CHAPTER 2

MORTALITY PATTERNS OF CHRONIC DISEASES OF LIFESTYLE IN SOUTH AFRICA

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INTRODUCTION

A world-wide phenomenon of the twentieth century has been long-term declines in mortality levels. Within this decline in mortality, there has been a health transition[1] resulting from the combined effects of demographic ageing of populations as well as a change in the epidemiological profile. This has resulted in a shift from those diseases associated with under-development, such as infectious diseases and poor maternal and child health, to chronic degenerative diseases affecting adults.

Health transition theory, as it stands, is merely descriptive and does not explain how social and economic changes are related to these changes in health. Murray and Chen[2] proposed that the three established theories of mortality change viz, the income and food theory, the dissemination of modern technologies, and socio-cultural change that includes changing beliefs and health behaviours, are likely to explain this general mortality decline in an interactive way.

Omran[3] described how as infectious diseases decline, in most societies, there has been a concomitant increase in chronic diseases resulting from unhealthy pattern of living. Habits such as smoking tobacco, consuming an unhealthy diet, high in fat and low in fibre, and following a sedentary lifestyle, are acquired at a very early age as a consequence of the norms of society. These risky behaviours result in the emergence of a range of biological risk factors, which include tobacco addiction, hypertension, abnormal glucose metabolism, hyperlipidaemia or obesity. These risk factors often remain undiagnosed, and over decades lead to an increasing incidence of chronic diseases of lifestyle (CDL) such, as ischaemic heart disease (IHD), stroke, diabetes and smoking-related diseases, such as lung cancer and chronic bronchitis. These complex interactions between an unhealthy lifestyle, the resulting risk factors and the subsequent range of CDLs that have a major impact on mortality are represented in Fig. 1 in Chapter 1.[4]

Frenk *et al*.[5] have argued that in middle-income countries with different social classes, the more affluent segments of the population tend to pass through the stages of the transition first and are then followed by the poor. This process results in a protracted bipolar transition with the coexistence of both infectious diseases and CDLs in the population. Chopra and Sanders[6] reflect the polarized transition as an expression of combined and uneven development. This bipolar model also represents a deviation from the set sequence of stages postulated by Omran[3] and may well be bidirectional.[7] During the 1990s, the global trend of improving mortality has in some circumstances been reversed. The HIV/AIDS epidemic has resulted in rapidly increasing mortality in certain regions of the world, the political economic transitions in Eastern Europe appear to have resulted in rapid increases in CDLs and alcohol-related mortality and some conflict in some countries has resulted in a reversal of the trend of reducing mortality. These variations in the transition highlight the connections between social determinants and health.

In most settings, cardiovascular disease (CVD) comprises a large component of CDLs. However, these too appear to follow a transition. Pearson *et al*. have developed a model of the stages of the epidemiological transition within cardiovascular diseases that is shown in Table 2.1. In the first stage, rheumatic heart disease, infections and nutritional cardiomyopathies are the major component. Hypertensive heart disease and haemorrhagic strokes emerge during the age of receding pandemics. Entering the age of degenerative diseases, all forms of stroke and IHD result from growing obesity and diabetes. This is followed by the age of delayed degenerative disease when health care shifts the stroke and IHD into older ages. Yusuf *et al*.[7] suggest that there is a further stage of health regression and social

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upheaval with the re-emergence of deaths from rheumatic heart disease, infections as well as increased alcoholism, violence and IHD and hypertensive disease in the young.

Table 2.1. Phases of the epidemiologic transition in cardiovascular diseases

Phase of epidemiologic transition	Deaths from circulatory disease (%)	Circulatory problems	Risk factors
Age of pestilence and famine	5-10	Rheumatic heart disease; infection and deficiency-induced cardiomyopathy	Uncontrolled infection, deficiency conditions
Age of receding pandemics	10-35	As above, plus hypertensive heart disease and hemorrhagic stroke	High-salt diet leading to hypertension; increased smoking
Age of degenerative and man-made diseases	35-55	All forms of stroke; ischaemic heart disease	Atherosclerosis from fatty diets, sedentary lifestyle; smoking
Age of delayed degenerative diseases	Probably under 50	Stroke and ischaemic heart disease at older ages	Education and behavioural changes leading to lower levels of risk factors

Source: Pearson *et al*. 1993,[8] based on Omran 1971,[3] and Olshansky and Ault 1986.[9]

The development of chronic diseases appears to be occurring at a faster pace than occurred in the developed countries.[10] There have also been some differences in the transition for specific disease categories for developed and developing countries. One example is the peak prevalence of CVD found in the economically active segment of the population of developing countries as opposed to peaking in older people as occurred in developed countries. Besides the relatively early age of manifestation, the scale of the CVD epidemic in developing countries is influenced by the large size of the populations as well as the high proportion of young adults.

Leeder *et al*.[10] have described the concern about the potential impact of CVD in countries with developing economies as the 'race against time'. Projections of the mortality impact in four developing countries including South Africa highlight that CVD will affect people in these countries at a younger age than in the developed countries and that it will result in higher death rates. The study also suggests that CVD will increasingly affect the poor in these countries, something that has been observed in South Africa in the analysis of mortality data.[11] A cross-sectional analysis of the risk factors and the average income level across more than 100 countries suggests that the distribution of the risk factors for CVD will be concentrated in low and middle-income countries.[12]

The co-existence of ailments related to lifestyle was observed in the early 1950s in the urban setting of South Africa by Kark.[13] He coined the term "Community syndrome of hypertension, atherosclerosis and diabetes (CHAD)" to describe the diseases arising from the changing lifestyle as the African population urbanised. This chapter aims to review the mortality trends in CDLs in South Africa using routinely available data. Tracking cause of death rates in South Africa, like that in most developing countries, is constrained by the lack of data, particularly for the rural population.[14] Mann[15] argued that the varied population composition of this country provides a "South African window" of opportunity to examine the relationship between lifestyle and chronic diseases through the cross-cultural contrast in both lifestyle and disease profiles. The available data allow limited comparison between population groups and provinces. However, these provide only a crude sense of the variations in health and it is impossible to discern the independent contributions of culture and social class or genetic factors.

ADULT MORTALITY

Adult mortality rates in South Africa have been found to be relatively high,[16] even prior to the impact of the HIV/AIDS epidemic. This was particularly high for men; it was estimated that in the mid-1980s, on average 38.4% of 15-year-old South African men could expect to die before age 60. In the case of African men, the estimate was 40%, similar to the high levels estimated for sub-Saharan Africa.[17] The high level of premature adult mortality in South Africa was attributed to the combination of injuries, infectious diseases such as TB, and the emerging chronic diseases.[16] In contrast, compared with sub-Saharan Africa, the premature adult mortality for women was lower in South Africa where 25.4% of 15-year-old women could expect to die before age 60.[16] This could in part be attributed to the lower maternal mortality levels in South Africa.

There was little change in the levels of adult mortality during the 1990s, with the rapid spread of HIV yet to take its full toll. It is only towards the end of the decade that the impact of the HIV/AIDS epidemic has been observed on adult mortality.[18] By 2000, the levels of young adult mortality were about 2.5 times higher than what they used to be for women and 1.5 times higher than what they used to be for men.[19]

MORTALITY PROFILE IN 2000

The South African National Burden of Disease (SA NBD)[20] study grappled with the inadequacies of the cause of death statistics and using multiple sources of information derived coherent and consistent estimates for the level and causes of mortality in South Africa for the year 2000. The study highlighted the considerable impact of HIV/AIDS as a cause of death by then and described the 'quadruple' burden experienced in South Africa with the combination of pre-transitional causes of death and disease related to under-development, as well as CDL, injuries and HIV/AIDS. The study estimated that in 2000 there were more than 500 000 deaths. Of these, 37% were a result of CDL, 30% were a result of HIV/AIDS, 12% injuries and 21% were a result of infectious diseases and other conditions related to under-development. The age and sex distribution by broad cause group are shown in Fig. 2. While the impact of HIV/AIDS on young adults and children is unequivocal, the number of CDL in the older ages is also apparent.

Fig. 3 shows the leading causes of adult deaths in 2000 for men and women by age group. In the young adults aged 15-45 years, HIV/AIDS, TB, homicide and road traffic accidents are the most common causes of death. However, for the age groups over 45 years, CVD and lifestyle-related cancers feature among the leading causes of death. The patterns differ by sex. Homicide and road traffic accidents are more pronounced among the men. The proportion of deaths related to HIV/AIDS is striking among young adult women, and stroke and diabetes are more pronounced among women compared with men. Cancer is more prominent in the 45-64-year-age group, with lung cancer in the case of men and both cervical and breast cancer in the case of women.

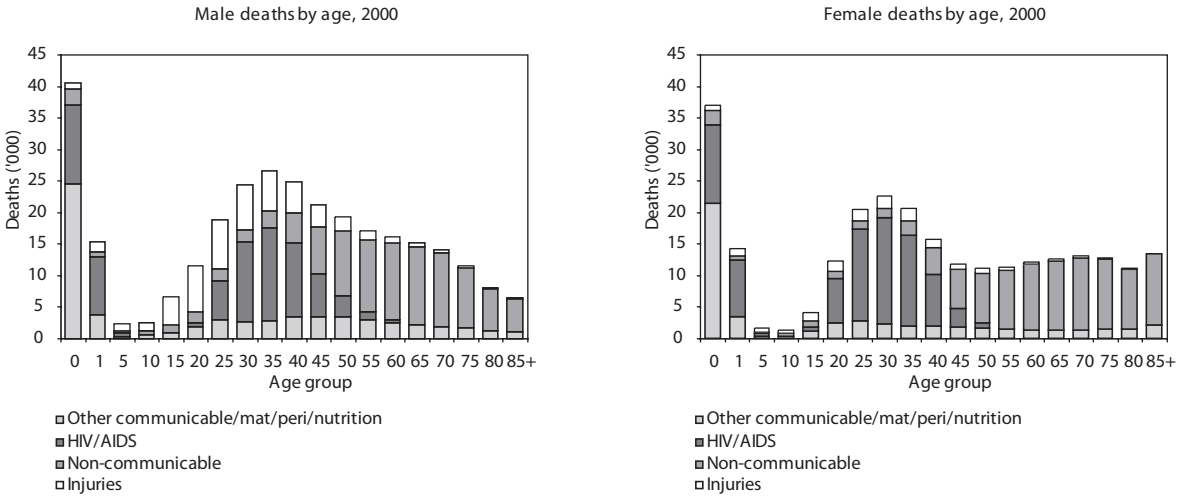

Figure 2: Age distribution of deaths by broad group and sex, SA NBD 2000
Source: Bradshaw *et al*., 2003[20]

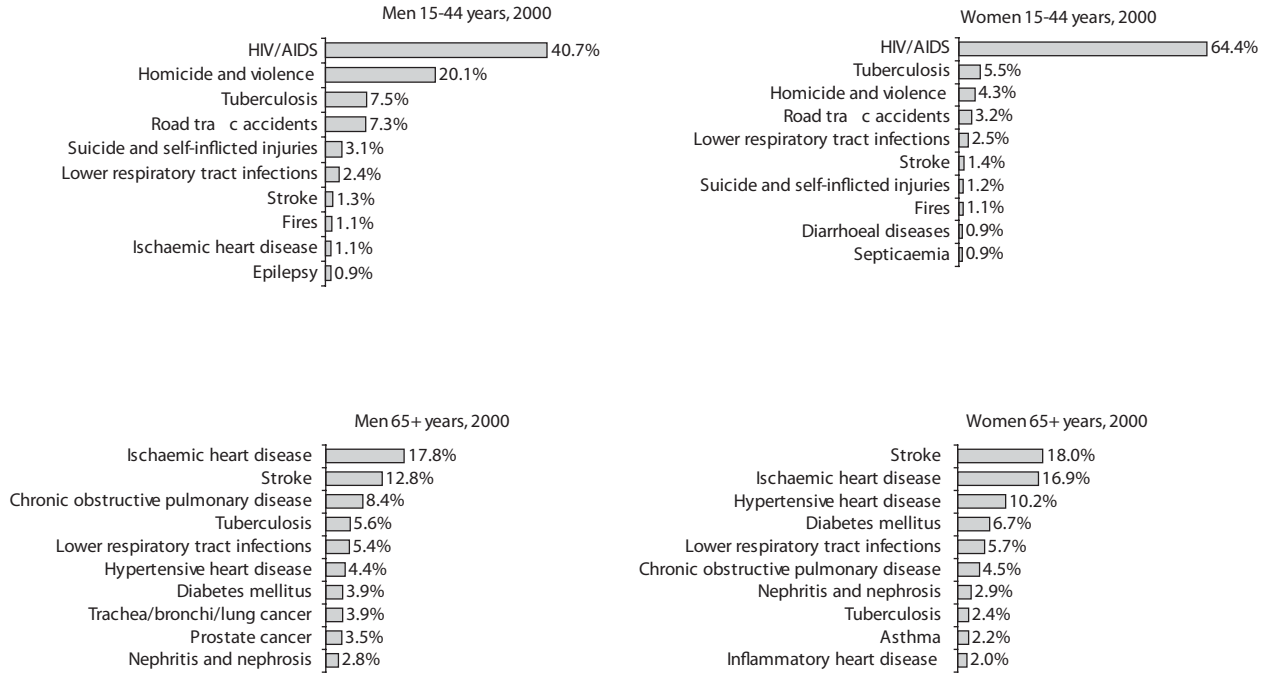

Figure 3: Top 10 causes of death for adults 15 years and older by age and sex, SA NBD 2000
Source: Bradshaw *et al*., 2003[20]

DIFFERENTIALS IN CHRONIC DISEASE MORTALITY

Estimates of age-standardised mortality rates for 2000 show that the all-cause mortality rates differ substantially between population groups (Table 2.2), being much higher for Africans than for the other groups. The rate for Africans was nearly double that for whites. In contrast, the death rates from CDL are fairly similar for the population groups, but slightly higher for Indians and coloured. The age-standardised death rates as a result of selected CDL estimated for 2000 differ by population group (Table 2.3). Death rates from cardiovascular diseases are similar for all groups but are extremely high for the Indians. Death rates from diabetes are also extremely high for Indians. Death rates resulting from neoplasms are highest for the coloured group, followed by whites.

Table 2.2. Age-standardised death rates per 100 000 as a result of CDL by population group, 2000

	African	White	Coloured	Indian	South Africa
All causes	**1613**	**937**	**1304**	**1172**	**1468**
Cardiovascular diseases	375	384	406	607	361
Neoplasms	126	199	212	121	149
Diabetes	59	23	64	111	49
Respiratory diseases	93	70	103	64	83
Other CDL	116	91	82	96	108
Total CDL	**769**	**767**	**867**	**1000**	**750**

Source: Comparative Risk Factor Assessment, 2006[21]

When considering the provincial mortality rates, there are similarly little differences in the age-standardised death rate from CDL between provinces (Fig. 4).[22] The poorer provinces had similar levels to those of the more developed provinces – all at about 750 per 100 000 population. However, the cause profile differs a little. The richer provinces of the Western Cape and Gauteng have higher cancer mortality rates. The Eastern Cape and the Northern Cape have higher mortality rates as a result of respiratory diseases.

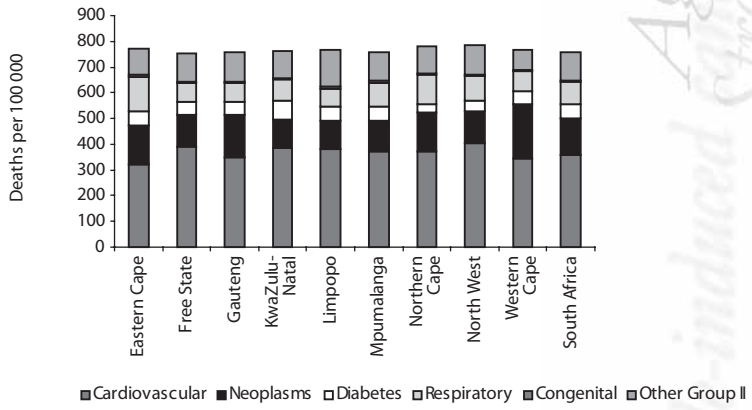

Figure 4: Provincial estimates of age-standardised death rates as a result of CDL diseases, 2000
Source: Bradshaw *et al*., 2004[22]

The lack of reliable cause of death data makes it impossible to fully examine the urban and rural differentials in mortality. Since high proportions of the white and Asian populations are already urbanised, the geographical patterns of chronic diseases experienced by the coloureds and blacks would be of particular interest. The analyses of the 1984-1986 data by magisterial district suggest that among coloureds, there were higher mortality rates for stroke in the more rural areas, while IHD tended to be a more urban phenomenon. [23]

TRENDS IN CHRONIC DISEASE MORTALITY

Studies of mortality trends have been restricted to selected population groups as a result of the limited availability of data. In 1988, the first year for which full data was ostensibly collected for the whole of South Africa (excluding the former Transkei, Venda, Boputhatswana and Ciskei) CDL accounted for 24.5% of the reported deaths of all ages and 28.5% in the 35-64-year age group.[4] This latter proportion represents the most economically productive sector of the population, suggesting that these diseases have an impact on the economy. It has been estimated that, prior to the AIDS epidemic, the proportion of deaths resulting from chronic diseases had been increasing for adults.[24] However, with AIDS as a competing cause, this proportion has decreased in recent years. By the year 2002, the national cause of death statistics shows that 18% of deaths of all ages and 20% of the 35-64-year-age group were a result of CDL.[25]

Community syndrome of hypertension, atherosclerosis and diabetes (CHAD)

Wyndham[26] described very high death rates as a result of IHD among white and Asian men that had increased during the 1980s and then appeared to plateau.[23] This was confirmed by the trends in age-specific mortality rates attributable to CHAD reported by Bradshaw *et al*.[23] (Figs. 5 and 6). While there are clear anomalies in the reported data (e.g. IHD mortality for coloured males from 1959-1967), it is possible to identify major trends. The rates are exceedingly high for Asians who experienced consistently high mortality because of hypertension, stroke, IHD and diabetes. An example is the highest overall IHD rates for Asians, approximately double the rate for the coloureds. Similar to the experience in developed countries during the 1980s, there appears to have been a rise and fall in stroke and IHD mortality in the three race groups, although the peak (often flattened) occurs at differing times for the different race/sex groups. This rise and fall of IHD mortality in these groups have been demonstrated previously,[23-29] as well as the pattern of a downward trend in stroke mortality.[26] However, it can be seen from the graphs that the downward trends often accompany upward trends in the ill-defined category. Lancaster[30] has suggested that there is evidence that the transfer of some causes of death from one ICD class to another, as well as changes in the prevailing ideas of aetiology and diagnosis have contributed to the downward trends observed in the United States and the United Kingdom. Recent analysis and modeling of the data from the United Kingdom have shown that there was substantial decline in IHD between 1981 and 2000.[31] This analysis demonstrates that more than half of the decrease could be attributed to reductions in major risk factors, principally smoking.

Diabetes is generally underestimated when a single cause of death is coded as in the case of South Africa. It is interesting to note that despite the increase in the ill-defined category, the diabetes mortality rates have increased. However, these increases are also consistent with the possibility of changing practices in diagnosis and coding with a shift from IHD to diabetes as the underlying cause. This phenomenon was clearly experienced in the last few years in the United States.[32]

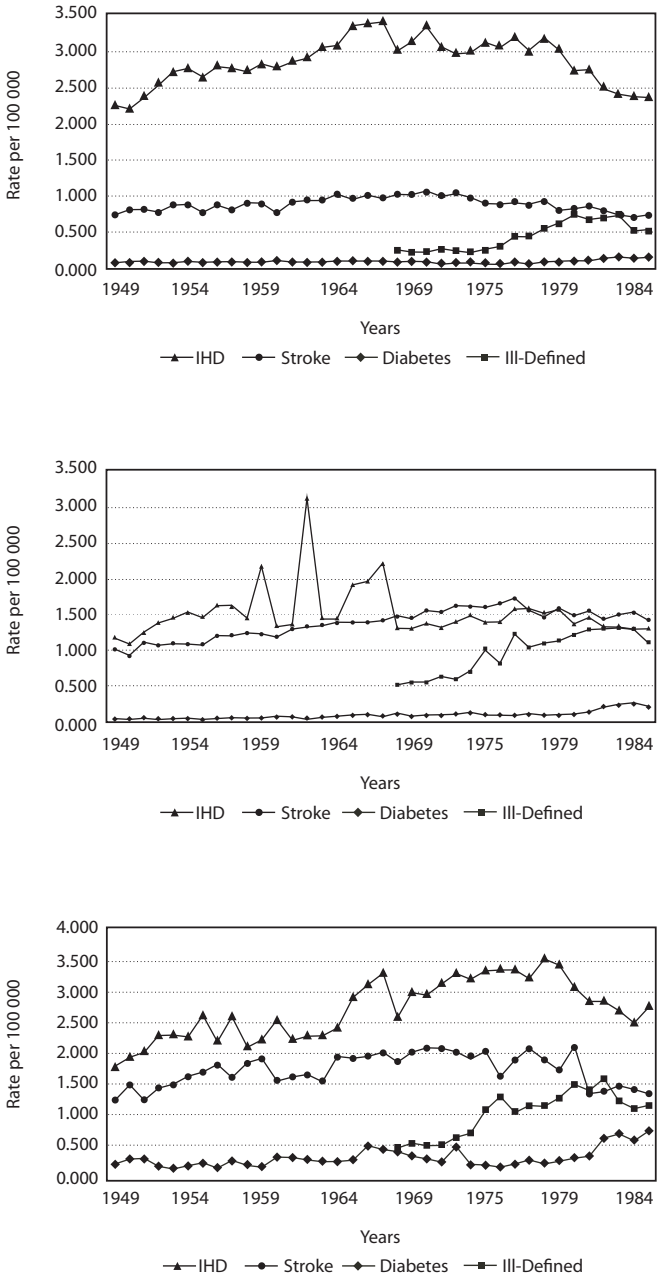

Figure 5: Age-specific death rates for CHAD-related conditions for male whites (top), coloureds (middle) and Indians (bottom), South Africa 2000
Source: Bradshaw *et al*. 1995[23]

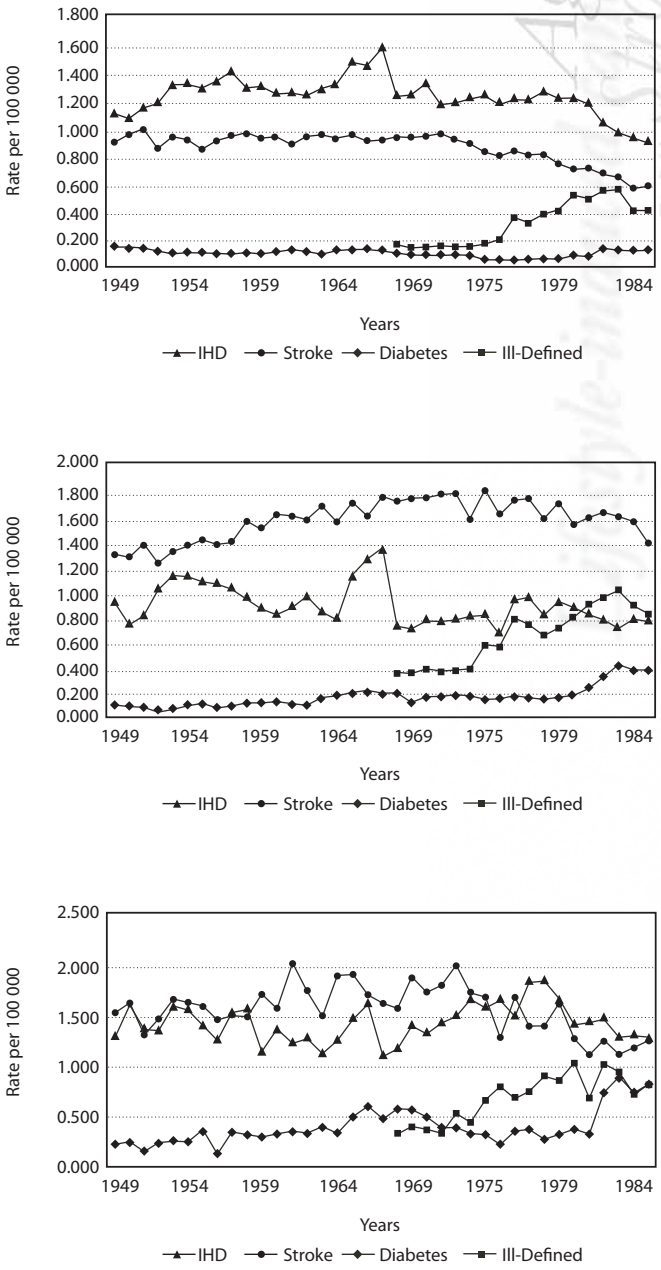

Figure 6: Age-specific death rates for CHAD related conditions for female whites (top), coloureds (middle) and Indians (bottom), South Africa 2000
Source: Bradshaw *et al*. 1995[23]

By 2000, the rates for CHAD-related causes show distinct profiles for the population groups. Indians have very high IHD and diabetes. Africans have high mortality from stroke and hypertensive heart disease. Whites and coloureds have high IHD mortality, while coloureds also have fairly high stroke mortality. Women have higher mortality from diabetes when compared with men and lower IHD and hypertensive heart disease. These differences suggest that the risk factor profiles differ by population groups which are at different stages of the health transition.

Table 2.3. Age-standardised mortality rates per 100 000 population for CHAD-related causes of death by population group and sex, 2000 (World Standard Population)

	African		White		Coloured		Indian		South Africa	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Stroke	145	160	72	84	143	156	136	121	125	124
IHD	85	66	323	187	203	169	497	346	169	102
Hyper-tensive heart	72	115	7	15	19	56	34	30	48	70
Diabetes	48	66	22	23	40	80	74	140	43	54

Source: Comparative Risk Factor Assessment, 2006[21]

From Fig. 7, it can be seen that the CHAD mortality rates vary between the provinces. Mortality from IHD was highest in Western Cape, Gauteng and Northern Cape, and lowest in Mpumalanga, Limpopo and Eastern Cape. The IHD mortality rate was consistently higher for males than females. In contrast, stroke death rates for males were similar to the rates for females. The stroke death rates were particularly high in KwaZulu-Natal, and low in Gauteng. Provincial death rates attributable to hypertensive heart disease showed marked variations between the provinces, and higher rates for females than for males in all provinces except Mpumalanga. North West, Limpopo and Mpumalanga had the highest rates of hypertensive heart disease, while Western Cape and Gauteng had the lowest rates. The variations between the provinces also suggest that the risk factor profiles differ and that provinces are at different stages of the health transition.

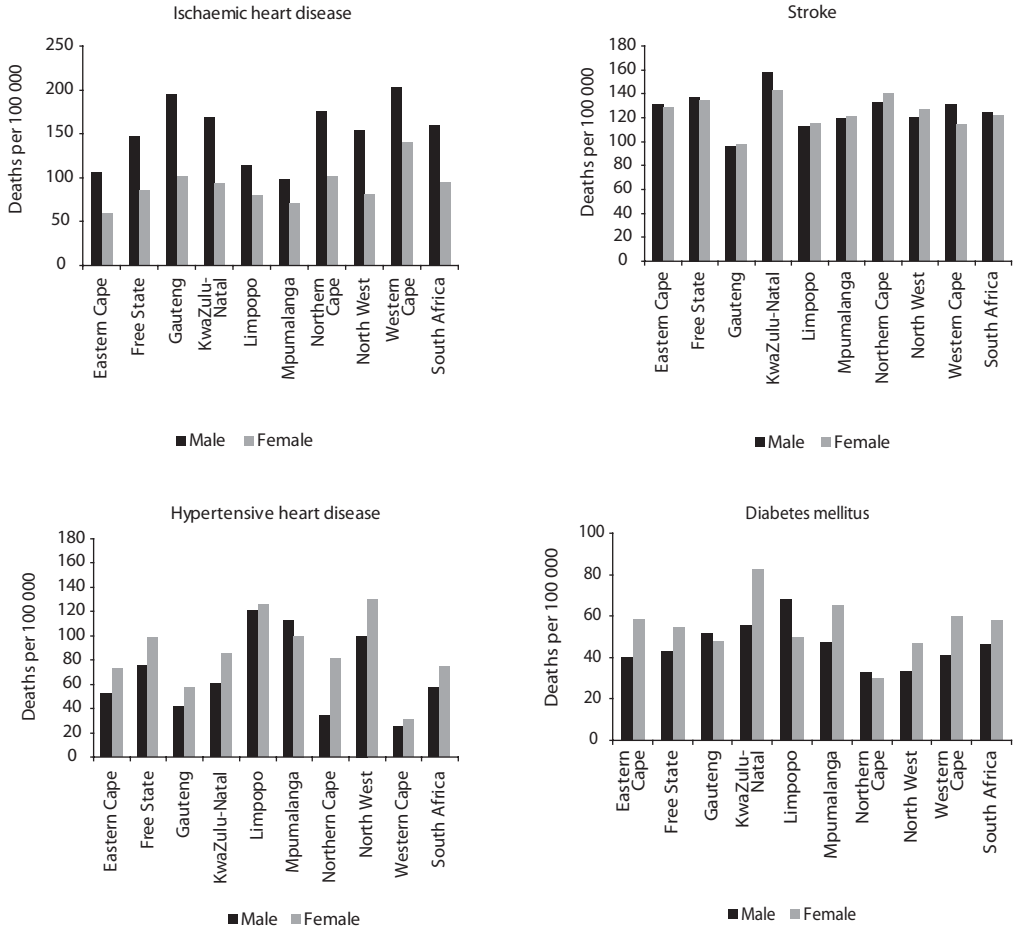

Figure 7: Provincial estimates of age-standardised death rates attributable to CHAD-related causes by sex, 2000

Source: Bradshaw *et al*., 2004[22]

Respiratory diseases

Bradshaw *et al*.[33] described the increasing lung cancer rates among whites, coloureds and Indians, a pattern subsequently confirmed by Wyndham.[34] It can be seen from Fig. 8 that the increase among coloured men was particularly marked. More recently, Ehrlich and Bourne,[35] reported increases in the asthma mortality trends in the 1960s for whites and coloureds that remained high for coloured men during the following years. However, these studies have failed to provide an overall sense of the epidemiological trends in chronic respiratory diseases among adults in South Africa as data for the majority of the population have been of poor quality.

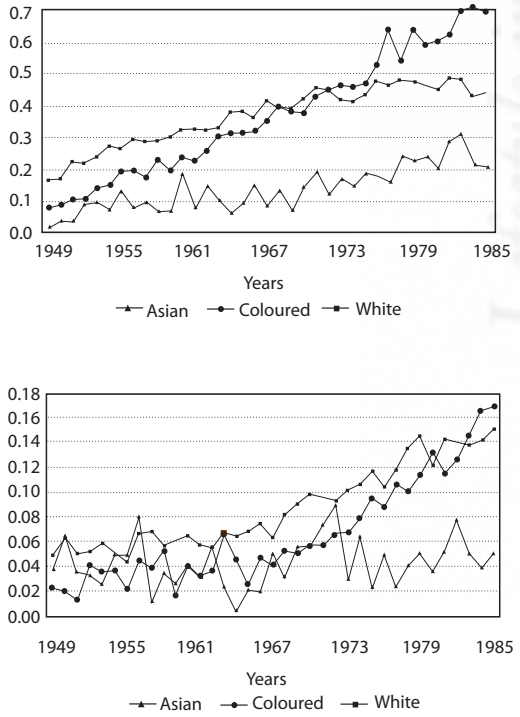

Figure 8: Age-specific death rates for lung cancer for male and female whites, coloureds and Indians, South Africa 2000
Source: Bradshaw *et al*. 1995[23]

Mortality rates from chronic obstructive pulmonary disease are about twice as high as those from lung cancer. From Table 2.4 and Fig. 8, it can be seen that lung cancer and chronic bronchitis are more common among men than women. This is likely to reflect the gender difference in the prevalence of tobacco smoking which has been much higher for men than women. It is also likely to reflect the higher occupational exposures to dusty environments experienced by men. Mortality from these respiratory conditions is extremely high for the coloured men. They are lowest among Indian women who have a low smoking prevalence. Fig. 8 shows that the provincial patterns differ for the two conditions with the lung cancer rates being very high in the Western Cape, while the mortality rates attributable to chronic bronchitis are highest in the Eastern Cape, and the Northern Cape.

Table 2.4. Age-standardised mortality rates per 100 000 population for respiratory diseases by population group and sex, 2000 (World Standard Population)

	African		White		Coloured		Indian		South Africa	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Lung cancer	31	6	52	30	77	39	27	6	42	14
COPD	73	29	73	46	118	45	59	6	76	30

Source: Comparative Risk Factor Assessment, 2006[21]

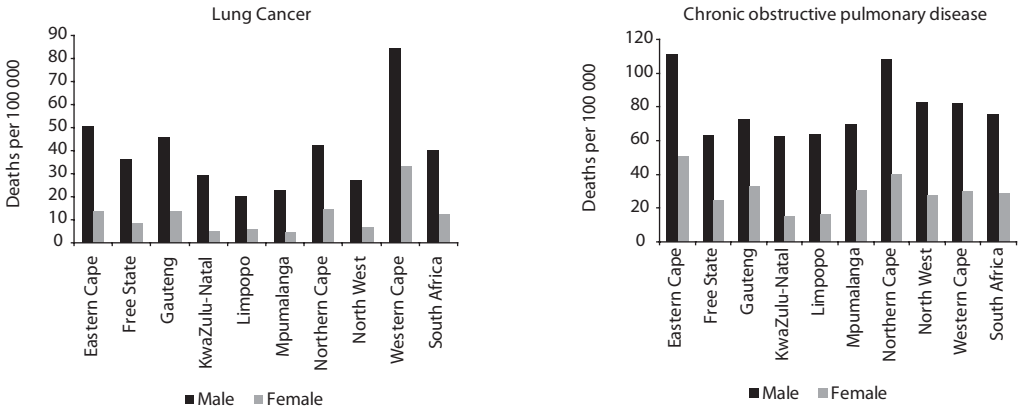

Figure 9: Provincial estimates of age-standardised death rates attributable to lung cancer and chronic bronchitis by sex, 2000

Source: Bradshaw *et al*., 2004[22]

Other cancers related to lifestyle

The most obvious cancer related to lifestyle is lung cancer, which has been demonstrated to be associated with cigarette smoking. Other cancers that were examined are breast cancer, possibly associated with nutrition and smoking, prostate cancer and cervical cancer, which may be linked to sexual behaviour. Bradshaw *et al*.[22] show that breast cancer rates among coloured and Indian women have been increasing, while the mortality rate for white women was fairly stable between 1949 and 1985. Cervical cancer rates for white and Indian women showed a decline during this period, while, in contrast, the rate for coloured women increased.[36]

The age-standardised rates are represented in Table 2.5 by population group while the provincial differences are displayed in Fig. 10. These show that breast cancer mortality is highest among the white, coloured and Indian women and that cervical cancer mortality is highest among African women and coloured women. Bailie *et al*.[36] argued that the high rates for these two groups reflect the lack of access to appropriately timed screening among the less advantaged. Mortality from prostate cancer is highest among white men, followed by coloured men. The rate is lowest among Indian men.

Table 2.5. Age-standardised mortality rates per 100 000 population for selected cancers by population group and sex, 2000 (World Standard Population)

	African	White	Coloured	Indian	South Africa
Breast - female	13	35	33	28	19
Cervical - female	27	5	22	8	21
Prostate - male	23	41	33	13	27

Source: Comparative Risk Factor Assessment, 2006[21]

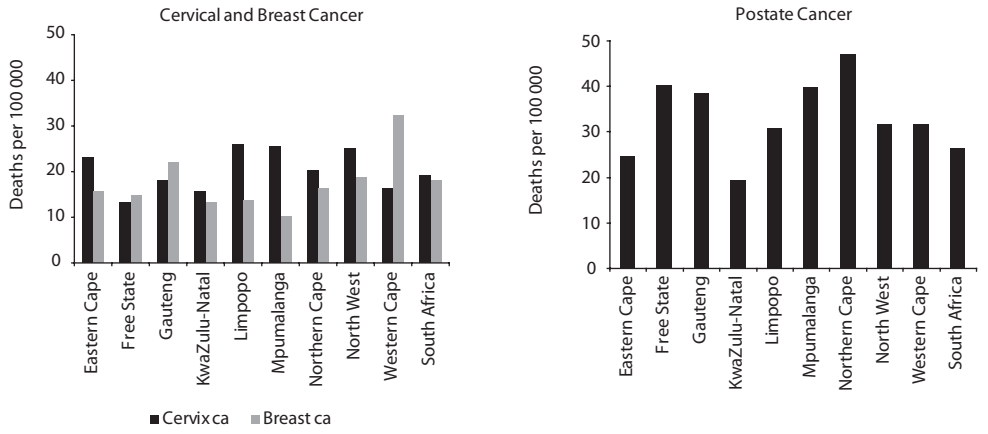

Figure 10: Provincial estimates of age-standardised death rates attributable to cervical and breast cancer for women and prostate cancer for men, 2000

Source: Bradshaw *et al*., 2004[22]

CONCLUSIONS

Unfortunately, there are no complete historical South African cause of death data available to observe clear, overall health transition trends and more specifically, transition patterns within CDL. This is a result of poor vital registration systems, exacerbated by the exclusion from official statistics in the apartheid past, of large sections of the population, officially residing in the so-called independent homelands. Taking into account the large group of ill-defined deaths, some changes to classification criteria, and incorporating improved coverage on cause of death, the recent Initial Burden of Disease Study[20] clearly shows that South Africa is in the midst of the health transition. Examination of the available trend data and mortality patterns of CDL presented in this chapter does allow glimpses of patterns predicted by classic transition theory. Some of the modified elements of transition theory are also apparent.

The burden of disease profile reflects the protracted polarised model of the epidemiological transition[5] characterised by the simultaneous occurrence of infectious diseases and CDL within a population. Living conditions in South Africa are heterogeneous with high levels of inequality and poverty arising from the uneven development, as well as urban and rural environmental differences. The additional transition stage of health regression and social upheaval suggested by Yusuf *et al*.,[7] associated with alcohol and violence, are evident in the South African disease burden, contributing to the quadruple burden of disease.

In addition to variations in living conditions, the South African population has genetic and cultural differences. CDL present a complex configuration among population groups and by province, linked to socio-economic differences. While the overall mortality rates from CDL do not vary, there are considerable differences by specific cause. Compared with the whites, the African population is earlier in the transition, while the coloured group may be in the additional stage of the transition that is put forward by Yusuf *et al*.[7] The poorer provinces appear to be in the earlier stages of the transition with high mortality from stroke. The more developed provinces are in later stages and have higher rates of IHD. In addition, there are high lung and breast cancer mortality rates especially for coloured South Africans. Unfortunately, the available data do not allow clear classification of the economic differences within the groups and consequent variation in the health transitional stage.

The World Development Report[37] of 1993 and others, such as the WHO Commission on Macroeconomics and Health,[38] advocate investing in health as a means of accelerating development. Analyses are presented to argue that good health increases the productivity of individuals, and therefore, the economic growth rates of countries. Investment in health leads to economic upliftment affecting factors such as income, education, employment status and occupation that impact on fertility and mortality trends. However, economic recession and inequalities would result in the re-emergence of CDL.

If one wants to influence the progression of the health transition, important variables to take into consideration are the environment, lifestyle and access to health care (both curative and preventive). Access to health care is a particularly relevant variable in South Africa, with the apartheid policies of the past having distorted access to health services. The trends in cervical cancer mortality data suggest that this is an important issue.

Health policy in South Africa has undergone major transition during this period of democratisation. Emphasis has appropriately been placed on a primary health-care approach. However, primary health care has tended to focus on strategies aimed at improving maternal and child health and managing acute conditions. While South Africa must address these priorities, the mortality patterns demonstrate that it is crucial that cost-effective interventions to prevent, treat and manage CDL must be incorporated into a comprehensive primary health-care strategy alongside the other specific aspects of health in South Africa, such as violence/trauma and HIV/AIDS. Unlike intervention strategies to promote child health, strategies to promote adult health are more complex, take longer to become effective and require complex intersectoral and political support.[39]

When considering health policy related to chronic diseases, the escalating health-care costs associated with increasing levels of chronic disease make it imperative to emphasise health promotion and the prevention of disease. This must be at the level of attempting to prevent the very emergence and establishment of lifestyles associated with elevated risk of disease through timely health education. This must address the underlying risk factors which are the engines driving the development of chronic diseases. Many of these risk factors are in turn generated by the powerful forces of urbanisation and globalisation.

Leeder *et al*.[10] emphasise that lifestyle choices occur within a context and reflect both individual choices as well as macroeconomic policies. These impact on CDL through agricultural policies, food marketing and regulation, tobacco production and sale, urban planning, employment and education. South Africa's effective tobacco control initiative provides a valuable model of macro-level interventions that are required to effect primordial prevention. This includes increased excise tax, restrictions of advertising and smoking in public places. At the same time it is crucial to provide good management

of the chronic diseases at the primary-care level in order to reduce complications. This includes early detection of chronic disease conditions and their risk factors. Health systems research is needed to develop appropriate models of primary health care to manage these conditions.

Health policy should be broadened so as to encompass the healthy population and aim at keeping it healthy, and the importance of improving the quality of life of those with disabling chronic conditions should be an acknowledged goal for health care. Raymond[40] has shown that the first two decades of the new millennium allow a unique opportunity to developing countries to manage chronic diseases, particularly cardiovascular diseases, before the growing numbers become too large to manage. As the birth rate declines, and before the number of older persons is excessive, the fiscal opportunity for preventive and supportive health-care systems is enormous. This is particularly true for South Africa which is expected to have a declining dependency ratio in the next few decades.

Understanding the mortality pattern experienced in South Africa is fraught with limitations because of the poor quality of data. The collection and collation of vital statistics have improved markedly, but there are still challenges, particularly in the rural areas. Adult mortality levels should be monitored regularly alongside the generally accepted childhood mortality indicators. The risk of a 15-year-old dying before the age of 60 years (45Q15) provides a very useful indicator for adult health, and this should be included in the health information system being set up to monitor progress in the health sector. Under-registration needs to be reduced further and the cause of death data needs to be improved so that full utilisation of the multiple causes of death details can be made in order to allow the emergence of a clearer picture of mortality patterns of chronic diseases in South Africa.

It would be useful for South Africa to set up a national macroeconomic and health commission that would identify the major health problems, the determinants and policy options. This commission would need to look at the costs of interventions and compare them with the costs of not acting.

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