Innovative Medicines South Africa

National Health Insurance Policy Brief 6

Costing and Long-term Modelling of NHI

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.

This policy brief deals with the basics of costing and pricing healthcare from an actuarial perspective. The brief highlights some of the issues and debates that need to be considered in the long-term modelling of diseases and costs including the quadruple burden of disease in South Africa.

1. Basics of Costing and Pricing Healthcare

The terms "cost" and price" are often used loosely and mean different things to different professions. It is important always to be clear on which term is meant. Actuaries like to differentiate between the terms "cost" and "price" as follows and as illustrated below:

- The total **cost** is the total amount needed across all eligible beneficiaries to provide access to a defined package of benefits in a particular delivery setting.
- The **price** is the amount incurred by contributors to the system and may be set according to other criteria, like equity and affordability. For example, the price may be expressed as a contribution table or as a percentage of income, subject to certain maximums.

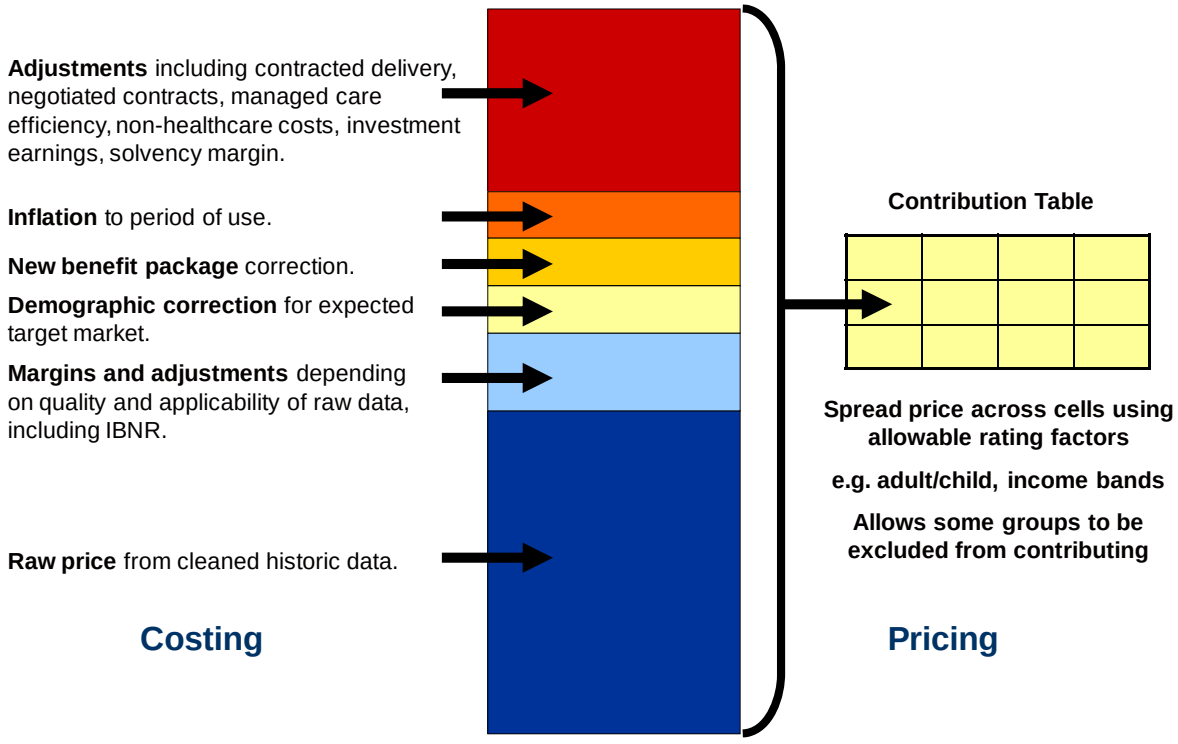

Figure 1: Generic Costing and Pricing of Healthcare

- The price charged by providers to funders in the health system will be referred to as the **reimbursement rate** and it may be determined in a variety of ways, from fee-for-service to per visit or capitation (pre-paid, typically on a monthly basis).

The generic costing and pricing model above is applicable to medical scheme and bargaining council schemes, to provider capitation (or other reimbursement methodologies), to determining the Risk Equalisation Fund tables and to mandatory health insurance.

For National Health Insurance, the need is to determine a table of amounts or a formula relative to some definition of income, payable by defined contributors and incorporating income cross-subsidies and an equitable Government subsidy. The total amount needed would be determined from historic data, population projections, other inputs and assumptions. The total amount would be set to cover a defined package of benefits for the entire population (or a phased target population), with an expected dispensation of efficiency in healthcare delivery. There would be loadings for administration and managed care costs but probably no loading for solvency as money in would equal money out.

The elements of costing and pricing and some of the issues to be considered are summarized below. The sequence usually starts with a defined package of benefits, then works up from the bottom of the costing part of Figure 1 and then across to determine the price to be charged to contributors.

Benefit package: the package of minimum benefits needs to be defined at the outset as the detail will influence the choice of data and the design of the costing study. There may be iterations to determine alternative benefit packages when affordability is assessed in the final step. The form of rationing[a] expected in the package has a large influence on the study design and needs to be articulated at the outset.

Raw price: a suitable source of data is identified and data extracted and tested for reasonability (this is often the longest phase of costing as further data extracts may be needed when anomalies are identified). As healthcare has a strong seasonal pattern, data must cover at least one complete calendar year and up to three years of data is ideal (any longer and trends are unlikely to be valid as benefits may have changed). If data is gathered from multiple sources, a lot of effort needs to be put into ensuring that data definitions are identical and that the results can be validly combined.

While it is true that total cost is a function of utilisation and the unit price (reimbursement rate to practitioners), it is often better to work with the total amount per beneficiary per month (pbpm). Utilisation has a strong pattern by age and gender but many researchers are not aware that average cost also has patterns by age and gender. The average cost patterns may be quite "lumpy" by comparison to utilisation and are thus difficult to use for modelling. An analogous situation occurs with admission rates and average length-of-stay (ALOS) in hospital data where ALOS is very lumpy and it is advisable to combine them and work with total bed days.

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[a] Healthcare financing is a rationing problem and rationing will occur somewhere in the system. We generally consider four parties that could do the rationing and each uses different tools, as shown in the examples below:

- Government: by means of budget constraints; by long queues (at clinics or for getting certain elective surgery); by availability (limited ICU beds or surgical beds); and by denial (no dialysis after a certain age and no resuscitation of very low-birth-weight babies).
- Health funders (like medical schemes or NHI): by means of limits, co-payments, deductibles and thresholds or by means of volume (like one pair of spectacles every two years).
- Patients and their families: by means of affordability (choice to have private insurance, level of savings account or degree of out-of-pocket spending) or conscious choice (choice to refuse care in terminal illness).
- Doctors: by prognosis typically but also by affordability in some cases (differential treatment or prescribing based on patient income).

In principle, we should try to move rationing to doctors firstly, together with their patients, rather than having accountants and bureaucrats make healthcare rationing decisions.

$$\text{Average Cost} = \frac{\text{Total cost}}{\text{Number of admissions/visits}}$$

$$\text{Utilisation} = \frac{\text{Number of admissions/visits}}{\text{Exposure}}$$

$$\text{Raw Price} = \frac{\text{Total cost}}{\text{Exposure}}$$

$$= \text{Average Cost} \times \text{Utilisation}$$

The box on the left shows the key pricing relationships. **Exposure** is usually calculated as "beneficiary months" which is the number of months that each beneficiary is exposed to making a potential visit or claim in the data. For example, if a person was in the risk pool for the whole year that would be 12 months of exposure but someone joining at the beginning of the last quarter of the year would have only 3 months of exposure.

Margins and adjustments: the raw data may need to be adjusted, depending on the quality and applicability of the data extract. One of the most common adjustments is to estimate the "incurred but not reported" claims (IBNR) if the data has been extracted very soon after the calendar year end. Medical scheme claims, for example, may be submitted up to four months after the event and there may be disputes about the amount payable. By delaying the extraction of data for five or six months after year end, the claims are usually fully "run-off" and no estimate needs to be made. Other adjustments may be due to sharp changes in the quality of coding or data submission during a period and sometimes a decision is taken to use only the patterns from the latter part of the time period. These adjustments require intimate knowledge of the data and considerable judgement is needed to ensure that the adjusted data is valid for the purpose of the study. Removing what some people call "outliers" (very large claims) is never advisable in healthcare data as the very nature of the data is some very expensive extreme events. Having a few of these in the data is in fact normal and the larger the data set the more predictable are these large cases.

The size of the data set extracted needs to take into account the minimum risk pool sizes in the box on the right. These are very much minimum sizes and the larger the risk pool the more stable the results will be. The most recent work on costing Prescribed Minimum Benefits in medical schemes[2] was done with 49.8 million beneficiary months of data or effectively 4.2 million lives worth of data for the calendar year.

Minimum size of risk pool to take risk[1] and thus give reasonably stable results:

Primary care only:	1,000 lives
GPs and Specialists:	30,000 lives
Hospital care only:	100,000 lives
All benefits:	25,000 lives

Demographic correction: it is rare to be able to obtain raw data for precisely the group that needs to be costed. It is much more likely that data from several sources will be used and then adapted for use on the expected target market. Major errors can be made if the demographic structure of the data is not taken into account and the number blindly applied to a population with a different demographic structure. As age and gender are the primary risk factors in cost, it makes sense to always do the costing work by at least age and gender. In some cases, using province is also useful as there are major differences in hospitalisation rates between the provinces. HIV strongly influences need for healthcare and Policy Brief 4[3] showed how this differs by province.

New benefit package correction: often the benefit package that is to be mandatory is being changed as part of the study. Taking data collected when a benefit is voluntary and converting it to the expected utilisation reimbursement rate and thus raw price when it is mandatory is a difficult exercise and requires experience and judgment. Typically, usage will be higher once a benefit is included in a minimum package but the extent of the change is difficult to forecast. It is simpler to take generous benefits and determine what the raw price should be if limits, deductibles or co-payments are applied, although all of these will still alter provider and beneficiary behaviour from that observed in historic data.

Inflation to period of use: the diagram overleaf describes the problem of using historic data to predict cost in the future. If data is extracted in Q3 2009, then the true inflation from mid-2008 to mid-2009 will already be known. An estimate of inflation will need to be made from mid-2009 to the

middle of the period of use, mid-2010. Inflation is usually calculated and estimated separately for different components of the benefits, like hospitals, medicines and visits. It is crucial to isolate any changes in the demographics of the risk pool from the price effects in calculating the historic inflation.

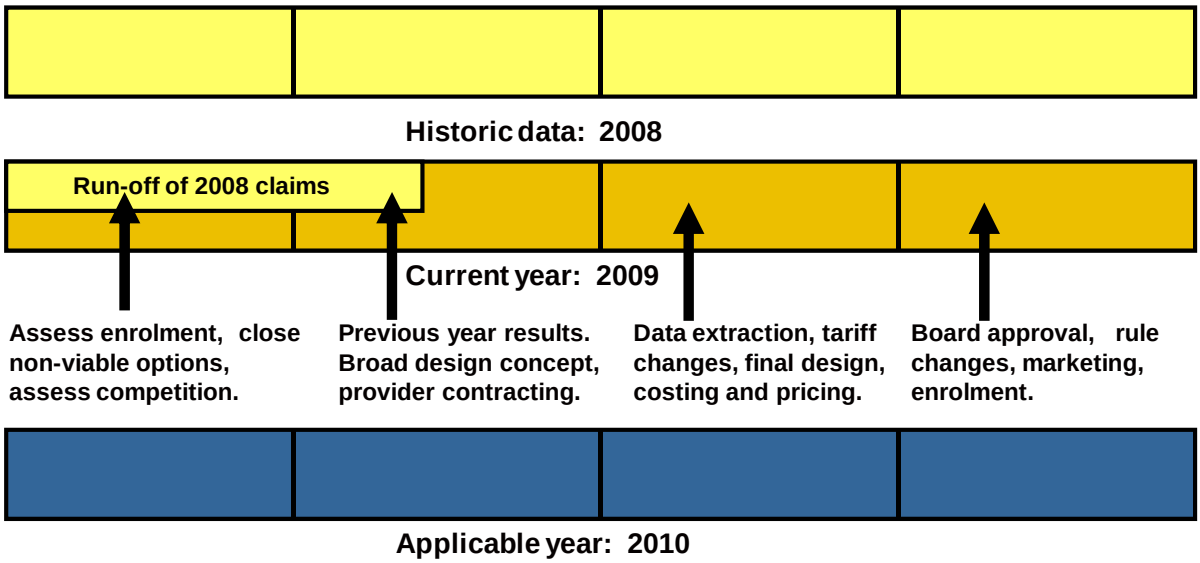

Figure 2: Benefit, Contribution and Data Cycle in Medical Schemes

Adjustments: the price of any negotiated healthcare delivery contracts and contracts for administration and managed care need to be explicitly taken into account. These contracts need to have been finalized before the costing is completed in order to be certain as to what needs to be charged. There are some spectacular examples of insolvency where a fund promised certain contributions to members first, before concluding contracts with providers, only to find that no providers would contract at the rate used in the calculations. This is a particular danger for NHI in that contribution levels have been promised to be lower than for existing medical schemes yet no negotiations with providers have yet been entered into.

Other adjustments in the total cost may be for anticipated investment earnings and there may be loadings for a liquidity buffer or solvency margin. Healthcare expenditure has a very particular seasonal shape by month of the year. Summer months and months with many holidays (the April or May Easter holidays) have much lower claims while the winter months have higher claims. This means that a buffer of unspent funds will build up in the first quarter of the year, there may be over-spending in the middle of the year and the final quarter of the calendar year is typically light. Unsuspecting trustees or managers can over-react and enhance benefits based on Q1 results only to find themselves under financial pressure in the following two quarters.

The single most critical assumption to be made in NHI costing and pricing will be the level of efficiency that might be achieved. There is a perception that the private sector is inefficient and that somehow the public sector can use the same funds more efficiently. This central assumption is typically offered without evidence and it is unwise to anticipate any improvement in efficiency (resulting in a lowering of costs) unless there is hard evidence on the table.

Spread total cost as a price to be charged using allowable rating factors: medical schemes may use income but not age as a factor in setting prices to be charged. Separate adult and child rates are permitted in the voluntary environment to encourage families to enrol children. Under NHI, the group of people who will become contributors will need to be tightly defined, as will the definition of how contributions are to be calculated and the definition of income. It is always possible in setting the prices to be charged to socially-engineer the table to provide relief for vulnerable groups. In medical schemes, elderly pensioners or lower income workers are typically favoured in restricted schemes. It is not usually feasible to do so in open schemes because of the potential anti-selection if

only some open schemes follow this route. This is where Government needs to play a role in regulating acceptable cross-subsidies that all open schemes must implement. Under NHI the definition of who is to contribute and who will be exempt from contributing (including definitions related to citizenship, employment, age and income) is critical before any price can be determined.

2. Estimates of Cost Curves in South Africa

The graph below illustrates the price curves by age and gender that have been developed[b] for 2009 showing the impact of different benefit designs. Critically, these are not yet adjusted for any of these packages becoming mandatory and costs of administration and managed care have not been loaded. The impact of the extent of the HIV epidemic needs further work to be more carefully incorporated as the effect changes over time. The level of efficiency in delivery is at the current level in the private sector, for purposes of illustration.

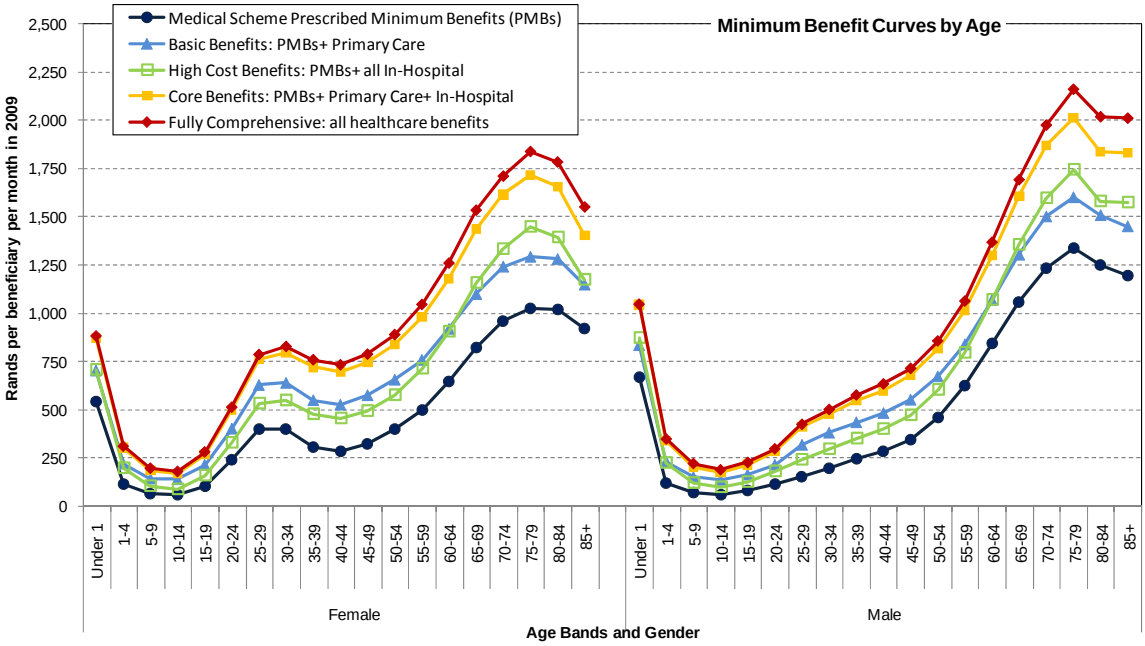

Figure 3: Initial Estimates of Cost Curves by Age and Gender for Medical Schemes in 2009

A critical issue in using these cost curves into the future is to what extent they might be stable. We know from experience that these general shapes by age and gender are persistent, not only over different schemes but also over time in the same funder (changing benefits are more important than time) and across countries (with some differences). Subsequent sections in this policy brief explore some of the philosophical assumptions that underlie whether the curves are in fact stable into the future.

Ideally, we would want to study the same curves in the public sector in South Africa but despite several attempts over a seven year period it has not yet been feasible to estimate any public sector curve. It is of course very difficult to use data from an under-resourced public service to predict cost in a future better-resourced system. This brings us back to attempting to use the excellent private sector data and adjust it to the total cost likely in a well-resourced public system.

[b] Cost curves for 2007 were originally developed by Pieter Grobler and Heather McLeod for a presentation to the Actuarial Society of South Africa in May 2009. The curves have been restated in 2009 terms for use in preliminary estimations of the total cost of NHI under various levels of delivery efficiency. They are preliminary estimates and should only be used after discussion with the authors.

In all likelihood the public sector curves have a similar shape to those shown in Figure 3, but with at least the following differences: lower costs for Under 1s (fewer ICU admissions and very low birth-weight babies are not resuscitated in the public sector); lower maternity costs (far fewer Caesarean sections); and higher HIV admissions and costs in the HIV years (a first attempt at this has been tried). The cost of chronic disease from age 40 onwards may also be affected by different patterns of disease and treatment regimens.

While we know that the mix of chronic diseases amongst the poor is different to that of the higher income groups in medical schemes, the total burden of disease (excluding HIV) might possibly be of about the same magnitude. This is a research question that needs further work and the results will have important implications for the use of private sector data to project public sector costs.

3. Uncertainty in Long-term Demographic Projections

The cost curves by age and gender above can be applied to the expected age and gender structures of the population in order to determine expected total cost for a given year.

In Policy Brief 1[4] it was strongly recommended that all costing work on National Health Insurance be done using the ASSA2003 provincial model and that the costings be updated when a revision to the model is released (perhaps by the end of 2009). The expected aging of the population of the South African population is significant over the period shown (to 2025) and thus NHI costings need to be done not only for the current period but also into the future. The degree of uncertainty in demographic projections needs to be borne in mind in this work.

The ASSA model[5] uses the cohort component projection method and the results are calibrated to available data as it emerges. The key elements for this approach are given below with some comments about the differences between provinces:

- The existing population by age, gender and ethnicity from a “good” Census or adjusted where the Census is weak. The model is calibrated to the Census points from 1991, 1996 and 2001, taking into account the limitations of each. The next Census is planned for 2011.
- Fertility rates to project births: the Western Cape and Gauteng have lower expected total fertility rates than other provinces. This has obvious implications for obstetrics and neo-natal facilities.
- Mortality rates to project deaths: these are set by ethnic group. The Western Cape has a very different ethnic structure to other provinces with predominantly so-called Coloured lives while KwaZulu-Natal has the largest Indian population.
- HIV incidence and prevalence: The HIV incidence (new infections) for the Western Cape is projected to peak at a much lower level than for the country as a whole. The peak is also later than for most of the provinces. The HIV epidemic is the highest and most advanced in KwaZulu-Natal.
- The effect of HIV on both mortality and fertility; and
- Net immigration (result of immigration in and emigration out).

Prof Dorrington, in teaching population projection[6], states that “As a general rule, nationally, the greatest uncertainty arises from fertility, followed (over the longer term) by mortality, and then migration. As a general rule, the smaller the unit (province, district, city, town) the more significant (and the less certain) is migration.”

He argues that “migration is most difficult to project: often impossible to record and difficult to estimate in future”. International migration is usually low but not in South Africa. Internally, work-seekers move to provinces with better employment opportunities but the families are sometimes left in the province of origin. This may lead to a reversal at later ages as retired people return to the province of origin. In projecting the future population, demographers usually assume the current level of migration for the short term or a slow trend towards zero over time. Immigration is also sometimes used as to balance a model to surveys of the population.

4. Demographic, Epidemiological and Health Transitions

The longer the period of costing and modelling into the future, the more we need to consider the broad changes happening in society and their impact on healthcare costs. The material in this and the following two sections is intended to give an introduction to the themes in the literature on these issues and the specific issues in South Africa.

A framework for understanding future health change is provided by Steyn and Schneider[7] who reviewed literature on the demographic, epidemiological and health transitions. The reader is referred to the original article for the references citied. These transitions have important lessons for South Africa and the modelling of a future National Health Insurance system.

"In the **health transition model**, (citing Omran), factors such as income, education and employment status and occupation, ... shape the age and sex patterns of populations through their impact on fertility and mortality." "The epidemiological transition together with the demographic transition has become known as the health transition (citing Mosley)"

"In populations undergoing **demographic transition** there is generally a decline in mortality, followed by a decrease in fertility, resulting from improved socio-economic conditions. The changing age structure of the population and the corresponding cause of death patterns during the demographic transition, are largely a function of the fertility decline. As fertility declines and the population ages, there (are relatively more) adults, i.e. persons born under conditions of high fertility and hence relatively more people exposed to cardiovascular problems and cancers. In addition, with industrialisation and urbanisation a decline occurs mainly in the mortality due to infectious diseases among the younger age groups."

"There is a consequent shift in the mortality profile towards chronic diseases, comprising the **epidemiological transition**. Omran ... (suggested) a set sequence of events starting with a preponderance of infectious diseases, followed by an era when chronic diseases predominated. Communities adopting unhealthy lifestyles, which include, smoking tobacco products, being physically inactive and consuming a typical westernised diet over time leads to the emergence of the chronic diseases. This results in high levels of obesity, hypertension, diabetes and hyperlipidaemia in communities."

An example of the epidemiological transition for cardiovascular diseases is quoted in the Western Cape Burden of Disease project[8] . "The cardiovascular transition is described by Yusuf et al as having 5 stages" as reproduced below.

Stages / Ages	**CVD deaths as % total deaths**	**Predominant CVD and risk factors**
1. Pestilence and famine	5 - 10	Rheumatic heart, infectious and nutritional cardiomyopathies
2. Receding pandemics	10 - 35	Hypertensive heart disease and haemorrhagic stroke
3. Degenerative diseases	35 - 50	All forms of stroke, IHD at young ages, increasing obesity and diabetes
4. Delayed degenerative disease	< 50	Stroke and IHD at old age
5. Regression and social upheaval	35 - 50	Re-emergence of rheumatic heart disease, infections, increased alcoholism and violence, increased CVD in young.

"As populations move from conditions of under-development towards industrialised societies, the cardiovascular disease profile changes from one related to infections and under-nutrition. In the second stage, hypertensive heart disease and haemorrhagic stroke predominate. This is followed by the stage of increasing obesity, diabetes, all forms of stroke and IHD affecting young ages. The fourth stage is indicated by a shift in the IHD and stroke mortality to older ages, and is the current experience of many Western countries. Yusuf et al have added the final stage based on the experience in parts of Eastern Europe with the re-emergence of conditions related to infections and alcohol."

Steyn and Schneider[7] say "It was anticipated that this increase in chronic diseases would occur in poor countries undergoing industrialisation, development and adoption of typical westernised lifestyles. Initially the chronic diseases emerged in the wealthier sector of society, however, in the last quarter of the 20th century these conditions occurred more frequently in the poor, than in the wealthy, typically westernised, industrialised countries. In wealthier countries, chronic diseases are ameliorated through healthier eating and smoking patterns that arise from education (citing several sources)"

"On the basis of observations from some large middle-income populations (citing Frenk) proposed modifications to Omran's theory with the **protracted-polarised model of epidemiological transition**. This model is characterized by the coexistence of infectious and chronic diseases in the same population persisting for a long time. In the protracted model more affluent sections of the population would have completed the transition, while economically disadvantaged groups continue to suffer from pre-transitional pathologies. A feature of the protracted-polarised model is the juxtaposition of a developed and an underdeveloped sector of the population. The model has its roots in inequality and the emerging health patterns further aggravate this."

"A consequence of the protracted-polarised model in developing countries with limited resources is the enormous burden placed on the health services to cater for multiple burdens of diseases. In this situation it is clear that the chronic diseases are less likely to be adequately provided for when competing with the more acute and urgent conditions such as patients with trauma or those severely ill with active infections. Chronic diseases lack urgency at every level of resource allocation and consequently, unless a health service has a scientifically based process of priority setting to ensure appropriate resource allocation, chronic diseases seldom receive the resource allocations required for prevention and cost-effective care."

"Furthermore, health services in poorer countries are largely based on a model for treating acute illness. Such a model, particularly in public sector clinics catering for the poor, rarely provides for the appropriate health promotion initiatives or educational needs of patients with chronic disease. For example, the logistics of dispensing long-term medication for chronic diseases is seldom organised so that patients can obtain repeat prescriptions in an efficient way."

5. The Quadruple Burden of Diseases in South Africa

In Policy Brief 3[9] a paper was quoted entitled "Conceptual Framework for Chronic Diseases of Lifestyle in South Africa.". The author argues[10] that "The **quadruple burden of diseases** in South Africa has serious consequences for the prevention and cost-effective management of chronic diseases and the unhealthy lifestyles and risk factors that precede them. The disease patterns in this region are characterised by a combination of **poverty-related diseases** together with the emerging **chronic diseases** [of lifestyle] associated with urbanisation, industrialisation and a westernised lifestyle. This double burden of diseases is exacerbated by high injury rates associated with the social instability of **violence** or high crime rates, and by the exploding epidemic of **HIV/AIDS** across the African continent. This multiple burden represents a demand on the health services of South Africa far beyond those experienced in developed countries and what the limited resources can accommodate."

In the conclusion to the report on poverty and chronic diseases[11], the authors say: "The data presented in this report show a complex picture of mortality, morbidity, risk factor and unhealthy lifestyle patterns in South Africa – an amalgam of a stratified society undergoing the health transition at a rapid pace. The current mortality pattern of chronic diseases reflects a lifetime's exposure to unhealthy lifestyles. The resulting risk factors were also poorly diagnosed and inadequately treated. South Africa has not escaped the protracted-polarised model of the epidemiological transition."

"[T]he 1996 mortality pattern shows a strongly polarised pattern, with the rich having a more typical westernised pattern where chronic diseases dominate, though exceedingly high levels of trauma-related death were also found among men. In contrast, the mortality picture of the poor could be described as a typical example of the protracted-polarised pattern of mortality with a combination [of] disease types. The increased number of early adult female deaths is probably due to the emergence of the AIDS epidemic and can be seen in both the poor and wealthy areas."

"Morbidity, measured by abnormal peak flow, and symptoms of "asthma" were not correlated with levels of wealth and poverty as reflected by the asset index, while chronic bronchitis was more common among the poor. Risk factors, such as hypertension and obesity, tended to increase in the wealthier groups. In contrast, the prevalence of unhealthy lifestyles, and exposures such as smoking (albeit light smoking) exposure to smoky fuels and alcohol dependence, tended to occur more frequently among the poor. This profile suggests that the poor are also likely to develop risk factors for chronic diseases as a result of their current unhealthy lifestyle. In addition, any alleviation of poverty leading to an increase in wealth may also contribute to additional increase in risk factors."

6. Theories of Future Changes in Mortality and Morbidity

As part of the evidence in the National Health Service Bed Inquiry in the United Kingdom, the London School of Hygiene and Tropical Medicine provided a report on how epidemiological and demographic changes might affect the future requirements for beds[12]. The summary is relevant to the assumptions being made about future levels of chronic disease and the need for health facilities in South Africa.

"The report considers the literature on demographic change and trends in the health status of the population, the effect of demographic change on bed usage and possible other epidemiological changes. … The ageing of the population is identified as the most important demographic trend likely to influence health and health care demand. Recent improvements in mortality at older ages have been substantial … falling mortality has an increasingly important impact on population age structure and changes in death rates at older ages have come to play an increasingly important role in overall mortality change in developed countries."

"Although improvements in mortality would seem to imply improvements in the health status of the total and the elderly population, this is not certain. The report presents three alternative theories:

a) As more people survive to older ages, a larger proportion of those with unfavourable health characteristics will survive. The suggested decline in mortality may be due therefore to medical interventions. Such interventions **prolong the period of pre-death morbidity** and disability rather than prolonging healthy life.

b) There will be a **'compression of morbidity'** achieved through postponement of morbidity and disability, but no corresponding delay in the time of death.

c) The **'dynamic equilibrium' theory** that suggests whilst the onset of degenerative diseases may be postponed, so is death, with the result that the period of life spent in poor health remains constant."

"International evidence regarding changes in morbidity over time is mixed. … Overall the literature suggests that there is a decline in the level of serious disability but increases in reported limiting long-standing illness and measures of mild disability."

"The use of hospital beds is strongly associated with age. As older patients also have longer hospital stays (and more re-admissions) it would seem clear that population ageing will lead to increased demand for hospital beds. Yet if hospital usage is associated with care close to death an ageing population may not imply more beds – beds will just be required later in life."

"There have ... been increases in [mortality rates for] certain diseases over time, particularly for the older age groups. This is expected – deaths avoided in earlier age groups will lead to an increase in the population surviving to older ages, and lead to more deaths at these older age groups, so increasing the death rates."

"Literature on the association between age and use of hospital beds usually concludes that demographic projections of hospital bed usage are likely to be flawed in that they assume age-specific rates of use will remain the same. However, changes in the age at which people die and in the length of terminal illness may lead to changes in these patterns of usage. Those dying at more advanced ages experience a shorter period of pre-death morbidity, in which case further gains in longevity might be associated with a reduction in demand for hospital usage in the last year of life. However, it is also possible that lower use among the very old reflects either the high proportions in this age group who are resident in institutions, who perhaps have a higher threshold for hospital admission, or age related rationing of services."

"Several approaches may be taken to projecting demands for hospital beds. The demographic approach involves simply projecting forward current age and sex specific patterns of use. However the report notes that demographically based projections have a number of limitations, as there is debate about the extent and implications of changes in the age and cause distribution of morbidity and mortality."

"For example, the analysis of the incidence and survival rates of some of the major cancers suggests that there will be a growing demand for bed days from cancer patients. What is not clear, given the need to take account of co-morbidity, competing risks and **'substitute morbidity'** is whether those dying from specific cancers, for example, will require more hospital care than those dying from specific cardiovascular diseases."

This is a complex topic for which little evidence has been gathered in South Africa. Researchers are advised to be aware of these possibilities in performing very long term projections of need. The impact of changes in medical practice and technology is an important influence which will impact any long-term projections. Over medium-term planning periods, the effects are not likely to be as important.

7. Conclusions and Implications for a Future NHI

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 graph overleaf shows the combination of the projections of future disease in South Africa, taken from the three policy briefs dealing with CDL chronic diseases[9], HIV/AIDS[3] and cancer[13].

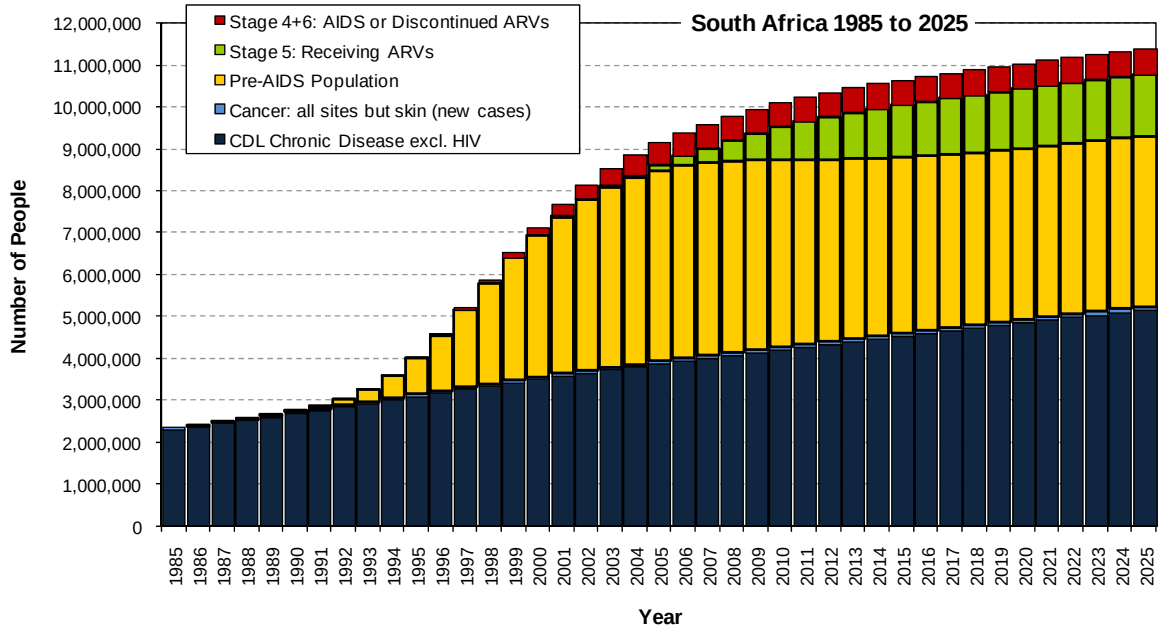

Figure 4: The Burden of CDL Chronic Diseases, Cancer and HIV/AIDS in South Africa, 1985 to 2025

Combining the 25 CDL chronic diseases, cancer (very small on the graph) and HIV, the numbers with these diseases have increased from 3.6 million in 1994 to 9.9 million in 2009 and could rise to 11.3 million by 2025. The non-CDL chronic diseases, the burden of violence and infectious diseases needs to be added for a more complete picture. The resourcing requirements in terms of staff needed in the health system become particularly stark when compared to the burden of disease in the national health system.

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Resources on the IMSA Web-site

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

- The slides and tables used in this policy brief. Includes slides of the disease projections to 2025 from Policy Briefs 3, 4 and 5 [PowerPoint slides].

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