

Projected Non-communicable Diseases Update

The purpose of this series of policy briefs on National Health Insurance (NHI) and the related IMSA web-site is to put in the public domain material and evidence that will progress the technical work of developing a National Health Insurance system in South Africa. This includes tools for costing NHI and evidence on where savings could be achieved in moving to a future mandatory system with universal coverage.

Policy Brief 18¹ dealt with the revised population and HIV/AIDS projections by the Actuarial Society of South Africa (ASSA). The ASSA2008 model was released in March 2011 and projects a larger population than the earlier ASSA2003 model. This policy brief uses the revised population and new information to update several policy briefs²⁻⁴ that projected future chronic disease and cancer in South Africa.

1. WHO Report on Non-communicable Diseases

In early 2011 the World Health Organisation (WHO) released a new report on the worldwide status of non-communicable diseases (NCDs)⁵. The report “gives particular attention to conditions in low- and middle-income countries, which now bear nearly 80% of the burden from diseases like cardiovascular disease, diabetes, cancer and chronic respiratory diseases”.

“Of the 57 million global deaths in 2008, 36 million, or 63%, were due to NCDs As the impacts of NCDs increases, and as populations age, annual NCD deaths are projected to continue to rise worldwide, and the greatest increase is expected to be seen in low- and middle-income regions. While popular belief presumes that NCDs afflict mostly high-income populations, the evidence tells a very different story. Nearly 80% of NCD deaths occur in low-and middle-income countries and are the most frequent causes of death in most countries, except in Africa. Even in African nations, NCDs are rising rapidly and are projected to almost equal communicable, maternal, perinatal, and nutritional diseases as the most common causes of death by 2020.”

“The consequences for societies and economies are devastating everywhere, but most especially so in poor, vulnerable and disadvantaged populations. These people get sicker sooner and die earlier than their counterparts in wealthier societies. In large parts of the developing world, non-communicable diseases are detected late, when patients need extensive and expensive hospital care for severe complications or acute events. Most of this care is covered through out-of-pocket payments, leading to catastrophic medical expenditures. For all these reasons, non-communicable diseases deliver a two-punch blow to development. They cause billions of dollars in losses of national income, and they push millions of people below the poverty line, each and every year.”

“Premature death is a major consideration when evaluating the impact of NCDs on a given population, with approximately 44% of all NCD deaths occurring before the age of 70.” In low- and middle-income countries, “29% of NCD deaths occur among people under the age of 60, compared to 13% in high-income countries”.

“On the positive side, much has been learnt about these diseases during the past three decades, especially as their initial burden was greatest in affluent societies with strong R&D^a capacities. Effective interventions are available, and abundant evidence now demonstrates their clear and measurable impact in a range of resource settings.”

^a Research and Development

The report “sets out a menu of options for addressing these diseases through both population-wide interventions, largely aimed at prevention, and individual interventions, aimed at early detection and treatment that can reduce progression to severe and costly illness and complications.”

Population-wide interventions

“While many interventions may be cost-effective, some are considered ‘best buys’ – actions that should be undertaken immediately to produce accelerated results in terms of lives saved, diseases prevented and heavy costs avoided. Best buys include:

- Protecting people from tobacco smoke and banning smoking in public places;
- Warning about the dangers of tobacco use;
- Enforcing bans on tobacco advertising, promotion and sponsorship;
- Raising taxes on tobacco;
- Restricting access to retailed alcohol;
- Enforcing bans on alcohol advertising;
- Raising taxes on alcohol;
- Reduce salt intake and salt content of food;
- Replacing trans-fat in food with polyunsaturated fat;
- Promoting public awareness about diet and physical activity, including through mass media.”

Individual health-care interventions

“In addition to population-wide interventions for NCDs, country health-care systems should undertake interventions for individuals who either already have NCDs or who are at high risk of developing them. Evidence from high-income countries shows that such interventions can be very effective and are also usually cost-effective or low in cost.”

“Currently, the main focus of health care for NCDs in many low- and middle-income countries is hospital-centred acute care. NCD patients present at hospitals when cardiovascular disease, cancer, diabetes and chronic respiratory disease have reached the point of acute events or long-term complications. This is a very expensive approach that will not contribute to a significant reduction of the NCD burden. It also denies people the health benefits of taking care of their conditions at an early stage.”

A strategic objective in the fight against the NCD epidemic must be to ensure early detection and care using cost-effective and sustainable health-care interventions”. “Among the best buys and other cost-effective interventions are:

- Counselling and multidrug therapy, including glycaemic control for diabetes for people > 30 years old with a 10-year risk of fatal or nonfatal cardiovascular events,
- Aspirin therapy for acute myocardial infarction;
- Screening for cervical cancer, once, at age 40, followed by removal of any discovered cancerous lesion;
- Early case finding for breast cancer through biennial mammographic screening (50–70 years) and treatment of all stages;
- Early detection of colorectal and oral cancer;
- Treatment of persistent asthma with inhaled corticosteroids and beta-2 agonists.

Health system interventions

“Financing and strengthening health systems to deliver the cost-effective individual interventions through a primary health-care approach is a pragmatic first step to achieving the long-term vision of universal care coverage.” “Initiatives aimed at improving health systems performance and reform should additionally include specific NCD-related endpoints in universal coverage goals.”

“Limited funding for essential NCD interventions, and the health sector in general, is at the root of many country capacity challenges. Health financing is key to improving health and reducing health inequities. The World Health Report 2010 on health system financing⁶ recommends several critical actions to improve support for interventions:

- Increasing efficiency of revenue collection and give priority to NCD prevention and control, when allocating government budgets.
- Improving access to social health insurance and include NCD prevention and control in health insurance.
- Introducing innovative financing for NCD prevention and control.
- Including NCD prevention and control as a priority for official development assistance, particularly to lower-income countries.”

“Innovative financing refers to a range of non-traditional mechanisms to raise additional funds for development and aid through ‘innovative’ projects such as micro-contributions, taxes, public–private partnerships and market-based financial transactions. ... There are examples of countries that have successfully used revenues from raised taxation on tobacco and alcohol to finance health promotion and promote coverage in primary health care.” Other examples include levies on air travel tickets or foreign exchange transactions.

“The warning remains stark. The epidemic already extends far beyond the capacity of lower-income countries to cope. In the absence of urgent action, the rising financial burden of these diseases will reach levels that are beyond the capacity of even the wealthiest countries in the world to manage.”

“The costs to health-care systems from NCDs are high and projected to increase. Significant costs to individuals, families, businesses, governments and health systems add up to major macroeconomic impacts. Heart disease, stroke and diabetes cause billions of dollars in losses of national income each year in the world’s most populous nations. Economic analysis suggests that each 10% rise in NCDs is associated with 0.5% lower rates of annual economic growth.”

2. Cancer Incidence using GLOBOCAN 2008

IMSA Policy Brief 5 on cancer³ was produced in August 2009 using population projections from ASSA2003⁷ together with cancer incidence and prevalence rates from GLOBOCAN 2002⁸. IMSA Policy Brief 18¹ discussed the important revised population projections from ASSA2008⁹ and showed that the population was expected to grow by 8.6% and be slightly older by 2025 than previously projected.

More importantly for cancer projections, the WHO International Agency for Research on Cancer (IARC)^b has begun to release new figures in GLOBOCAN 2008¹⁰. This is a significant new release and represents a major improvement on earlier data. “The increasing availability of incidence data from cancer registries and mortality data from vital statistics offices, coupled with the fine-tuning of the estimation methods means that the current incidence and mortality estimates for 2008 cannot be directly compared to estimates from previous versions.” Older versions, like GLOBOCAN 2002, have been removed from the public domain as a result.

“There are several differences between GLOBOCAN 2002 and GLOBOCAN 2008 which relate to availability of incidence and/or mortality data, methods used to estimate rates in the absence of data and methods used to project available data for 2008.” IARC plans to “update the GLOBOCAN 2008 estimates every year with available recorded data for 2008. A new set of estimates for 2010 will be made available in 2012”. The rate of incidence of cancer by type of cancer, age bands and gender has been improved with more age bands being used at middle and older ages. Mortality rates have also been released but prevalence rates will only be published in mid-2011.

^b <http://globocan.iarc.fr/>

The graph below compares the cancer incidence rates for South Africa from GLOBOCAN 2002 and GLOBOCAN 2008. The World incidence from GLOBOCAN 2008 is also shown. The 2008 tables are provided as an Excel spreadsheet on the IMSA web-site^c under Resources for this policy brief.

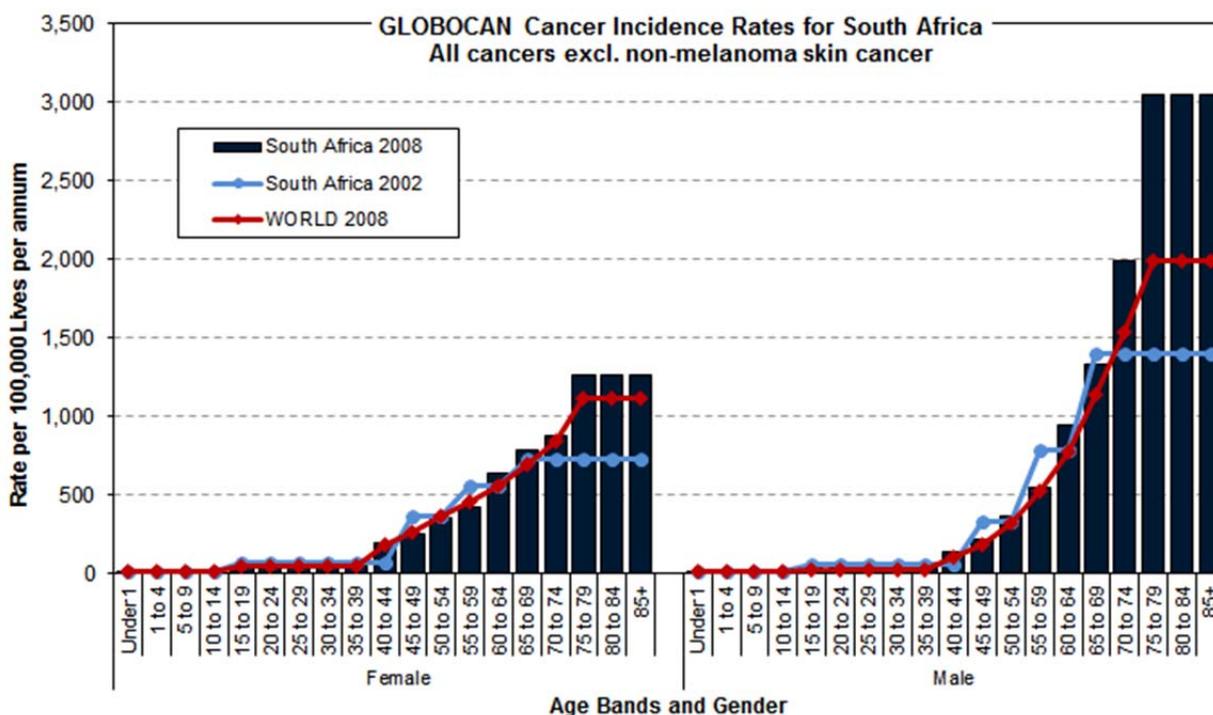


Figure 1: Cancer Incidence Rates from GLOBOCAN 2002 and GLOBOCAN 2008

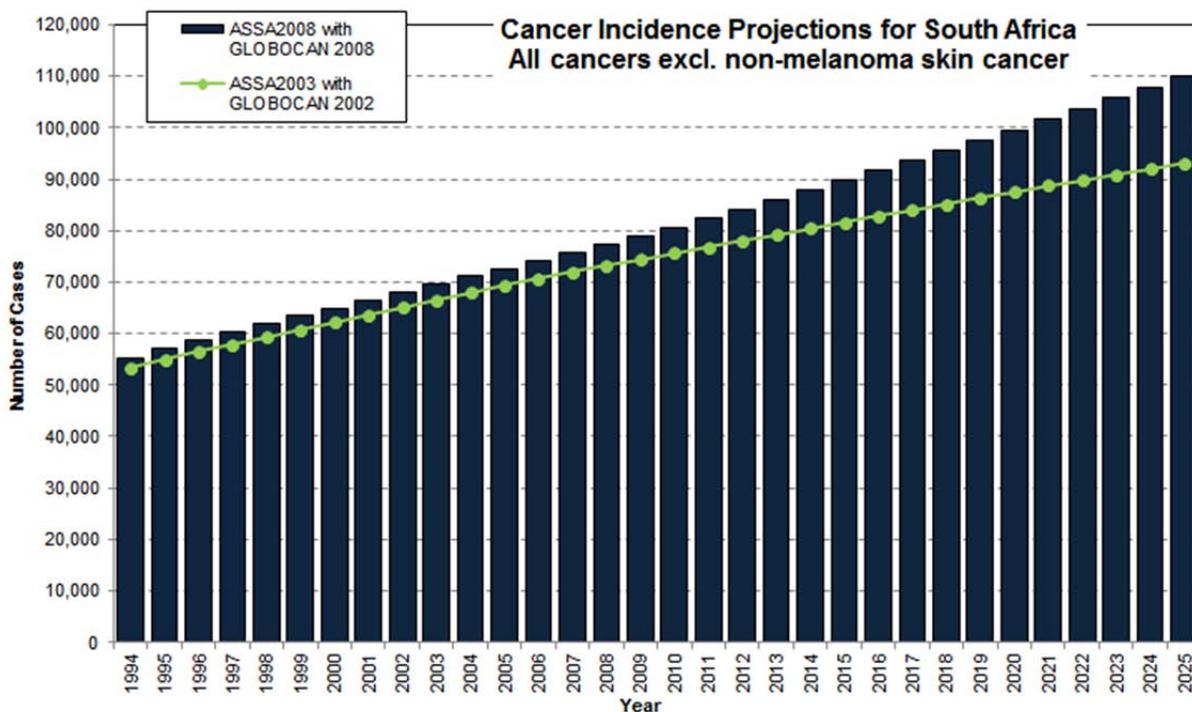


Figure 2: Cancer Incidence Projections for South Africa to 2025

^c http://www.imsa.org.za/national_health_insurance_library.html

The GLOBOCAN 2008 projection gives an expected number of new cases of 74,688 in 2008. Applying the incidence rates to the new ASSA2008 population projection for 2008 increases the expected incidence to 77,289 for the same year.

The graph on the previous page compares the projection with ASSA2003 and GLOBOCAN 2002 (the "old projection") to the projection using ASSA2008 and GLOBOCAN 2008 (the "new projection"). The old projection was for 75,644 cases in 2010 and 93,060 in 2025. The new projection gives 80,585 cases in 2010 and 109,956 in 2025. This is an increase of 6.5% in 2010 and 18.2% by 2025. The table below shows the expected incidence of cancer by type of cancer using the new projection.

Table 1: Expected Incidence of Cancer to 2025 using ASSA2008 and GLOBOCAN 2008

Expected Incidence of Cancer Cases							
Site or Type of cancer	1994	2000	2005	2010	2015	2020	2025
Bladder	1,212	1,405	1,568	1,740	1,953	2,184	2,448
Brain, nervous system	950	1,079	1,172	1,262	1,367	1,468	1,567
Breast	6,126	7,379	8,430	9,495	10,670	11,825	12,998
Cervix uteri	4,036	4,841	5,498	6,136	6,853	7,526	8,168
Colorectum	3,844	4,493	5,023	5,582	6,265	7,007	7,845
Corpus uteri	1,086	1,304	1,479	1,672	1,900	2,156	2,418
Gallbladder	394	472	537	599	676	750	848
Hodgkin lymphoma	367	425	460	487	518	545	567
Kaposi sarcoma	2,446	2,866	3,132	3,346	3,600	3,831	4,060
Kidney	406	462	505	550	600	652	705
Larynx	770	897	1,005	1,119	1,255	1,398	1,551
Leukaemia	981	1,125	1,228	1,328	1,439	1,561	1,690
Lip, oral cavity	701	824	929	1,034	1,155	1,278	1,410
Liver	2,725	3,217	3,606	3,979	4,427	4,859	5,382
Lung	4,788	5,542	6,203	6,915	7,777	8,695	9,719
Melanoma of skin	1,741	2,043	2,276	2,509	2,790	3,079	3,393
Multiple myeloma	378	442	497	555	621	694	772
Nasopharynx	888	1,037	1,154	1,274	1,413	1,552	1,693
Non-Hodgkin lymphoma	1,643	1,926	2,135	2,321	2,540	2,751	2,974
Oesophagus	4,573	5,388	6,067	6,770	7,572	8,407	9,272
Other pharynx	640	748	841	938	1,049	1,161	1,276
Ovary	593	710	807	905	1,022	1,141	1,260
Pancreas	1,192	1,417	1,590	1,795	2,008	2,279	2,570
Stomach	831	973	1,094	1,221	1,376	1,544	1,731
Thyroid	574	680	762	835	928	1,019	1,108
Prostate	6,147	6,937	7,609	8,401	9,428	10,635	11,996
Testis	130	152	167	178	191	202	213
All cancers excl. non-melanoma skin cancer	55,383	64,942	72,674	80,585	89,886	99,581	109,956

Source: using ASSA2008 and GLOBOCAN 2008

Note that the sum of the types of cancer is not equal to All Cancers in the GLOBOCAN tables

Note that in the table above, the incidence of Kaposi sarcoma has not been adjusted to future years as the HIV/AIDS epidemic progresses. A separate projection should be undertaken using the projection of the staging of the HIV/AIDS epidemic from the spreadsheets included with Policy Brief 18¹.

The increase in cases from 2010 to 2025 will be different for each cancer type as there is now much better information about the incidence by age and gender. As the population ages, so more people are found in the age bands where cancer is more prevalent.

The pie chart below summarises the distribution of new cancers by site or type, as expected in 2010.

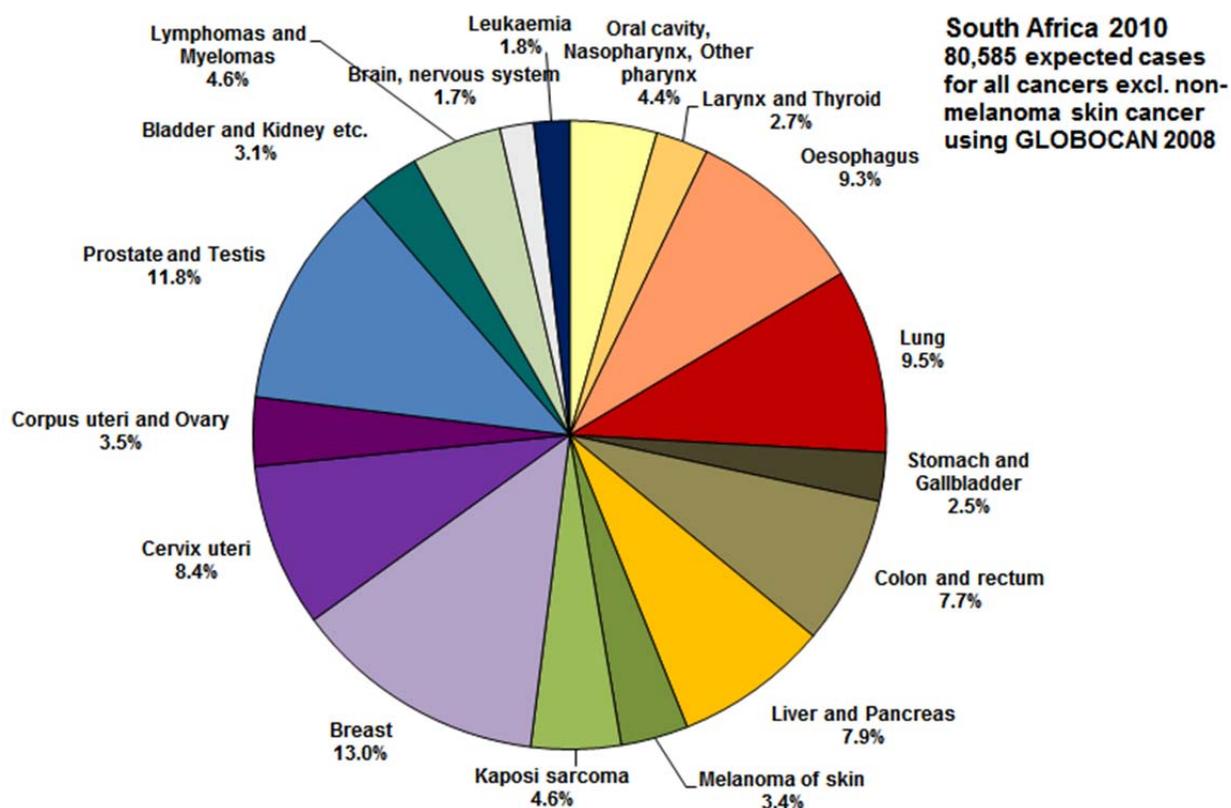


Figure 3: Expected Incidence of Cancers in South Africa in 2010

As before, there is insufficient information on which to produce separate incidence rates for each cancer for each of the provinces. The rates for South Africa as a whole should be applied with caution to the provinces as there are significant differences in ethnicity and thus certain cancers may be more prevalent in some provinces than others.

The projections in this section use a static set of cancer incidence rates calibrated by IARC to 2008. If evidence becomes available that there is an increase in the rates of cancer by age band and gender, then the actual incidence would be higher than shown in the graphs and tables here.

3. Chronic Disease Prevalence

The best information in South Africa on the prevalence of chronic diseases by age and gender comes from the private sector data extracted for the Risk Equalisation Fund (REF) tables during the REF Study 2005¹¹. These prevalence rates for “treated patients” were used together with ASSA2003 to produce projections of chronic disease to 2025 as reported in IMSA Policy Briefs 4² and 6⁴.

While the Council for Medical Schemes has been busy on a new REF Study, there are still no other figures on the prevalence of chronic disease by age and gender available. The graph below thus uses the original chronic disease prevalence rates together with the revised population projections in ASSA2008⁹ to estimate the numbers who will need chronic medication for the 25 Chronic Disease List (CDL) conditions^d. The number of people expected to be on anti-retroviral medication was extracted from the ASSA2008 model as discussed in IMSA Policy Brief 18¹.

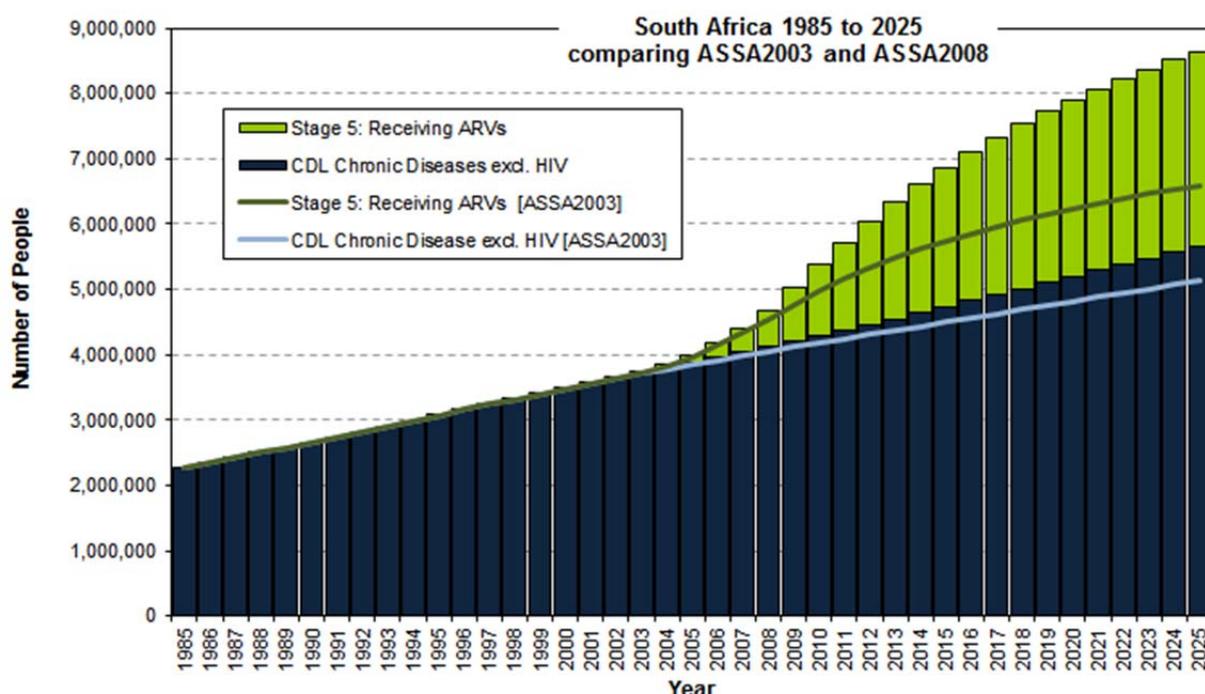


Figure 4: People Expected to be on Chronic Medication, comparing ASSA2003 and ASSA2008 Projections

The graph shows a significant increase in the total number of people who are expected to be on chronic medication by 2025. Using ASSA2003 the number on chronic medicines by 2025 was 6.6 million in 2025. The revised ASSA2008 results in 8.6 million people on chronic medicine by 2025 or 131% of the earlier estimate. This is made up of a 10% increase in those being treated for the 25 CDL chronic diseases and a doubling of those needing ARVs.

These figures have important implications for the funding and staffing of primary care services and for the funding of the purchase of chronic medicines into the future.

^d The CDL list was legislated with effect from 1 January 2004 together with therapeutic algorithms for each of the 25 diseases. All medical schemes must provide diagnosis, treatment and medicine according to the algorithms, without limits or co-payments. They may, however, use designated service providers and drug formularies to manage cost. Since 1 January 2006 there have been REF Verification Criteria which describe ICD-10 codes and medicine codes required to prove someone is diagnosed and treated with these conditions.

The table below shows the expected numbers with each of the 25 CDL diseases, excluding HIV (as this was shown separately and discussed in Policy Brief 18). The figures are shown for South Africa as a whole.

Table 2: Numbers Expected to be Treated Patients for CDL Chronic Disease in South Africa to 2025

People on Treatment for Disease		Calendar Year						
REF code	Disease	1994	2000	2005	2010	2015	2020	2025
ADS	Addison's Disease	1,613	1,874	2,066	2,256	2,492	2,731	2,973
AST	Asthma	628,150	701,621	747,187	782,258	819,471	855,637	888,785
BCE	Bronchiectasis	1,953	2,201	2,393	2,582	2,811	3,022	3,228
BMD	Bipolar Mood Disorder	17,649	20,782	22,924	24,832	26,878	28,820	30,428
CMY	Cardiomyopathy	133,325	161,803	182,929	204,656	230,495	259,688	291,603
COP	Chronic Obs. Pulmonary Disease	72,619	83,850	93,217	103,769	116,433	131,013	146,272
CRF	Chronic Renal Disease	6,972	8,148	9,095	10,050	11,159	12,264	13,298
CSD	Crohn's Disease	5,276	6,195	6,846	7,499	8,213	8,900	9,492
DBI	Diabetes Insipidus	493	563	610	651	689	722	746
DM1	Diabetes Mellitus 1	78,734	91,373	100,373	108,639	117,562	126,288	134,381
DM2	Diabetes Mellitus 2	310,842	365,441	412,033	459,842	513,755	569,888	625,877
DYS	Dysrhythmias	35,436	41,571	46,615	52,300	59,003	66,653	74,941
EPL	Epilepsy	122,124	140,262	152,470	162,980	174,116	184,873	194,788
GLC	Glaucoma	49,140	58,532	65,891	73,935	83,463	94,408	106,240
HAE	Haemophilia	626	699	747	771	790	808	825
HYL	Hyperlipidaemia	615,814	715,311	804,473	902,504	1,016,763	1,138,979	1,259,678
HYP	Hypertension	1,388,628	1,639,498	1,854,997	2,082,974	2,341,046	2,609,754	2,874,692
IBD	Ulcerative Colitis	8,577	10,071	11,177	12,303	13,516	14,695	15,804
IHD	Coronary Artery Disease	160,949	188,594	211,973	237,999	268,507	302,789	339,079
MSS	Multiple Sclerosis	3,778	4,492	4,980	5,415	5,879	6,297	6,645
PAR	Parkinson's Disease	15,533	18,687	21,034	23,516	26,577	30,150	34,379
RHA	Rheumatoid Arthritis	62,961	74,436	84,144	94,149	105,234	116,532	127,177
SCZ	Schizophrenia	8,863	10,504	11,676	12,712	13,826	14,943	15,927
SLE	Systemic LE	5,145	6,111	6,818	7,468	8,130	8,730	9,265
TDH	Hypothyroidism	283,949	336,494	381,133	429,955	484,726	540,707	593,247
CC2	Two simultaneous conditions	663,938	778,297	877,700	985,428	1,109,319	1,241,669	1,374,235
CC3	Three simultaneous conditions	151,215	176,187	198,534	223,618	253,006	285,317	317,644
CC4	Four or more simultaneous conditions	20,424	23,703	26,686	30,144	34,254	38,870	43,497
Number of People with CDL Diseases excl.HIV		2,991,059	3,486,872	3,882,428	4,282,218	4,732,544	5,199,248	5,658,412
Number of People with Multiple Diseases		835,578	978,188	1,102,920	1,239,190	1,396,579	1,565,856	1,735,376
Total Population		40,192,500	45,255,267	48,155,945	50,371,513	52,633,956	54,604,913	56,255,907
Proportion of Population with CDL Diseases excl. HIV		7.4%	7.7%	8.1%	8.5%	9.0%	9.5%	10.1%
Proportion of Population with Multiple Diseases		2.1%	2.2%	2.3%	2.5%	2.7%	2.9%	3.1%
respiratory: COP+AST+BCE		702,722	787,672	842,798	888,609	938,716	989,672	1,038,285
cardiac: CMY+IHD+DYS+HYP		1,718,339	2,031,467	2,296,514	2,577,929	2,899,050	3,238,883	3,580,315
renal: CRF+HYP		1,395,600	1,647,647	1,864,091	2,093,024	2,352,205	2,622,018	2,887,989
gastro: CSD+IBD		13,853	16,266	18,023	19,802	21,730	23,595	25,295
diabetes: DM1+DM2		389,576	456,814	512,405	568,481	631,318	696,175	760,258
mental: BMD+SCZ		26,512	31,286	34,600	37,544	40,704	43,764	46,355
neuro: MSS+BMD+EPL		143,551	165,536	180,373	193,227	206,873	219,990	231,862
skeletal: RHA+SLE		68,106	80,547	90,962	101,617	113,364	125,262	136,442
Source: using REF Study 2005 and ASSA2008								
Assumes 100% of medical scheme prevalence.								

One of the most difficult issues in projecting future chronic disease is the extent to which the medical scheme prevalence might be applicable to the public sector. The issue was written up and evidence presented in IMSA Policy Brief 6 on long-term modelling⁴.

“The WHO report on NCDs⁶ says “People of lower social and economic positions fare far worse. Vulnerable and socially disadvantaged people get sicker and die sooner [emphasis added] as a result of NCDs than people of higher social positions; the factors determining social positions are education, occupation, income, gender and ethnicity. There is strong evidence for the correlation between a host of social determinants, especially education, and prevalent levels of NCDs and risk factors.”

It has not yet been possible to get sufficient and detailed data from the public sector to be able to produce incidence rates by age and gender of the chronic diseases. If the WHO is correct, then the shape of those curves in lower socio-economic groups may be further to the left. This would increase the numbers expected with diseases as there are more people alive in the slightly younger age bands. If anything, this modelling of chronic disease numbers in South Africa would then be a lower bound estimate.

4. Conclusions and Implications for a Future NHI

The graph below summarises the new estimates of CDL chronic disease, cancer and HIV for South Africa. The graph is shown from the beginning of the HIV/AIDS epidemic in 1985.

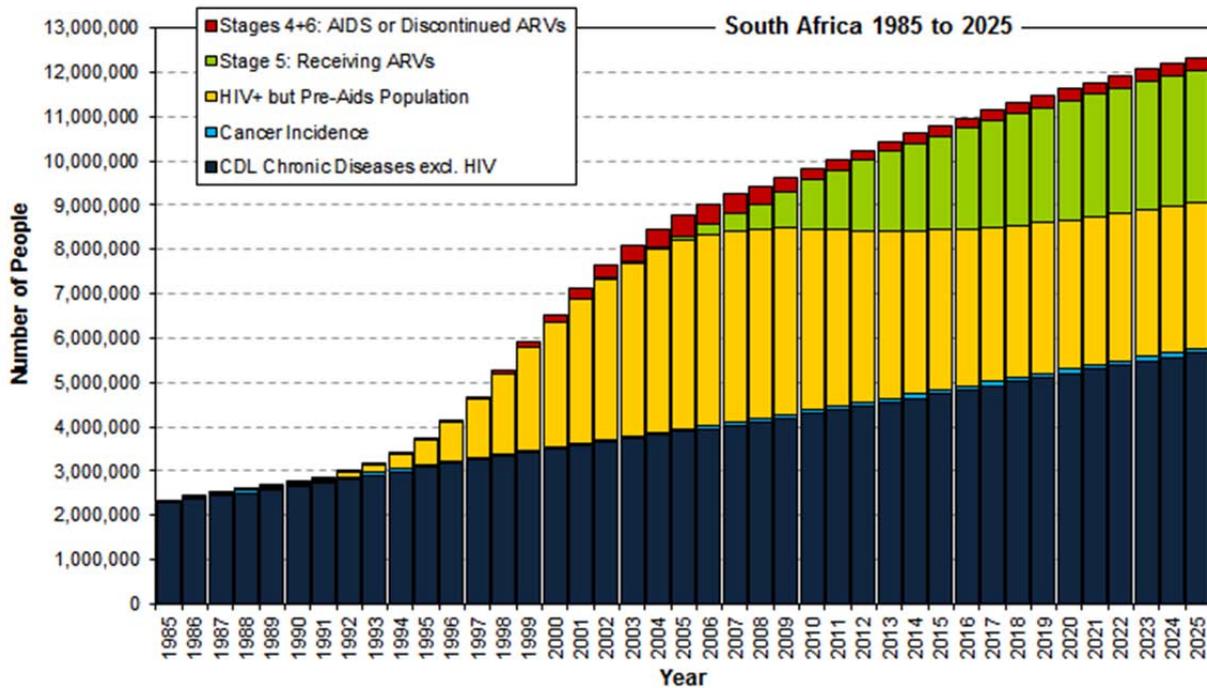


Figure 5: The Burden of CDL Chronic Diseases, Cancer and HIV/AIDS in South Africa, 1985 to 2025

The previous projections gave a total of 11.3 million people being treated for a CDL chronic disease or being HIV+ by 2025. The new projections give a total of 12.3 million people, a 9% increase.

It was said in IMSA Policy Brief 6⁴: “The key issue remains for planning in South Africa – that the number of elderly people is expected to increase rapidly and that chronic disease and cancer prevalence and need for hospital facilities are strongly related to age. While the extent may be difficult to quantify precisely, there is no doubt that there will be an increasing burden on the health system in future.”

“Add to this the well-documented and modelled HIV/AIDS epidemic and related epidemics of sexually-transmitted infections and tuberculosis, and the immense challenges for a sustainable National Health Insurance system become apparent.”

The revised figures show that the burden of chronic disease on the health system is going to be greater than expected. This is an important consideration for planning future financing for healthcare in South Africa.

Planning Health Services at a Provincial Level

There is even less data on the burden of NCDs by province. However we do know that there are substantial differences in the age and gender profile of the provinces¹. This information alone gives an understanding that the need will not only be different by province but will evolve differently in each province. The graph below uses the prevalence rates of chronic disease by age and gender and applies them to the projected provincial populations from ASSA2008.

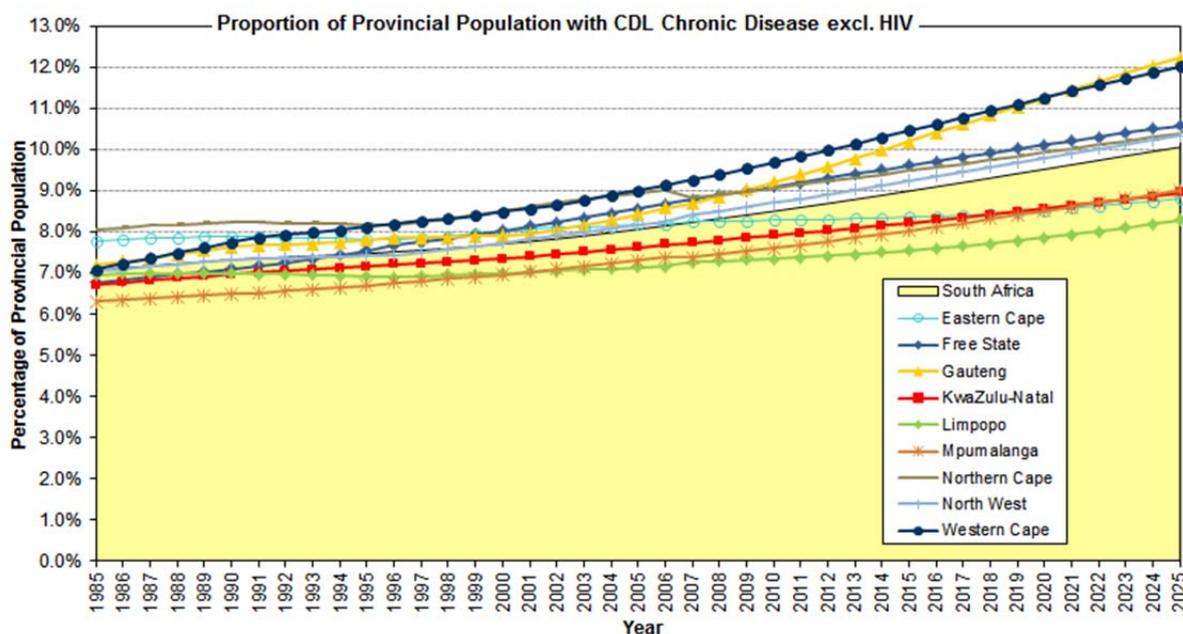


Figure 6: The Burden of CDL Chronic Disease by Province 1985 to 2025

Note the different shapes over time for each province. By 2025, Gauteng and the Western Cape could have some 12.2% and 12.0% respectively of their populations needing treatment for the CDL chronic diseases. In contrast, KwaZulu-Natal might have only 8.9% and Limpopo only 8.3%. This argues strongly for planning which takes account of the demographic differences between the provinces. It is also critical when comparing results by province to take into account the expected differences due to the different age and gender structures. If not, false conclusions about equity and access to treatment might well be reached.

The graph below shows another aspect of planning by province, that of the expected number of births. These numbers are taken from the ASSA2008 projections⁹ using the standard assumptions. The roughness in the lines for some provinces is due to changes in provincial boundaries.

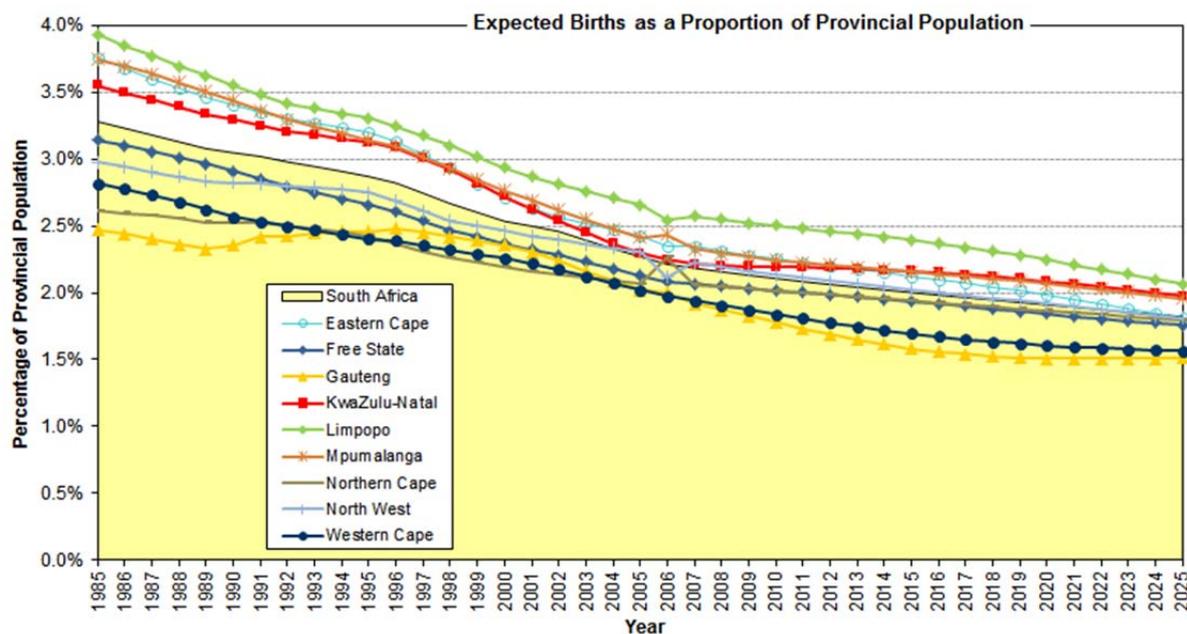


Figure 7: Projected Births by Province 1985 to 2025, using ASSA2008

The graph shows that all provinces are expected to have fewer births as proportion of the total population over time. The differences by province are largely due to the ethnicity differences and to the different age and gender structures.

As we progress towards planning for the whole health system, this sort of information will prove critical. The slides available with this policy brief include provincial projections for the numbers on ARVs and the numbers expected to have AIDS but not be receiving ARVs.

In health system planning, whether it be the number of nurses, the number of hospital beds or the volumes of medicines needed, we underestimate the impact of the age and gender structure of the population at our peril.

Produced for IMSA by
Heather McLeod
 20 June 2011

Resources on the IMSA Web-site

The following are available on the NHI section of the IMSA web-site: www.imsa.org.za

- The slides and tables used in this policy brief [PowerPoint slides].
- Tables of the expected future population by age and gender and births in South Africa and each of the nine provinces. [Excel spreadsheets]. See under Resources for Policy Brief 18.
- Tables from GLOBOCAN 2008 on the rates of incidence for South Africa and the World for each type of cancer [Excel spreadsheets].

- A table giving the expected incidence of cancers by site and type, from 1994 to 2025 [Excel spreadsheet].
- The tables of CDL disease prevalence rates by age and gender, for “diagnosed cases” and “treated patients” [Excel spreadsheets]. See under Resources for Policy Brief 3.
- Tables giving the expected numbers with CDL chronic diseases from 1994 to 2025, showing Diagnosed Cases and Treated Patients [Excel spreadsheet].

As the purpose of this series is to put in the public domain material and evidence that will progress the technical work of developing a National Health Insurance system, we would be delighted if you make use of it in other research and publications. All material produced for the IMSA NHI Policy Brief series and made available on the web-site may be freely used, provided the source is acknowledged. The material is produced under a Creative Commons Attribution-Noncommercial-Share Alike licence.



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