early 2000s, approximately one-in-ten children died before reaching their first birthday, whereas by the time of the 2015 Census, the probability of dying in infancy had dropped by half, such that approximately one-in-twenty children died before reaching one year of age. Despite this, comparisons of the latest data from the 2017 revision of World Population Prospects illustrates that Timor-Leste's infant mortality rate (56 deaths per 1,000 live births) and child mortality rate (72 deaths per 1,000 live births) for 2010–2015 remain relatively high for South-east Asia and moderately high for a developing country.

Between 2003 and 2014, infant mortality declined for males and females in both rural and urban areas, and more consistently so in rural areas despite rural IMRs being higher for both males and females in 2003 and in 2014. The urban-rural gap in the male IMR decreased whereas the gap in the female IMR stayed almost the same in 2003 and 2014 This demonstrates that despite improvements, there is a persistent problem with deaths of infants in rural Timor-Leste.

The analysis shows that in 2010–2015 infant and child mortality rates varied widely around the country, such that the range across Administrative Posts (69 points for IMRs and 111 points for under-five mortality) was larger than the national rates. This demonstrates that in certain locations, there is a persistent problem with deaths of infants and young children. The female under-five mortality rates were higher in the south-west and through the center of the country, whereas male rates had a less distinctive pattern. The data for decrease in rates between 2004–2009 and 2010–2015 further emphasizes the persistence of the problem in specific Municipalities, especially Covalima, where there was no change for males and an increase for females. There is also some indication that child mortality rates are higher for the children of the least-well educated and unmarried mothers, indicating that the phenomenon is concentrated among vulnerable households.

Chapter 3: Life expectancy

3.1 Sources and methods

The measurement of mortality tends to focus on infant and child mortality because of its importance in health policy, the fact that a substantial number of infant and child deaths still occur in less developed countries, and also because it is usually easier to determine than mortality at older ages. Sometimes it is assumed that adult mortality and life expectancy can be inferred by extrapolating infant and child mortality. However, efforts should also be put into effect to independently ascertain mortality at older ages since the construction of accurate life tables, require reliable adult mortality estimates. In the more developed countries, adult mortality can be measured using data from civil registration systems and population numbers derived from censuses or population registers. In most less developed countries, however, the most frequent approach is to use data from censuses or household based surveys. Several indirect methods have been developed during recent decades to measure adult mortality from these data sources or to adjust vital registration information.

The inclusion of a question on the number of deaths by age and sex in a household during the 12 months preceding a census became common during the 2000 and 2010 world round of population and housing censuses. If this information were accurately declared, it would allow the direct calculation of mortality at all ages, including adult mortality. But there are several reasons why this information is often not declared correctly. Family members do not like to talk about the death of their loved ones, the time reference of 12 months may be misunderstood, the distinction between "household members" and broader "family members" may not be clear, and there may even be doubt about "in the household" in cases where the death occurred after prolonged sickness and absence from home.

There are several methods used to assess and correct the data for this problem and frequently adjust the results successfully. The method that was used here is known as the Generalized Growth Balance (GGB) method. The Growth Balance method originally proposed by Brass (1975) assumed a stable age structure which nowadays is generally not the case in developing countries. The GGB method overcomes this limitation and can be applied to all populations, provided that they are closed to migration or that migration is known so that the population structure can be corrected for it. The specific formulation of the method is the one implemented by Moultrie et al. (2013).

Questions on deaths in households during the 12 months preceding the 2015 Census, together with the age and sex of the deceased, were incorporated into the census questionnaire. The GGB method is based on comparison of deaths by age and sex that occurred between two successive censuses (2010 and 2015) with the change of population sizes by age and sex. Obviously, in the absence of migration and excluding the very youngest children, there should be a direct relation between the number of deaths occurring during the inter-censal period and the changes in population sizes. The GGB method assumes that the age structure of the number of deaths by sex is correct, but that the level should be adjusted by comparing the populations by age and sex in the two censuses. As a by-product, the GGB method yields an estimate of the relative under-count of the second census with respect to the first or vice versa.

In the case of the 2010 and 2015 Censuses of Timor-Leste, there was a notable improvement in the reporting of deaths during the 12 months preceding the 2015 Census as compared to the 2010 Census. In 2010, only 4,030 deaths were reported, whereas in 2015 there were 6,536 reported deaths. While some of this increase may be due to population growth, the more important reason is an improvement in the completeness of reporting such that the 2015 data were estimated to be more than 90 per cent complete. However, the method requires reconstructing the number of deaths likely to have occurred between the two censuses and this means interpolating the number of reported deaths from both censuses. The joint coverage of deaths from both censuses was 75 per cent for males and 80 per cent for females. There is also a difference in the coverage of the base populations. The 2010 Census under-counted men by 0.6 percentage points relative to the 2015 Census and conversely, the 2015 Census under-counted women by 0.6 percentage points relative to the 2010 Census.

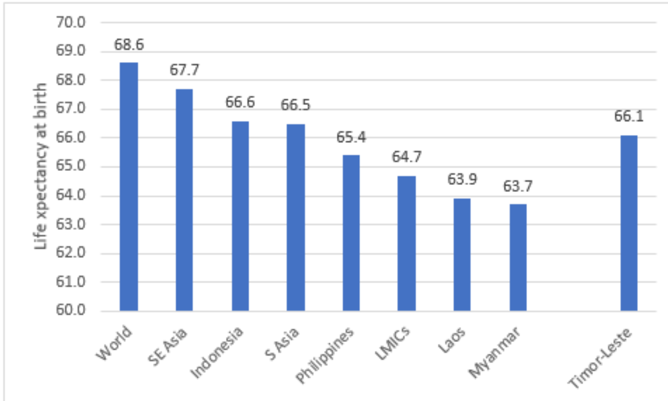
As was noted in the previous chapter, the Princeton model "East" best represented the infant and child mortality data. In the case of the adult mortality estimates, it is not strictly necessary to use model life tables as the GGB itself provides an age pattern of mortality. However, it is prudent to smooth the results with a model life table as the raw GGB method estimates can be erratic. In this case, the Princeton East model did not provide the best fit. In the case of male adult mortality, an excellent fit was obtained using the United Nations General model. This model also yielded good results in the female case, although it seemed to slightly over-state mortality in the 65 to 80 years age range. Nevertheless, both the male and female adult mortality curves were adjusted based on this model. The infant and child mortality parts of the life table (up to age five years) were based on the adjusted estimates for males and females, averaged over the 2010–2015 period (Table 4).

3.2 Life expectancy at the national level

International comparison of life expectancy

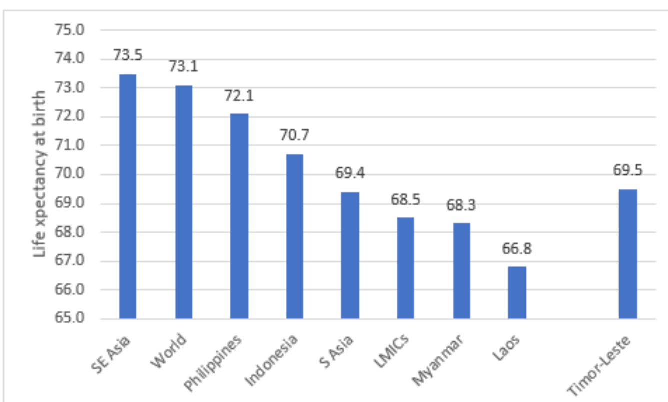
The 2017 revision of World Population Prospects estimated the male life expectancy for Timor-Leste at 66.1 years (Figure 15) for the period 2010–2015. This value was 2.5 years lower than the world average and 1.6 years lower than the average value for the South-east Asian region, but was similar to the values for Indonesia (66.6) and the South Asian region (66.5). The male life expectancy for Timor-Leste was higher than the values for three countries in the South-east Asian region – Myanmar (63.7), Laos (63.9) and Philippines (65.4), and also higher than the average value for lower-middle income countries (64.7) (United Nations, 2017). Male life expectancy for Timor-Leste was below average but not the lowest in the region.

Figure 15: International comparison of male life expectancy at birth



The 2017 revision of World Population Prospects estimated female life expectancy for Timor-Leste at 69.5 years for the period 2010–2015 (Figure 16). This value was 3.6 years lower than the world average, four years lower than the average value for the South-east Asian region, 2.6 years lower than the Philippines (72.1) and 1.2 years lower than Indonesia (70.7). The Timor-Leste value was almost identical to the value for the South Asian region (69.4). The female life expectancy for Timor-Leste was higher than the values for two countries in the South-east Asian region – Laos (66.8) and Myanmar (68.3), and one year higher than the average value for lower-middle income countries (68.5) (United Nations, 2017). Female life expectancy for Timor-Leste was 3.4 years higher than male life expectancy for the period 2010–2015, but the female-male gap was lower than the gap in Indonesia (by 0.7 years) the Philippines (by 3.4 years), and even the world average (by 1.1 years). The evidence suggest Timor-Leste is not performing as well for female life expectancy as for male life expectancy as compared to other countries in the region.

Figure 16: International comparison of female life expectancy at birth



Life expectancy estimates based on the GGB method

Tables 17 and 18 display life tables for the 2010–2015 period for males and females respectively based on the 2010 and 2015 Censuses.

Table 17: Male life-table, 2010–2015, Timor-Leste, 2010 and 2015 Censuses

Age	m(x,n)	q(x,n)	l(x)	d(x,n)	L(x,n)	T(x)	e(x)
0	0.062	0.059	100,000	5,856	95,198	6,364,273	63.64
1	0.004	0.015	94,144	1,388	372,898	6,269,075	66.59
5	0.004	0.020	92,756	1,890	459,055	5,896,177	63.57
10	0.002	0.010	90,866	870	452,153	5,437,123	59.84
15	0.003	0.013	89,996	1,158	447,083	4,984,969	55.39
20	0.003	0.016	88,838	1,451	440,561	4,537,886	51.08
25	0.003	0.017	87,387	1,486	433,218	4,097,325	46.89
30	0.004	0.019	85,901	1,603	425,496	3,664,106	42.66
35	0.005	0.023	84,298	1,900	416,739	3,238,610	38.42
40	0.006	0.029	82,398	2,356	406,098	2,821,871	34.25
45	0.008	0.038	80,041	3,008	392,686	2,415,773	30.18
50	0.010	0.051	77,033	3,914	375,381	2,023,086	26.26
55	0.014	0.069	73,119	5,034	353,011	1,647,705	22.53
60	0.020	0.096	68,085	6,519	324,126	1,294,694	19.02
65	0.029	0.134	61,566	8,264	287,169	970,567	15.76
70	0.041	0.188	53,302	10,014	241,474	683,398	12.82
75	0.060	0.261	43,288	11,295	188,201	441,925	10.21
80	0.088	0.361	31,993	11,553	131,082	253,723	7.93
85	0.167	...	20,440	20,440	122,641	122,641	6.00

m(x,n) = Age-specific mortality rates, that is, death rates calculated of each age groups (from x to x+n)

q(x,n) = Probability of dying between exact ages x and x+n

l(x) = Number of sur vivors at age x out of 100,000 births

d(x,n) = Number of deaths occurring between age x and x+n

L(x,n) = Number of person-years lived between ages x and x+n

S(x,n) = Survival ratio for persons aged x to x+n

T(x) = Number of person-years lived after age x

e(x) = Life expectancy at age x

Table 18: Female life-table, 2010–2015, Timor-Leste, 2010 and 2015 Censuses

Age	m(x,n)	q(x,n)	l(x)	d(x,n)	L(x,n)	T(x)	e(x)
0	0.056	0.053	100,000	5,312	95,644	6,616,900	66.17
1	0.005	0.019	94,688	1,770	374,062	6,521,256	68.87
5	0.004	0.019	92,918	1,794	460,106	6,147,194	66.16
10	0.002	0.008	91,124	769	453,699	5,687,089	62.41
15	0.002	0.011	90,355	1,026	449,211	5,233,390	57.92
20	0.003	0.014	89,329	1,258	443,502	4,784,178	53.56
25	0.003	0.016	88,072	1,365	436,945	4,340,676	49.29
30	0.004	0.017	86,706	1,506	429,768	3,903,731	45.02
35	0.004	0.020	85,201	1,681	421,801	3,473,963	40.77
40	0.005	0.023	83,520	1,916	412,808	3,052,162	36.54
45	0.006	0.029	81,604	2,325	402,206	2,639,354	32.34
50	0.008	0.038	79,278	2,996	388,903	2,237,148	28.22
55	0.011	0.052	76,283	3,974	371,480	1,848,245	24.23
60	0.015	0.074	72,309	5,318	348,251	1,476,765	20.42
65	0.023	0.107	66,991	7,151	317,078	1,128,514	16.85
70	0.034	0.157	59,840	9,424	275,639	811,436	13.56
75	0.053	0.233	50,416	11,729	222,756	535,798	10.63
80	0.083	0.342	38,687	13,237	160,342	313,041	8.09
85	0.167	…	25,450	25,450	152,699	152,699	6.00

The GGB method yielded life expectancies of 63.6 years for males and 66.2 years for females respectively for the period 2010–2015 (Tables 17 and 18). It should be noted that 1.3 years of life expectancy for both males and females is attributable to the adjustment to infant mortality.

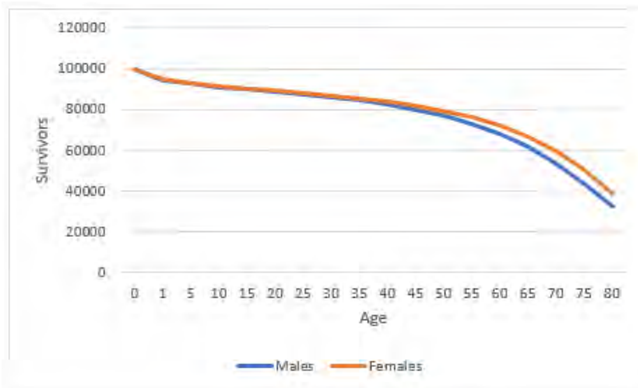
Analysis of survivorship by age and sex

In 2010–2015, the life expectancy at age five years (63.6 for males and 66.2 for females) was the same as at age zero years. This is because of disproportionally high child mortality compared with lower mortality at older ages. The implication is that children that survived until age five years had significantly improved survival chances from then onwards.

Female life expectancy exceeded male life expectancy by 2.6 years during 2010–2015. In the vast majority of countries life expectancy at birth is greater among females. The reason is that women live longer than males because of a combination of biological and behavioral differences. Men are generally more likely to smoke tobacco and drink alcohol than women. They have more motor vehicle accidents, engage in more dangerous occupations and are more prone to suicide. A large proportion of male excess mortality is caused by ischemic heart diseases and lung cancer, both of which are related to life style. Males also have greater susceptibility to life-threatening diseases, because female hormones provide defence from coronary artery/ischemic heart diseases until menopause, which causes a ten-year deferral in the onset of heightened risk of death for this cause compared with males (Rowland, 2003).

Figure 17 presents l(x), or survivorship values from the life tables for males and females. The burden of early childhood mortality is clearly visible corresponding to around 7 per cent of boys and girls deceased by age five. Thereafter mortality reduced, such that the decline in survivorship is shallower as age increases before accelerating again after age 40. Into older ages, a gap forms between the curves because female survivorship exceeds male survivorship.

Figure 17: Number of survivors (lx) by sex, 2010–2015



A comparison can also be made with the survivorship values from the 2004 Census mortality monograph for the year 2002 (NSD and UNFPA, 2008). Comparisons of survivorship values from the 2002 and 2010–2015 life tables graphically illustrate that for males (Figure 18) and even more-so females (Figure 19), improved survivorship was evident at all ages, and particularly in early childhood and at increasingly older ages.

Figure 18: Number of male survivors (lx), 2002 and 2010–2015

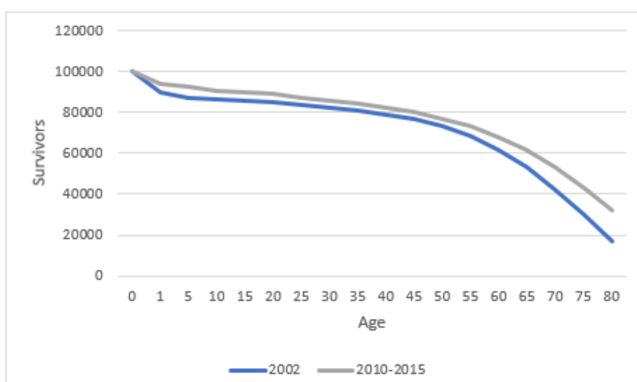
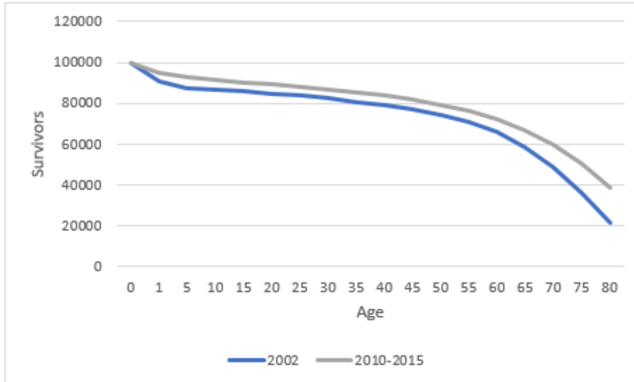


Figure 19: Number of female survivors (lx), 2002 and 2010–2015



<u>Analysis of the probability of dying between ages 15 and 60 years</u>

Life expectancy at any adult age can be considered as an indicator of adult mortality. However, the most frequently used measure for this purpose is the probability of dying between ages 15 and 60 years or, in symbols, 45q15. This value can be computed directly from age-specific mortality rates or from life tables.

The probability of dying between ages 15 and 60 was 0.243 for males and 0.200 for females in 2010–2015, down from 0.279 and 0.232 a decade earlier (as estimated from the 2004 Census for 2002). Therefore, the probability of dying between ages 15 and 60 years in 2010–2015 had declined by 17 percentage points for males and 18 percentage points for females when compared against 2002 values (NSD and UNFPA, 2008). This decline is attributable to fewer males and females dying between ages 15 and 60 years because larger proportions of people were living longer lives in 2010–2015 as compared with 2002.

The declines in 45q15 values for males and females between 2002 and 2010–2015 were relatively small compared to the declines in IMRs over the same period, from 100 per 1,000 live births for males and 96 for females in 2002 to 58.6 and 53.1 for males and females respectively in 2010–2015. This demonstrates that infant (and child) mortality is much more susceptible to rapid decline than mortality at older ages.

<u>International comparison of census-based estimates of the probability of dying between ages 15 and 60 years and of life expectancy</u>

The values for 2010–2015 for the probability of dying between ages 15 and 60 were compared to a range of estimates from the 2017 revision of World Population Prospects for the same period. These data are displayed in Figure 20 for males and Figure 21 for females.

In Figure 20, the male probability of dying between ages 15 and 60 as measured using 2010 and 2015 Census data was only exceeded in the U.N. estimates of one country in the South-east Asian region (the Philippines), and the Timor-Leste value was substantially higher than the U.N. estimates for South-east Asia (0.212), Indonesia (0.210) and the world average (0.179) (United Nations, 2017). The value was also higher than the average for all lower-middle income countries. For females (Figure 21), the probability of dying between ages 15 and 60 as measured using 2010 and 2015 Census data was higher than for all selected values. Indeed, across Asia, the census based value for 2010–2015 was only exceeded by U.N. estimates for the period 2010–2015 in two countries– Afghanistan (220) and Bhutan (225).

Figure 20: Probability of dying between ages 15 and 60, males, Timor-Leste census and U.N. estimates, 2010–2015

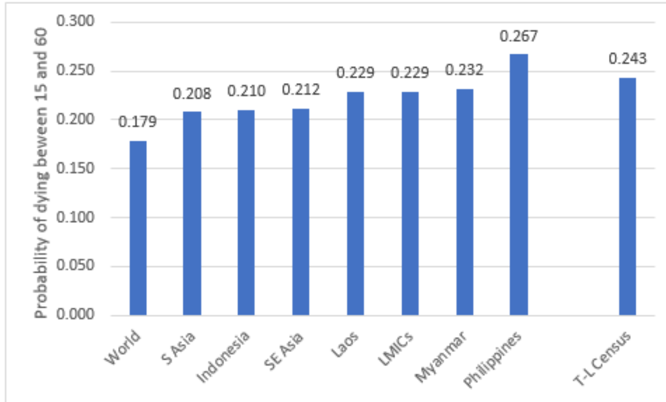
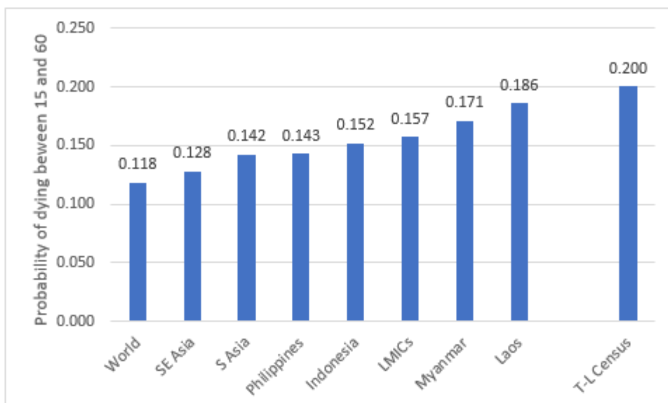


Figure 21: Probability of dying between ages 15 and 60, females, Timor-Leste census and U.N. estimates, 2010–2015



The census-based male life expectancy value for 2010–2015 was 2.5 years lower than the value of 66.1 years for 2010–2015 from the 2017 revision of World Population Prospects (United Nations, 2017). The census value of 63.6 was higher than the U.N. estimates for only two countries in Asia: Afghanistan (61.0 years) and Yemen (62.8 years) (United Nations, 2017). Thus, the census male life expectancy estimate for 2010–2015 can be considered low by Asian standards when compared to U.N. estimates.

The census-based female life expectancy value for 2010–2015 was 3.3 years lower than the value of 69.5 years for 2010–2015 from the 2017 revision of World Population Prospects (United Nations, 2017). As for males, the census value of 66.2 was higher than the U.N. estimates for only two countries in Asia: Afghanistan (63.5 years) and Yemen (65.6 years) (United Nations, 2017). Thus, the 2015 Census female life expectancy for 2010–2015 can also be considered low by Asian standards when compared to U.N. estimates.

<u>Improvements in life expectancy</u>

A direct comparison with the results from the 2010 Census thematic report on mortality imply a significant increase of almost five years for males and almost six years for females from 58.7 and 60.4 years in 2008–2009 based on the analysis of the 2010 Census (NSD and UNFPA, 2012b). However, some caution should be attached to the interpretation of these data since the 2010 Census analysis used a different method, applied to a single census to yield life tables for a shorter time-frame (2008–2009) as compared to the 2015 Census analysis which applied the GGB method to two censuses to output life tables for 2010–2015.

A comparison can also be made with the estimates from the 2004 Census mortality monograph, which estimated male life expectancy at 57.4 years and female life expectancy at 58.9 years for the year 2002 (NSD and UNFPA, 2008), which is effectively a decade earlier than the 2010–2015 estimates from the 2010 and 2015 Census. Making this comparison, male life expectancy increased by 6.2 years, or 0.6 years every year, and female life expectancy increased by 7.3 years, or 0.7 years every year, which seems plausible. It is notable that the male-female gap in life expectancy increased from 1.5 years in 2002 to 2.6 years in 2010–2015, which represents an increase of 0.1 years per year.

It is also reassuring to note that according to the 2017 revision of World Population Prospects, life expectancy was estimated to have increased by 6.1 years for males, and by 6.5 years for females between 2000–2005 and 2010–2015 (United Nations, 2017), which is entirely consistent with the comparison between the 2004 Census results and the estimates in this report. Therefore, it can be stated with confidence that Timor-Leste experienced significant improvements in life expectancy for males and females over the decade preceding the most recent estimates for 2010–2015.

Life expectancy by urban and rural location and Municipality

In order to estimate male and female life expectancies by urban and rural location and for the Municipalities, an approximate method based on Brass' logit transformation model (Brass, 1971) was applied, using the national male and female life tables (Tables 17 and 18) as the standard. The average proportion of deaths by sex in the 25–29 and 30–34 age groups were computed at the national and sub-national levels, the survival functions up to age 5 were adjusted accordingly and the remainder of the life tables were adjusted by means of logit transformation with slope factor β equal to 1. As this procedure is based on infant and child mortality, it does not take into account the possibility that the age pattern of mortality differences might not be the same at higher ages. Consequently, the results should be interpreted with some caution.

Table 19 present urban and rural life expectancies by sex for 2010–2015. The urban male life expectancy was estimated at 67.3 years, which is 3.7 years higher than the male life expectancy for Timor-Leste. The urban female life expectancy was estimated at 69.8 years, which is 3.6 years higher than the female life expectancy for Timor-Leste. The male-female gap in urban life expectancy was 2.5 years, 0.1 years less than the male-female gap in life expectancy for Timor-Leste. The rural life expectancy for males was estimated at 62.3 years, which is 1.3 years lower than the male life expectancy for Timor-Leste and five years less than the urban life expectancy for males. The rural life expectancy for females was estimated at 64.8 years, which is 1.4 years lower than the female life expectancy for Timor-Leste and five years less than the urban life expectancy for females. The male-female gap in rural life expectancy was 2.5 years. Life expectancy estimates were not produced for the urban and rural populations in the 2010 Census thematic report and consequently it is not possible to assess change over time.

Table 19: Life expectancy at birth by sex, urban and rural locations, 2010–2015, 2010 and 2015 Censuses

	Urban		Rural		Timor-Leste	
	Male	Female	Male	Female	Male	Female
Life expectancy at birth	67.3	69.8	62.3	64.8	63.6	66.2

Estimated male and female life expectancies for the Municipalities are displayed in Table 20 and presented graphically in Figures 22 and 23 for males and females respectively. In 2010–2015, male life expectancy was highest in Dili (67.8 years), followed by Oecusse (67.2) and lowest in Covalima (58.6) followed by Ainaro (60.6) (Figure 21). The range in male life expectancy was 9.2 years. Eight out of 13 Municipalities had a lower male life expectancy than the national average of 63.6 years.

In 2010–2015, female life expectancy was highest in Dili (70.1 years), followed by Oecusse (69.4) and lowest in Covalima (60.3) followed by Manatuto (62.8) (Figure 22). The range in female life expectancy was 0.6 years larger than for males at 9.8 years. Nine out of 13 Municipalities had a lower female life expectancy than the national average of 66.2 years.

Female life expectancy was higher than male life expectancy in all Municipalities in 2010–2015. The female-male gap in life expectancy varied across the Municipalities from the largest gap of 5.4 years in Baucau followed by 3.6 in Ainaro to the smallest gap of 1.1 in Manatuto followed by 1.4 in Manufahi. Baucau, Ainaro, Ermera and Aileu had a female-male gap in life expectancy that was larger than or equal to the national difference of 2.6 years and eight Municipalities had a lower gap.

Table 20: Life expectancy at birth by sex, Municipalities, 2010–2015, 2010 and 2015 Censuses

Municipality	Life expectancy at birth	
	Males	Females
Aileu	63.3	65.9
Ainaro	60.6	64.2
Baucau	61.5	66.9
Bobonaro	61.0	63.4
Covalima	58.6	60.3
Dili	67.8	70.1
Ermera	63.2	66.1
Lautém	65.5	68.0
Liquiça	63.7	65.3
Manatuto	61.7	62.8
Manufahi	63.8	65.2
Oecusse	67.2	69.4
Viqueque	62.2	64.4

Figure 22: Male life expectancy, Municipalities, 2010–2015, 2010 and 2015 Censuses

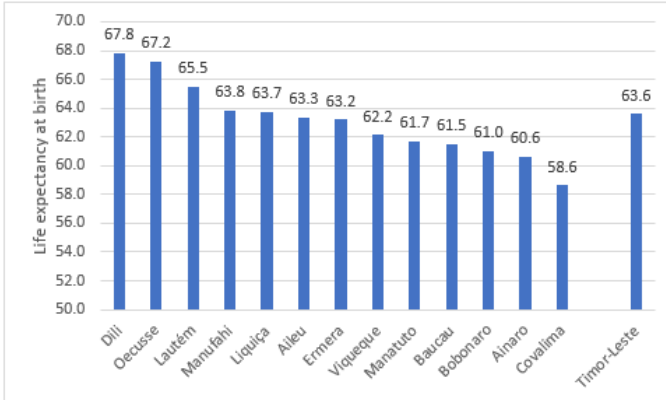


Figure 23: Female life expectancy, Municipalities, 2010–2015, 2010 and 2015 Censuses

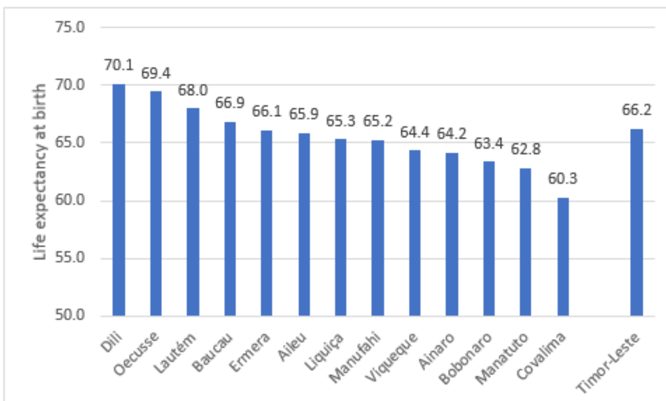


Figure 24 maps male life expectancy and Figure 25 maps female life expectancy at birth by Municipality in 2010–2015. Because the estimation of life expectancy is based on estimates of infant and child mortality, the distribution forms an inverse to the under-five mortality maps (Figures 9 and 10). For males, the highest life expectancies were in Dili, Oecusse and Lautem. This was also the case for females, with the additional inclusion of Baucau. Lower life expectancies can be found in the south west and through the center of the country.

Figure 24: Male life expectancy at birth, Municipalities, 2010–2015, 2010 and 2015 Censuses

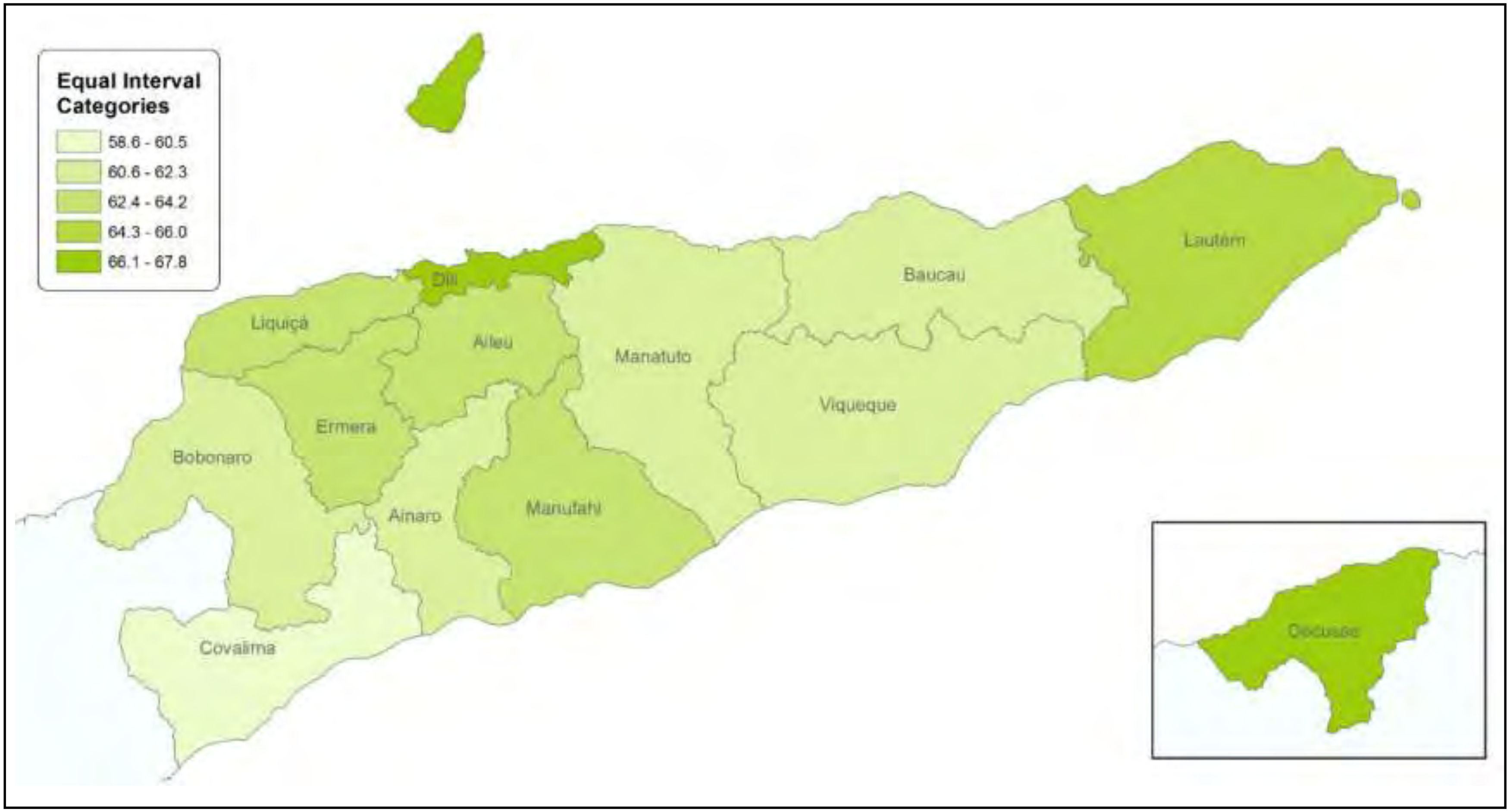
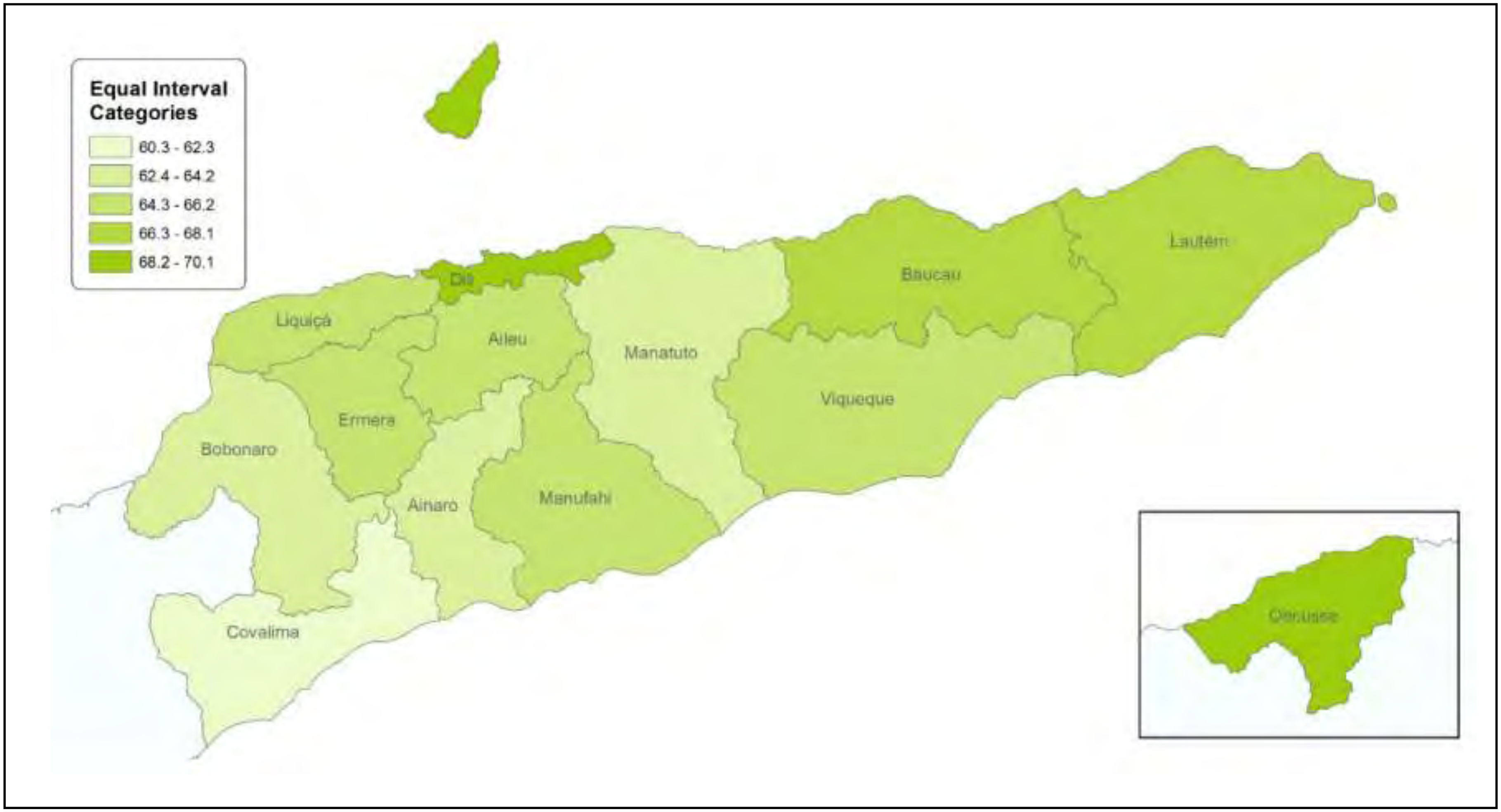


Figure 25: Female life expectancy at birth, Municipalities, 2010–2015, 2010 and 2015 Censuses



Life expectancy by Administrative Post

The same method as was used for the Municipalities was applied to estimate life expectancy for the Administrative Posts. Consequently, these estimates should also be interpreted with some caution. Estimated male and female life expectancies are presented in Table 21 and presented graphically in Figures 26 and 27 for males and females respectively.

Table 21: Life expectancy at birth by sex, Administrative Posts, 2010–2015, 2010 and 2015 Censuses

Administrative Post	Life expectancy at birth	
	Males	Females
Aileu Vila	62.5	64.9
Laulara	64.4	64.6
Lequidoe	67.0	70.8
Remexio	62.4	65.8
Ainaro Vila	60.7	63.9
Hato-Udo	60.5	63.1
Hato-Builico	57.1	61.3
Maubisse	62.5	66.4
Baguia	65.0	73.4
Baucau	61.5	66.4
Laga	65.1	68.7
Quelicai	58.8	66.4
Vemasse	57.3	62.1
Venilale	62.3	67.6
Atabae	67.1	66.7
Balibo	61.7	66.2
Bobonaro	59.7	63.3
Cailaco	66.4	68.0
Lolotoe	56.7	56.4
Maliana	59.5	61.8
Fatululic	51.3	54.6
Fatumean	65.3	76.3
Fohorem	54.2	62.1
Maucatar	65.7	57.6
Suai	58.5	60.6
Tilomar	65.6	70.4
Zumalai	53.8	56.0
Autaro	60.0	66.4
Cristo Rei	70.3	72.7
Dom Aleixo	68.1	71.4
Metinaro	59.3	60.0
Nain Feto	68.0	71.5

Administrative Post	Life expectancy at birth	
	Males	Females
Vera Cruz	66.8	64.3
Atsabe	59.4	63.7
Ermera Vila	67.6	67.0
Hatulia	61.8	65.8
Letefoho	61.6	66.6
Railaco	64.6	67.7
Iliomar	60.7	60.1
Lautém	64.3	67.8
Lospalos	66.2	68.7
Luro	71.9	75.2
Tutuala	67.0	71.4
Bazartete	62.0	66.0
Liquiça	64.7	63.7
Maubara	65.1	66.2
Barique	63.8	66.9
Laclo	62.9	59.9
Laclubar	58.3	63.9
Laleia	63.8	53.6
Manatuto	62.8	64.9
Soibada	62.9	64.1
Alas	68.5	68.0
Fatuberlio	62.6	62.9
Same	63.0	65.0
Turiscai	63.0	66.5
Nitibe	60.0	66.9
Oesilo	67.0	65.8
Pante Macassar	70.1	70.9
Passabe	68.9	72.6
Lacluta	68.6	74.2
Ossu	59.5	63.4
Uato Lari	59.8	62.3
Uatucarbau	64.1	65.8
Viqueque	63.0	63.5

In 2010–2015, male life expectancy was highest in Luro, Lautem (71.9 years), followed by Cristo Rei, Dili (70.3) and lowest in Fatulilic (51.3) followed by Zumalai (53.8) and Fohorem (54.2) all in Covalima (Figure 26). The range in male life expectancy was 20.6 years. Thirty-six out of 65 Administrative Posts had a lower male life expectancy than the national average of 63.6 years and 15 Administrative Posts had a life expectancy for males of less than 60 years in 2010–2015.

In 2010–2015, female life expectancy was highest in Fatumean, Covalima (76.3 years) followed by Luro, Lautem (75.2 years) and lowest in Laleia, Manatuto (53.6) followed by Fatulilic (54.6) and Zumalai (56) in Covalima (Figure 27). The range in female life expectancy was 22.7 years, two years greater than for males. Thirty-four out of 65 Administrative Posts had a lower female life expectancy than the national average of 66.2 years and six Administrative Posts (Laleia, Fatululic, Zumalai, Lolotoe, Maukatar and Laclo) in Manatuto, Covalima and Bobonaro had a life expectancy for females of less than 60 years in 2010–2015.

Female life expectancy was higher than male life expectancy in 54 Administrative Posts in 2010–2015. The largest excess of female life expectancy over male life expectancy was in Fatumean, Covalima (11 years), and the largest excess male life expectancy over female life expectancy was in Laleia, Manatuto (10.2 years). Thirty-six Administrative Posts had a female-male gap in life expectancy that was larger than or equal to the national advantage of 2.6 years for females, 18 Administrative Posts had a smaller female-male gap than 2.6 years, and 11 Administrative Posts had higher male life expectancy than for females.

Figure 28 maps male life expectancy at birth and Figure 29 maps female life expectancy by Administrative Post in 2010–2015. These maps do not display any clear pattern, with male and female life expectancies varying widely and without a high degree of consistency. However, there is a general tendency for female life expectancies to be lower in the south west and Viqueque and higher in the north and west.

Figure 26: Male life expectancy, Administrative Posts, 2010–2015, 2010 and 2015 Censuses

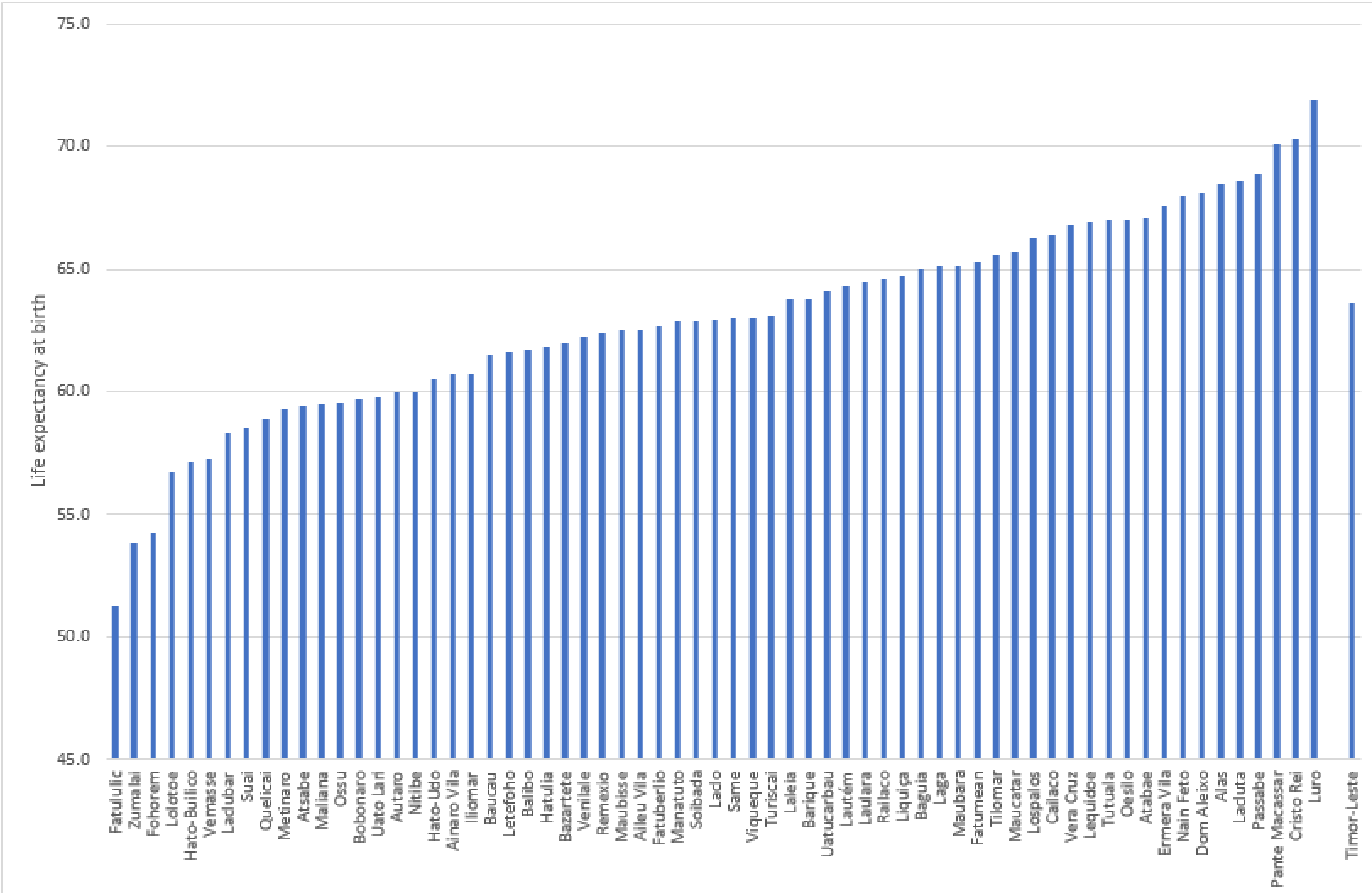


Figure 27: Female life expectancy, Administrative Posts, 2010–2015, 2010 and 2015 Censuses

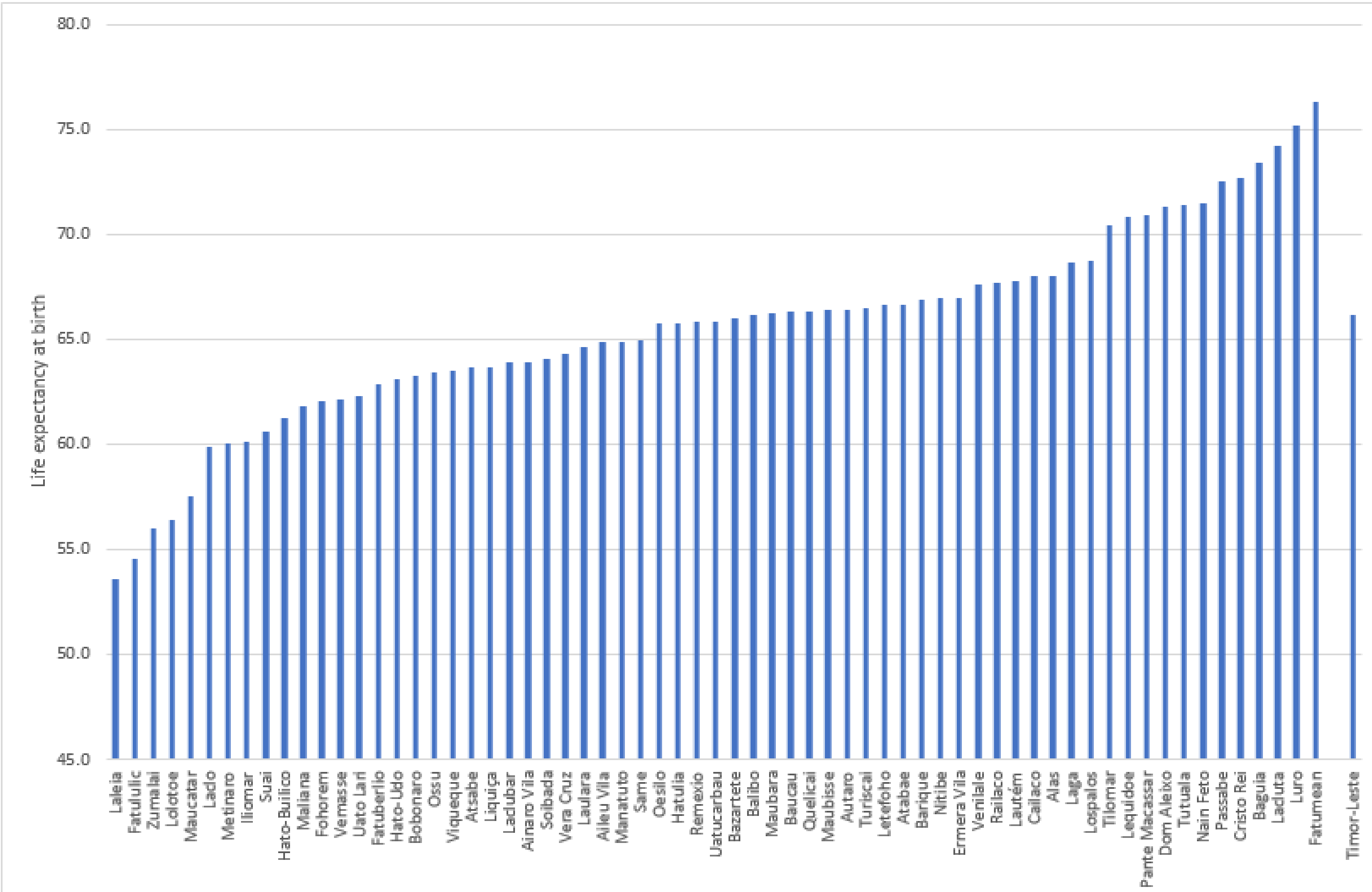


Figure 28: Male life expectancy at birth, Administrative Posts, 2010–2015, 2010 and 2015 Censuses

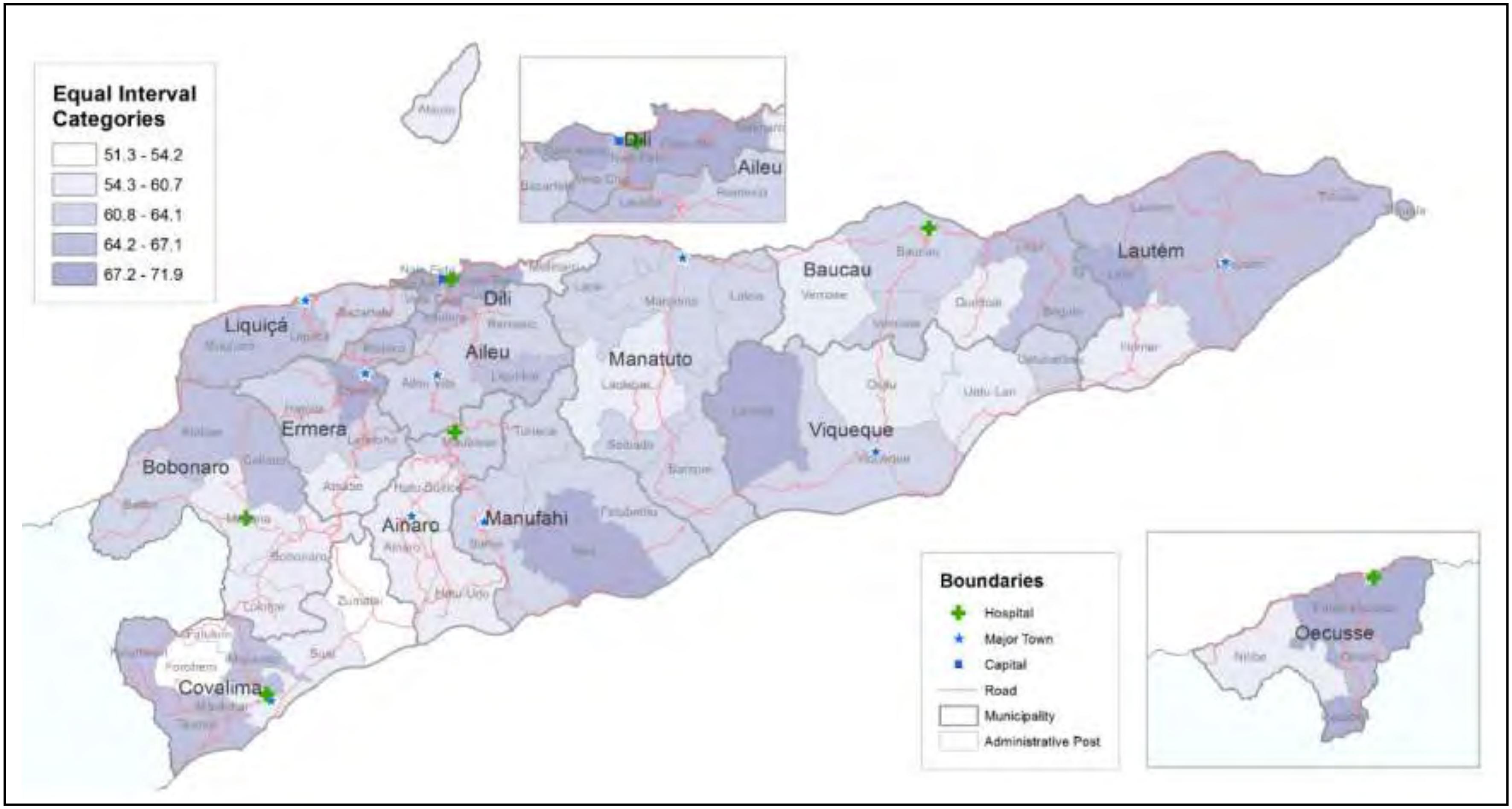
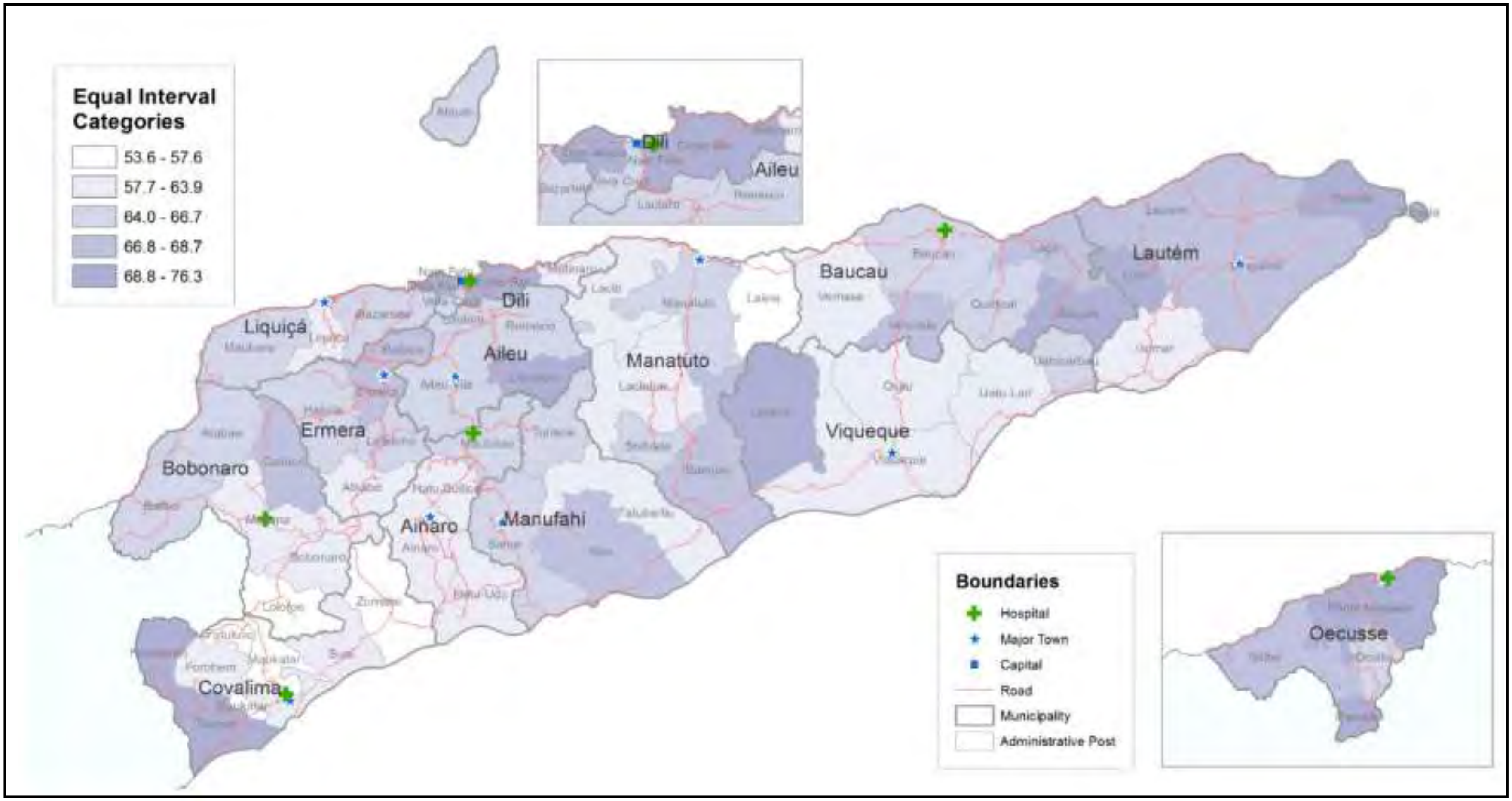


Figure 29: Female life expectancy at birth, Administrative Posts, 2010–2015, 2010 and 2015 Censuses



Life expectancy by background characteristics

The same methodology used to estimate life expectancy for urban and rural locations, Municipalities and Administrative Posts for the period 2010–2015 was applied to derive life expectancy estimates for socio-economic groups by sex and urban and rural locations. For comparison, values for Timor-Leste were estimated based on the differences between urban and rural values and Timor-Leste values by sex as in Table 19. Due to the method utilized, the Timor-Leste values for highest level of education achieved, marital status and economic activity are presented as whole numbers.

Table 22 presents life expectancy values by highest level of education achieved. A general increase in life expectancy can be observed between males educated to pre-primary level and males educated up to secondary level, especially in rural areas. The data is less consistent for females. Male estimates are generally lower than female estimates and rural estimates lower than urban estimates.

Table 22: Male and female life expectancy at birth by highest level of education achieved, 2010–2015, rural and urban locations, 2010 and 2015 Censuses

Highest education level achieved	Life expectancy at birth					
	Urban		Rural		Timor-Leste [1]	
	Males	Females	Males	Females	Males	Females
Pre-primary	60.7	65.3	60.1	62.7	60	63
Primary	66.7	70.4	62.3	64.6	63	66
Pre-secondary	66.5	69.7	63.0	67.0	64	68
Secondary	68.5	70.2	63.8	65.8	65	67
Polytechnic / Diploma	65.2	66.7	59.5	65.9	61	66
University	66.7	70.2	60.9	65.1	62	66
Non-formal	71.7	67.7	65.4	64.1	67	65
Never attended school	67.2	68.3	61.5	63.7	63	65
Total estimates	67.3	69.8	62.3	64.8	63.6	66.2

[1] Modelled with male and female estimates and enumerated data

Table 23 presents life expectancy values by marital status for 2010–2015. The most notable finding is that married persons had the highest life expectancy compared to people of other marital status. This was particularly notable for rural females. The lowest male estimates were for divorcees in urban locations and never married men in rural areas. For females, the lowest urban estimates were for those women living together with a partner, followed by widows. For rural females, the lowest life expectancy estimates were for those women widowed or separated.

Table 23: Male and female life expectancy at birth by marital status, 2010–2015, rural and urban locations, 2010 and 2015 Censuses

Marital status	Life expectancy at birth					
	Urban		Rural		Timor-Leste [1]	
	Males	Females	Males	Females	Males	Females
Never Married	64.5	66.8	56.6	60.7	59	62
Married	67.8	70.3	62.7	65.2	64	67
Widowed	67.1	65.7	57.3	60.1	60	62
Divorced	56.7	68.0	62.6	60.2	61	62
Separated	66.3	68.4	61.1	60.1	62	62
Living Together	62.4	63.1	61.5	65.6	62	65
Total estimates	67.3	69.8	62.3	64.8	63.6	66.2

[1] Modelled with male and female estimates and enumerated data

Table 24 presents life expectancy values by economic activity. Unemployed males and females had the lowest life expectancy estimates in 2010–2015. In urban areas, male and female estimates for the employed were slightly lower than for those classified as economically inactive, whereas the opposite was the case in rural areas, with a slightly larger advantage for employed females compared to inactive females as compared to the same gap for rural males.

Table 24: Male and female life expectancy at birth by economic activity, 2010–2015, rural and urban locations, 2010 and 2015 Censuses

Economic activity	Life expectancy at birth					
	Urban		Rural		Timor-Leste [1]	
	Males	Females	Males	Females	Males	Females
Employed	67.3	69.3	62.4	65.1	64	66
Unemployed	65.7	69.0	59.2	63.6	61	65
Economically Inactive	67.4	70.1	62.1	64.5	63	66
Total estimates	67.3	69.8	62.3	64.8	63.6	66.2

[1] Modelled with male and female estimates and enumerated data

<u>Summary</u>

Data for 2010–2015 from the 2017 revision of World Population Prospects suggest that despite male life expectancy for Timor-Leste not being the lowest in the South-east Asian region, it was well below average.

Timor-Leste lagged even further behind other countries in the region for female life expectancy. Indeed, the analysis in this report yielded life expectancies of 63.6 years for males and 66.2 years for females respectively for the period 2010–2015, which although being lower than the World Population Prospects values for Timor-Leste during the same period (by 2.5 years for males and 3.3 years for females), these values were higher than the U.N. estimates for only two Asian countries: Afghanistan and Yemen (United Nations, 2017). This clearly demonstrates that Timor-Leste is not performing well for life expectancy, especially for females.

Nevertheless, comparison with estimates for 2002 from the 2004 Census mortality monograph suggests that male life expectancy increased by 6.2 years and female life expectancy increased by 7.3 years by 2010–2015, and the male-female gap in life expectancy increased from 1.5 to 2.6 years. Also, increases between 2000–2005 and 2010–2015 in U.N. estimates were entirely consistent with the comparison between the census results. Thereby demonstrating that Timor-Leste experienced significant improvements in life expectancy for males and females over the decade preceding the most recent estimates (2010–2015). A comparison of survivorship values from the 2002 and 2010–2015 life tables illustrates that for males and especially for females, reductions in mortality rates occurred for all age groups, but particularly in early childhood and at increasingly older ages.

The urban-rural gap in life expectancies in 2010–2015 was five years for both males and females and life expectancy varied widely around the country, with a large range across Municipalities and especially Administrative Posts (20.7 years for males and 22.7 years for females). There is a general tendency for female life expectancies to be lower in the south west and Viqueque and higher in the north and west, whereas for males the pattern is less distinct. Life expectancy was lowest for the least educated, men who had never married, widowed women, and the unemployed. Thus, life expectancy was lower in vulnerable households in remote areas of Timor-Leste in 2010–2015.

Chapter 4: Maternal mortality

Measurement methods

An important component of adult mortality is maternal mortality which is usually measured not in relation to the number of women of reproductive age (Maternal Mortality Rate), but to the number of births occurring in the population during the reference period (Maternal Mortality Ratio). The WHO defines a maternal death as the "death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental causes" (WHO, 1993).

Maternal mortality is difficult to measure because, in addition to the difficulties of measuring adult mortality in general, there is also a known tendency for maternal deaths to be misclassified. Even in developed countries with good death registration systems such as France or the UK it has frequently been observed that maternal deaths tend to be attributed to other causes, especially when factors such as high blood pressure played a role in the event. Maternal mortality is not measured directly in developing countries as good death registration systems (and in particular, with reliable attribution of cause of death) are not in place.

In developing countries, deaths that occur during pregnancy, delivery or during the first 6 weeks after delivery are classified as "pregnancy-related" and hence considered potential maternal deaths. This procedure is not ideal. The person reporting the death may not be aware that the woman was pregnant at the time of her death, particularly in the case of unmarried girls who might be hiding their pregnancy, potentially leading to under-reporting of cases. Conversely, not all deaths occurring during the relevant period are necessarily maternal in nature: some may be purely accidental or due to other causes unrelated to the pregnancy or delivery, potentially leading to misclassification of deaths as maternal when they were in fact due to other causes.

In terms of the methodology for obtaining information on maternal deaths as defined above, there are basically two approaches. One consists of asking respondents about the survival of their sisters and, in case the sisters have died, under what circumstances the death occurred. This so-called "sisterhood method" is the one applied in DHSs. There has been a tendency to place somewhat exaggerated confidence in the estimates generated by this method. Although in general the data quality of DHSs is better than that of censuses, this is not necessarily true of the sisterhood data on maternal mortality which are subject to selection biases, under-reporting of adult mortality in general, and large confidence intervals due to small numbers of cases.

The data collection method employed in most censuses, including in Timor-Leste, is not the sisterhood method, but an extension of the question on deaths that occurred in the household during the 12 months preceding the census. It should be noted that the differences in methodology and the fact that the census applies to the whole population can lead to differences in estimates between censuses and surveys. In the 2015 Census, in the case of deaths of women 15 years and above, respondents were asked whether the deceased was pregnant, delivering, or less than 6 weeks away from having delivered at the time of their death. Unlike the 2010 Census, in the 2015 Census, a further question was asked to ascertain if the death was due to an accident or violence, so that these cases could be excluded as not being maternal deaths.

The analysis of the data is linked to the GGB methodology used in the previous chapter, which requires pooling the 2015 data with those from the 2010 Census, to obtain an estimate for the 2010–2015 period.

Estimation and results

As for adult mortality in general, the quality of reporting on pregnancy-related deaths in the 2015 Census seems to have improved relative to the 2010 Census. Thus, the total number of reported pregnancy-related deaths increased from 144 in the 2010 Census to 219 in the 2015 Census. However, it was estimated that female deaths were under-reported by a factor of 19.8 per cent and so the pooled pregnancy-related death estimates for 2010–2015 were adjusted by this factor, resulting in a total of 1,053 pregnancy-related deaths for 2010–2015, of which 19 were of women aged 50 years and above.

According to the Own Children method, as applied in the fertility thematic report, 158,564 births were estimated to have occurred between 2010–2015 (GDS, 2018). Dividing the pregnancy-related deaths estimate by the estimated number of births yielded a mortality ratio of 664 maternal deaths per 100,000 births (if deaths of women aged 50 years and above are included) or 652 (if deaths of women aged 50 years and above are excluded).

Finally, a further correction was applied to exclude those deaths that were reported as due to accidents or violent causes. In the 2015 Census, there were 76 such cases, most of them (60) deaths during pregnancy. This was 34.7 per cent of the total. After excluding these cases from the previous estimates, there were 434 maternal deaths per 100,000 births (including deaths of women aged 50 years and above), or 426 maternal deaths per 100,000 births for women aged between 15 and 49 years.

The ratio of 426 maternal deaths per 100,000 births for the period 2010–2015 is the official census-based estimate of maternal mortality for Timor-Leste for the period 2010–2015.

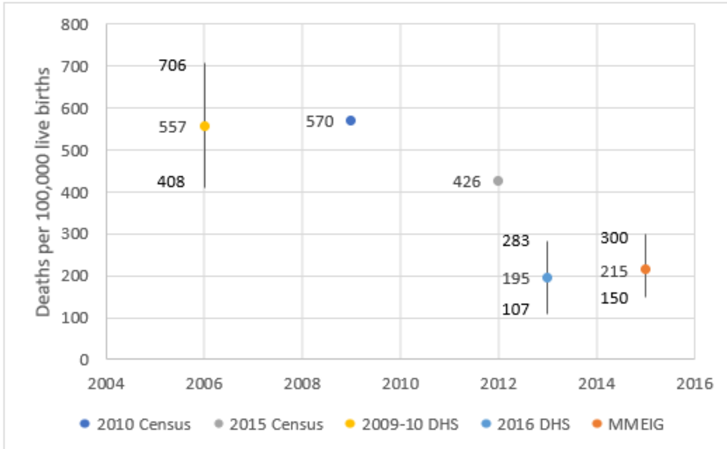
Comparison with other national estimates of maternal mortality

The thematic report on mortality from the 2010 Census estimated the maternal mortality ratio to be 570 for the 12 months preceding the census, which provides a plausible comparison with 426 from the 2010 and 2015 Censuses for the period 2010–2015, bearing in mind that the former is based solely on the 2010 Census.

The 2010 and 2015 Census estimate of 426 deaths per 100,000 births for 2010–2015 is higher than the point estimate value of 195 deaths per 100,000 births obtained by the 2016 TLDHS (GDS, MoH and ICF, 2018) for the seven-year period preceding the survey (with a confidence interval range of 107 to 283 deaths per 100,000 live births). As explained in the Measurement methods sub-section, the differences in methodology between the census and the DHS can lead to differences in maternal mortality ratio estimates between the two sources and this is indeed the case for the data from the censuses (2010 and 2015) and the 2016 TLDHS. The point estimate generated by the Maternal Mortality Estimation Inter-Agency Group (MMEIG) of 215 for 2015 (with an uncertainty interval of 150 to 300 deaths per 100,000 live births) (WHO, 2015) is also lower compared with the census results. By means of explanation for the difference, the methodology used by the MMEIG is based on a regression model which includes GDP per capita, an indicator which is likely to be unrepresentative of local health conditions in Timor-Leste due to a boost on GDP estimates as a result of Timor-Leste being an oil-exporting economy.

Nevertheless, the 2010 Census-based estimate and the 2010–2015 Census-based estimate form a linear trend with the upper-level uncertainty value of the MMEIG estimate for 2015 (Figure 30). It is indeed encouraging that the range of estimates have a downward trajectory, implying that maternal death, whilst still at very high levels, is declining in Timor-Leste.

Figure 30: Maternal Mortality Ratio estimates from different sources, Timor-Leste



<u>Other measures of maternal mortality</u>

The maternal mortality ratio is the most common measure of maternal or pregnancy-related mortality, but there are other measures that can be applied (Table 25). Corresponding indicators estimated for the year preceding the 2010 Census are presented for comparison. However, some caution should be considered when comparing the indicators because of the different methods and time-reference periods represented.

The proportion of deaths of women of reproductive age (15–49 years) that were due to maternal causes was estimated. For the pooled data for the 2010–2015 period, 22 per cent of the deaths of women aged 15–49 years can be characterized this way, without making a correction for deaths that were due to accidents or violence. If this correction is made, the percentage falls to 14 per cent. By comparison, the 2010 Census estimate was 21 per cent for women aged 15–49 years. Another measure is the cause-specific death rate of women aged 15–49 years due to maternal causes, which was estimated at 0.5 per 1,000 women. By comparison, the 2010 Census estimate was one per 1,000 women.

A common indicator of maternal mortality is the life-time risk of dying due to maternal causes. The formula for this indicator is:

$$Life\ Time\ Risk = 1 - (1 - MMR)^{TFR}$$

In the case of the 2010–2015 period, using the Own Children estimated TFR of 4.7 live births per woman (GDS, 2018), the life-time risk of dying due to maternal causes was estimated at two per cent (which excludes deaths of women aged 50 years and over and deaths due to accidents or violence). This means that on average, were 2010–2015 levels to remain constant, over the course of a 15–49 year old woman's reproductive life, the risk of dying due to a maternal cause would be one-in-fifty. By comparison, based on the 2010 Census estimate, the risk of dying was one in thirty-four (or 2.9 per cent).

Table 25: Maternal mortality indicators, 2009–10 and 2010–2015, 2010 and 2015 Censuses

Maternal mortality indicators	15-49 years	
	2009-10	2010-2015
Maternal Mortality Ratio (per 100,000 live births)	570	426
Deaths due to maternal causes (%)	21.0	14.0
MM rate (per 1,000 women)	1.0	0.5
Lifetime risk of maternal death (%)	2.9	2.0

Table 26 and Figure 31 present age-specific maternal death ratios for 2009–2010 and 2010–2015 based on the 2010 and 2015 Censuses. It should be noted that some caution should be considered when comparing the indicators because of the different methods and time-reference periods represented.

Table 26: Age-specific maternal mortality ratios, 2009–10 and 2010–2015, 2010 and 2015 Censuses

Age Group	Age-specific maternal death ratio	
	2009-10	2010-2015
15-19	1,037	789
20-24	534	522
25-29	402	370
30-34	352	262
35-39	754	327
40-44	483	359
45-49	1,589	2,464
15-49	570	426

Bearing this in mind, in Figure 31 it can be observed that the shapes are in general similar, with slightly higher values for adolescents, followed by decline to age 30–34 years. The values increase sharply for women aged 45–49 years as compared to women aged 40–44 years.

Figure 31: Age-specific maternal mortality ratios, 2009–10 and 2010–2015, 2010 and 2015 Censuses

In Table 26 and Figure 31, it can also be observed that the values were lower for adolescents and women aged between 30 and 44 in 2010–2015 as compared to 2009–10, whereas the values for women aged between 45–49 years were higher in 2010–2015 as compared to 2009-10. The shape of the curves are 'j-shaped', which corresponds to the pattern seen for all the world's regions apart from South-east Asia, where the maternal mortality ratio for the 15–19 years age group was lower than for 20–24 years age group. These data were generated in a study based on data from 144 countries (Nove et al, 2014).

The final step that was taken in this analysis was to adjust the ratios for age-specific maternal deaths using the 'South-east Asian' shape from the study by Nove et al (2014). This was done so that the Timor-Leste data are aligned with the characteristics of the region within which Timor-Leste lies. The adjusted data are presented in Table 27.

Table 27: Adjusted age-specific maternal mortality rates, 2010–2015, 2010 and 2015 Censuses

Age Group	2010-2015
	Adjusted age-specific maternal death ratio[1]
15-19	176
20-24	216
25-29	352
30-34	446
35-39	771
40-44	1,759
45-49	3,111
15-49	426

[1] Based on 'South-East Asia' shape

Summary

A ratio of 426 maternal deaths per 100,000 live births for the period 2010–2015 represents a reduction on the values from the 2010 Census (570). Associated indicators are also tracking in the right direction. However, 426 is still an extremely high maternal mortality ratio. To place Timor-Leste in context, the MMEIG point estimate for 2015 was the third highest in Asia, behind Afghanistan and Nepal, equal to the value for Papua New Guinea, and 89 deaths per 100,0000 live births higher than in Indonesia (WHO, 2015). Age-specific rates exhibit the classic 'j-shape' of higher rates for adolescents and women in older reproductive ages, the age-groups that are generally at most at risk of maternal mortality.

Chapter 5: Conclusions and recommendations

5.1 Conclusions

Infant and child mortality on the decline, but still moderately high

The evidence from the 2015 Census suggests that infant mortality in Timor-Leste has been on a downward trajectory since at least the early 2000s and most likely the 1990s. Declines in infant mortality have been greater for males. However, the rates for males were highest in the early 2000s and remained highest immediately prior to the 2015 Census, at 52.6 deaths per 1,000 live births as compared to 47.4 for girls (or 58.6 for males and 53.1 for females for the period 2010–2015). In the early 2000s, approximately one-in-ten children died before reaching their first birthday, whereas by the time of the 2015 Census, the probability of dying in infancy had dropped by half, such that approximately one-in-twenty children died before reaching one year of age. Despite this, comparisons of the latest data from the 2017 revision of World Population Prospects illustrates that Timor-Leste's infant (56 deaths per 1,000 live births) and child (72) mortality rates for 2010–2015 remain relatively high for South-east Asia and moderately high for a developing country.

Between 2003 and 2014, infant mortality declined for males and females in both rural and urban areas, and more consistently so in rural areas despite rural IMRs being higher for both males and females in 2003 and in 2014. The urban-rural gap in the male IMR decreased whereas the gap in the female IMR stayed almost the same in 2003 and 2014. This demonstrates that despite improvements, there is a persistent problem with deaths of infants in rural Timor-Leste.

The analysis shows that in 2010–2015 infant and child mortality rates varied widely around the country, such that the range across Administrative Posts (69 points for IMRs and 111 points for under-five mortality) was larger than the national rates. This demonstrates that in certain locations, there is a persistent problem with deaths of infants and young children, and the data for decrease in rates between 2004–2009 and 2010–2015 further emphasizes the persistence of the problem in specific Municipalities, especially Covalima, where there was no change for males and an increase for females. There is also some indication that child mortality rates are higher for the children of the least-well educated and unmarried mothers, indicating that the phenomenon is concentrated among vulnerable households.

Life expectancy on the increase, but still relatively low, especially for women

Data for 2010–2015 from the 2017 revision of World Population Prospects suggest that despite male life expectancy for Timor-Leste not being the lowest in the South-east Asian region, it was well below average.

Timor-Leste lagged even further behind other countries in the region for female life expectancy. Indeed, the analysis in this report yielded life expectancies of 63.6 years for males and 66.2 years for females respectively for the period 2010–2015, which although being lower than the World Population Prospects values for Timor-Leste during the same period (by 2.5 years for males and 3.3 years for females), these values were higher than the U.N. estimates for only two Asian countries: Afghanistan and Yemen (United Nations, 2017). This clearly demonstrates that Timor-Leste is not performing well for life expectancy, especially for females.

Nevertheless, comparison with estimates for 2002 from the 2004 Census mortality monograph suggests that male life expectancy increased by 6.2 years and female life expectancy increased by 7.3 years by 2010–2015, and the male-female gap in life expectancy increased from 1.5 to 2.6 years. Also, increases between 2000–2005 and 2010–2015 in U.N. estimates were entirely consistent with the comparison between the census results. Thereby demonstrating that Timor-Leste experienced significant improvements in life expectancy for males and females over the decade preceding the most recent estimates (2010–2015). A comparison of survivorship values from the 2002 and 2010–2015 life tables illustrates that for males and especially for females, reductions in mortality rates occurred for all age groups, but particularly in early childhood and at increasingly older ages.

The urban-rural gap in life expectancies in 2010–2015 was five years for both males and females and life expectancy varied widely around the country, with a large range across Municipalities and especially Administrative Posts (20.7 years for males and 22.7 years for females). Life expectancy was lowest for the least educated, men who had never married, widowed women, and the unemployed. Thus, life expectancy was lower in vulnerable households in remote areas of Timor-Leste in 2010–2015.

Maternal mortality on the decline, but still amongst the highest in Asia

A ratio of 426 pregnancy-related deaths per 100,000 live births for the period 2010–2015 represents a reduction on the values from the 2010 Census (570). Associated indicators are also tracking in the right direction. However, 426 is still an extremely high maternal mortality ratio. To place Timor-Leste in context, the MMEIG point estimate for 2015 was the third highest in Asia, behind Afghanistan and Nepal, equal to the value for Papua New Guinea, and 89 deaths per 100,0000 live births higher than in Indonesia (WHO, 2015). Age-specific rates exhibit the classic 'j-shape' of higher rates for adolescents and women in older reproductive ages, the age-groups that are generally at most at risk of maternal mortality.

5.2 Recommendations

Rates of infant and child mortality have been in decline in Timor-Leste for at least a decade. Therefore, the government and development partners must sustain interventions to reduce infant and child mortality rates. The evidence generated by this report clearly identifies the pockets where higher rates persist. This evidence should be used to target interventions so that the progress made in other locations can be achieved everywhere. In order to reduce these rates, improved access to healthcare services by all, especially the most vulnerable, is necessary.

Life expectancy has been increasing in Timor-Leste for at least a decade, mainly because of reductions in infant and child mortality rates, but also because of reduced mortality at all ages. The latter has been achieved through a broad range of public health interventions. As for infant and child mortality, the evidence generated by this report clearly identifies the pockets and sub-populations where improvements in life expectancy have been weaker and consequently particular targeting of interventions is necessary. The Government, and the Ministry of Health in particular, should re-double efforts to reduce mortality at all ages through existing interventions and development programmes so as to reach across the whole country. Additionally, the Government must recognize that with increased life expectancy comes increased morbidity and mortality through non-communicable disease – improving nutrition, reducing substance abuse (especially tobacco) and promotion of healthy lifestyles through awareness-building and other initiatives will contribute towards sustained improvements in life expectancy.

The commitment of the Government to reducing maternal mortality through interventions such as a reproductive health strategy, a national family planning programme, training for health providers on safe deliveries and emergency obstetric care, and the equipping of established health facilities, appears to be reducing the maternal mortality ratio. However, these efforts must be further intensified given the continued severity of the problem. A critical step concerns providing universal access to sexual and reproductive health services, including modern contraception to reduce higher-risk pregnancies (especially among adolescents and women in older reproductive ages and those in remote areas). It is vital that the government supports the extension of healthcare out-reach services to the remoter parts of the country so that all women, and especially the most vulnerable women can receive access to antenatal care, a safe childbirth and postnatal care.

implement, monitor and evaluate these interventions. The Government should focus on:

- SDG 2 (End hunger, achieve food security and improved nutrition and promote sustainable agriculture)
    - Target 2.2: By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons
        - Indicator 2.2.1: Prevalence of stunting (height for age <-2 standard deviation from the median of the World Health Organisation (WHO) Child Growth Standards) among children under 5 years of age;
        - Indicator 2.2.2: Prevalence of malnutrition (weight for height >+2 or <-2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age, by type (wasting and overweight).
- SDG 3 (Ensure healthy lives and promote well-being for all ages and at all times)
    - Target 3.1: By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births
        - Indicator 3.1.1: Maternal mortality ratio;
        - Indicator 3.1.2: Proportion of births attended by skilled health personnel.
    - Target 3.2: By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births
        - Indicator 3.2.1: Under-five mortality rate;
        - Indicator 3.2.2: Neonatal mortality rate.
    - Target 3.3: By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases
        - Indicator 3.3.1: Number of new HIV infections per 1,000 uninfected population, by sex, age and key populations;
        - Indicator 3.3.2: Tuberculosis incidence per 100,000 population;
        - Indicator 3.3.3: Malaria incidence per 1,000 population;
        - Indicator 3.3.4: Hepatitis B incidence per 100,000 population;
        - Indicator 3.3.5: Number of people requiring interventions against neglected tropical diseases.
    - Target 3.4: By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being
        - Indicator 3.4.1: Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease.
    - Target 3.7: By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes
        - Indicator 3.7.1: The proportion of women of reproductive age who have their needs for family planning satisfied with modern methods;
        - Indicator 3.7.2: Adolescent birth rate.
    - Target 3.8: Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable

essential medicines and vaccines for all

        - Indicator 3.8.1: Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population).
    - Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
        - Indicator 3.9.1: Mortality rate attributed to household and ambient air pollution;
        - Indicator 3.9.2: Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services).
    - Target 3.a: Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate
        - Indicator 3.a.1: Age-standardized prevalence of current tobacco use among persons aged 15 years and older.
- SDG 5: (Achieve gender equality and empower all women and girls)
    - Target 5.6: Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences
        - Indicator 5.6.1: Proportion of women aged 15-49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care.

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