OVERVIEW AND CONCLUSIONS: A PERSPECTIVE ON DEALING

WITH CHRONIC DISEASES OF LIFESTYLE IN SOUTH AFRICA

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1 OVERALL SUMMARY

The data presented in this Report reveal that the majority of the South African population has moved extensively along the epidemiological transition towards a disease profile related to Western lifestyle. However, the diseases of poverty, which are related to infections and maternal disease, still contribute significantly to the overall burden of disease in the poorer sector of the South African population, as do high rates of HIV/AIDS and trauma. The Actuarial models of projecting AIDS and chronic disease mortality for 2010 leave no doubt that the contribution of chronic diseases of lifestyle (CDL) to the burden of disease in South Africa cannot be ignored despite increasing rates of AIDS. In addition, the projections on the age structure of South Africans suggest that by 2025 one in ten persons will be 60 years or older. This will also lead to an increased burden of CDL.

The epidemiological transition is driven by the adoption of unhealthy lifestyles, which relate to tobacco use, unhealthy nutrition, and lack of regular aerobic physical activity. The use of tobacco has declined markedly since 1994 when the new democratic regime came to power in South Africa. This is probably because of the strict tobacco control legislation that was introduced and improved over the last decade. Although excellent progress has been made towards reducing the use of tobacco products, improved implementation of the many aspects of the tobacco products control legislation should reduce smoking rates even further. It is also necessary to improve the legislation on those aspects that currently allow the tobacco industry to devise ways to promote their killing products. People who are currently addicted to nicotine by smoking tobacco products or using snuff (smokeless tobacco) are poorly catered for in the primary health-care setting in the country. Significant levels of snuff use were identified in black women. The high smoking rates during pregnancy, particularly in women from the coloured group, contribute significantly to complications of pregnancy that can be avoided if they were supported in quitting using tobacco.

In addition to smoking during pregnancy, other factors such as under-nutrition have also been shown to predispose to higher rates of low birth weight babies. These findings were more common in the poorer sector of the society. Precursors to hypertension and diabetes have been shown in these low birth weight children as early as five years of age.

The ongoing nutrition transition is also clearly illustrated by the data presented concerning children, adults and older people. Those people who follow a typical westernised lifestyle consume a diet with few, if any, elements of a healthy prudent diet. Instead, their diet is high in fat, particularly saturated fat, sugars and refined carbohydrates. Inadequate amounts of vegetables and fruit are consumed, and low levels of vitamins and essential trace elements. In addition, high levels of sodium and low levels of potassium, calcium and magnesium seem to contribute to hypertension. In the black African community, the westernised diet was found in the urban settings more frequently than in rural ones. This is not the case for the other groups in the country. Men consume alcohol far more frequently than women do.

Sufficient physical activity to impart health benefits is undertaken by less than half the South African population. Even in children, inadequate amounts of physical activity frequently occur. Some groups of children watch television as much as 3 hours per day, and, in conjunction with this, tend to be more overweight than others are. It should therefore not be surprising that about 17% of children in the country are overweight or obese. At the same time as many as 19% are stunted because of insufficient food intake. In South Africa's first Demographic and Health Survey (SADHS) conducted in 1998, more than half of the adult women were found to be either overweight or obese.

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With high rates of risk factors for hypertension (i.e., obesity, excessive alcohol use, and high sodium and low potassium intake), it is not surprising that about a quarter of South Africans have hypertension. The same risk factors and the typical western diet were also found to be related to higher than expected rates of diabetes, particularly in the black African population, and abnormal blood lipid levels, most frequently in the white and Indian community, but not infrequently in the black African community. In addition to the well-known risk factors for cardiovascular disease (CVD), the degree of urbanisation was also found to be an independent predictor of patients having hypertension or diabetes. There are less data on the prevalence of diabetes and lipid levels compared to those risk factors that can be identified without collecting blood samples in surveys. The costs of population surveys, which include collecting blood samples, are prohibitive and currently the only available data are from a few small local studies that were conducted some time ago. There is a real need to conduct more good quality community-based surveys and, ideally, these should be done nationally, such as in the SADHS.

The above-mentioned risk factors for chronic disease frequently co-exist in patients. The synergistic nature of these risk factors exponentially increases their overall level of risk for future events. This increase can frequently be as large as that found in patients who already have suffered a catastrophic event, such as a myocardial infarction, stroke or other forms of target organ damage (TOD). This latter group of patients, with the highest level of overall risk, will benefit the most from secondary prevention. Unfortunately, the data show that even these patients have poor levels of control for CDL risk factors. This disturbing finding illustrates the urgent need for practical screening tools to identify those at highest overall chronic disease risk in the population.

Currently, the only tools available are formulae, such as the Framingham total risk formula,[1] which predicts the probability of a person suffering from a CVD event over a 10-year period. However, two drawbacks exist, the first being that these formulae were developed in mostly Western populations from long-term cohort studies and may not be applicable to people of African descent. Secondly, these formulae require blood testing for CDL risk factors, such as diabetes and hyperlipidaemia. These measures are costly and frequently cannot be afforded by the public health-care services in South Africa. There is consequently a dire need to develop total CDL risk assessment tools that are based on easily and economically measured risk factors. Research on this is urgently needed in developing countries with limited resources.

This report shows that there is a dearth of nationally representative CVD morbidity data in South Africa. The only community-based survey of stroke prevalence is the SASPI study conducted in the Agincourt demographic and health surveillance site in Limpopo Province.[2] No incidence data on either stroke or myocardial infarction exist in the country. Osteoporosis, linked to insufficient calcium intake and lack of physical activity, is a condition where, again, no national prevalence data is available.

The lack of data has resulted in suggestions that the black African population may not respond to the same known risk factors as other populations do and may escape the high rates of CVD that result from the health transition. However, two recent case-control studies have finally removed any doubt as to the susceptibility of the black African people of the country to CDL risk factors. The first is the African data of the INTERHEART study.[3] This study compared patients with their first acute myocardial infarction with age and gender matched controls. More than 80% of the participants were South Africans and the subgroups of black, coloured and European groups were compared to the findings in the overall INTERHEART study conducted in 52 countries. The degree of association for each of the major risk factors with acute myocardial infarction in the African sample is consistent with that found in the global study.[4] Five modifiable risk factors could be attributed to 89.2% found in the people of Africa, most of whom were South African.

Table 18.1. Comparison of CVD Risk Factors between patients with acute myocardial infarctions and control in the Three Ethnic Groups participating in the African countries[3]

Characteristics	Black Africans			Coloured Africans			European/other Africans		
	Controls N (%)	MI Cases N (%)	Odds ratio (95% CI) N (%)	Controls N (%)	Cases N (%)	Odds ratio (95% CI)	Controls N (%)	MI Cases N (%)	Odds ratio (95% CI)
Male gender	218(61.9)	92(63.9)		212(63.9)	192(62.5)		80(76.2)	101(79.5)	
Self report HTN	46(13.1)	71(50.4)	6.99(4.23,11.55)	88(26.5)	126(41.7)	2.31(1.61,3.32)	14(13.3)	43(34.4)	3.90(1.92,7.94)
Diabetes	14(4.0)	33(23.6)	5.79(2.91,11.53)	38(11.5)	71(23.4)	2.53(1.61,3.96)	8(7.6)	30(24.0)	4.04(1.67,9.77)
Current smoker	101(29.8)	37(26.6)	1.14(0.69,1.89)	153(46.2)	193(64.6)	2.34(1.53,3.59)	41(39.1)	65(51.6)	2.73(1.44,5.17)
Current/former smoker	130(38.4)	63(45.3)	1.48(0.95,2.30)	248(74.9)	250(83.6)	1.79(1.20,2.69)	58(55.2)	95(75.4)	2.76(1.51,5.02)
Physical activity	56(15.9)	25(17.7)	1.22(0.70,2.10)	44(13.25)	33(11.2)	0.86(0.52,1.42)	34(32.4)	26(20.6)	0.54(0.29,1.01)
Alcohol	94(27.3)	45(32.4)	1.44(0.86,2.39)	80(24.2)	53(18.0)	0.56(0.37,0.86)	35(33.3)	26(20.8)	0.41(0.21,0.77)
Fruits+Veg daily	132(39.4)	50(37.0)	0.61(0.36,1.06)	118(36.2)	103(35.0)	0.98(0.63,1.53)	50(50.0)	50(43.86)	1.04(0.44,2.47)
Depression	82(23.9)	48(36.9)	1.96(1.26,3.08)	63(19.8)	77(27.3)	1.69(1.13,2.50)	25(25)	43(36.8)	1.76(0.95,3.25)
Stress, Permanent	10(2.9)	12(9)	3.45(1.27,9.36)	16(14.2)	28(9.6)	3.53(1.69,7.37)	9(8.7)	13(10.5)	0.87(0.29,2.62)
Continuous Variables:	Mean (SD)	Mean (SD)	p-value**	Mean (SD)	Mean (SD)	p-value**	Mean (SD)	Mean (SD)	p-value**
Age	50.6(12.0)	53.0(12.3)	0.03	53.5(11.1)	54.6(11.1)	0.21	53.3(10.4)	54.9(10.6)	0.28
BMI	26.8(5.2)	28.4(5.2)	0.003	26.9(5.6)	27.4(5.1)	0.31	26.2(4.9)	27.2(5.0)	0.14
WHR	0.90(0.081)	0.92(0.085)	0.01	0.92(0.072)	0.96(0.069)	<0.0001	0.92(0.081)	0.98(0.089)	<0.0001
Total Chol. ^	4.42(1.12)	4.50(1.18)	0.58	5.29(1.19)	5.53(1.27)	0.03	5.29(1.45)	5.33(1.25)	0.85
HDL Chol^	1.16(0.46)	0.99(0.45)	0.0006	1.14(0.42)	1.03(0.32)	0.004	1.10(0.46)	0.93(0.29)	0.01
LDL Chol^	2.57(0.92)	2.82(0.97)	0.04	3.27(1.02)	3.66(1.15)	<0.0001	3.07(1.08)	3.42(1.02)	0.04
Apo A1	1.20(0.33)	1.08(0.31)	0.0002	1.22(0.29)	1.11(0.24)	<0.0001	1.27(0.35)	1.12(0.25)	0.0018
Apo B	0.753(0.24)	0.851(0.24)	0.0012	0.942(0.26)	1.04(0.28)	<0.0001	0.941(0.29)	1.06(0.31)	0.0056
Apo B/Apo A1 ratio	0.681(0.33)	0.855(0.37)	<0.0001	0.811(0.27)	0.982(0.31)	<0.0001	0.838(0.48)	0.963(0.25)	0.0147

^From non-fasting blood sample, post-infarct in cases (and varying time after initial chest pain)

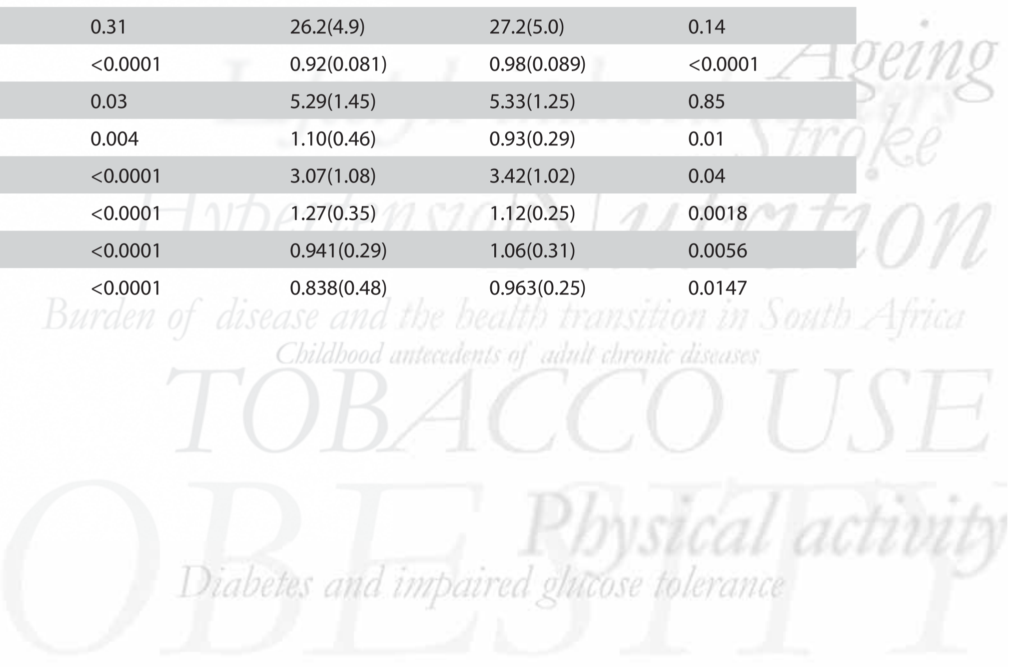

Table18.2. The stepwise multiple logistic regression analyses of the relationship between known risk factors and ischaemic heart disease, and other atherosclerosis related target organ damage. (Risk factors that contributed to the area under the ROC curves are shown.)[5]

	Odds ratio	95% CI	P value
Ischaemic heart disease (89 cases; 356 controls).			
Area under the ROC curve = 0.9268			
Family history of myocardial infarction	17.29	5.48 to 54.51	< 0.0001
Hypertension (BP ≥ 140/90 mmHg and/or treatment)	8.38	3.66 to 19.17	< 0.0001
Family history of hypertension	4.33	2.21 to 8.52	< 0.0001
Ratio of HDLC:LDLC ratio ≤ 20%	2.82	1.24 to 7.22	0.0157
Type 2 diabetes (fasting glucose ≥7 mmol/L and/or treatment)	2.99	1.19 to 6.68	0.0184
Hypercholesterolaemia (TC ≥ 6.5 mmol/L)	2.53	0.92 to 6.89	0.0692
Tobacco pack years	1.02	0.99 to 1.04	0.1407
Secondary regression analyses (356 controls)			
Left ventricular hypertrophy (49 with, 307 without LVH)			
Area under the ROC curve = 0.7159			
Hypertension	4.27	2.25 to 8.08	< 0.0001
Family history of myocardial infarction	3.87	0.57 to 26.09	0.1652
Men compared to women	3.19	1.07 to 9.51	0.0386
Family history of diabetes	3.07	0.98 to 9.63	0.0543
≥ Gr 2 retinopathy (109 with, 247 without retinopathy)			
Area under the ROC curve = 0.8104			
Family History of stroke	6.61	1.13 to 38.71	0.0369
Hypertension	5.64	3.23 to 9.86	< 0.0001
Type 2 diabetes	4.16	1.29 to 13.40	0.0175
Family history of diabetes	2.96	0.90 to 9.78	0.0742
Age > 55 years	2.33	1.35 to 4.03	0.0024
HDLC < 1.2 mmol/L	1.80	1.05 to 3.11	0.0348
Tobacco pack years	1.02	0.99 to 1.04	0.1459
Men compared to women	0.59	0.30 to 1.18	0.1393
Peripheral vascular disease (51 with, 305 without PVD) Area under the ROC curve = 0.7873			
Hypercholesterolaemia	8.63	2.74 to 27.15	< 0.0001
Hypertension	4.09	2.11 to 7.93	< 0.0001
Family history of diabetes	3.22	0.92 to 1.33	0.0681
Age > 55 years	2.47	1.25 to 4.93	0.0106
HDLC < 1.2 mmol/L	1.67	0.82 to 3.39	0.1568
HDLC:LDLC ratio < 20%	0.22	0.06 to 0.84	0.0275
Renal TOD (61 with, 295 without renal TOD)			
Area under the ROC curve = 0.6983			
Family history of stroke	3.37	0.74 to 15.44	0.1182
Hypertension	3.14	1.69 to 5.82	< 0.0001
Men compared to women	1.89	0.84 to 4.26	0.1218
Age > 55 years	1.57	0.87 to 2.81	0.126
Tobacco pack years	0.96	0.92 to 1.00	0.0092
Hypercholesterolaemia	0.31	0.07 to 1.39	0.1275

TOD=target organ damage; ROC=receiver operator characteristic; BP=blood pressure; HDLC=high-density lipoprotein cholesterol; LDLC=low-density lipoprotein cholesterol; TC=total cholesterol; PVD=peripheral vascular disease

The risk factors were current/former tobacco smoking, self-reported hypertension and diabetes, abdominal obesity measured as the waist-hip ratio, and the lipoprotein apo B/apo A-1 ratio. Four of these risk factors can be determined by taking a medical history and measuring waist and hip circumferences of patients who attend primary health-care services. Table 18.1 compares the risk factor profile for the three ethnic groups and reveals that they are at different stages of the epidemiological transition; the black African group is at an earlier stage and the other groups at a later stage.

The second study, conducted by Loock *et al*.,[5] compared black African patients who had suffered a myocardial infarction or angina with a control group matched for age and gender living in the same township outside Pretoria. Table 18.2 shows the results of the regression analyses of the relationship between known CVD risk factors and IHD and other related target organ damage.

These data, collected about two decades earlier than the INTERHEART study, show that an association existed between IHD and the major CVD risk factors and CVD-related family histories in urban black South Africans. Furthermore, the same risk factors and CVD-related family histories were shown to be associated with target organ damage of the eyes, kidneys, peripheral vessels, and with LVH also in the control group, who were free of IHD.

These findings finally challenge the notion that black people of Africa are "immune" to the development of IHD as was believed by many clinicians in the past. The low IHD rates reported in black people of Africa could be ascribed to previously low prevalence rates of the known IHD risk factors. Alternatively, observations could have been made during the extended period of recently raised levels of risk factors, and before the development of extensive atherosclerosis that is necessary for IHD and related target organ damage to emerge.

Of the chronic diseases, neoplasms are the second most common cause of death in the country. The data from cancer registries represent the only national objectively measured morbidity data for any chronic disease. Among the poorer and wealthier sectors of society, the pattern of cancers differs significantly and, in part, can be ascribed to different risk factor patterns in these groups. The data show that in addition to the chronic disease risk factors mentioned above, exposure to indoor smoke from solid fuels, aspects of undernutrition contribute to the high rates of oesophageal cancer in poor men and that unsafe sex and multiple partners predispose to cervical cancer in poor women.

The high rates of chronic respiratory diseases in the country are also not surprising in view of the high rates of risk factors reported. Some national morbidity data on chronic bronchitis and asthma, based on symptom complexes collected by questionnaires in the SADHS in 1998, indicate that these conditions contribute significantly to the burden of disease in the country.

The presented data illustrate that the chronic disease conditions and risk factors are infrequently diagnosed and inadequately treated, resulting in high levels of uncontrolled hypertension, diabetes, hyperlipidaemia and chronic respiratory diseases. The level of chronic disease control was found to be better in the private than the public sector. However, even in the private sector CDL control leaves much to be desired. Clearly, much improvement is required if better prevention and control of CDL is to be achieved in the population, particularly with respect to the premature CDL in people who represent the workforce and are under age 65 years.

The initiatives of the National Department of Health (NDOH) in establishing chronic disease care on the health agenda of the new ANC government since 1994 are also described. Much progress has been achieved in this time, and national and provincial strategies as well as practical tools, such as therapeutic guidelines for the care of patients with CDL and their risk factors, have been formulated. The patient centered approach for chronic disease care is central to the planning of the NDOH. While the National Department of Health formulates policies and develops practical tools, the Provincial Departments of Health have to implement and operationalise health care for patients with CDL within the constraints of their budgets. Elsewhere in the document, the wide-reaching national policies on nutrition and physical activity are described, as well as the success that has been achieved with the tobacco products control legislation.

The review of research related to the primary health services for CDL in South Africa shows that the implementation of national policies and many other structural and human resource factors has many deficiencies for the care of patients with CDL. The data identify patients with poor levels of control of chronic diseases and illustrates shortcomings in factors related to the patients, their health-care providers and the structures of the health-care services in both the public and private sectors. The lack of patient-centred care seems to be a central factor resulting in passive patients who do not see themselves as active participants in their own care. Those patients who seem to be more active in their care were found to have better levels of hypertension control than those who do not. Furthermore, the health services at primary care level are still squarely based on an acute care model. The health-care sector in South Africa has been particularly exposed to the effects of the 'brain drain' that is occurring in the country. Consequently, there is a shortage of staff while

health-care providers were found to be frequently frustrated and unmotivated. In many settings, care is provided by staff with inadequate knowledge and experience, and, furthermore, staff trained in chronic disease care are frequently inappropriately used in the health-care services. In the public health-care sector, the community health centres (CHC) are dealing with very large numbers of patients; the structures needed to provide care for patients with chronic diseases and their risk factors on an ongoing basis have seldom been put in place. Very limited time for consultations is available. Patients are required to return monthly to refill prescriptions for medications; long waiting times at the CHC lead to high levels of patient frustration. The drug distribution systems have sometimes failed to provide sufficient drugs on time resulting in the notorious IOU system that requires patients to return to collect their chronic disease drugs. The findings have identified an urgent need to reform the primary-care services to cater for the ever-growing need of the many patients with chronic conditions.

In a recent publication by Leeder *et al*.[6] entitled, 'A race against time', it was shown that people of working age (35 - 64 years) already had increased CVD mortality rates in South Africa in 2000 that were higher than those found in people of similar age in the USA and Portugal. The publication also shows that the projected CVD mortality in South Africa for this age group predicts an increase of 41% between 2000 and 2030. These premature deaths will have a major negative economic impact on the country, simultaneously having to deal with the HIV/AIDS pandemic where even younger people are lost from the workforce.

The preceding chapters clearly illustrate that CDL contribute significantly to the burden of diseases in South Africa, that the conditions and their risk factors are poorly diagnosed and treated, and that this situation impacts negatively on the economic burden of CDL in the country. Despite nationally recognised needs for improved treatment of patients with CDL and their risk factors at population and primary health-care level, adequate diagnoses and treatment are seldom achieved, which highlights the urgent need to address CDL care at these levels.

Unfortunately, the need for health care in South Africa, particularly at primary-care level, faces not only the demands of the traditional acute care model that is needed for high levels of diseases of poverty involving acute conditions, such as infections, trauma, maternal and childcare conditions, but also includes the added requirements of care for chronic diseases. This type of care uses different management modalities than those required for acute care. Countries like South Africa, with multiple burdens of disease, actually require a health-care system that caters for both acute and chronic conditions equally. Such countries are called upon to provide both modalities of care with extremely limited resources. Even highly sophisticated Western countries with higher resource availability for health care are not called upon to provide equally for both acute and chronic conditions. Although much has been achieved in the last decade to formulate the needs of chronic disease care in developing countries, very little international research and policy activities have addressed the taxing question of how poorer developing countries, with multiple burdens of disease, can address both acute and chronic conditions.

2 CONTRIBUTION OF INTERNATIONAL DEVELOPMENTS FOR CDL HEALTH CARE

International recommendations, together with the findings presented in this report, inform us that prevention and treatment of CDL and their risk factors are required across the lifespan. Furthermore, comprehensive CDL intervention requires a multidisciplinary, multi-sectoral patient centred approach that goes far beyond the limited medical model that is required for the care of patients with acute conditions, the latter being the model of current health care in South Africa at the primary level.

Fortunately, much work has been published in the last decade that informs poor developing countries of the requirements for the effective prevention and treatment of CDL. Guidelines have predominantly been formulated by the World Health Organization (WHO). A double-pronged approach is most effective and involves targeting the population as a whole. The first requirement is the prevention of the emergence of CDL risk factors (primordial and primary prevention). This involves motivating the population as a whole to adopt a healthier lifestyle. This is achieved partly through health promotion and partly by modifying the environment by legislation and regulation so that it is more conducive and supportive of healthy lifestyle choices. The second requirement is that people at high risk for the development of CDL must be diagnosed early and treated cost-effectively. This will reduce total CDL risk and help prevent the premature emergence of complications of CDL. Furthermore, an efficient surveillance system is needed to monitor the burden of CDL in the community and to evaluate the success of interventions to reduce its premature onset.[7]

Two critical developments were led by WHO. The Framework Convention on Tobacco Control

is a landmark achievement for WHO, which formulated, for the first time, the requirements of a comprehensive tobacco control policy. This was adopted by the member states of WHO at the World Health Assembly in May 2004. This provided a guideline for the essential elements of tobacco control for all countries.[8] In May 2005, the World Health Assembly, together with the Food and Agricultural Organisation (FAO), adopted the Global Strategy for Nutrition and Physical Activity.[9] This completed the global guidelines in lifestyle modification that focused on the prevention of CDL. The development of practical guidelines by WHO for the implementation of these policies is currently being formulated. The need for prevention and practical recommendations to achieve effective preventive programmes was clearly spelled out by WHO's publication titled, 'Prevention of Chronic Diseases, a Vital Investment', published in 2005.[10] This document includes the STEPS approach to policy development for CDL.[11] In 2003, WHO also published the book, 'Making Choices in Health, WHO guide to cost-effectiveness analyses' by the WHO-CHOICE working group. This publication provides the tools for carrying out cost-effectiveness analyses for many health interventions.

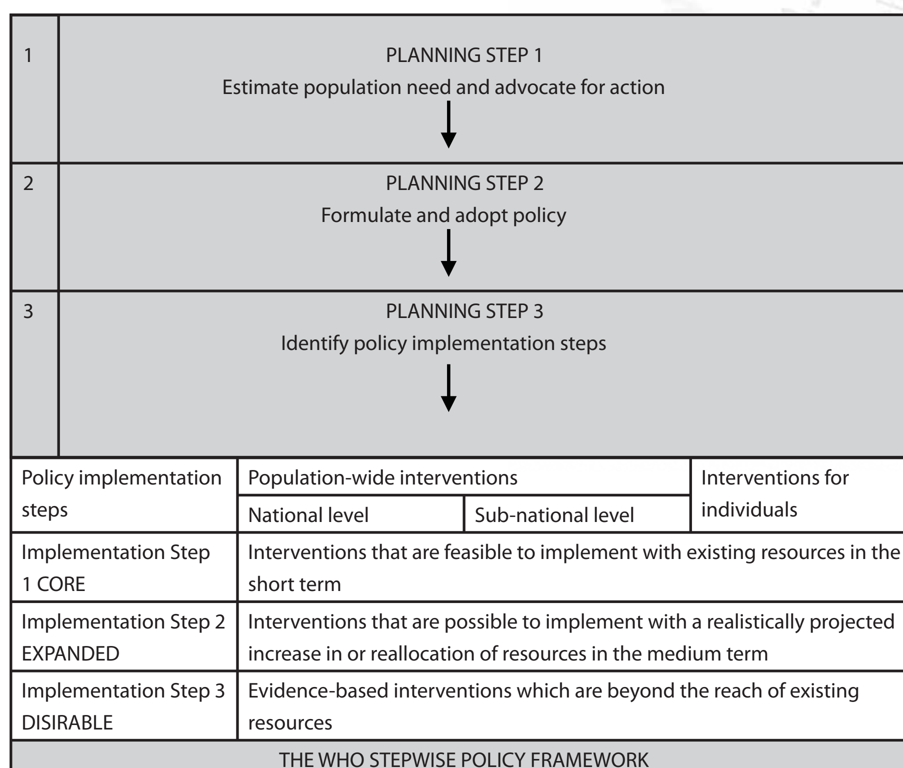

Figure 1: STEPS for Prevention of CDL policy implementation WHO

Four other recent publications also addressed the urgent need to improve CDL care in developing countries, and identified the importance and cost-effectiveness of interventions related to CDL. The first is 'A Race against Time. The Challenge of Cardiovascular Disease in Developing Countries' by Leeder *et al*.[6] South Africa is one of the four countries reported in this publication, therefore making it of particular importance for South African health policy makers. Evidence is provided showing that CVD has a major economic impact in the country and that the management of CVD should therefore be a priority for health policy makers if the projected increase in the burden of chronic diseases is to be averted.

In 1993 the Disease Control Priorities Project of WHO, the World Bank and the Fogarty International Center of the National Institutes of Health in the United States published 'Disease Control Priorities in Developing countries.[12] The many international participants in this project are now working on the second edition of this book.[13] It is edited by Dean Jamison and others who extensively discuss the factors needed for disease control in developing countries. The book identifies a number of CDL-related interventions that are cost-effective in resource-scarce settings, such as South Africa. Steve Tollman *et al*.[14] reviews the many strengths, weaknesses, and requirements of primary health-care services in developing countries. He quotes Starfield who concluded that 'countries with a stronger orientation to primary care indeed are more likely to have better health service levels and lower costs.[15] Tollman *et al*.[14] also review the public and private primary-care settings, and suggest useful private/public partnerships to optimise the ability of the public primary-care setting to provide health care for the poor and thus address the inequities existing in countries like South Africa. The role of community outreach programmes from the

community health centres with dynamic health teams, including community health workers, is discussed. The vexing question of avoiding vertical programmes in primary-care services is addressed, while identifying the different health-care needs for different clusters of conditions and diseases. This chapter warns that a single minded focus on purely cost-effective interventions may ignore issues of inequitable health care and the basic principles of public health in providing for needs identified by communities and improving the health of the poor.

The third publication that can support South African health policy developers in selecting cost-effective interventions for the country is a report by Derek Wanless[16] written for the British Parliament and titled, 'Securing Good Health for the Whole Population'. The report focuses mostly on prevention, the wider determinants of health in England, and on cost-effectiveness of action that can be taken to improve the health of the whole population and reduce health inequalities. The report reaffirms the need for establishing a comprehensive public service for a country to improve health for all and to reduce inequities in health care by focussing on the different needs of different groups in society.

In the textbook, 'International Public Health', Yach *et al*.[17] review the impact of CDL globally and spell out the elements of good CDL management in developing countries in its full multifaceted complexity. Particularly useful with respect to this chapter are the pointers to the successful elements of the Framework Convention on Tobacco control;[8] these can be applied to promoting the global policy on nutrition and physical activity.[9] In the same book Green and Collins[18] spell out the needs for management and planning for public health in developing countries.

WHO has taken extensive steps to develop tools that countries, particularly developing countries, can use to address the requirements of a health service when dealing with CDL. They built on the Wagner model for Chronic Disease Care.[19] The WHO model for 'Innovative Care for Chronic Conditions' (ICCC)[20] summarises these requirements and is illustrated in Fig. 2. The framework illustrates the needs at the levels of patient care, health-care organisation and community participation, as well as at the macro-level of policy and financing requirements. The model identifies the productive interaction between informed, motivated and prepared patients, families, community partners and a prepared proactive and equipped practice teams. The latter implies the availability of appropriate management guidelines, other decision support tools, and essential supplies (including clinical examination supplies, diagnostic tests and medications). The ICCC model also implies continuity and coordination of services between primary, secondary and tertiary care. The third aspect of the ICCC model refers to policy and financing aspects of chronic care.[21] Many of these aspects have been referred to in the publications mentioned above. The ICCC model also indicates the importance of evidence-based behavioural medicine and social science studies; these improve the complex issues of the implementation of interventions that have been shown to be effective after implementation efforts in health services of developing countries.[22]

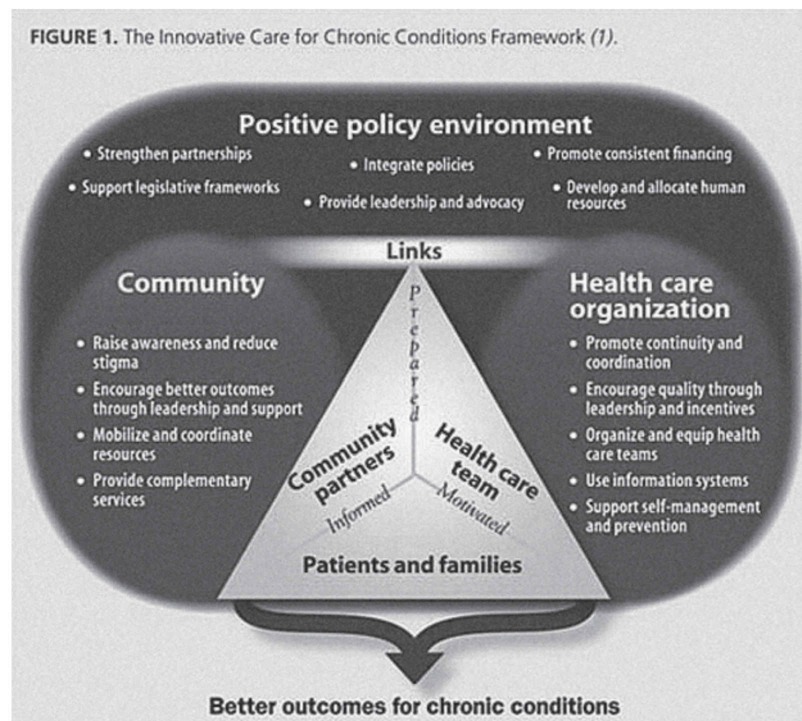

Figure 2: Innovative Care for Chronic Conditions (ICCC) Model

3 MODEL FOR CDL HEALTH CARE IN SOUTH AFRICA

The information provided in this chapter indicates that significant progress has been achieved, particularly with respect to tobacco control, with the primordial and primary prevention initiatives needed to promote a healthy lifestyle for the whole population. The development of primary health-care services has been one of the highest priorities of the National Department of Health since 1994. A long history of inequities in health-care provision between private and public sectors, between the poor and wealthy, and among the different provinces of South Africa have occupied the planners of health services. A focus on the availability and costs of medication has mostly addressed treatment of AIDS, malaria and tuberculosis. The same initiative for cheaper medication for CDL still needs to be put in place. The development of vital registration and an adequate health information system has also received attention, although the development and use of adult health indicators still need to be achieved. Similarly, good primary-care audit systems have not been put in place. These are needed to provide useful local information for primary health-care services to monitor their own progress in achieving good care for patients with chronic conditions.

The National Department of Health has made progress in planning for good clinical care for patients with chronic conditions, and the 5-year strategic plan specifically includes chronic disease care. Essential drug lists for primary and hospital care have been formulated. A long-term care model with support groups for patients with chronic conditions is being promoted. Multiple therapeutic guidelines have been formulated for many conditions. Each of the nine provinces should have a dedicated chronic disease care team. However, at the primary-care level the implementation leaves much to be desired for achievement of optimal care in line with the WHO's ICCC model. An ongoing critical evaluation and reformulation of the primary health services in the nine provinces of the country is needed to implement the ICCC model, while also attending to acute conditions. Fig. 3 is a proposed model for a National Chronic Disease Care for the country.

<table>
<tr><td>1° Prevention
Target Group:
WHOLE POPULATION</td><td colspan="11">• Promote Healthy Lifestyle: tobacco, exercise, nutrition
• Motivate public to seek appropriate screening</td><td rowspan="4">MULTIDISCIPLINARY RESEARCH</td><td rowspan="4">PARTNERSHIPS (including PUBLIC / PRIVATE)</td><td rowspan="4">QUALITY ASSURANCE</td></tr>
<tr><td rowspan="2">2° Prevention
Target Group:
PEOPLE WITH RISK FACTORS AND CHRONIC DISEASES
Diagnosis and treatment</td><td colspan="11">CONDITIONS INTER-RELATED AND OFTEN CO-EXIST</td></tr>
<tr><td>TOBACCO & ALCOHOL ADDICTION</td><td>HYPERLIPIDAEMIA</td><td>OBESITY</td><td>HYPERTENSION</td><td>DIABETES</td><td>CVD, STROKE & HEART ATTACKS</td><td>CANCER</td><td>CHRONIC LUNG DISEASE</td><td>MENTAL HEALTH</td><td>DISABILITY & REHABILITATION</td><td>GERIATRICS / GERONTOLOGY</td></tr>
<tr><td>HEALTH SERVICE DEVELOPMENT</td><td colspan="11">• Organisational structure of primary health-care services to provide for both chronic and acute conditions
• Adequate staffing levels
• Staff training in chronic diseases care utilization of staff
• Equipment
• Cost-effective locally appropriate management guidelines
• Drug delivery system
• Compliance by activated patients and health-care team
• Long-term care
• Evaluation adult health indicators health information system</td></tr>
</table>

Figure 3: MODEL FOR NATIONAL CHRONIC DISEASES PROGRAMME FOR SOUTH AFRICA

3.1 PREVENTION STRATEGIES TARGETING THE POPULATION AS A WHOLE

The success that has been achieved in tobacco control with good legislation has provided an excellent example of what can be accomplished in the country. The government provides the necessary legislation while the non-governmental organisations concerned with tobacco use, particularly the National Council Against Smoking (NCAS), are vigilant in identifying where the tobacco industry is attempting to find ways to promote their lethal products. The extensive use of the media to alert the public to infringements of the law and the necessity to improve current legislation has also been extensively used by NCAS. Ongoing vigilance by all tobacco control groups and a stricter implementation of current and planned legislation will be necessary to achieve a further reduction in tobacco use.

The excellent suggestions made by Yach *et al*.[17] – to use the models developed for successful tobacco control for improving the implementation of the global policy for nutrition and physical activity – should be seriously considered now that the Health Promotion Directorate of the National Department of Health are developing national strategies for the promotion of healthy lifestyles for South Africa. Their planning to date has had a distinct multi-sectoral and multi-disciplinary approach, which much increases their chances of success. However, caution is required to ensure that all interventions used have been tested and shown to be effective.

The promotion of healthy food with sufficient fruit and vegetables, especially for the poorer sectors of society, remains a priority and may need to be addressed by considering subsidies for healthy foods, or at least the removal of sales taxes. The cost of fruit and vegetables in poorer townships is high and their availability in these settings is frequently less than much unhealthier food from street vendors and spaza shops.

The level of salt in many staple foods in South Africa is much too high, and cheap alternatives with low sodium levels need to be developed. The regulation of the amount of sodium in bread and other processed food needs attention from the National Department of Health.

The labelling of food products is currently receiving attention from the National Department of Health. However, there is much to confuse consumers, particularly those with low levels of literacy. Culturally appropriate ways to assist such people in making healthy food choices still needs to be developed and tested for all sectors of the population. There is also confusion with many symbols on food products from more than one NGO. There is, for example, the Heart Mark of the South African Heart Foundation and the Mark from the Cancer Association of South Africa. The National Government may have to facilitate the standardisation of the healthy food marks on products by the various organisations and ensure that solid scientific criteria are maintained by NGOs in selling the use of these marks on products to the food industry.

The promotion of physical activity is currently receiving much attention nationally. The 'Vuka South Africa' multi-sectoral programme launched in 2005 should contribute significantly. Although physical education stopped being a separate subject at schools since the beginning of 2006, it has become part of a compulsory new subject, 'Life Orientation'. There is some concern that this will provide adequate exercise for children to improve the habits and well-being.[23] There are many poor schools where very few facilities are available for physical activity. School health programmes have been reactivated and the 'health promoting schools' initiative is being supported.

The environment in many settings needs to improve in order to support safe outdoor physical activity for people of all ages. Programmes have been developed for members of the community. One such programme is CHIPS, developed at the Sport Science Institute of the University of Cape Town. It is encouraging that planning is in place to implement such programmes widely across the country. Evaluation of these programmes needs to be built into their dissemination. Town planning and measures promoting physical activity where ever possible need to be carefully considered in order to facilitate increased physical activity in the community, but these aspects have not as yet been widely considered.

Another aspect of supporting the community in making healthy lifestyle choices is the availability of credible and culturally congruent health information and messages appropriate to the target audience's level of education. Unfortunately, no central source of information exists in South Africa where the public can turn to for reliable information on CDL. Instead, the public is exposed to advertising messages from commercial enterprises and reports in the media selected for possible newsworthiness and that frequently focus on health-related controversies. This leaves the public confused and unable to identify well-established factual knowledge and prone to accept as correct whatever the media presents to them.

A further aspect of health information that needs attention is a lack of knowledge that will prompt the public to self-select for screening. In particular, the public needs to be better educated regarding situations where their own family and medical history, including the

presence of risk factors, suggest that they may be at high risk for chronic diseases. For example, an obese person with a family history of diabetes and hypertension should present themselves at health services with a request for CDL risk factor screening. Related to this people need to be educated regarding early signs of disease. This may facilitate the early diagnosis of conditions. Typical examples are the early signs of the presence of cancer, and the symptoms of transient ischaemic attacks which could indicate an extremely high risk of suffering a stroke. Again, such education would help people self-select for screening. Programmes to inform the public should be part of the activities of the National Department of Health's Directorate for Health Promotion. In addition, appropriate NGOs should contribute to public awareness campaigns. Such campaigns typically provide the opportunity for multi-sectoral, multi-disciplinary collaboration.

3.2 DEVELOPMENTS NEEDED FOR IMPROVED CDL HEALTH SERVICES

The most challenging aspect to the development of an effective system of primary health-care in South Africa is to cater for the quadruple burden of diseases in the country. This, in essence, means providing for both acute and chronic conditions with limited resources. The traditional medical model that now forms the basis of primary health care is a typical acute care model, which does not provide for the needs of patients with chronic conditions. Table 18.3 summarises the different needs of care for acute and chronic diseases. There is very little information available on the effective structure and approaches required for health policy makers on which to base planning simultaneously for both types of conditions. The current overwhelming focus on integrated health-care services at a primary health-care level is distinct from vertical programmes with their highly inefficient utilisation of available resources. This has prevented critical thinking regarding the differing needs of patients with acute and chronic conditions. This has led to many primary-care settings placing the two classes of patients in one queue while they wait for health-care providers. It is clear that in overextended services this 'integrated' system results in chronic care patients losing out while health-care providers focus more on the urgent and demanding needs of acute care patients. However, other community health centres where dedicated chronic disease clinics have been introduced are closer to the proposed patient-centred approach. These are frequently run by specially trained nurse clinicians supported by medical practitioners. This model of chronic care is preferred by patients. Careful study of this model is needed to operationalise it in most CHCs across the country.

Table 18.3. COMPARISON OF ACUTE AND CHRONIC HEALTH CARE

ASPECTS OF CARE	ACUTE CARE	PATIENT CENTERED CHRONIC CARE
Goal of care	Cure the condition	Control progression Increase survival and quality of life
Duration of treatment	Limited	Indefinite
The group with the required knowledge base to treat the conditions	The health-care provider	The health-care provider Patients and family Community members
Requirements for disease management	Acute interventions Medical treatment	Often comorbidities present Multiple drugs used Patient self-management with help of others
Provider of care	Clinicians and clinical services	Broad based including NGOs, community and families
Quality of care experienced	Determined in clinical setting	Determined by all groups involved including empowered patients

Another aspect that needs addressing is the almost universal insistence that patients with chronic diseases return monthly to collect their medications. This results in long queues and long waiting times, often from well before dawn. This system should be changed so that, where appropriate, medications are provided for much longer periods. Furthermore, drug delivery systems to all CHCs must be addressed to eradicate the common problem of them running out of drugs for chronic conditions. These improvements will not only reduce the enormous numbers of patients attending CHCs but will also permit the currently overextended staff to deal more effectively with patients when they come to chronic disease clinics. The principal

of patient support groups and the possibilities of using these clinics to establish networks of patients with similar conditions for mutual support still needs to be explored.

The successful treatment of patients with chronic conditions is multifaceted and requires a collaborative approach from all involved. However, in the final analysis, these patients self-manage their condition.[24] The central position of patients in chronic care was summarised by Glasgow *et al*.[25] as follows: 'Patients are in control. No matter what we as health professionals do or say, patients are in control of these important self-management decisions. When patients leave the clinic or office, they can and do veto recommendations a health professional makes'. An understanding of this principle emphasises the need that patient empowerment is central to effective care of chronic diseases. The data in Chapter 17 show that patients in the public sector CHCs tend to be passive and do not participate in interaction with the health-care provider. This is hardly surprising in the context of the political history of South Africa where passivity of the poor and disenfranchised was demanded by the system. The traditional authoritarian style of interaction of health-care providers with patients contributes to the situation, as does the lack of culturally appropriate education tools to support patient empowerment.

The patients with the highest level of CDL risk for developing target organ damage (TOD) or events such as myocardial infarctions and strokes will benefit the most if they are identified and treated aggressively. These patients have already suffered a stroke or myocardial infarction, have other TOD, or suffer from diabetes. The data shown suggest that the poor level of CDL risk factor control found in these patients contributes significantly to the occurrence of further events. This group of patients, who are easily identified, must receive adequate intervention to control their CDL risk factors. This will be the most cost-effective group of patients to treat in the country. Another group of patients that can be treated very cost-effectively are those who have not yet suffered an event as described above but who have many CDL risk factors that synergistically contribute to high levels of total CDL risk.[26,27] The challenge is that these patients are more difficult to identify, firstly, because they are not actively sought within the patient community attending CHCs, and, secondly, because expensive blood tests are required to identify all the risk factors necessary to apply the Framingham total risk assessment formulae. The primary health-care resources are inadequate to do all these blood tests. There is consequently a great need to develop total CDL risk formulae based on easily measurable risk factors. WHO and others are working towards developing such formulae. The South African health policy developers plan to utilise these formulae in order to identify those patients who have high levels of total CDL risk. These patients can then have the necessary blood tests done so as to more fully identify all their risk factors. The number of patients who then require such blood tests will then be considerably fewer and this approach will be a much better use of scarce resources.

A detailed discussion of all groups of patients needing chronic disease care is beyond the scope of this chapter, but some neglected groups need to be highlighted.

- A major group is those addicted to tobacco products. Support for these patients is currently not widely available at CHCs. Effective brief interventions for smokers have been formulated and with proper training of health-care providers can be implemented without excessive demands on the time of health-care providers. A particular focus should be pregnant women who smoke or use smokeless tobacco; this will help to reduce the negative effects on the outcomes of the pregnancy.
- Another group of patients needing more attention are those requiring acute care for strokes and myocardial infarctions. Correct care as soon as possible after presentation is critical in order to improve the outcome of these catastrophic events.
- Cervical cancer screening programmes to identify the commonest cancer in women in South Africa are on the agenda but their implementation nationally needs to be optimised.

The formulation of therapeutic guidelines for many chronic conditions has been a focus of the National Department of Health. This is in line with international developments. The American National Guideline Clearinghouse sponsored by the Agency for Healthcare Research and Quality listed 1650 active clinical guidelines in July 2005.[28] It has been emphasised that even the best evidence-based, disease-specific therapeutic guidelines may lead to unintended consequences, particularly when patients with co-morbid conditions and the elderly are not carefully considered.[29] Non-adherence and medical errors are common in patients treated with many medications and many lifestyle change recommendations. The risk of this increases when cross-cultural communication occurs between health-care providers and their patients.

Furthermore, many therapeutic guidelines are sometimes inappropriate in primary health-care settings with limited resources and the recommendations are not ranked in terms of their clinical value. Data are often presented in a way that the busy clinician cannot quickly access. Because of these various problems, overextended health-care providers working in primary care typically consider the guidelines as unrealistic and tend to ignore them, particularly if suggested medications are not available at CHCs. Despite these limitations, evidence-based therapeutic guidelines remain an essential tool for caring for patients cost-effectively in resource-scare settings. This requires that therapeutic guidelines are formulated in ways that are realistic in primary care, resource-scarce settings. Recommendations must be prioritised in terms of their contribution to effective care for patients with chronic conditions. This prioritisation may be presented in the form of the number of patients needed to treat to have a specific outcome. Costs for the patients and CHC must be considered and individual patients' co-morbid conditions, age, life expectancy and similar considerations must play a part in the implementation of the therapeutic guidelines.

4 EDUCATIONAL AND OTHER NEEDS FOR HEALTH CARE PROVIDERS

The quality of primary health care in South Africa for patients with chronic diseases, particularly in the public sector, is affected by many factors related to the actual providers of health-care. There has been a severe brain drain from the public sector of nurses, doctors and allied health-care professionals out of the country or to the private sector. Frustration of staff in the public sector has been identified as a major area of concern. The number of patients at primary-care CHCs has increased dramatically as patients have been prevented from entering the health-care services at secondary or tertiary levels. This occurred without the necessary facilities, staff quotas and training being put into place. Pleas to higher-level health service administrators have been ignored and urgently needed support has not been forthcoming. Because of this primary-care staff work under untenable circumstances, they have a very low level of morale and the quality of care is falling. Frequently, nurses who are trained in chronic disease care have been moved to different settings in the health-care services. Another problem relating to the health care-providers is the traditional style of health-care providers in interacting with patients is a top down approach leaving little space for patient participation in their own care.

This staff situation is in clear conflict with WHO's ICCC model of 'prepared and motivated health care team' with the necessary knowledge and empathetic support needed to help poor patients to develop self-empowerment to manage their chronic conditions. The need to re-orientate health-care providers has been emphasised as the chronic disease care model has been developed.[30,31] The required changes include new approaches to staff education that move well beyond purely clinical skills and additional training in diet counselling, advice on exercise and smoking cessation. This should include training in: 1) patient-centred care and could include training in motivational interviewing; 2) partnering with patients, communities and other health-care providers to build support for improved care of patients with chronic conditions; 3) quality improvement including the use of locally collected data to monitor progress; 4) information and communication technology skills to establish adequate patient information systems and its effective use for communicating with others involved with chronic disease care; and 5) a public health perspective which moves the workforce from caring for individual patients to planning care for populations of patients, including a systems thinking approach that assesses the need for medical interventions across the whole spectrum from clinical prevention to palliative care.

Another aspect of chronic disease care that needs to be considered is the role of community health workers and community outreach programmes. They have a role to play as part of the chronic disease health-care team. Their interaction with chronic disease patient networks or self-help groups will be central but details still needs to be addressed. The training of community health workers and possible remuneration for their services also needs further clarification.

5 MONITORING AND EVALUATION SYSTEM FOR CHRONIC DISEASES OF LIFESTYLE

Limited information about CDL is currently collected in the country. Routinely collected information is based on mortality data from Statistics South Africa, a national pathology-based cancer registry and one community-based cancer registry in the Transkei. The provincial hospital information systems are available for most large hospitals. In addition, some data are collected routinely at CHCs and collated as the provincial reports, but they provide information only on the number of patients with different conditions attending the CHC. These data are not especially useful, either

for planning services or to document the trends in CDL over time. The largest health survey, the Demographic and Health Survey (SADHS), with a specifically developed adult health module to collect data on CDL and other conditions, provides essential adult health indicators. This survey was initiated in 1998 by surveying about 14 000 adults aged 15 years and older. It is conducted every 5 years; the second survey was conducted in 2004.

Other data collected in South Africa is as follows. SASPREN is a volunteer network of family and general medical practitioners who conduct ongoing surveillance of selected health indicators. As far as CDL is concerned, they collect data on asthma, hypertension, diabetes, acute myocardial infarctions and depression. These data are the only information from the private health-care system, while the data on acute myocardial infarctions are the only regularly collected data on that condition. A South African Health Review is published annually by the Health Systems Trust and contains limited data on CDL. The Health Systems Trust was contracted by the National Department of Health to conduct a survey of primary health-care (PHC) facilities in 1997, 1998 and 2000. In 2000 a random sample of 445 PHC clinics were surveyed across the country. These surveys have not included any information regarding CDL. A national disability survey was conducted in 2000. In 2002 and 2004, a youth tobacco survey was carried out in a random sample of South African schools; elements of this international questionnaire were included in a more general Youth Survey of risk-taking behaviour. With regard to data pertinent to CDL, it recorded use not only of tobacco but also of alcohol.

A number of localized surveys of CDL risk factors have been conducted over the last 15 years in different parts of the country. These surveys are the only ones that collected blood samples from randomly selected participants therefore allowing an estimation to be made of the prevalence of CDL risk factors, such as hyperlipidaemia and diabetes.

Accurate and complete information on the incidence of conditions such as strokes and myocardial infarctions is, in general, notoriously difficult to collect. An adequate CDL (or adult) health information system can only be designed after a critical evaluation of currently available data so as to ensure that appropriate, but not unnecessary, data are collected and that optimal use is made of this data. Furthermore, there is an urgent need to develop a CHC auditing process that will enable each CHC to monitor their performance in treating CDL and their risk factors.

The Chronic Diseases of Lifestyle Unit and its collaborators proposed an extensive list of CDL indicators for the National Department of Health (K Steyn, *et al.*, unpublished data), Chronic Diseases of Lifestyle Unit, Medical Research Council). These indicators would be useful for monitoring CDL patterns and quality of CDL care in the country, and for planning CDL health services. The ease and accuracy with which data can be collected, either from currently available sources or by simple data collection procedures, were also suggested.

From the mortality data of the country, 12 indicators of chronic disease were suggested. These would indicate the contribution of chronic diseases to the overall mortality pattern, the age and gender distribution of chronic disease mortality, and years of life lost because of those diseases. The indicator 40Q25 (the chance that a person reaching the age of 40 dies prematurely before age 65) indicates premature mortality and loss from the workforce; this is due mostly to chronic diseases as those who die of AIDS do so before the age of 40 years Cause-specific mortality for a number of major chronic diseases was also suggested as an indicator.

The Demographic and Health Survey's (SADHS) adult health module was designed to yield 16 chronic disease indicators. Hypertension was chosen as an indicator condition in this survey where lifestyle factors related to blood pressure were identified, the prevalence of risk factors determined and the quality of health care reported. Morbidity patterns related to symptomatology of chronic respiratory diseases were also identified as indicators.

Data for ten chronic disease indicators can be easily collected if the Health Facilities surve, mentioned above, is repeated. The data collected should address the availability of necessary equipment and tests for diagnoses and the medications for the treatment of chronic diseases and their risk factors. The surveyed facilities could also be asked about shortages of drugs. Provincial drug depots can supply data on the use of medications for chronic diseases, and this can provide the required information for four indicators.

The greatest need for information is at the level of the CHC. Planners of primary health care suggest that an in-depth review for a period of two weeks every two years at each CHC would provide data that each clinic and also each region and province could use in order to plan services. These data could then be collated nationally, and would allow the findings at the clinics to be compared with the data generated in the SADHS every 5 years. The Quality of Care Manager at the provincial level can be given the responsibility to coordinate the processes with the district management team's information officer.

Twenty-five chronic disease indicators related to patient care factors, to staff related factors and to structural and logistic factors at the CHC, were suggested by Steyn *et al*. Table 18.4 presents the list of 13 essential national chronic disease indicators suggested by the same authors.

Table 18.4. Thirteen essential chronic disease indicators (Steyn *et al*. unpublished)

Indicator	Definition	Aspect Addressed	Data Source
% Adult daily tobacco smokers	Smoke 1 cig/day by people age 15 and older	Effectiveness of tobacco control programme	DHS every 5 years
% Adolescent daily tobacco smokers	Smoke 1 cig/day by people age 15-19	Effectiveness of preventing the uptake of smoking in youth	DHS every 5 years
% Obese people	BMI > 30	Magnitude of the risk of diabetes and hypertension	DHS every 5 years
% Of people with hypertension who are controlled	BP < 140/90mmHg in adults with hypertension	Effectiveness of chronic disease control programmes (diagnosis and management)	DHS every 5 years
% Of hypertension patients attending public sector primary care facilities who are controlled	BP < 160/90mmHg in patients with hypertension	Effectiveness of management of hypertension control programmes	Tally sheets collated every 2 years in facility audit
% Of diabetic patients attending public-sector, primary-care facilities who are controlled		Effectiveness of management of diabetes control programmes	Tally sheets collated every 2 years in facility audit
25Q40	% Of people who reached age 40 who die before age 65	Premature deaths due to mostly preventable chronic diseases but excluding AIDS.	Mortality data
% Of all deaths attributable to CDL	% Of deaths attributable to CDL	Total CDL mortality burden in South Africa	Burden of disease estimates based on mortality data
% Of all years of life lost attributable to CDL	% of all years of life lost attributable to CDL	Total premature mortality burden	Burden of disease estimates based on mortality data
Age-standardised death rate attributable to cardiovascular causes	Death rate attributable to cardiovascular causes, standardised to WHO population	Impact of CVD	Burden of disease estimates based on mortality data
Age-standardised death rate attributable to cancer	Death rate attributable to cancer, standardised to WHO population	Impact of cancer	Burden of disease estimates based on mortality data
Age-standardised death rates attributable to chronic respiratory conditions	Death rate attributable to chronic respiratory conditions, standardised to WHO population	Impact of chronic respiratory diseases	Burden of disease estimates based on mortality data
Age-standardised death rates attributable to diabetes	Death rate attributable to diabetes, standardised to WHO population	Impact of diabetes	Burden of disease estimates based on mortality data

6 RESEARCH REQUIRED FOR CHRONIC DISEASES OF LIFESTYLE

International research funding for developing countries is largely focused on communicable diseases. However, two international initiatives have recently been initiated to address CDL in developing countries. These are the Initiative for Cardiovascular Health Research in Developing Countries (IC Health) under the leadership of Prof Srinath Reddy, coordinated from India, and the Community Actions to Prevent Chronic Diseases (CAPCoD), which operates under the umbrella of the Oxford Health Alliance. Although neither of these initiatives have large amounts of funding available for research, their particular strength lies in recognising that researchers from developing countries need support from accomplished international researchers in order to develop good research questions and protocols that can procure significant funding from large funding agencies. Consequently, both organisations have spent a significant amount of their resources to provide training and support for researchers from developing country who have approached them with

relevant research questions. IC Health has convened, in addition, workshops around the world with experts from developing countries to identify important research questions in areas of CDL needed for developing countries. This model of research development is very useful to build research capacity in any developing country and should be followed in South Africa.

Another aspect urgently required for research development on CDL in South Africa is to attract promising young scientists to this area. One way to do this is to fund dedicated fellowships, which not only provide a salary for promising researchers to do a PhD but also some additional funding for research projects. An open competition for such fellowships would ensure that high-calibre candidates are attracted. In the last decade, this has been done one time with fellowships for tobacco control, funded by Research International for Tobacco Control, and a fellowship for CDL and nutrition research, funded by the international food company, Unilever. The Medical Research Council's programme of research interns) also places good post-graduate students with established research programmes, providing them with a salary, university fees and some training. Unfortunately, this programme does not provide project money for these students.

PhD or post-doctoral students who work on CDL topics could take part in exchange programmes between universities in South Africa and overseas. This should be developed to address the dearth of well-qualified South African researchers working in the area of CDL. The growing focus on international health at many overseas universities might be taken advantage of to ensure that neglected areas of research in developing countries, such as CDL, are included in their research portfolios.

The many areas of CDL research required in South Africa are highlighted in the different chapters of this technical report and will not be repeated here. However, some major needs are suggested. Research on the development of a comprehensive health information system on CDL is necessary together with the development and evaluation of adult health indicators, as was set out in section 18.5. The optimal use of data already available, such as the Demographic and Health survey, needs refinement. Without the necessary information and evaluation the development of effective services for CDL is not possible.

An urgent need is for research on health services that supports the development of effective primary care, both for acute and chronic conditions. This research should use not only epidemiological methods but also social science methods as insufficient attention has been paid to the cultural diversity of the South African population in the context of health services. This will facilitate the development and testing of interventions that are culturally appropriate and locally feasible have to be. Further development and validation of cross-cultural research tools is another area where further investigation is required. The country urgently needs to know how to spend limited resources to obtain the best health possible for the largest number of patients with CDL. For that reason another important area of health services research is the study of the cost-effectiveness of different interventions. The extensive introduction of national preventive programmes, such as 'Vuka South Africa,' must be monitored to ensure optimal benefits.

In a country with such wide reaching demands on limited health services resources policy makers need to implement the most cost-effective interventions in allocation available budgets. The dearth of health economic studies on chronic disease management precludes the ability to make informed cost-effective decisions. The need for studies on cost-effective interventions for chronic disease should be high on the list of research topics that need development in the country.

7 CONCLUSIONS

Most of the elements of CDL health care modification suggested by WHO's ICCC would equally apply to good HIV/AIDS care for patients and are currently being introduced in South Africa with the massive AIDS epidemic. The latter has indeed forced the health services in the country to address many aspects of the care for chronic diseases in developing the services for patients infected with HIV. This provides an opportunity that should not be missed to establish a chronic disease health-care system for the country. However, there is currently no clear plan to link all chronic disease care in the public sector primary health-care system.

This technical report has documented that CDL and their risk factors are extremely common in South Africa and constitute an important part of the overall burden of disease in the country. The data also show that these conditions are poorly diagnosed and inadequately treated. In contrast to the findings reported in the previous (1995) edition of the technical report of CDL in South Africa significant policy developments have taken place at the level of the National Department of Health. However, the data presented document that the implementation of the national strategy for CDL has not yet been achieved. This technical report has highlighted many of the implementation strategies that need to be addressed as well as the extensive health information on CDL that is

needed to create a primary health-care service that will effectively provide for both acute and chronic diseases. Central to this is the development of a patient centred approach that is essential to good health care for all people in South Africa in the 21st century.

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