Quantifying population level progress in tackling HIV/AIDS in South Africa: Life and healthy life expectancy in 2001 and 2011

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ABSTRACT

BACKGROUND

Over the last decade South Africa has observed an increase in life expectancy due to improved HIV/AIDS treatment programs. However, the effect of these programs on the quality of life at population level, measured by the healthy life expectancy is unclear and has received less attention.

OBJECTIVE

This article aims to measure both life expectancy and healthy life expectancy in South Africa and its provinces, assess their evolution by sex, and by population groups. Its main focus is to assess whether the increase in life expectancy from 2001 to 2011 is associated with corresponding increase in proportion of time spent in good health.

METHODS

We used two analytical approaches to provide an analysis of the morbidity in South Africa; mainly a descriptive analysis and the computation of the healthy life expectancy for the years 2001 and 2011. The analysis was drawn from the 10% sample of the household censuses from these two periods.

RESULTS

We found that the life expectancy has increased from 56.9 years in 2001 (54.3 for males and 58.9 for female) to 60.3 years in 2011 (56.5 for males and 62.4 for female). However, the proportion of life expectancy spent in good health has slightly decreased from 71.5 per cent in 2001, to 69.5 per cent in 2011, indicating that South Africa experienced an expansion of morbidity during this period.

CONCLUSIONS

The findings of this research highlight three issues. First, different approaches used to measure disabilities in the two censuses may affect comparisons. Second, specific measures of disabilities related to HIV need to be incorporated in future census, particularly days' work lost due to illness. Third, it is important that appropriate policies are implemented to reduce disability as well as uplift the existing disabled population.

CONTRIBUTION

This research documents the progress that has been made in the fight against HIV/AIDS in South Africa from a quality of life point of view, and highlights more importantly the area of future progress.

Keywords: Healthy life expectancy, life expectancy, disability, Sullivan Method, South Africa

Introduction

In the past few years, there has been an increased focus on South Africa's quality of life, in response to the quadruple burden of disease that the country is facing namely HIV and AIDS, non-communicable diseases, communicable disease, and violence and injury (Mayosi *et al.* 2009). All four are high prevalence diseases related to poverty, and occurring within a context marked by an inefficient healthcare system (Coovadia *et al.* 2009). As a consequence, it has been said that the quality of health in South Africa is worse than in most emerging economy countries (Coovadia *et al.* 2009).

Of specific interest has been the progression of HIV/AIDS. South Africa shared 17% of the global burden of HIV infection in 2005 (Abdool Karim *et al.* 2009) and today has the world's largest population of people living with HIV. The first two decades of the epidemic were characterized by denialism and low prioritization of HIV/AIDS treatment and prevention programs in the country. However, this has changed considerably over the past ten years, with government efforts to combat HIV/AIDS through national prevention and treatment programs, doubling and becoming more visible to combat the pandemic. For instance, from 1994 to 2006, the number of male condom distributed by government's programs have increase from 8 million to 376 million (Abdool Karim *et al.* 2009). As such, researchers have noted that HIV/AIDS is moving towards being classified as a chronic condition, rather than a fatal disease (Kuper 2014; Banks *et al.* 2015). For this reason, it is of importance to determine whether treatment and preventative programs have had an effect on the life expectancy in South Africa and whether the progression of the disease has resulted in an increase in the level of disability in the country.

HIV/AIDS has a direct as well as indirect effect on disability. Directly, HIV can affect the way an individual acts in their everyday life. Indirectly, it has been found that the medication used to treat HIV/AIDS can lead to disabilities, such as hearing loss, sight loss, physical disability and intellectual disability (Nixon *et al.* 2011; Banks *et al.* 2015). This implies that both the high level of HIV prevalence among the population and the increase in treatment programs may affect significantly the level of disability observed in South Africa. The evolution of the HIV epidemic in South Africa reached a milestone in 2006 when the number of deaths exceeded the number of new HIV infections (Abdool Karim *et al.* 2009). In 2012, the prevalence of HIV among the whole population was estimated to be 12.2% or 6.4 million persons, with around 31.2% of them exposed to ART (Shisana *et al.* 2014). It is not only the HIV epidemic and the concomitantly high prevalence of tuberculosis that are causing disability for the population but many other non-communicable diseases and factors such as violence and injuries (Abdool Karim *et al.* 2009; Mayosi *et al.* 2009).

Although, it is incorrectly assumed that disabled persons do not partake in the same risk seeking behaviour as able bodied persons, they do engage in behaviours such as sexual activity and drugs, which increase the risk of HIV/AIDS (Groce 2005). They are also at higher risk of sexual abuse which further increases their risk of contracting HIV (Groce and

Trasi 2004). Further, disabled persons are often neglected in preventative and treatment programs (Groce 2005). This occurs as a result of information being pitched at levels which are not understood by the disabled and due to the fact that clinics and other treatment centres are also often inaccessible to persons with physical disability (Groce 2005).

In order to provide an indication of the quality of life of South Africans, this study attempts to determine the proportion of life, which the non-institutionalised South African population spent in good health, and how it has evolved over time, using the 2001 and 2011 household census data. To achieve this aim, two objectives were set. Firstly, an analysis of the non-institutionalised disabled population of South Africa in both 2001 and 2011, and secondly, the calculation of the healthy life expectancy for the non-institutionalised South African population in both years.

Background

With the increasing longevity of life among populations in resource-developed countries, there has been an increased focus on developing indicators that predict the level of health and wellbeing of the population as a whole. The main indicator in use, which has been for many years, for the prediction of the level of health in an area is that of life expectancy (Bor *et al.* 2013). Life expectancy gives a measure of the mean number of years which an individual, at a particular age, could expect to live when subjected to the age specific mortality rates of that population (Bor *et al.* 2013). Globally there has been a trend of improvement in life expectancy over the past 15 to 20 years, leading to population structures characterised by a larger proportion of elderly rather than young members (Robine *et al.* 1999; Molla *et al.* 2001).

As a result a new question about the level of health of a population (especially in old age) has been raised. This question poses the issue of whether people who are living longer experience an extension of the years of healthy life into older ages (compression of morbidity) or if they experience a longer term of unhealthy or disabled life (expansion of morbidity) (Gruenberg 1977; Fries 1983; Robine *et al.* 1999). A third notion, dynamic equilibrium, claims that the effect of disability is less severe than historically (Manton 1982, p. 226-227).

Health expectancies are indicators which measure the number of years which an individual at a particular age could expect to live without disability when subjected to the mortality and morbidity rates of that population (Sullivan 1971). The expectancies differ according to the way in which the level of disability is defined and calculated. The first such contribution to the development of these indicators was proposed by Sanders in 1964 (Robine and Ritchie 1991). Sanders (1964) noted that, due to improvement in medical technology, there would be an increase in the diagnosis of, and life years lived with, chronic conditions. Further, this would lead to an increase in the prevalence of morbidity (Sanders 1964). He

proposed an index, which combined the elements of morbidity and mortality, to measure the extent of the effects of the increase in chronic disease (Sanders 1964).

Three indicators, which make up the group of health expectancies, have been defined. These indicators differ in the way in which disability or health have been defined, the sources of data used and how disability has been weighted in the calculation (Salomon *et al.* 2013). They include healthy life years or healthy life expectancy (HALE), where the health levels are defined by considering chronic conditions, disability free life expectancy, where health is defined in accordance with social or functional ability, and active life expectancy, where health is defined according to an ability to perform certain activities (Molla *et al.* 2001). Depending on the data available, one is able to calculate the health expectancy based on one of the above definitions. However, the guidelines stipulated by the World Health Organisation cast doubt on the validity of disability free life expectancy as the interpretation of social or functional limitations may differ depending on the cultural or social norm of the population in question.

While several estimates of life expectancy are computed internally and externally for South Africa, research on healthy life expectancy focusing solely on the country is limited. There are few studies conducted on several countries including South Africa, which provide information on the level of healthy life expectancy in the country. The most recent are those by Salomon *et al.* (2013) and measures from the World Health Organisation (2014).

The study of Salomon *et al.* (2013) found that the level of healthy life expectancy for South Africa was 52.6 and 58.5 - for males and females respectively - in 1990, compared to 49.1 and 52.7 - for males and females respectively - in 2010. The main reason cited for the decreased healthy life expectancy was the HIV/AIDS pandemic (Salomon et al., 2013). The life expectancy for these periods was 60.7 for males and 68.7 for females in 1990 and 57.4 for males and 62.3 for females in 2010. With regards to the breakdown of life expectancy into healthy years and unhealthy years, in 1990 86.7 per cent of the life expectancy of males was lived in good health in comparison to the 85.2 per cent for females. In 2010 the same proportions were 85.5 per cent and 84.6 per cent respectively. This indicates that the level of morbidity in South Africa increased between 1990 and 2010, which is in contrast to most other countries (Salomon *et al.* 2013). The results also demonstrate that males spend more time in good health than females.

The World Health Organisation (2014) found that the healthy life expectancy for South Africa was 51 years in 2000 (48 and 53 years for males and females respectively). Just over 10 years later the overall healthy life expectancy had not changed much, as it was 51 years in 2012 (49 and 53 years for males and females respectively). The World Health Organisation also reported the life expectancy of South Africa for both 2000 and 2012. They found in 2000 that the overall life expectancy was 59 years, 55 and 62 years for males and females respectively, in comparison to the overall level of life expectancy in 2012 of 59 years, 56 and 62 years for males and females respectively (World Health Organisation 2014).

Both sets of results observe the same trends with regards to healthy life expectancy and life expectancy.

There are a number of studies, which have reported that the proportion of life years lived in good health is lower for females than males (Katz *et al.* 1983; Rosenberg *et al.* 1999; Jagger *et al.* 2008; Salomon *et al.* 2013). This is in contrast to life expectancy, where it is generally found that females have a longer life expectancy than males. Results from previous studies, especially from the study by Salomon *et al.* (2013), present the same conclusion for South Africa. As mentioned above, the proportion of life lived in good health was found to be lower for females than for males. Researchers speculate that this is due to the fact that women live longer than men after chronic diseases and disability have developed and hence spend a greater proportion of their life in poor health (Robine *et al.* 1999).

It should be noted that both these studies, the study conducted by Salomon *et al.* (2013) and the estimates provided by the World Health Organisation (2014), are on a global scale using data specific to morbidity and mortality. They fail to provide adequate reasons to explain the results obtained. In addition, due to the fact that their aim was to provide an estimate of HALE, they lacked a clear description of the level of morbidity within the country. In our analyses, we go further and use detailed national census data to conjecture on possible reasons for the differences noted as well as provide a descriptive analysis of disability in South Africa.

Method

Data and variables

This study used a ten per cent sample of the South African 2001 (Statistics South Africa 2001) and 2011 (Statistics South Africa 2011) household censuses. In order to perform the disability analysis and calculate health expectancies, the sections on health and well-being and household deaths of each census were used. Information related to the death in the household is reported for the last 12 months. The census reports for each death, the month and year of death, the sex of the deceased and the age at death. These questions are similar for both 2001 and the 2011 censuses.

The question on disability differed between the two censuses. The 2001 question was based on the 1980 WHO ICIDH (International Classification of Impairments, Disabilities and Handicaps) definition of disability (Statistics South Africa 2012). It required that the respondent indicate whether any one of the disabilities of sight, hearing, intellectual, physical and/or emotional prevented any member of the household from partaking in normal life. The 2011 census used the Washington Group (WG) definition. It required respondents to give an indication of each household member's level of ability when considering the actions of sight, hearing, communication, remembering and concentrating, walking and climbing stairs and self-care (Statistics South Africa 2012).

Due to the fact that the question in the two censuses differed, we made the assumption that the questions which referred to "walking and climbing stairs" and "remembering and concentrating" in 2011 recorded information about physical and intellectual disabilities respectively. As a result, comparisons could be made with regards to five disabilities, mainly: sight, hearing, communication, physical and intellectual.

An assumption was also required with regards to the level of severity of the disabilities recorded in both censuses. Due to the manner in which the 2001 disability question was phrased, coupled with the fact that enumerators were requested not to record disabilities corrected by an assistive device (Statistics South Africa 2003), the assumption was made that only severe cases of disability were recorded in 2001. In order to ensure comparability with the 2011 census, we assumed that responses "A lot of difficulty" and "Cannot do at all" recorded disabilities of the same severity in 2011 as those recorded in 2001. The 2011 questions were phrased to take into account the use of assistive devices. This led to a disabled person being defined as any individual who indicated a disability under the 2001 census question in the categories listed above and any person who responded with "A lot of difficulty" and "Cannot do at all" to the above categories in the 2011 census.

Procedure for data quality assessment

We assessed the quality of the two censuses to ensure the reliability of the results and conclusions. The main areas of concern, which could potentially distort results, were instances of age heaping, under reporting and missing values within the population, household death and disability data.

In order to identify age heaping, plots of the age and sex distribution were made. Spikes at specific ages, for example ages ending in zero and five digits, years ending in zero or five or significant historical events, are an indication of age heaping (Moultrie *et al.* 2013). The age and sex ratio were computed for both the population and household death data.

With regards to under reporting, we used the Brass Growth Balance (BGB) method to determine completeness of death data. This method makes the assumptions that the population is stable and that the net migration is small in comparison to the level of mortality (Dorrington 2013). The application of these assumptions means that the growth rate of the population should be approximately equal to the birth rate less the death rate (Dorrington 2013). The BGB method makes use of this fact to estimate the level of deaths which are not reported by fitting a straight line to the growth equation and using this to estimate the proportion of deaths reported (Dorrington 2013). In doing so, the assumption is made that deaths are reported to the same degree at all ages.

Comparisons were also made with vital registration death data in order to determine the actual distribution of under reporting across the population. This allowed us to identify any violations to the BGB assumptions. Deaths recorded in the vital register between October 2000 and September 2001 and October 2010 and September 2011 were used as a comparison

for 2001 and 2011 respectively. The records were corrected for under reporting using assumptions made by the Health Data Advisory and Co-ordinating Committee (HDACC) as to completeness of vital registration records as reported in Bradshaw *et al.* (2012). The HDACC assumes a completeness of 92 per cent at age naught, 73.4 per cent at age one, 93 per cent above age 15 and a linear trend between ages two and 14 starting at the figure for age one and ending at the figure for age 15 (Bradshaw *et al.* 2012).

We refer to the methods proposed by Arriaga (1994) to impute missing age and sex values for deaths in the 2011 household data. His method makes use of contingency table methods to impute the missing values. It requires an existing distribution and totals for each of the variables. The existing distribution of the two variables is entered into a two-way contingency table. Each of the row elements is then adjusted proportionally to achieve the desired row total, following this each column element is adjusted proportionally to achieve the correct column total (Arriaga 1994). This is repeated until the table converges to the correct row and column totals (Arriaga 1994). It was assumed that the distribution of deaths with known values was representative of the actual distribution. Finally, hotdeck imputation was used to impute unspecified responses in the 2011 disability data. The assumption was made that there is a correlation between disability and poverty; and, as a result, the hotdeck imputation was done using poverty strata. Income level was used as an indication of poverty. For those below age 15 (not of working age), the assumption was made that they would experience the same level of poverty as the head of the household. The results obtained are robust to alternative stratification based on population group.

Analytical Approach

Two analytical approaches were implemented in order to achieve the aim of the study: a description of the sample and the computation of the healthy life expectancy (HALE), disaggregated by sex, population groups and provinces of South Africa.

Descriptive tables were computed to investigate the state of disability in South Africa. The focus was on disability by type and sex in both the 2001 and 2011 censuses. A more detailed analysis also considered the characteristics of the disabled population in relation to geographical distribution, population groups, education and employment status.

The results from the application of the BGB method together with the comparison with the vital register were used to adjust the deaths and population data for completeness. Thereafter, normal life table techniques were used to compute the life table. For ages five and above, it was assumed that deaths occurred on average midway through the interval. The Brass Logit relational model was used to smooth the life table for ages five and above. This method fits a linear relationship between the logit of two different life table functions i.e. $Y_1 = \alpha + \beta Y_2$, where α and β are estimated coefficients, and Y_1 and Y_2 represent the logits of survivorship (l(x)) for two different life tables, with $Y(x) = logit\big(l(x)\big) = -\frac{1}{2}\ln\left(\frac{l(x)}{1-l(x)}\right)$

(Moultrie *et al.* 2013). Due to the specificity of South Africa in terms of HIV/AIDS, any standard model life table is suitable. Therefore, we used the model developed by The Actuarial Society of South Africa's AIDS and Demographic model (ASSA2008 lite) as a model life table (Actuarial Society of South Africa 2011). For ages below five, the values of average person years proposed by Coale and Demeny (1983), as adapted by Preston *et al.* (2000) were used. We computed the life tables by population groups and provinces, by making the assumptions that the deaths which were reported in a certain household would belong to the same population group as the head of the household, and that the deaths which occurred in a certain household occurred in the same province in which the household was enumerated.

There are three major methods available to compute HALE, namely the life table method, the multi-state life table method, and the Sullivan method (Robine *et al.* 1999). The life table method proposed by Katz *et al.* (1983) makes use of normal life table techniques to calculate health expectancies. The end point of the life table is set such that it takes into account all those who are dependent, institutionalised and dead (Katz *et al.* 1983). The multi-state life table method, as proposed by Rogers *et al.* (1989), makes use of a time-inhomogeneous Markov chain. A number of decrement states are defined and the transition intensities between these states are calculated to form a multi-state life table (Rogers *et al.* 1989). The Sullivan method, the method used most frequently, calculates health expectancies by combining age-specific disability prevalence with the life-table using cross-sectional data (Imai and Soneji 2007). Due to the fact that it is the only method which supports the use of cross-sectional data, the Sullivan method was used in this study. In the absence of a survey on the population's perception of the severity of different disabilities in South Africa, we refer to weights which have been published in the Global Burden of Disease (GBD) study in a previous study (Salomon *et al.* 2013). The "healthy weight" (one minus the disability weight) in conjunction with the life years at each age is then used to calculate the healthy life years at each age. The healthy life expectancy can then be calculated as the sum of the healthy life years divided by the population at each age (Sullivan 1971).

Co-morbidities were taken into account using the method described by Salomon *et al.* (2013). In this method the combined "healthy" weight is calculated as the product of 1 minus each of individual's disability weights (Salomon *et al.* 2013). This combined healthy weight was multiplied by one minus the prevalence of each combination of disability in each age group to find the healthy values. An average healthy value was then calculated for each age group. This was then combined with the life years in each age group to find the healthy life years from which the healthy life expectancy was calculated. This method was used to compute healthy life expectancy by sex, population group and province for both census 2001 and 2011. The same disability weights were used for all analyses to ensure comparable results.

The analysis was performed using the following software: R version 3.0.1 (R Core Team 2013), Microsoft Excel 2013, and Stata 14.

Results

Assessing the data quality

Age heaping was identified in some ages ending in one in both the 2001 and 2011 population and household death data (Figure A.1, and Figure A.2 in Appendix). However, the grouping of population data into five-year age groups resolved the issue of age heaping. As a result, all tables are computed on five years' age groups intervals. In contrast, age heaping in the household death data was not entirely smoothed out when grouping the age groups; we made use of the BGB method and comparisons with the vital register to correct for under and over reporting in certain age groups. The age and sex ratio also highlighted instances of non-linear progression between the age groups in both population and death data which further indicate that the level of reporting is not uniform across age groups (results not presented).

Figure 1: Comparison of the log mortality rates of the Vital Registrar and Census for 2001 and 2011

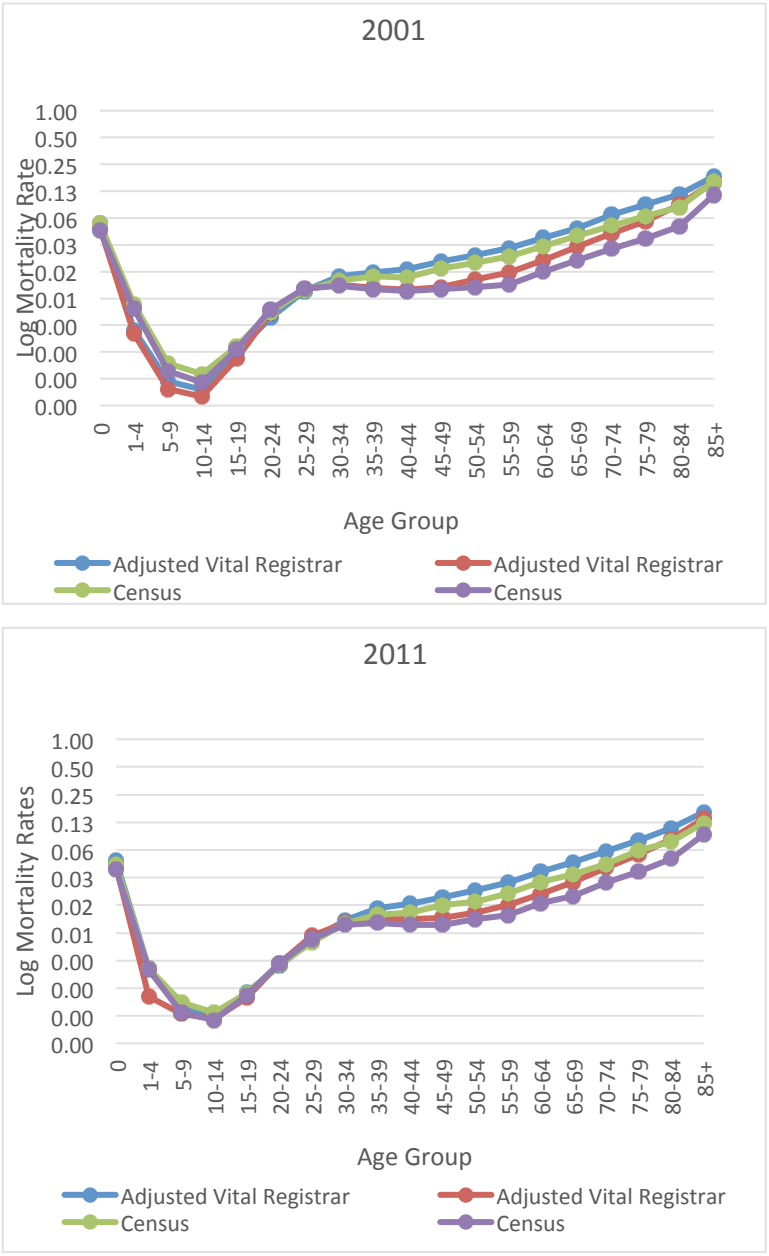


Figure 1 presents the comparison of the log mortality rate from the census and the vital registration. According to this figure, the levels of completeness of household death data are estimated to 62 and 85 per cent in 2001 for males and females respectively and 82 and 86 per cent in 2011 for males and females respectively. Furthermore, comparison with the vital register indicates that under reporting occurred at the very young ages and above age 30. Between ages 5-30 there appears to be over reporting. These observations were used to further adjust the death data for completeness. Due to the poor quality of reporting at ages below five for both censuses, the deaths reported according to the vital registrar were used in place of the number recorded by the census.

No missing values were reported in all three of the 2001 population, household death and disability data. There were also no missing values in the 2011 population data. In contrast 3% of entries in the household death data on age and sex had missing entries which were imputed using the procedure described by Arriaga (1994). We also found missing and unspecified values in the 2011 disability data. A total of 7.40% of the sample, 7.39% for female and 7.42% for the male had an indeterminable disability status due to unspecified values which were imputed by the hotdeck method described in the previous section.

Descriptive results

Figure 2: Proportion disabled by type and by year

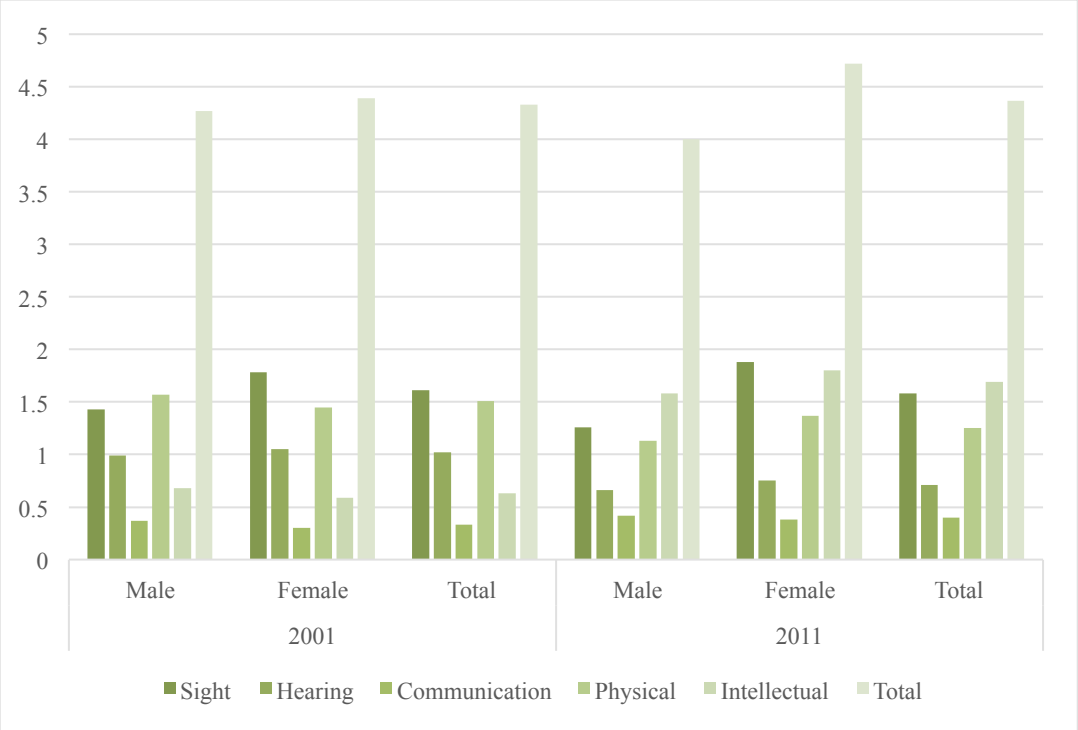


Figure 2 shows that 4.3% of the population was disabled in 2001 in comparison to 4.4% in 2011 with a notable difference between males and females. The level of disability decreased for males from 4.3% to 4.0%, but increased for females from 4.4% to 4.7%. This Figure also describes the results of the descriptive analysis by type of disability. The disability of sight had the highest prevalence in 2001 across all three of male, female and the total population. In contrast, intellectual disability was most prevalent in 2011 for both the total population and males while sight remained the most prevalent for females.`

Table A.1 (Appendix) presents a detailed analysis of the disabled population by provinces, population groups, education level and employment status. The results indicate there is a significant difference between the different qualitative characteristics with regards to the proportion disabled. The highest level of disability in 2001 occurred in the Free State, while the Northern Cape showed the highest level of disability in 2011. The Black African population group showed the highest level of disability in both 2001 and 2011. A high level of disability was also found among persons with no schooling in both 2001 and 2011. This did not improve between the two censuses. In contrast, disability is lower among persons with higher level of education for both censuses which may indicate that the disabled population could experience difficulty in finding employment. This was echoed in the employment status where the largest proportion of disability was found among those classified as being not economically active. Although the level of disability among the not economically active population decreased between the two censuses, it still remained the highest in this category in comparison to employed and unemployed categories.

Figure 2a: Proportion disabled by type, and age in 2001

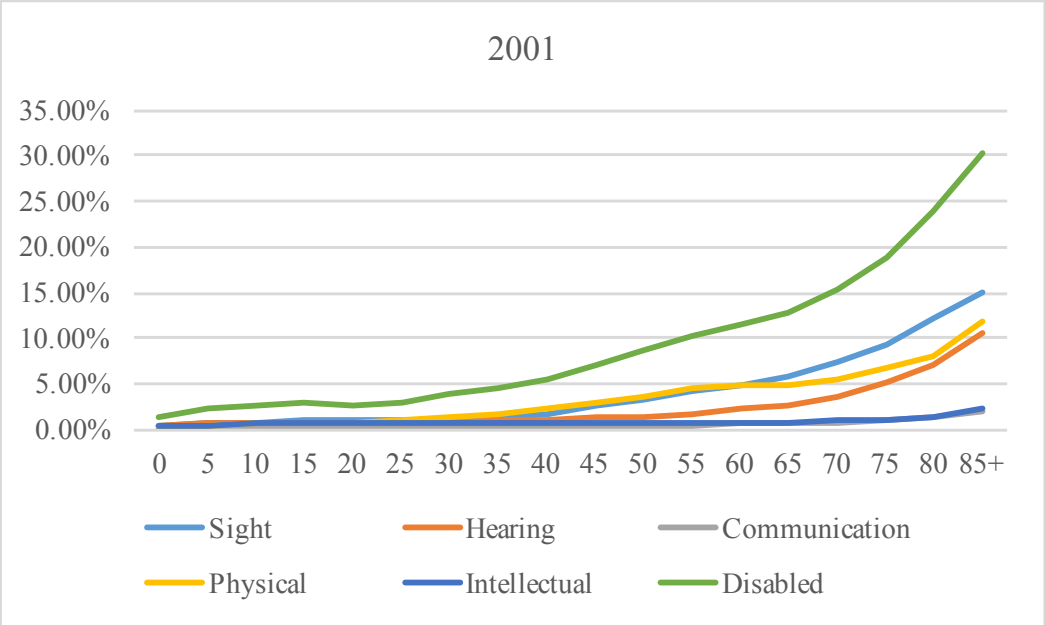
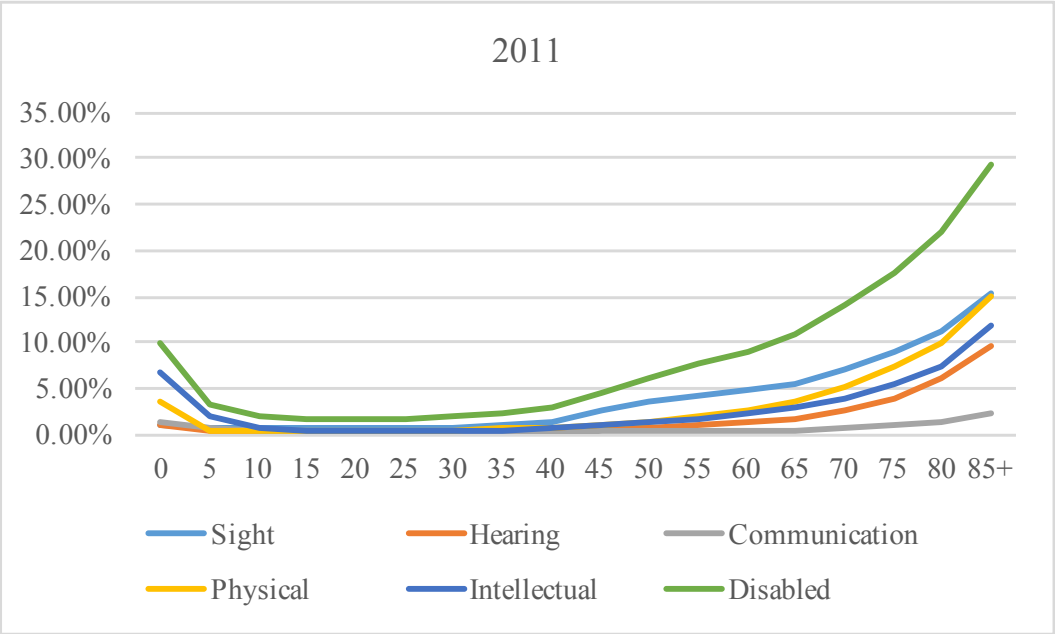


Figure 2b: Proportion disabled by type, and age in 2011



The Figures 2a and 2b present also the distribution of the population with disability by age and by type for the years 2001 and 2011. These Figures shown the increased proportion of young peoples living with disability in 2011 compared to 2001. This may indicates a real change in the age-distribution of the disability or a problem with the data.

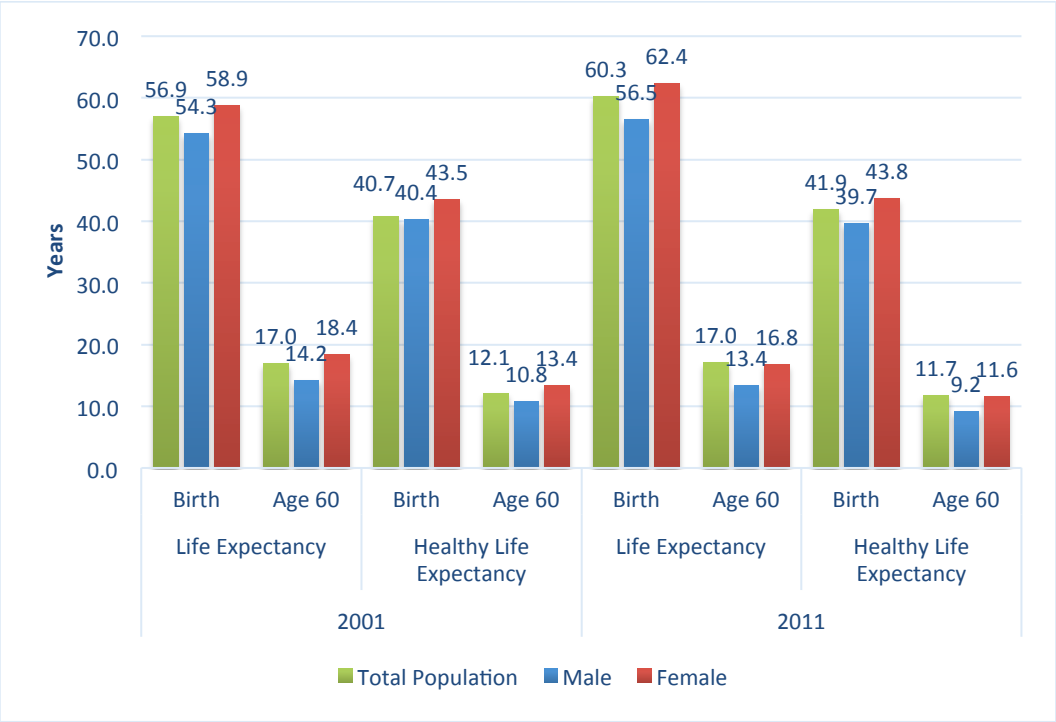
Life and healthy life expectancy: Change over time

Figure 3 presents the results of the computation of the life and healthy life expectancy at birth and at age 60 for 2001 and 2011. According to this Figure, both the life and healthy life expectancy increased during this period, ranging from 56.9 and 40.7 at birth in 2001 to 60.3 and 41.9 in 2011. In terms of proportion of life spent in good health, the Figure is less descriptive. Over the period, this proportion decreases, from 71.5 in 2001 to 69.5% in 2011. At the age of 60, the proportion of life spent in healthy condition ranges from 71.2 in 2001 to 68.8% in 2011.

Figure 3 also depicts the same results by sex. The healthy life expectancy at birth was 40.6 and 43.9 years for males and females respectively in 2001, in comparison to levels of 39.7 and 43.8 years for males and females respectively in 2011. The results show that, at birth, in 2001 both males and females could be expected to spend 74.4 and 73.9% of life years in good health respectively. In contrast, in 2011 males and females could expect to spend, at birth, 70.3 and 70.1 per cent of life in good health (without disability) respectively.

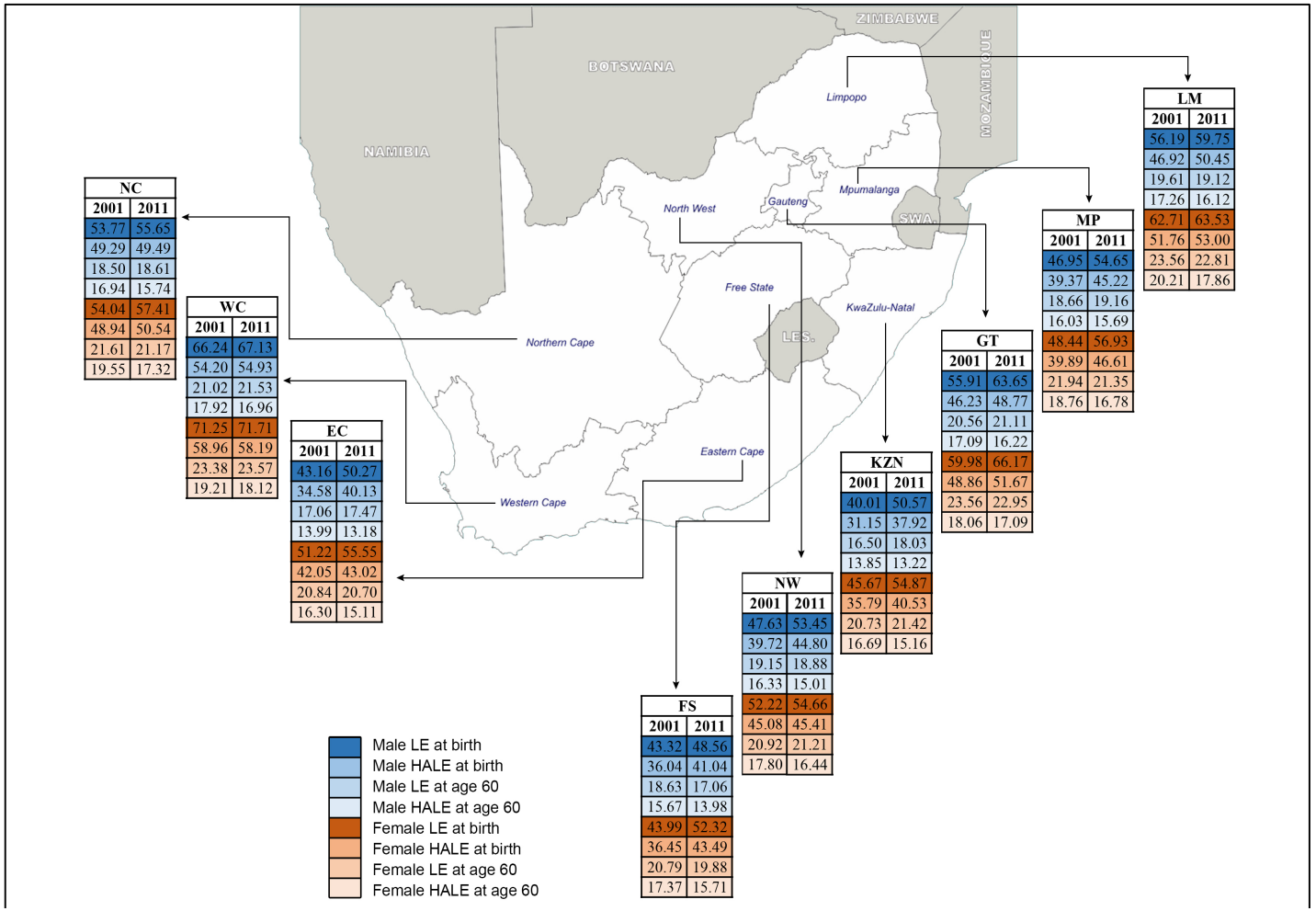
At age 60, the proportion of time spent in good health was 76.0 and 72.8% for males and females respectively in 2001, in comparison to 68.7% for males and 69.0% for females in 2011. As can be seen in Figure 3, both the life expectancy and healthy life expectancy decreased between the two censuses. Females observed a higher level in both indicators for both censuses than that of males. Detailed life tables for the total population, males and females is presented in Table A.2 to A.7 in the Appendix.

Figure 3: Comparison of the Life Expectancy and Healthy Life Expectancy According to Census 2001 and 2011



The analysis was also completed by population groups (Figure A.3, Appendix) and provinces (Map 1). Both the healthy life expectancy and life expectancy increased for all population groups between 2001 and 2011. The Black African population had the lowest life expectancy and healthy life expectancy for both censuses. Predictably, given the positive health and socio-economic outcomes enjoyed by White and Indian populations in South Africa, the White population group observed the highest life expectancy in both censuses while the Indian/Asian population group observed the highest healthy life expectancy, also in both censuses.

Map 1: Life and healthy life expectancy by provinces for 2001 and 2011



NC	
2001	2011
53.77	55.65
49.29	49.49
18.50	18.61
16.94	15.74
54.04	57.41
48.94	50.54
21.61	21.17
19.55	17.32

WC	
2001	2011
66.24	67.13
54.20	54.93
21.02	21.53
17.92	16.96
71.25	71.71
58.96	58.19
23.38	23.57
19.21	18.12

EC	
2001	2011
43.16	50.27
34.58	40.13
17.06	17.47
13.99	13.18
51.22	55.55
42.05	43.02
20.84	20.70
16.30	15.11

FS	
2001	2011
43.32	48.56
36.04	41.04
18.63	17.06
15.67	13.98
43.99	52.32
36.45	43.49
20.79	19.88
17.37	15.71

NW	
2001	2011
47.63	53.45
39.72	44.80
19.15	18.88
16.33	15.01
52.22	54.66
45.08	45.41
20.92	21.21
17.80	16.44

KZN	
2001	2011
40.01	50.57
31.15	37.92
16.50	18.03
13.85	13.22
45.67	54.87
35.79	40.53
20.73	21.42
16.69	15.16

GT	
2001	2011
55.91	63.65
46.23	48.77
20.56	21.11
17.09	16.22
59.98	66.17
48.86	51.67
23.56	22.95
18.06	17.09

MP	
2001	2011
46.95	54.65
39.37	45.22
18.66	19.16
16.03	15.69
48.44	56.93
39.89	46.61
21.94	21.35
18.76	16.78

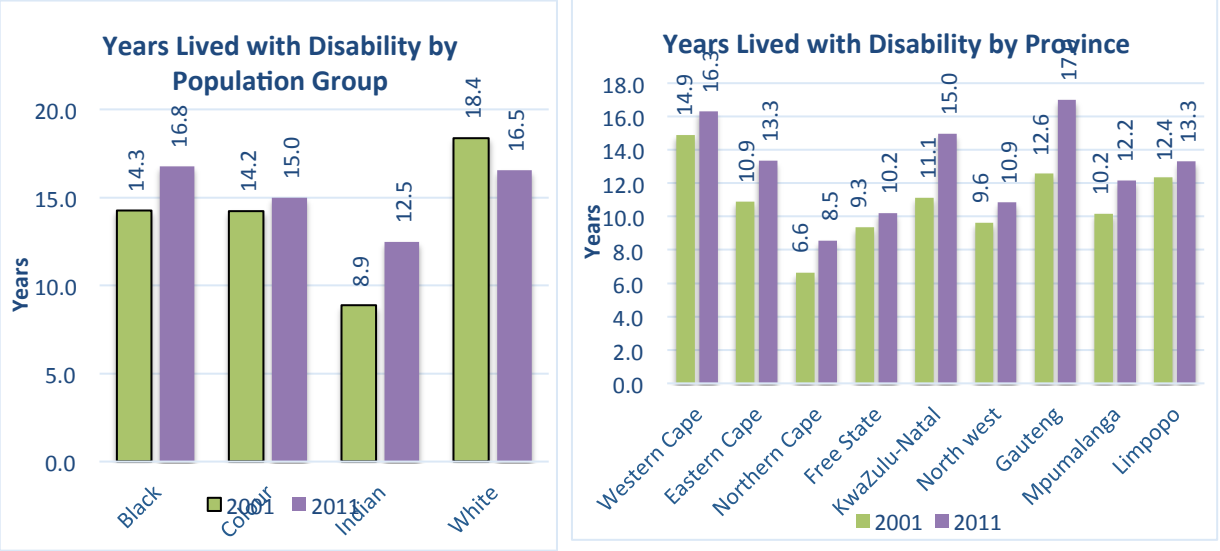
LM	
2001	2011
56.19	59.75
46.92	50.45
19.61	19.12
17.26	16.12
62.71	63.53
51.76	53.00
23.56	22.81
20.21	17.86

The results presented in Map 1 show large differences between the provinces in South Africa in regard to healthy and life expectancy. The life expectancy ranged from 42, in KwaZulu-Natal to 69, in the Western Cape, in 2001 and from 50, in the Free State, to 70, in the Western Cape, in 2011. The healthy life expectancy ranged from 31, in KwaZulu-Natal, to 54, in the Western Cape in 2001 and from 38, in KwaZulu-Natal, to 53 in the Western Cape. Both the life expectancy and healthy life expectancy increased for all provinces, except that of the Western Cape which observed a decrease in healthy life expectancy, between 2001 and 2011.

Years lived in morbid states in 2001 and 2011

Figure 4 below shows the difference between the healthy life expectancy and life expectancy for both 2001 and 2011 by province and population group. This is an indication of the number of years, at birth, an individual could expect to spend in a morbid state.

Figure 4: Differences between life expectancy and healthy life expectancy for 2001 and 2011 by population groups and provinces.



The Figure 4 shows that morbidity increased for all but the White population group between 2001 and 2011 and that morbidity increased for all provinces between 2001 and 2011. The White population experienced the highest number of years in disability in 2001. In contrast, the Black African group had the highest morbidity levels in 2011. Accordind to the provinces, Western Cape had the highest number of years of disability in 2001 while Gauteng showed the highest number in 2011.

Discussion

Studies have shown that the life expectancy of South African is increasing due to the impact of improved HIV/AIDS treatment programs, but the effects of this on the quality of health of South Africans are not clear. This study attempted to provide an indication of the level of morbidity in South Africa, specifically the proportion of time non-institutionalised South Africans could expect to spend in good health. Our results indicate that in 2001 South Africans could expect to spend 71.5 per cent of life years in good health (without disability). This is in contrast to 2011, where South Africans could expect to spend 69.5 per cent of life years in good health. Overall, the decrease in the proportion of time spent in good health indicates that South Africa experienced an expansion in morbidity between the two censuses. This means that, although the life expectancy of South Africans is increasing, the quality of life is in fact worsening. These results are consistent with the descriptive analysis where we observed an increase in the proportion of the total population disabled from 4.33 per cent in 2001 to 4.37 per cent in 2011.

With regards to the results at age 60, it can be concluded that individuals who reach retirement without disability could expect to spend a large proportion of their retirement in good health. This implies that individuals who reach age 60 in good health would not put excessive strain on the health system due to the fact that they are expected to spend a large proportion of their remaining life years in good health.

The results also show differences between males and females. We have found that the life expectancy and healthy life expectancy for females is higher than that of males. However, in contrast, females are expected to spend a smaller proportion of life in good health. This confirms the conclusions from previous studies. With regards to males, we noted a decrease in HALE which is in contrast to the decrease in the disability observed among the male population in the descriptive analysis. This can be explained by the fact that the different disabilities are allocated different weights according to their severity, meaning that a higher level of disabilities with a larger weight would decrease the average healthy weight and thus the HALE. A higher proportion of intellectual disability, which has the largest disability weight, was observed among males in 2011 in comparison to 2001 which may have resulted in the inconsistent results.

Another inconsistency is that the proportion of time spent in good health for the total population is lower than both that of males and females for both years. This may have been caused by the fact that certain combinations of disabilities only appeared in either male or female and not both and when combined, all combinations appeared in the total population. This means that there are more combinations of co-morbidities in the total population and, due to the fact that the effect of the disability weight is greater than the prevalence, this leads to a lower average healthy weight.

Our results also highlight differences between the population groups and provinces. Of interest is the fact that while the White population have seen a decrease in the number of years lived with disabilities, the Black African population observed an increase over time. We found that the number of years lived with disability for the African Black population was 14.3 and 16.8 years in 2001 and 2011 respectively, in contrast to the White population which showed levels of 18.4 and 16.5 years lived with disability in 2001 and 2011 respectively. We also observed a much larger increase in the life expectancy for the African Black Population than that of the White population. This is to be expected, because although the Black African population has been known to be characterised by a high prevalence of HIV/AIDS in South Africa, in recent years much emphasis has been placed on improving HIV/AIDS outcomes in the country, resulting in the largest antiretroviral (ART) treatment program roll out in the world (UNAIDS 2014). Our results indicate that HIV/AIDS treatment programs are improving life expectancy but that this improvement is characterised by an increase in the time spent with morbidity.

Our results differ to those of both the World Health Organisation (2014) and Salomon et al. (2013). The life expectancies observed were lower than that reported by the World Health Organisation (2014) for 2001 and higher than both the World Health Organisation (2014) and Salomon *et al.* (2013) for 2011. Both the healthy life expectancies and proportion of years spent in good health were lower for 2001 and 2011 in comparison to those of both the World Health Organisation (2014) and Salomon *et al.* (2013). The differences in life expectancy could be explained by adjustments made to the data. While the differences in healthy life expectancy could be explained by a difference in the definition of disability used in our study in contrast to those of previous studies, particularly the study Salomon *et al.* (2013) which considered a much broader range of disabilities. This has been noted as a limitation of the healthy life expectancy as a population indicator, as it is not clear how disability or morbidity should be defined and this definition is often limited by the availability of data.

It was also identified that a much higher number of children below the age of five were recorded as being disabled in 2011 in comparison to 2001. It was determined that 0.14 per cent of the population below the age of five in 2001 were disabled in comparison to 1.10 per cent in 2011. This may be due to misinterpretation of the question leading to children who may not yet have reached the stage in their development enabling them to perform certain tasks being recorded as disabled in place of using the response “Cannot yet be determined”. This may have caused higher levels of disability in 2011, in comparison to 2001, and resulted in the lower healthy life expectancy observed in 2011. However, an alternative explication is also that more children are living with HIV but in most the case with bad health conditions. Further analysis is important to assess this change in the level of disability at younger age.

This study has some limitations. First, this study covered a period of 10 years where many changes occurred in the evolution of the HIV/AIDS pandemic in South Africa.

According to Abdoul Karim et al., post-2000 was the fourth phase of the evolution of the disease, called "AIDS mortality phase" and characterized by rapid increase in the number of deaths due to AIDS. However, this phase did not last long because of the increase in public expenditure on ART that changed the course of the epidemic. As such, the results reflected in our analyses showing a linear increase of the life expectancy may in fact be a decrease from 2001 to 2007 and an increase later. In terms of healthy life expectancy, the lower mortality in 2011 is associated with many people on ART, which compensates the expected gain on the quality of life.

Second, the study was limited by the availability of good quality comparable data. A number of concerns have been noted with respect to the quality of data of both censuses and, as a result, caution should be taken when ascertaining the reliability of the results. Third, the change in the disability definition used, and hence the manner in which disability questions were phrased availed no options but to make assumptions when comparing the results from the two censuses. Assumptions were also made pertaining to the population groups and provinces of household death data entries, which enabled the computation of life tables by population group and province. Finally, another limitation of the study was the use of disability weights which were not specific to South Africa. Salomon *et al.* (2013) used paired- comparisons to determine weights for 320 health states. A broad set of respondents were used and it was found that the disability weights did not vary between different cultures, environments, educational levels or demographic characteristics of individuals (Salomon et al. 2012). The assumption was made that the population used to develop the published disability weights is representative of the South African population. This could potentially have had an impact on the results if South Africans view the effects of disability differently to those of the population used by the global burden of disease study to compute the weights. As a result, we were compelled to make the assumption that the population on which the weights were based, was representative of the South African population. The assumption was also made that the disability weights would not differ by population group, province and over time. These may be areas for further investigation.

Conclusion

The South African government has placed an increased emphasis on the eradication of inequality in all areas of life in South Africa. Two areas of focus have been that of healthcare and the rights of the disabled population. South Africa is also bound by the United Nations Convention on the Rights of Persons with Disabilities, a global treaty which was implemented in May 2008 (Statistics South Africa 2014). In accordance with this treaty, the government is expected to uphold the rights of the disabled population while ensuring that they have access to the same opportunities as the able bodied population (Statistics South Africa 2014).

The results of this study indicate that attempts to decrease the level of severe disability have not been effective globally as the total level of disability increased slightly

over time. The female population experienced an increase in disability in contrast to the decrease observed in the male population. This indicates that there may be an uneven distribution of resources between males and females. This could also be explained by the fact that females between the ages 15-24 are at greater risk of becoming infected by HIV than men (Muula 2008). As a result, the impact of HIV/AIDS may have resulted in higher levels of female disability.

It seems that measures in place to improve education of the disabled have not been effective, due to the fact that the proportion of those with no schooling characterised as being disabled increased. However, it also appears that the disabled population is becoming more active within the work force; a decrease in the proportion of those not economically active characterised as being disabled was observed. This may suggest that there are fewer barriers preventing the disabled from participating in the labour market today than it was the case ten years ago.

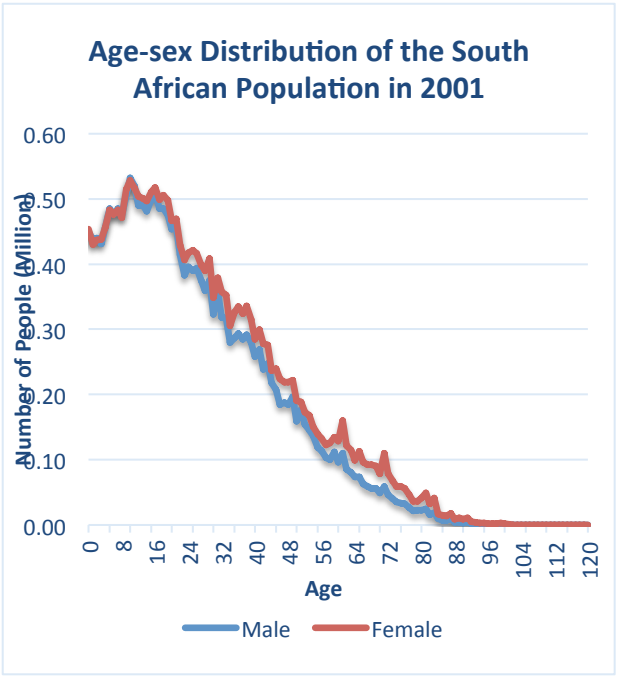
Another issue which has been affecting South Africa for many years is that of the HIV/AIDS pandemic. An increase in life expectancy observed between the two censuses may be an indication that HIV/AIDS treatment programs are having a positive impact on life expectancy. However, we were unable to determine the effect of HIV/AIDS treatment programs on the level of healthy life expectancy due to lack of data. We were also limited in our capacity to determine the effect of HIV/AIDS on disabled individuals. Thus, it is recommended that further analysis is done to explore the link between disability and HIV and AIDS in South Africa. In order to do this, additional questions may need to be added to data sources, in particular the number of days work lost due to ill-health.

Appendix

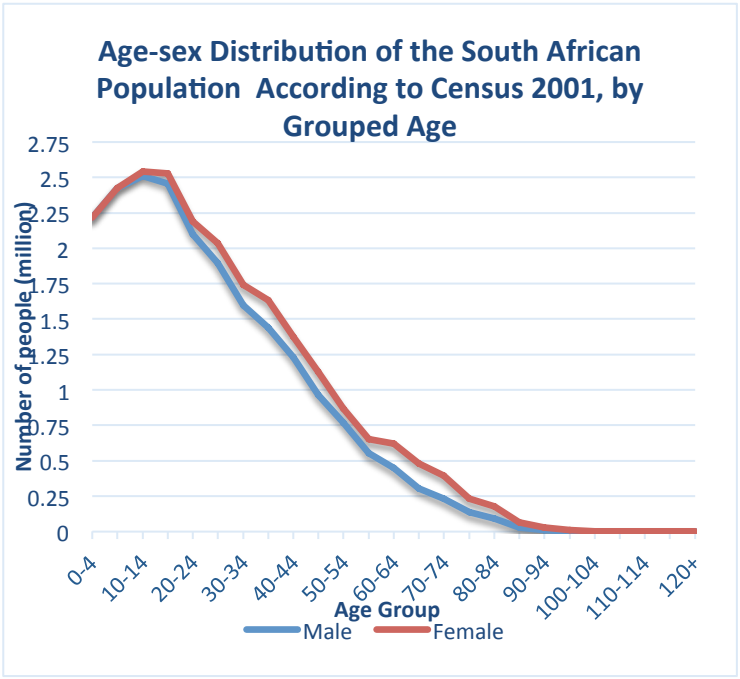
Table A.1: Distribution of the disabled population by certain characteristics, 2001 and 2011

Characteristics	Percentage of Disabled Population					
	2001			2011		
	Male	Female	Total	Male	Female	Total
Provinces	***	***	***	***	***	***
Western Cape	4.02	3.50	3.76	3.31	3.63	3.47
Eastern Cape	5.04	5.12	5.09	4.94	5.82	5.41
Northern Cape	4.85	4.69	4.77	5.90	6.51	6.21
Free State	6.05	6.30	6.18	5.50	6.74	6.14
Kwazulu-Natal	4.33	4.51	4.43	4.16	5.23	4.72
Limpopo	4.47	4.44	4.45	4.18	4.40	4.30
North West	5.07	5.25	5.16	4.97	5.87	5.42
Gauteng	3.23	3.50	3.37	2.88	3.42	3.15
Mpumalanga	5.11	5.08	5.09	3.94	4.48	4.21
Population groups	***	***	***	***	***	***
Black African	4.52	4.70	4.62	4.17	5.02	4.60
Coloured	4.13	3.39	3.74	3.85	4.11	3.99
Indian or Asian	3.41	3.13	3.27	2.87	3.52	3.20
White	4.10	4.35	4.23	2.99	2.99	2.99
Level of education	***	***	***	***	***	***
No schooling	9.20	9.39	9.31	9.99	11.89	11.11
Some primary	4.59	4.56	4.58	4.03	5.13	4.58
Completed primary	4.74	4.78	4.76	3.36	4.65	4.02
Some secondary	4.03	3.88	3.95	2.52	3.23	2.89
Grade 12/Std10	2.72	2.54	2.63	1.79	1.99	1.89
Higher	2.80	2.75	2.78	1.78	2.00	3.89
Employment status	***	***	***	***	***	***
Employed	2.84	2.64	2.76	1.88	2.45	2.13
Unemployed	3.26	3.12	3.18	2.16	2.39	2.29
Other not economically active	8.30	6.33	7.12	4.17	4.28	4.23

Figure A.1: Data Quality Analysis of the 2001 Census Data

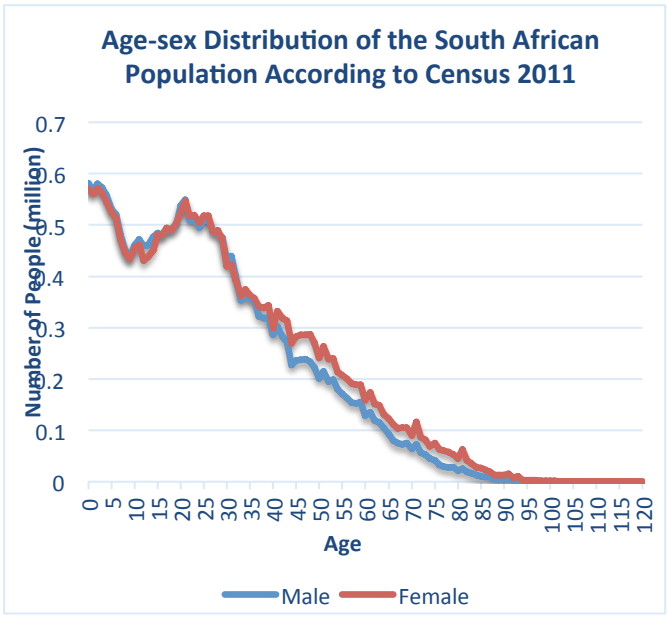


(a) Age-Sex Distribution

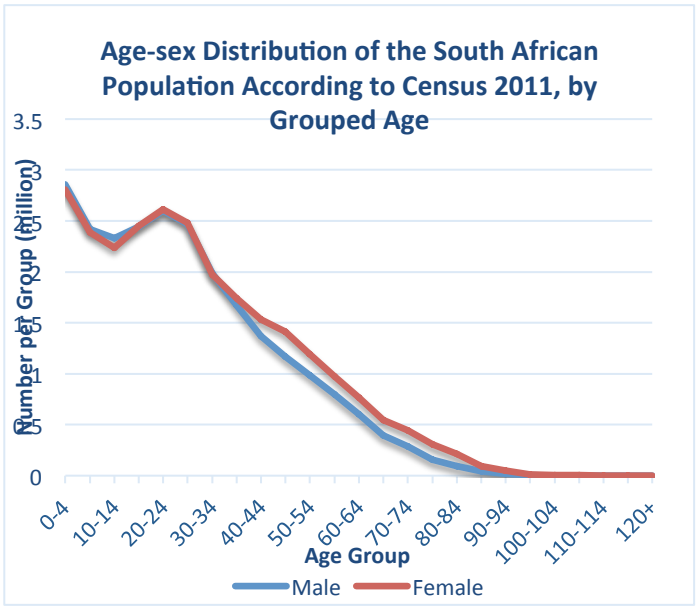


(b) Age-Sex Distribution Grouped by Age

Figure A.2: Data Quality Analysis of the 2011 Census Data



(a) Age-Sex Distribution



(b) Age-Sex Distribution Grouped by Age

Figure A.3: Comparison of the Life Expectancy and Healthy Life Expectancy in 2001, by Population Group and Sex

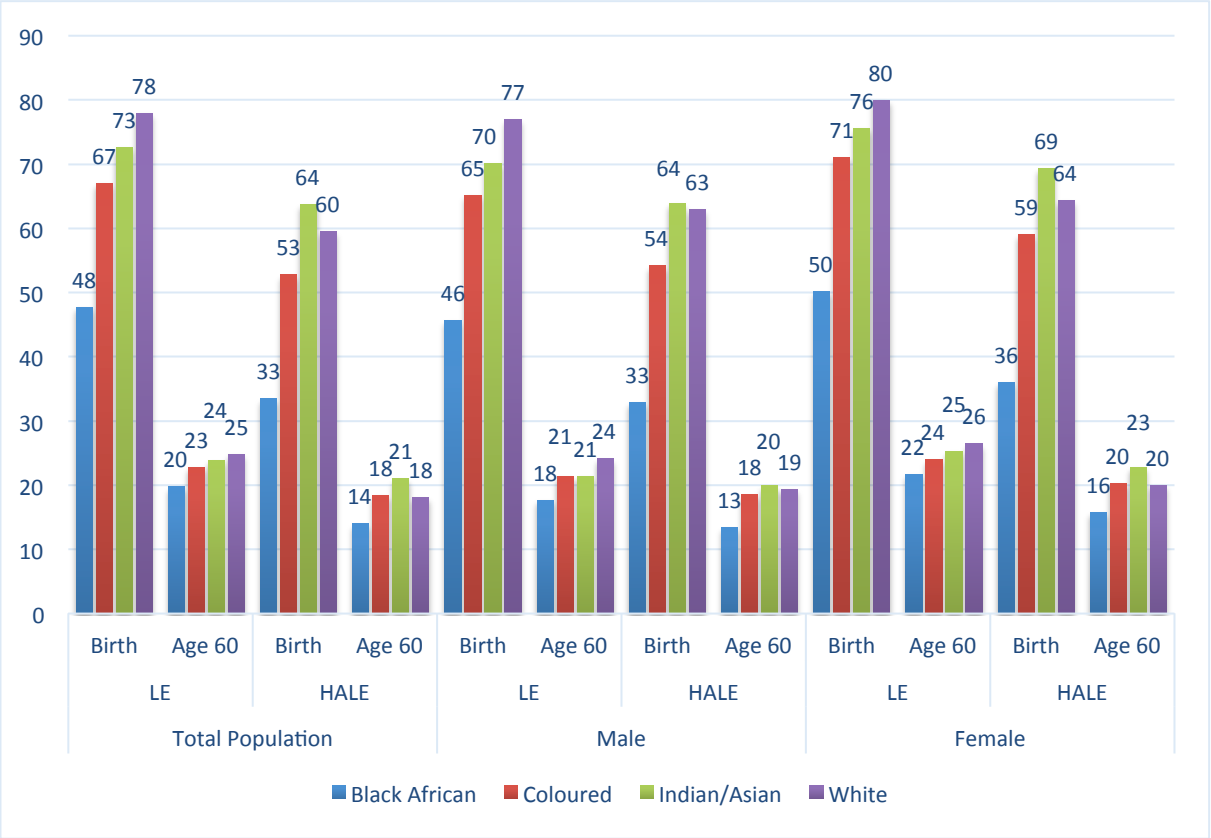


Table A.2: Life Table of the Total South African Population According to Census 2001

Age Group	q_x	L_x	L_x	T_x	e_x	Healthy weight	L_x HALE	T_x HALE	e_x HALE
0	0.049	1.00	1.01	56.95	56.95	0.82	0.83	40.74	40.74
1-4	0.025	0.95	3.84	55.94	58.84	0.75	2.87	39.91	41.99
5-9	0.017	0.93	4.60	52.10	56.21	0.69	3.16	37.04	39.96
10-14	0.015	0.91	4.52	47.50	52.12	0.70	3.16	33.88	37.17
15-19	0.031	0.90	4.42	42.98	47.90	0.72	3.18	30.72	34.23
20-24	0.039	0.87	4.26	38.56	44.35	0.69	2.93	27.54	31.67
25-29	0.038	0.84	4.10	34.30	41.06	0.70	2.88	24.61	29.45
30-34	0.037	0.80	3.94	30.21	37.60	0.75	2.95	21.73	27.05
35-39	0.041	0.77	3.79	26.26	33.95	0.73	2.78	18.78	24.27
40-44	0.049	0.74	3.62	22.47	30.28	0.70	2.54	16.00	21.56
45-49	0.061	0.71	3.42	18.85	26.72	0.73	2.50	13.45	19.06
50-54	0.079	0.66	3.18	15.43	23.30	0.70	2.23	10.95	16.54
55-59	0.099	0.61	2.90	12.25	20.07	0.72	2.08	8.72	14.29
60-64	0.124	0.55	2.58	9.35	17.00	0.70	1.81	6.64	12.07
65-69	0.160	0.48	2.22	6.77	14.05	0.71	1.56	4.83	10.02

70-74	0.207	0.40	1.81	4.55	11.25	0.71	1.29	3.27	8.07
75-79	0.267	0.32	1.39	2.74	8.54	0.71	0.99	1.98	6.18
80-84	0.351	0.24	0.97	1.35	5.75	0.73	0.71	0.99	4.22
85+	1.000	0.15	0.38	0.38	2.50	0.74	0.28	0.28	1.86

Table A.3: Life Table of the Male South African Population According to Census 2001

Age Group	q_x	L_x	L_x	T_x	e_x	Healthy weight	L_x HALE	T_x HALE	e_x HALE
0	0.05	1.00	1.01	54.27	54.27	0.89	0.90	40.36	40.36
1-4	0.03	0.95	3.83	53.26	56.19	0.77	2.97	39.46	41.63
5-9	0.01	0.92	4.59	49.43	53.57	0.72	3.31	36.49	39.55
10-14	0.01	0.91	4.55	44.84	49.02	0.71	3.23	33.18	36.28
15-19	0.02	0.91	4.47	40.29	44.51	0.72	3.22	29.95	33.09
20-24	0.04	0.88	4.33	35.82	40.53	0.72	3.10	26.73	30.25
25-29	0.04	0.85	4.14	31.49	37.14	0.72	2.98	23.63	27.87
30-34	0.04	0.81	3.96	27.34	33.77	0.77	3.05	20.65	25.50
35-39	0.05	0.77	3.77	23.39	30.24	0.75	2.81	17.59	22.75
40-44	0.06	0.73	3.56	19.62	26.69	0.73	2.61	14.78	20.11
45-49	0.08	0.69	3.32	16.05	23.24	0.80	2.65	12.17	17.62
50-54	0.10	0.64	3.02	12.73	19.99	0.74	2.22	9.52	14.95
55-59	0.13	0.57	2.66	9.71	17.03	0.74	1.98	7.30	12.81
60-64	0.17	0.49	2.27	7.05	14.24	0.75	1.71	5.33	10.76
65-69	0.23	0.41	1.82	4.79	11.63	0.78	1.42	3.62	8.79
70-74	0.30	0.32	1.35	2.96	9.31	0.71	0.96	2.19	6.89
75-79	0.38	0.22	0.90	1.61	7.20	0.75	0.68	1.23	5.53
80-84	0.48	0.14	0.53	0.70	5.09	0.77	0.40	0.55	4.00
85+	1.00	0.07	0.18	0.18	2.50	0.84	0.15	0.15	2.10

Table A.4: Life Table of the Female South African Population According to Census 2001

Age Group	q_x	L_x	L_x	T_x	e_x	Healthy weight	L_x HALE	T_x HALE	e_x HALE
0	0.05	1.00	1.01	58.86	58.86	0.86	0.87	43.50	43.50
1-4	0.02	0.95	3.85	57.85	60.68	0.78	2.99	42.64	44.72
5-9	0.02	0.93	4.61	54.00	57.99	0.71	3.28	39.65	42.58
10-14	0.02	0.91	4.53	49.39	54.11	0.75	3.38	36.37	39.84
15-19	0.03	0.90	4.41	44.87	49.99	0.75	3.30	32.99	36.76
20-24	0.03	0.87	4.26	40.46	46.65	0.72	3.06	29.69	34.23
25-29	0.03	0.84	4.12	36.19	43.18	0.73	3.03	26.63	31.77
30-34	0.03	0.81	3.99	32.07	39.51	0.76	3.06	23.60	29.08
35-39	0.04	0.79	3.86	28.07	35.72	0.76	2.93	20.55	26.15
40-44	0.04	0.76	3.70	24.22	31.96	0.72	2.65	17.62	23.26
45-49	0.06	0.72	3.52	20.51	28.35	0.73	2.57	14.97	20.69

50-54	0.07	0.68	3.30	16.99	24.86	0.71	2.34	12.40	18.14
55-59	0.09	0.64	3.04	13.69	21.52	0.76	2.31	10.06	15.81
60-64	0.11	0.58	2.75	10.65	18.35	0.70	1.92	7.75	13.36
65-69	0.13	0.52	2.41	7.91	15.28	0.73	1.77	5.83	11.26
70-74	0.17	0.45	2.05	5.49	12.27	0.75	1.54	4.06	9.06
75-79	0.21	0.37	1.66	3.44	9.25	0.73	1.21	2.52	6.77
80-84	0.28	0.29	1.26	1.78	6.09	0.73	0.92	1.31	4.49
85+	1.00	0.21	0.53	0.53	2.50	0.75	0.40	0.40	1.89

Table A.5: Life Table of the Total South African Population According to Census 2011

Age Group	q_x	L_x	L_x	T_x	e_x	Healthy weight	L_x HALE	T_x HALE	e_x HALE
0	0.038	1.00	1.01	60.28	60.28	0.83	0.84	41.92	41.92
1-4	0.013	0.96	3.87	59.27	61.64	0.69	2.65	41.08	42.72
5-9	0.011	0.95	4.72	55.41	58.36	0.69	3.24	38.43	40.48
10-14	0.012	0.94	4.67	50.69	53.97	0.69	3.21	35.19	37.46
15-19	0.024	0.93	4.58	46.02	49.57	0.69	3.15	31.98	34.45
20-24	0.033	0.91	4.45	41.43	45.75	0.70	3.13	28.82	31.83
25-29	0.032	0.88	4.31	36.98	42.21	0.71	3.07	25.70	29.33
30-34	0.031	0.85	4.17	32.67	38.54	0.71	2.95	22.63	26.70
35-39	0.034	0.82	4.03	28.50	34.71	0.70	2.83	19.68	23.97
40-44	0.043	0.79	3.88	24.46	30.86	0.69	2.67	16.85	21.26
45-49	0.055	0.76	3.69	20.58	27.13	0.69	2.53	14.19	18.70
50-54	0.073	0.72	3.45	16.89	23.57	0.70	2.42	11.65	16.26
55-59	0.093	0.66	3.17	13.44	20.22	0.69	2.17	9.23	13.89
60-64	0.117	0.60	2.84	10.27	17.04	0.70	1.97	7.06	11.71
65-69	0.155	0.53	2.45	7.43	13.97	0.69	1.68	5.09	9.56
70-74	0.212	0.45	2.01	4.98	11.08	0.68	1.38	3.40	7.57
75-79	0.280	0.35	1.52	2.97	8.39	0.68	1.04	2.03	5.73
80-84	0.365	0.26	1.04	1.45	5.68	0.68	0.71	0.99	3.87
85+	1.000	0.16	0.41	0.41	2.50	0.68	0.28	0.28	1.70

Table A.6: Life Table of the Male South African Population According to Census 2011

Age Group	q_x	L_x	L_x	T_x	e_x	Healthy weight	L_x HALE	T_x HALE	e_x HALE
0	0.046	1.00	1.01	56.50	56.50	0.83	0.84	39.70	39.70
1-4	0.013	0.95	3.84	55.49	58.14	0.69	2.63	38.86	40.72
5-9	0.004	0.94	4.70	51.65	54.82	0.70	3.28	36.23	38.45
10-14	0.006	0.94	4.68	46.95	50.02	0.72	3.35	32.95	35.11
15-19	0.016	0.93	4.63	42.27	45.31	0.69	3.18	29.61	31.74
20-24	0.031	0.92	4.52	37.65	41.02	0.70	3.17	26.42	28.79
25-29	0.038	0.89	4.36	33.13	37.27	0.72	3.14	23.25	26.16
30-34	0.039	0.86	4.19	28.77	33.63	0.72	3.01	20.11	23.51
35-39	0.044	0.82	4.02	24.57	29.90	0.71	2.86	17.10	20.81

40-44	0.056	0.79	3.82	20.56	26.16	0.70	2.69	14.24	18.13
45-49	0.075	0.74	3.57	16.74	22.56	0.69	2.45	11.55	15.57
50-54	0.106	0.69	3.25	13.17	19.19	0.70	2.28	9.10	13.26
55-59	0.140	0.61	2.85	9.92	16.18	0.69	1.96	6.83	11.13
60-64	0.181	0.53	2.40	7.07	13.39	0.70	1.67	4.87	9.23
65-69	0.248	0.43	1.89	4.67	10.81	0.69	1.30	3.20	7.41
70-74	0.340	0.32	1.35	2.78	8.55	0.68	0.92	1.90	5.86
75-79	0.432	0.21	0.84	1.43	6.67	0.68	0.57	0.98	4.57
80-84	0.532	0.12	0.45	0.59	4.84	0.68	0.31	0.40	3.33
85+	1.000	0.06	0.14	0.14	2.50	0.70	0.10	0.10	1.75

Table A.7: Life Table of the Female South African Population According to Census 2011

Age Group	**q_x**	**L_x**	**L_x**	**T_x**	**e_x**	**Healthy weight**	**L_x HALE**	**T_x HALE**	**e_x HALE**
0	0.040	1.00	1.01	62.41	62.41	0.85	0.85	43.75	43.75
1-4	0.012	0.96	3.86	61.40	63.95	0.69	2.65	42.90	44.69
5-9	0.005	0.95	4.73	57.54	60.69	0.69	3.25	40.25	42.46
10-14	0.007	0.94	4.70	52.81	56.00	0.69	3.23	37.00	39.24
15-19	0.018	0.94	4.64	48.11	51.38	0.70	3.26	33.77	36.06
20-24	0.021	0.92	4.55	43.47	47.25	0.72	3.26	30.52	33.17
25-29	0.022	0.90	4.46	38.92	43.20	0.73	3.24	27.26	30.26
30-34	0.023	0.88	4.36	34.46	39.10	0.72	3.14	24.01	27.25
35-39	0.028	0.86	4.24	30.11	34.98	0.72	3.04	20.88	24.26
40-44	0.039	0.84	4.10	25.87	30.93	0.69	2.82	17.84	21.34
45-49	0.052	0.80	3.92	21.77	27.07	0.69	2.69	15.03	18.69
50-54	0.069	0.76	3.68	17.85	23.41	0.70	2.58	12.34	16.18
55-59	0.095	0.71	3.38	14.17	19.97	0.69	2.32	9.76	13.75
60-64	0.122	0.64	3.02	10.79	16.79	0.70	2.10	7.44	11.58
65-69	0.160	0.56	2.59	7.77	13.78	0.70	1.80	5.34	9.47
70-74	0.218	0.47	2.11	5.18	10.94	0.68	1.44	3.54	7.47
75-79	0.288	0.37	1.58	3.07	8.29	0.68	1.08	2.09	5.66
80-84	0.373	0.26	1.07	1.48	5.63	0.68	0.73	1.01	3.84
85+	1.000	0.17	0.41	0.41	2.50	0.68	0.28	0.28	1.70

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