Comments on select aspects of the NHI White Paper

Report on behalf of the Hospital Association of South Africa
(‘HASA’)
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Executive Summary

On 10 December 2015, the Department of Health (DoH) released the National Health Insurance (NHI) White Paper, in which it was stated that "National Health Insurance (NHI) is a health financing system that is designed to pool funds to provide access to quality, affordable personal health services for all South Africans based on their health needs, irrespective of their socioeconomic status. NHI is intended to ensure that the use of health services does not result in financial hardships for individuals and their families."

According to the White Paper, by the time of full implementation the NHI plan is to significantly increase public expenditure on healthcare from 4.1% to 6.6% of GDP. This raises the question as to how such an increase in public health spending will be funded. It is also important to consider how existing supply side constraints will hamper service delivery under the proposed NHI model. The aim of this report is to critically analyse the NHI cost projections, the assumptions underlying those calculations (as presented in the NHI White Paper) and to evaluate the feasibility of the NHI given current supply side constraints.

We commence the analysis by putting the NHI figures in the context of the current health budget, finding that the National Treasury’s most recent (February 2016) estimates for health expenditure in the next two to three years are not in line with the NHI expenditure estimates in the White Paper. Only relatively small direct and indirect grants for the NHI are included, much less than the requirements presented in the White Paper for comparative years. The medium term expenditure estimates reveal very little expected increases in the national health budget as a percentage of GDP up to 2018/19 (in real terms). It is also found that the annual increases in the public health budget, as assumed in the White Paper, are not sufficient for NHI implementation and that the health budget will have to grow by more than 10% annually from 2019/20 until 2025/26 to reach the estimated R 256 billion (in 2010 terms). This is the estimated cost of full NHI implementation in the final year (total public health budget). In order to reach this figure by 2025/26, the health budget will have to grow with double digit figures, compared to recent growth rates of 3.85% annually (between 2010/11 and 2015/16). We therefore argue that the NHI costs as shown in the White Paper will have a huge impact on the health budget and that these have not been taken into consideration to date. While the NHI White Paper includes estimates for NHI implementation, these are not explicitly taken into account in the medium term expenditure estimates for healthcare.

Having seen that the current health budget and projected growth do not cater for full implementation of the NHI, we turn to the question whether the estimated R 256 billion total NHI/ public health spending by 2025/26 will be sufficient, given what is known about South Africa’s burden of disease and international experience in this regard. The figures in the White Paper are based on what was calculated in the NHI
Green Paper four years ago, and from that document it is evident that expected demand and utilisation increases were modelled after Thailand’s experience when introducing universal health coverage (UHC). After revisiting the literature on insurance-induced and pent-up demand, the latest burden of disease data for South Africa is examined in detail. The analysis also includes a comparison with Thailand’s burden of disease, showing that the South African population has a more severe and complex burden of disease. This implies that using utilisation increases experienced by Thailand for estimating the cost of the NHI in SA, is not prudent. Taking into account these factors, as well as the fact that most of the existing medical scheme members who currently use private sector health services are expected to also utilise public sector services when the NHI is fully operational, a much larger increase in demand can be expected. Any cost projections should therefore also make provision for this large increase in the demand for public health services.

In order to better understand the implications for financing the proposed NHI system, we evaluate the magnitude and funding shortfall of the cost estimates included in the White Paper, as well as three additional scenarios based on the expected increase in demand and utilisation. It is clear that the preferred GDP growth scenario in the White Paper (3.5%) is no longer realistic. We therefore rely on more recent GDP growth forecasts which indicate much slower growth than assumed in the NHI modelling. The more modest GDP growth rate assumptions imply a larger NHI shortfall, as the health budget (and similarly total government budget or income) will not grow as fast as envisioned in the White Paper. For example, if we consider the White Paper scenario of R 256 billion estimated total spending on the NHI in 2025/26, the shortfall will be R 108 billion if GDP grows at an average rate of 2% annually. This implies that government revenue (tax income) will have to increase with more than 10% to fund the R 108 billion shortfall. However, when considering our third scenario assuming the largest increases in demand/utilisation (16%), the shortfall could be more than R 200 billion by that time.

The funding implications as modelled in the White Paper, and according to the additional three scenarios incorporating larger increases in demand, are deemed very onerous and will weigh heavily on the national fiscus. It is argued though, that even if the government is able to raise enough funds for this purpose, it is not the only hurdle to overcome. Supply side constraints are assessed and considered to be substantial. There is very little extra capacity in the public and private sectors collectively; both for human resources and facilities. While additional funding will certainly aid in ‘buying’ more health services under a NHI system, it will not solve all the supply side issues. Existing shortages imply an immediate need for additional human resources for health (HRH), irrespective of NHI implementation. The expected increased demand, as discussed previously, will require even more facilities and HRH.

The report concludes that the current NHI White Paper estimates are not currently reflected in the most recent health budget and as such the health budget will have to grow with double digit figures to reach R 256 billion by 2025/26. In addition, the underlying assumptions of the R256 billion are flawed and do not
sufficiently account for a number of factors. These estimates are based on utilisation increases as experienced in Thailand after the introduction of UHC and on GDP growth rates that are too optimistic. The evidence suggests that South Africa will in all likelihood experience even greater increases in demand; which should be accounted for in the modelling. Also, existing supply side constraints will impact negatively on service delivery under the proposed NHI model. The implementation of a NHI plan will have to overcome all of these supply constraints. Sufficient increases in health facilities and HRH should therefore also be factored into the financial modelling. As such, it is advisable to reconsider a different format for achieving universal health coverage in South Africa than what is currently envisaged in the White Paper.
IN SUMMARY:

1. The public health budget is projected to increase from 4.1% of GDP to 6.6%.

2. In order to finance the estimated R 256 billion total cost of the NHI in 2025/26, the public health budget will have to increase with more than 10% annually (between 2019/20 and 2025/26).

3. There is no evidence of large budget increases for NHI funding in the near future as the February 2016 medium-term budget expenditure estimates show very little expected increases in the national health budget as a percentage of GDP up to 2018/19 in real terms.

4. The White Paper funding shortfall is estimated at R 108 billion by 2025/26, assuming a GDP growth rate of 2% going forward. This is equivalent to 80% of the current budget. Revised estimates, assuming greater increases in demand and updated GDP growth forecasts, indicate that the shortfall may exceed R 200 billion by 2025/26.

5. Funding the R 108 billion shortfall only, requires total government revenue to increase by more than 10% by 2025/26.

6. Given the literature on insurance-induced demand, pent-up demand and South Africa’s unique quadruple burden of disease, much larger utilisation increases are to be expected than current assumptions allow for. The expected increases in demand and utilisation associated with the introduction of the NHI are not sufficient.

7. Existing supply constraints (health facilities and human resources) present a significant challenge, especially under a NHI scenario that will impose an even greater burden on these scarce resources.

8. Expected increases in both demand and supply are therefore not adequately accounted for in the NHI White Paper costing model. It is found that the financial implications will be even greater than currently anticipated if these are included.
1 Introduction

The Department of Health (DoH) has published the White Paper on the NHI (‘National Health Insurance for SA – Towards Universal Health Coverage’\(^1\)), on 10 December 2015. The White Paper provides a roadmap for the journey towards full implementation of the NHI and covers many diverse areas such as the rationale and benefits, population coverage, organisation of the health system, etc.

The aim of the current report is to consider the macroeconomic implications of the NHI. More specifically, we will evaluate in detail the funding requirements and the assumptions made in the NHI White Paper. In addition to the large financial requirements, we will further show that there are currently severe supply constraints that need to be addressed before the implementation of a universal healthcare (UHC) system can take place. While there are many other important issues covered in the White Paper, those are not explicitly dealt with here. The comments in this report therefore deal mainly with issues raised in Chapter 7 of the White Paper.

In order to set the scene, the proposed NHI costings in the White Paper are evaluated within the context of the most recent (February 2016) health budget and GDP forecasts (including updated growth rate estimates based on the most recent data). We also consider how these cost estimates differ from what was proposed in the Green Paper in 2011. It is argued that these costing estimates are not sufficient from a macroeconomic perspective, but more importantly also from a healthcare perspective. International evidence indicates a large increase in the demand for healthcare services once consumers are fully insured. Based on a number of country studies and relevant economic theory, we calculate three different scenarios for the expected increase in demand; highlighting the significant impact on overall costs. The report continues to examine the macroeconomic impact of these expected scenarios and also provides evidence of severe supply constraints. It is found that these hurdles, both financial and physical (human resources and facilities) are not adequately accounted for in the NHI White Paper. The suggested road to UHC should therefore be reviewed and updated to include the most recent data and evidence, to allow for the design of a more appropriate policy proposal.

2 Financing of the NHI

Having described the various building blocks of the NHI, the White Paper deals with the ‘Financing of the NHI’ in Chapter 7. The financing of the NHI is a controversial topic and much work has been done previously by various parties on income sources and funding scenarios. In fact, we note that the White Paper states (in para 250) that, “it is not useful to focus on getting the exact number indicating estimated cost. This is because the evidence has shown that countries that have gone down this path have ended up tied to an endless cycle of revisions and efforts to dream up new revenue sources – thus focusing on issues that have more to do with tax policy than health policy.” While one has sympathy with the complexities around financing scenarios, it does not mean that this aspect of the NHI planning can simply be ignored. The White Paper does provide various financing estimates, based on different growth assumptions, and the aim of this section is to critically analyse these figures to see what those mean in terms of macro-economic requirements and funding sources.

2.1 Current health budget and expenditure

In order to understand the cost estimates of the NHI (as set out in the White Paper), we firstly provide some detail about the current health budget. We use the estimates of the February 2016 Budget Review, unless otherwise noted.

Currently, total annual health expenditure by the public and private healthcare sectors constitutes approximately 8.5% of Gross Domestic Product (GDP), of which 4.3% is accounted for by the private sector and 4.2% by the public sector.\(^2\) The Department of Finance’s revised budget estimate for health expenditure covers the period up to 2018/19 (medium-term budget expenditure estimates)\(^3\). These figures reveal very little expected increases in the national health budget as a percentage of GDP over this period. In fact, based on our estimates for real GDP and Treasury’s estimates for the medium-term forecasted health budget, we find that the health budget as a percentage of real GDP remains more or less constant up to 2018/19. Figure 1 shows the real National Health Budget (public health expenditure) as a percentage of real GDP\(^4\) (expressed in 2010 terms using CPI figures from StatsSA\(^5\) and GDP forecasts from the IMF and the World Bank\(^6\)).

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\(^2\) Medium-term estimates in the 2010/11 – 2016/17 Provincial Budgets and Expenditures Review

\(^3\) The figures we use are taken from the 2016 Budget Review, published in February 2016. The value for 2015/16 is shown as a ‘revised estimate’, whereas those for 2016/17 – 2018/19 are shown as ‘Medium-term estimates’.

\(^4\) In order to allow for an accurate comparison, we use the most recent nominal GDP figures quoted by National Treasury, which we express in constant 2010 terms using CPI figures from StatsSA and inflation rate forecasts from National Treasury (see footnote 5).

\(^5\) Note that we adjust the CPI such that it is expressed in financial years coinciding with the financial year of National Treasury (April to March) and to allow for a like-with-like comparison with the NHI White Paper. In particular, when we state that a value is expressed in constant 2010 terms, this means that it has been adjusted to have the 2010/11 financial year as a base year for the CPI index. We use the forecasted inflation provided by National Treasury to provide the index value from 2015/16 to 2018/19.

\(^6\) We make use of the most recent forecasts available at the time of writing.
Figure 1: Actual and projected increases in the national health budget (public health expenditure) in real terms and as a percentage of real GDP, 2014/15 – 2018/19

Source: National Treasury, Econex calculations

In Figure 2 we find that, as a percentage of the total budget expenditure, the health budget (which we take to be the consolidated health expenditure) was 11.7% of total consolidated expenditure and 14.2% of the main budget non-interest expenditure for the fiscal year ending 2015. These ratios have been fairly constant over time and, based on Treasury’s medium-term expenditure forecasts, they are expected to remain relatively similar going forward (see Figure 2).

Figure 2: Health expenditure as percentage of total consolidated expenditure and main budget non-interest expenditure, fiscal years 2010/11 – 2018/19

Source: National Treasury, Econex calculations

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7 The non-interest expenditure is defined as the total expenditure by government minus debt-service costs.
The proportion of total health expenditure for the private and public sector was 49.8% and 50.2% respectively, for the fiscal year ending 2015. This ratio also remains relatively constant over time and is expected to continue in this fashion based on Treasury’s medium term forecasts (see Figure 3).

**Figure 3: Split between public and private healthcare expenditure, fiscal years 2010/11 – 2017/18**

![Chart showing split between public and private healthcare expenditure](chart.png)

*Source: National Department of Health, National Treasury*

Importantly, what these figures reveal is that there seems to be limited provision for the NHI in the forecast period (up to 2018/19), despite the NHI White Paper projections in this regard. In the next section we show that minimal NHI financing costs are already included in the health budget, but that these costs are expected to increase dramatically from 2020/21 if the reforms are implemented as planned.

### 2.2 Universal coverage – the NHI

The aim of the NHI is to provide universal coverage to all South Africans. According to the NHI White Paper, the cost of implementing the NHI is estimated to be R 134,324 million for the 2015/16 fiscal year, R 185,370 million for the 2020/21 fiscal year and R 255,815 million for 2025/26 fiscal year (2010 prices). This implies that the average annual increase before 2015/16 is 4.1% while it is 6.7% thereafter. According to these figures, public health spending as a proportion of GDP would increase from roughly 4% currently (see Figure 1) to 6.2% in 2025/26, assuming economic growth of 3.5% per annum. It should be noted that the total NHI costs in 2025/26 (R 256 billion) as per the White Paper, is the same amount as shown in the 2011 Green Paper, but with more moderate cost increases in the earlier years. This is also clear when considering Figure 4. This must mean that very little (if any) work has been done on the financing requirements between the Green Paper (2011) and the White Paper (2015). This is obviously a cause for concern.
Figure 4: NHI Cost Projections under Green Paper and White Paper (millions of 2010 Rands), fiscal years 2010/11 – 2025/26

Source: National Department of Health

It can be deduced from the White Paper that the resource requirements for the NHI are estimates for total government spending on health and not an additional cost separate from the health budget. As such, we can compare these projections with historical and future health budget figures. It is found that the amounts budgeted for health expenditure by Treasury in each fiscal year includes both direct and indirect grants for NHI pilot programs. Also, health expenditure since 2010/11 already includes amounts spent on the NHI. The amounts historically spent on NHI are very small (typically less than 1% of total consolidated health expenditure) as can be seen in Table 1.

Table 1: Direct and indirect grants for NHI to provinces (R millions, constant 2010 terms)

<table>
<thead>
<tr>
<th>Year</th>
<th>Direct</th>
<th>Indirect</th>
<th>Total</th>
<th>Total consolidated health expenditure</th>
<th>NHI Grant as % of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012/13</td>
<td>R 135</td>
<td>R 0</td>
<td>R 135</td>
<td>R 112,257</td>
<td>0.1%</td>
</tr>
<tr>
<td>2013/14</td>
<td>R 43</td>
<td>R 620</td>
<td>R 663</td>
<td>R 113,657</td>
<td>0.6%</td>
</tr>
<tr>
<td>2014/15</td>
<td>R 56</td>
<td>R 1,265</td>
<td>R 1,321</td>
<td>R 116,001</td>
<td>1.1%</td>
</tr>
<tr>
<td>2015/16</td>
<td>R 46</td>
<td>R 840</td>
<td>R 887</td>
<td>R 121,440</td>
<td>0.7%</td>
</tr>
<tr>
<td>2016/17</td>
<td>R 61</td>
<td>R 901</td>
<td>R 962</td>
<td>R 120,365</td>
<td>0.8%</td>
</tr>
<tr>
<td>2017/18</td>
<td>R 0</td>
<td>R 1,119</td>
<td>R 1,119</td>
<td>R 123,594</td>
<td>0.9%</td>
</tr>
<tr>
<td>2018/19</td>
<td>R 0</td>
<td>R 1,122</td>
<td>R 1,122</td>
<td>R 126,195</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

Source: National Treasury
The historical amounts spent on the NHI specifically, and those funds budgeted for each year until 2018/19 (as seen in Table 1), are not in-line with the White Paper cost projections. For instance, in the last year we have Treasury’s budget estimates for (2018/19) we calculate a difference of roughly R 37 billion8 (in 2010 terms) between those and the White Paper’s cost estimates; making it clear that the White Paper proposals were not taken into account for the most recent budget estimates. While not commenting on the financing of the NHI in detail, Minister Pravin Gordhan noted in his 2016 budget speech that “In order to take the White paper’s proposals forward, the Treasury will shortly release further details on financing aspects.”9

As noted above, the White Paper estimates indicate that the level of public health spending will increase from roughly 4% of GDP currently to 6.2% of GDP by 2025/26, assuming that the economy grows at an annual rate of 3.5%. Estimates obtained from the World Bank and the IMF, however, suggest that 3.5% is an overestimated growth figure, with the average forecasted growth rate over the next few years closer to 1%. Accordingly, spending on NHI as a percentage of GDP is expected to be higher than 6.2% by 2025/26. We discuss the White Paper’s GDP growth rate assumptions in more detail in section 4.1.

In order to provide an initial indication of how the current forecast of health expenditure compares with the projected costs of the NHI, we provide some scenarios in Figure 5. The graph shows national health expenditure in real terms for the period 2004/5 to 2018/19, which includes the forecasts from Treasury's Medium Term Expenditure Framework, as well as estimates of health expenditure until 2025/26, should current trends in annual health expenditure increases continue (the "Health Expenditure" line in Figure 5). This projection was calculated using the average annual real increase in health expenditure during the period 2010/11 to 2015/16 (3.85% per year, termed “Scenario 1”) as well as over the period 2005/6 to 2015/16 (6.25% per year, termed “Scenario 2”). We show both scenarios in Figure 5.

Health expenditure with the implementation of the NHI plan is also indicated for the period 2010/11 to 2025/26 (shown as “NHI Costs (White Paper)” in the figure). This is the NHI expenditure path as shown in the White Paper and as such is not realised health expenditure, but rather estimated health expenditure using the same model as used in the Green Paper.10 Note that the NHI expenditure path differs between the White Paper and the Green Paper, as the White Paper uses “…more recent estimates of the costs of the NHI pilots and other reforms currently being implemented.”11 Furthermore, the annual modelled costs of the NHI, while shown in the Green Paper, are not shown at a disaggregated level in the White Paper. As such, we calculated these at an annual level using solving techniques which employ an optimising

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8 Calculated by subtracting the 2018/19 health budget in the medium term expenditure estimates (R 126 billion), from the estimated cost of the NHI scheme in the 2018/19 fiscal year (R 163 billion). While the R 163 billion is not shown in the White Paper we have calculated it using solving techniques which employs an optimising algorithm designed for non-linear problems (see discussion below).
10 See para. 252 in the NHI White Paper
11 NHI White Paper, para. 252
algorithm designed for non-linear problems. This procedure uses iterative numerical methods that involve different iterations of the estimation problem to arrive at an optimum solution.

We also show the NHI cost as a percentage of GDP. We use the nominal GDP figures used by the National Treasury for 2010/11 to 2014/15. We adjust these figures so that they are in constant 2010 terms (using StatsSA CPI data\(^{12}\)). However, from 2015/16 onwards, we use updated real GDP growth rate assumptions, as the growth rates assumed in the White Paper seem overstated\(^{13}\). This is also evident when comparing the growth rates in the NHI White Paper with National Treasury’s most recent announcement of their (adjusted) forecasted real GDP growth rates, published in the February 2016 Budget Review. As such, the growth rates assumed by the NHI seem at odds with even those assumed by Treasury.

**Figure 5: Comparison of realised/forecasted public health expenditure and estimated NHI White Paper cost (2010 terms), 2004/5 – 2025/26**

![Graph showing NHI costs as a percentage of GDP over time.]

Source: National Treasury, StatsSA, National Department of Health; Econex calculations

Under these assumptions, we find that the total annual health budget will be R 164,421 million in 2025/26 under scenario 1 and R 192,916 million under scenario 2. Comparing these figures to the NHI budget in 2025/26, we find that the shortfall in health expenditure resulting from the implementation of the NHI is

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\(^{12}\) Refer to footnote 5 for a description of the methodology followed in order to state figures in 2010 terms

\(^{13}\) Specifically, between 2014/15 and 2016/17, we assume growth rates of 1.3%, 0.8% and 1.5%. These figures are the average growth rates between the World Bank and IMF’s latest quoted real GDP growth forecasts. For 2017/18, we use the growth rate as quoted by the World Bank in their January 2016 Global Economic Prospects report. For 2018/19 and 2019/20, we assume the annual growth to be 2.6%, based on the IMF’s World Economic Outlook. From 2020/21 to 2025/26, we assume that the annual GDP growth rates are the average of the preceding 3 years, i.e. 2.3% per annum.
R 91,394 million under scenario 1 and R 62,899 million under scenario 2. For a more detailed breakdown, please refer to Table 2 below.

Table 2: Shortfall calculations for different public health expenditure scenarios (2010 terms)

<table>
<thead>
<tr>
<th>Fiscal year ending</th>
<th>NHI Costs (White Paper)</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Public health expenditure</td>
<td>Shortfall</td>
</tr>
<tr>
<td>2010/11</td>
<td>R 109,769</td>
<td>R 101,744</td>
<td>R 8,025</td>
</tr>
<tr>
<td>2011/12</td>
<td>R 114,292</td>
<td>R 109,583</td>
<td>R 5,279</td>
</tr>
<tr>
<td>2012/13</td>
<td>R 119,001</td>
<td>R 113,588</td>
<td>R 6,744</td>
</tr>
<tr>
<td>2013/14</td>
<td>R 123,904</td>
<td>R 114,707</td>
<td>R 10,246</td>
</tr>
<tr>
<td>2014/15</td>
<td>R 129,009</td>
<td>R 115,992</td>
<td>R 13,007</td>
</tr>
<tr>
<td>2015/16</td>
<td>R 134,324</td>
<td>R 121,036</td>
<td>R 12,884</td>
</tr>
<tr>
<td>2016/17</td>
<td>R 143,262</td>
<td>R 116,333</td>
<td>R 22,896</td>
</tr>
<tr>
<td>2017/18</td>
<td>R 152,795</td>
<td>R 119,896</td>
<td>R 29,201</td>
</tr>
<tr>
<td>2018/19</td>
<td>R 162,962</td>
<td>R 123,428</td>
<td>R 36,767</td>
</tr>
<tr>
<td>2019/20</td>
<td>R 173,805</td>
<td>R 131,056</td>
<td>R 42,749</td>
</tr>
<tr>
<td>2020/21</td>
<td>R 185,370</td>
<td>R 136,105</td>
<td>R 49,265</td>
</tr>
<tr>
<td>2021/22</td>
<td>R 197,705</td>
<td>R 141,348</td>
<td>R 56,356</td>
</tr>
<tr>
<td>2022/23</td>
<td>R 210,860</td>
<td>R 146,794</td>
<td>R 64,066</td>
</tr>
<tr>
<td>2023/24</td>
<td>R 224,891</td>
<td>R 152,449</td>
<td>R 72,442</td>
</tr>
<tr>
<td>2024/25</td>
<td>R 239,855</td>
<td>R 158,322</td>
<td>R 81,533</td>
</tr>
<tr>
<td><strong>2025/26</strong></td>
<td><strong>R 255,815</strong></td>
<td><strong>R 164,421</strong></td>
<td><strong>R 91,394</strong></td>
</tr>
</tbody>
</table>

*Source: Econex calculations*

Note that for comparative purposes, these numbers are shown in 2010 terms. The equivalent shortfall under scenario 1 in 2015/16 terms would be R 119,945 million and under scenario 2 it would be R 82,549 million in 2015/16 terms. In addition to the above, one can also calculate the required real increases in the annual health budget from 2019/20 onwards, in order to arrive at the R 256 billion estimated amount in 2025/26. The results are shown in Figure 6.
Figure 6: Comparison of realised/forecasted public health expenditure and required growth to reach NHI projected cost in 2025/26 (2010 terms), 2004/5 – 2025/26

Source: National Treasury, StatsSA, National Department of Health; Econex calculations

The annual health budget would have to grow by 10.62% annually (in 2010 terms) from the start of the 2019/20 fiscal year to reach R 256 billion in 2025/26. With these figures in mind, the question remains: how will this be financed? However, before we turn to the funding implications, we consider whether the cost projections in the White Paper are sufficient. We elaborate on important factors that need to be taken into account in the modelling of NHI costs. These include the increased demand and utilisation that will result from the implementation of universal coverage and South Africa’s unique burden of disease situation.
3 Demand, utilisation and the burden of disease

As previously mentioned, the cost of the NHI program in 2025/26 is estimated at approximately R 256 billion and from the NHI Green Paper we note that the costing model used was adopted from the approach recommended by the International Labour Organisation (ILO). This supposes that total expenditure is a product of the user population, service utilisation rates and unit costs. As such, the costs are dependent on utilisation trends.

The implementation of universal health coverage aims to provide increased access to healthcare services for the previously uninsured population who currently have limited access. International evidence\(^{14}\) indicates that such a policy change is expected to cause an increase in the demand and utilisation of healthcare services. In addition to this expected “insurance-induced” demand increase, we expect that South Africa’s quadruple burden of disease will have the effect of increasing the quantity and intensity of care required by newly insured individuals (pent-up demand). From our understanding and interpretation of the estimated expenditure increases in the NHI White Paper (and Green Paper), some expected utilisation increases (as related to the factors mentioned here) were taken into account. However, we argue that this is not sufficient. Due to South Africa’s unique burden of disease, one cannot simply assume that the same demand increases will be realised here as in other countries. Specifically, we compare our burden of disease to that of Thailand’s as the expected utilisation increases were modelled on their experience.

The relevant economic literature on insurance-induced demand, as well as pent-up demand, is discussed in Appendix A. We also include a number of country studies that show the increase in demand for healthcare service after the introduction of universal coverage. For ease of reference, Figure 7 below shows the indexed increases in health expenditure by Thailand, Turkey and Mexico subsequent the implementation of wide-scale health reforms in 2002, 2003 and 2005, respectively. (The index was calculated from health expenditure data in real 2005 US Dollars, adjusted for purchasing power parity. An index is used here due to the different levels of expenditure by these three countries. The real figures are shown in Figure 31, Figure 32 and Figure 33 in Appendix A.)

\(^{14}\) See Appendix A for case studies and references.
With the theoretical and international evidence on expected demand increases in mind, we turn our focus to South Africa’s unique burden of disease which is anticipated to have an additional (unforeseen) impact on service utilisation.

3.1 South Africa’s burden of disease

In addition to the potential increased demand and utilisation, that is expected to follow the implementation of the NHI, we note that South Africa’s quadruple burden of disease will result in even more demand pressure. This places South Africa in a more precarious position than other countries that have implemented universal health coverage.

A widely accepted method used in quantifying a country’s burden of disease is the use of Disability Adjusted Life Years, or DALYs. The WHO defines a DALY as follows: "One DALY can be thought of as one lost year of "healthy" life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health...

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Source: WHO (2016), Econex calculations

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situation where the entire population lives to an advanced age, free of disease and disability. DALYs for a disease or health condition are calculated as the sum of the Years of Life Lost (YLL) due to premature mortality in the population and the Years Lost due to Disability (YLD) for people living with the health condition or its consequences.”

The figure below shows South Africa’s DALY’s for 2000 and 2012, broken down into subcategories of HIV/AIDS, Other communicable (maternal, perinatal and nutritional) diseases, non-communicable diseases and injuries.

**Figure 8: DALY breakdown for South Africa, 2000 and 2012**

![DALY breakdown for South Africa, 2000 and 2012](image)

*Source: WHO (2016)*

From the figure it is evident that the composition of South Africa’s burden of disease has not changed significantly between 2000 and 2012. In 2012, HIV/AIDS and non-communicable diseases made up the majority of the distribution, as was the case in 2000. Other communicable diseases decreased slightly as a share of the total (from 25% to 19%), while HIV/AIDS and non-communicable diseases have both increased from 33% to 36%. As a result, we find that in terms of the DALY composition, South Africa still suffered from the same ‘quadruple burden of disease’ in 2012.

Looking at the absolute DALY values in Figure 9 shows us that although the composition has stayed relatively stable, the total DALY count per 100,000 of the population has increased over this 12-year period, which suggests that South Africa’s burden of disease has in fact increased in magnitude.
Figure 9: South Africa's absolute DALY count per Group (per 100,000 of the population), 2000 and 2012

We note that there was an increase in HIV/AIDS and non-communicable diseases between 2000 and 2012, while injuries and other non-communicable diseases both decreased slightly. From this, we can see that South Africa's burden of disease per 100,000 of the population increased by 3% (see Table 3 below).

Table 3: Breakdown of South Africa’s DALYs per 100,000 of the population, 2000 and 2012

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV/AIDS</td>
<td>20 009</td>
<td>22 599</td>
<td>13%</td>
</tr>
<tr>
<td>Other communicable diseases</td>
<td>14 869</td>
<td>12 105</td>
<td>-19%</td>
</tr>
<tr>
<td>Non-communicable diseases</td>
<td>20 003</td>
<td>22 201</td>
<td>11%</td>
</tr>
<tr>
<td>Injuries</td>
<td>5 720</td>
<td>5 515</td>
<td>-4%</td>
</tr>
<tr>
<td><strong>All causes</strong></td>
<td><strong>60 601</strong></td>
<td><strong>62 419</strong></td>
<td><strong>3%</strong></td>
</tr>
</tbody>
</table>

Source: World Health Organization; Econex calculations

From the table, we can see that there was a 13% increase in the population-adjusted HIV/AIDS DALYs between 2000 and 2012, while non-communicable diseases increased by 11%. We note that there was a 19% decrease in other communicable diseases and a 4% decrease in injuries. However, in total, South Africa’s DALY count increased by 3% over this period, which suggests that South Africa’s burden of disease has worsened between 2000 and 2012. This is in stark contrast to international trends, which show that DALYs have generally decreased across developed and developing countries between 2000
and 2012. The figure below shows the breakdown the DALY figures for several developing and developed countries, as well as for broad income regions.

**Figure 10: DALY breakdown comparison between South Africa, developing countries and income groups, 2012**

![DALY Breakdown Comparison Chart]

*Source: World Health Organization*

It is evident that South Africa’s burden is significantly different to any other country or region, specifically in terms of its HIV/AIDS prevalence. The DALYs in developed countries and the high income regions are typically made up of non-communicable diseases. In developing countries and the lower/middle income regions, the largest share of the DALYs is made up of non-communicable diseases, while the second largest is for other communicable diseases. However, in South Africa, the two largest groups are HIV/AIDS and non-communicable diseases (both at 36%), while other communicable diseases makes up 19%. Additionally, although injuries constitute only 9% of the DALYs, we note that the absolute number is much higher than for other countries, given South Africa’s very high DALY count per 100,000 of the population. This is shown in Figure 11 and compared to other countries and regions. South Africa is shown in red, followed by the developed countries, developing countries and income groups, respectively.
Figure 11: 2012 DALY counts for South Africa, developing countries, developed countries and income regions

Source: World Health Organization; Econex calculations

It is clear that South Africa has a more severe population-adjusted burden of disease than all the other countries and regions in our analysis. We note that the developing and lower/middle income countries typically have a higher DALY count and that the high global DALY figure is driven by the fact that the majority of the world’s population resides in these countries. To get a better picture of the change in DALYs for different regions and countries compared to South Africa, Table 4 shows the percentage change in DALY groups between 2000 and 2012.
Table 4: Percentage change for DALY Groups per country and region, 2000-2012

<table>
<thead>
<tr>
<th>Group</th>
<th>HIV/AIDS</th>
<th>Other communicable diseases</th>
<th>Non-communicable diseases</th>
<th>Injuries</th>
<th>All Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global</td>
<td>-22%</td>
<td>-37%</td>
<td>-1%</td>
<td>-16%</td>
<td>-17%</td>
</tr>
<tr>
<td><strong>Income groups</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High income</td>
<td>58%</td>
<td>-17%</td>
<td>-4%</td>
<td>-22%</td>
<td>-7%</td>
</tr>
<tr>
<td>Low and middle income</td>
<td>-25%</td>
<td>-38%</td>
<td>1%</td>
<td>-15%</td>
<td>-19%</td>
</tr>
<tr>
<td><strong>Developing countries</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>-18%</td>
<td>-46%</td>
<td>2%</td>
<td>0%</td>
<td>-10%</td>
</tr>
<tr>
<td>China</td>
<td>142%</td>
<td>-53%</td>
<td>6%</td>
<td>-30%</td>
<td>-10%</td>
</tr>
<tr>
<td>Colombia</td>
<td>1%</td>
<td>-33%</td>
<td>3%</td>
<td>-47%</td>
<td>-18%</td>
</tr>
<tr>
<td>Ghana</td>
<td>-54%</td>
<td>-33%</td>
<td>7%</td>
<td>4%</td>
<td>-22%</td>
</tr>
<tr>
<td>India</td>
<td>6%</td>
<td>-44%</td>
<td>0%</td>
<td>-16%</td>
<td>-23%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>251%</td>
<td>-41%</td>
<td>-3%</td>
<td>-22%</td>
<td>-18%</td>
</tr>
<tr>
<td>Russia</td>
<td>290%</td>
<td>-33%</td>
<td>-5%</td>
<td>-42%</td>
<td>-11%</td>
</tr>
<tr>
<td>Thailand</td>
<td>-67%</td>
<td>-33%</td>
<td>10%</td>
<td>-10%</td>
<td>-11%</td>
</tr>
<tr>
<td>Tunisia</td>
<td>88%</td>
<td>-31%</td>
<td>7%</td>
<td>-13%</td>
<td>-3%</td>
</tr>
<tr>
<td>Turkey</td>
<td>46%</td>
<td>-56%</td>
<td>-9%</td>
<td>-31%</td>
<td>-23%</td>
</tr>
<tr>
<td>Developing average (excluding SA)</td>
<td>-32%</td>
<td>-39%</td>
<td>1%</td>
<td>-25%</td>
<td>-16%</td>
</tr>
<tr>
<td>South Africa</td>
<td>13%</td>
<td>-19%</td>
<td>11%</td>
<td>-4%</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Developed countries</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>-43%</td>
<td>14%</td>
<td>-1%</td>
<td>-8%</td>
<td>-1%</td>
</tr>
<tr>
<td>Germany</td>
<td>-29%</td>
<td>6%</td>
<td>-2%</td>
<td>-10%</td>
<td>-2%</td>
</tr>
<tr>
<td>UK</td>
<td>19%</td>
<td>-34%</td>
<td>-8%</td>
<td>-5%</td>
<td>-10%</td>
</tr>
<tr>
<td>USA</td>
<td>-55%</td>
<td>-4%</td>
<td>0%</td>
<td>-6%</td>
<td>-2%</td>
</tr>
<tr>
<td>Developed average</td>
<td>-46%</td>
<td>-10%</td>
<td>-3%</td>
<td>-7%</td>
<td>-4%</td>
</tr>
</tbody>
</table>

Source: World Health Organization; Econex calculations

From the table, we find that developing countries experienced the largest decline in DALYs between 2000 and 2012. However, this is mainly due to their high DALY counts in 2000, whereas developed countries were already at a low base, which creates less room for improvement. Importantly, all countries in the sample experienced a decrease in their overall population-adjusted DALY count, except for South Africa. The figure below illustrates this by plotting the percentage change between 2000 and 2012 for the total DALYs per 100,000 of the population.
As can be seen from the figure, developing countries have made great strides in reducing their DALY counts. It would therefore be expected that a developing country such as South Africa would also show a decline in the DALY count. However, South Africa has performed even worse than developed/high income countries.

From our analysis, we have found that when comparing South Africa’s DALYs with developed countries and similar developing countries, the burden of disease situation is very unique. This is further illustrated in the figure below, which shows the distribution between the different categories for South Africa, developing and developed countries as well as for different income groups.
South Africa’s burden of disease situation is not only much more significant in terms of magnitude, but also in terms of the distribution between different diseases. The heavy HIV/AIDS prevalence in the South African DALY figures is unlike any other country or region. It is clear that developed countries have a much smaller total burden of disease problem. We have also shown that developing countries have experienced a decrease in their DALY figures. Therefore, the global trend shows that developed countries have better burden of disease situation, but that developing countries are showing a rapid decline in DALY count. For South Africa, neither of these two points hold true, as the magnitude is large and the burden is increasing.

South Africa’s quadruple burden of disease, in addition to large-scale pent-up demand, will ensure that providing full insurance coverage to the entire population will result in a large-scale increase in demand. The burden of disease therefore has strong implications for the proposed NHI plan. In a previous Econex research note\(^\text{16}\), we discussed how South Africa’s quadruple burden of disease would translate into greater resource requirements when implementing universal health coverage. We found that it was therefore not advisable to model a NHI model after the experience in other countries, since South Africa’s

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\(^{16}\) Econex NHI Note 2. “South Africa’s Burden of Disease.” Available at: [www.econex.co.za](http://www.econex.co.za)
BOD will result in unique demand conditions. We emphasise again that it is important to evaluate local patterns of demand and utilisation when considering the implementation of universal health coverage.

Our evaluation of more recent DALY data confirms this point and places South Africa in an even more precarious position than before. The financing estimates in the NHI White Paper are based on the modelling that was done for the NHI Green Paper and there it is stated that “...projected increases in utilisation are comparable to the extent of utilisation increases experienced in Thailand when a universal health coverage system was introduced”. This indicates a lack of understanding of South Africa’s unique BOD which is not only double that of Thailand, but also entirely different in composition. It further implies that the cost estimates are bound to be incorrect. South Africa will have to develop a system that is carefully designed (and costed) for its specific circumstances. Such a plan should include consideration of its budget constraints, and detailed implications for service delivery directly linked to the country’s BOD.

3.2 Conclusions

It was discussed here (with further information in Appendix A) that South Africa’s policy makers would be wise to expect large increases in utilisation when the NHI is fully operational. Not only can one anticipate the normal increases in demand as related to insurance-induced and pent-up demand, but also in South Africa’s case specifically, the additional demand for services due to the large burden of disease. Another factor that should be kept in mind is that the majority of services provided by the private sector at the moment will now have to be provided via the NHI as the White Paper states that medical schemes will only be allowed to offer complementary cover for services not included in the NHI benefit package.

In order to illustrate the difference in the financing implications when taking into account larger demand increases, the following section explores various scenarios in the context of forecasted GDP growth and fiscal requirements.
4 Macroeconomic Considerations

4.1 GDP growth forecasts

In the NHI White Paper, the funding shortfall is expressed as a function of GDP growth. Three growth scenarios are presented, namely 2%, 3.5% and 5%. It is shown that under these three macroeconomic growth paths, the funding shortfall can range between R 27.6 billion and R 108 billion (shown graphically in the figure below).

Figure 14: Funding shortfall under different growth paths

Since the funding shortfall differs as the GDP growth assumptions change, we assume that in the costing model in the NHI Green Paper and White Paper, the public health expenditure which is used to finance the NHI is a function of GDP. This is a reasonable assumption, because as shown earlier, the health budget has remained at a constant level of GDP over the last ten years and the medium-term forecasts indicate that this will continue in the years ahead.

The White Paper’s main illustrative scenario assumes 3.5% annual GDP growth up to 2025/26. This produces a funding shortfall of approximately R 72 billion. This scenario is consequently used to illustrate potential tax policy changes. However, since more recent GDP data are available, the scenarios should be updated to reflect these current forecasts. In what follows, we take into account the recent downward revisions to GDP growth, which provide a more accurate indication of the magnitude of the NHI’s funding shortfall and the commensurate potential tax implications.
The current South African GDP growth outlook is much weaker than supposed in the NHI White Paper. This is evident both when considering external sources, as well as when considering the recent GDP growth forecasts published by National Treasury in the 2016 Budget Review. In the latest budget, they have revised their GDP growth forecasts downward when compared to the previous growth forecasts shown in the 2015 Medium Term Budget Policy Statement (MTBPS). The previous as well as revised real GDP growth forecasts are shown in Table 5.

**Table 5: Treasury forecasted real GDP growth estimates**

<table>
<thead>
<tr>
<th></th>
<th>Growth Estimate in 2015 MTBPS</th>
<th>Growth Estimate in 2016 Budget Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015/16</td>
<td>1.2%</td>
<td>0.9%</td>
</tr>
<tr>
<td>2016/17</td>
<td>2.1%</td>
<td>1.2%</td>
</tr>
<tr>
<td>2017/18</td>
<td>2.7%</td>
<td>1.9%</td>
</tr>
<tr>
<td>2018/19</td>
<td>2.8%</td>
<td>2.5%</td>
</tr>
</tbody>
</table>

*Source: National Treasury*

From the table, it is clear that there has been a significant revision in the real GDP growth rates assumed by Treasury over the next few years. As such, the 3.5% growth figure assumed in the NHI seems an outdated figure, even when compared to Treasury’s own estimates. We also obtained the latest estimates of South African real GDP growth over the medium term from various credible sources. It is significant to note that there has recently been a downward adjustment in these growth forecasts. For instance, the IMF adjusted its forecast of real GDP growth from 2.1% to 1.8%, stating that South Africa’s growth would be negatively affected by lower commodity prices and higher borrowing costs. Similar adjustments have been made by the World Bank. Shown in Table 6 are the latest available growth forecasts. Note that these forecasts are shown as year-on-year increases and are based on calendar years. As such, we assume that the fiscal year ending in the year for which the forecasts are made to be the fiscal year to which the forecast applies.

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18 For instance, we would take the 2014 forecast of 1.5% to imply that real GDP grew by 1.5% from 2013 to 2014. As such, we assume that the economy grew by 1.5% over the 2013/14 fiscal year (i.e. from April 2013 to March 2014).
Table 6: Year-on-year GDP growth forecasts, 2013/14 – 2025/26

<table>
<thead>
<tr>
<th>Year</th>
<th>Corresponding Fiscal Year</th>
<th>World Bank</th>
<th>IMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>2013/14</td>
<td>1.5%</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>2014/15</td>
<td>1.3%</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>2015/16</td>
<td>0.8%</td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>2016/17</td>
<td>1.1%</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>2017/18</td>
<td></td>
<td>1.6%</td>
</tr>
<tr>
<td>2019</td>
<td>2018/19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>2019/20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020/21 – 2025/26 (Average growth rate for previous three years assumed)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: IMF, World Bank

As is clear from the table, there seems to be a consensus that real GDP growth in South Africa is expected to remain slow over the next few years. It is also interesting to note that the growth rates shown in the table above are much closer to those shown by Treasury in the 2016 Budget Review. We use the figures shown in the table above in our calculations. These average GDP growth rates will enable us to adjust the NHI White Paper scenarios to reflect a more recent and up-to-date GDP growth scenario.

4.2 NHI cost under various demand and GDP growth scenarios

Thus far we have discussed two aspects of the NHI White Paper's financing calculations. Firstly, the impact of increased demand and utilisation following the implementation of a comprehensive care plan; and, secondly, the GDP growth rate scenarios used in estimating the shortfall. In order to incorporate our discussions into the costing of the NHI, we make adjustments to the cost estimates used in the NHI White Paper.

Our calculations of the shortfall presume a higher annual increase in the NHI costs than those assumed in the NHI White Paper and also an adjusted GDP growth rate up to 2025/26. The funding requirement of the NHI in 2010/11 is provided in the White Paper (R 109.7 billion in 2010 terms). From here, the White Paper assumes that this cost will increase by 4.1% per annum up to 2015/16, after which a growth rate of 6.7% per annum is applied until 2025/26 to arrive at a NHI cost of R 256 billion.

Using the most up-to-date figures on public health expenditure from the 2016/17 Budget Review, we note from the MTEF that public health expenditure will be R 126 billion in 2018/19 (in 2010 terms). In order to
reach the R256 billion NHI cost in 2025/26, this figure will have to grow by 10.6% annually (as discussed earlier in the report). This growth rate implicitly assumes a 70% and 80% increase in outpatient and inpatient utilisation, respectively, as stated in the NHI Green Paper. This increase in utilisation is compared to that of Thailand after its implementation of UHC. However, from our earlier DALY analysis, we note that South Africa’s burden of disease composition and magnitude is wholly different from and much more severe than Thailand’s, which implies that there may be a much larger increase in utilisation than the (already high) rates used in the NHI costing model.

As a result, we postulate that a variety of annual growth rates can materialise over the implementation period (from 2019/20 to 2025/26). In addition to the 10.6% growth rate that will yield R 256 billion in 2025/26, we have assumed growth rates of 12%, 14% and 16% (scenarios named “Econex 1”, “Econex 2” and “Econex 3”, respectively) to illustrate the impact of a higher NHI cost growth rate that may result from increased demand and utilisation following the implementation of NHI.

We assume that public healthcare expenditure will stay constant at 3.8% of real GDP. In this vein, it is stated in the White Paper that “…over the long run, the pace of economic growth is an important indicator of the overall growth rate in health expenditure.” Since public healthcare expenditure will be used to fund the NHI costs, we assume that the NHI’s financing will be a function of GDP. Consequently, we apply the different GDP growth rates from the White Paper as well as more up-to-date real GDP growth estimates, shown in Table 6 above. Changing the rate of the annual cost increases as well as the GDP growth rates will therefore provide several potential shortfalls in funding the NHI system, as shown in Table 7.

Following Table 7, we look at each scenario in more detail and also include a figure which illustrates the shortfall between the NHI costs (under the 10.6%, 12%, 14% and 16% annual increase scenarios) and public health expenditure, assuming that it is a function of our actual GDP/forecast scenario.

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19 NHI Green Paper, para. 121.
20 We calculate this as the average of health expenditure as a percentage of real GDP since 2011/12, which has consistently been approximately 3.8%.
21 NHI White Paper, para 257.
### Table 7: NHI cost projections under different demand and GDP assumptions

<table>
<thead>
<tr>
<th></th>
<th>NHI White Paper</th>
<th>White Paper recalculated</th>
<th>Econex 1</th>
<th>Econex 2</th>
<th>Econex 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average annual per cent increase</td>
<td>Cost projection (R ‘000s)</td>
<td>Average annual per cent increase</td>
<td>Cost projection (R ‘000s)</td>
<td>Average annual per cent increase</td>
</tr>
<tr>
<td><strong>Baseline public health budget</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010/11</td>
<td></td>
<td>R 109,769</td>
<td>R 101,744</td>
<td>R 101,744</td>
<td>R 101,744</td>
</tr>
<tr>
<td><strong>Projected NHI expenditure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015/16</td>
<td>4.1%</td>
<td>R 134,324</td>
<td>Actual R 121,440</td>
<td>Actual R 121,440</td>
<td>Actual R 121,440</td>
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<tr>
<td><strong>Funding shortfall in 2025/26 if GDP increases by:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0%</td>
<td>R 108,080</td>
<td>2.0%</td>
<td>R 112,359</td>
<td>2.0% R 135,521</td>
<td>2.0% R 172,318</td>
</tr>
<tr>
<td>3.5%</td>
<td>R 71,914</td>
<td>3.5%</td>
<td>R 96,924</td>
<td>3.5% R 120,086</td>
<td>3.5% R 156,883</td>
</tr>
<tr>
<td>5.0%</td>
<td>R 27,613</td>
<td>5.0%</td>
<td>R 80,086</td>
<td>5.0% R 103,248</td>
<td>5.0% R 140,045</td>
</tr>
</tbody>
</table>

Source: NHI White Paper; Econex calculations
### Table 8: NHI cost projections under different demand and GDP assumptions – White Paper recalculated scenario

<table>
<thead>
<tr>
<th></th>
<th>NHI White Paper</th>
<th>White Paper recalculated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average annual per cent increase</td>
<td>Cost projection (R '000s)</td>
</tr>
<tr>
<td>Baseline public health budget</td>
<td>2010/11</td>
<td>R 109,769</td>
</tr>
<tr>
<td>Projected NHI expenditure</td>
<td>2015/16</td>
<td>4.1%</td>
</tr>
<tr>
<td></td>
<td>2020/21</td>
<td>6.7%</td>
</tr>
<tr>
<td></td>
<td>2025/26</td>
<td>6.7%</td>
</tr>
<tr>
<td>Funding shortfall in 2025/26 if GDP increases by:</td>
<td></td>
<td>Actual GDP/forecasts</td>
</tr>
<tr>
<td></td>
<td>2.0%</td>
<td>R 108,080</td>
</tr>
<tr>
<td></td>
<td>3.5%</td>
<td>R 71,914</td>
</tr>
<tr>
<td></td>
<td>5.0%</td>
<td>R 27,813</td>
</tr>
</tbody>
</table>

**Figure 15: Calculated funding shortfall under Econex GDP forecasts and 10.6% annual increase in NHI costs**

![Diagram showing calculated funding shortfall under Econex GDP forecasts and 10.6% annual increase in NHI costs]

Source: NHI White Paper; Econex calculation
Table 9: NHI cost projections under different demand and GDP assumptions – Econex 1 scenario

<table>
<thead>
<tr>
<th></th>
<th>NHI White Paper</th>
<th>Econex 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average annual per cent increase</td>
<td>Cost projection (R '000s)</td>
</tr>
<tr>
<td>Baseline public health budget</td>
<td>2010/11</td>
<td>R 109,769</td>
</tr>
<tr>
<td>Projected NHI expenditure</td>
<td>2015/16</td>
<td>4.1%</td>
</tr>
<tr>
<td></td>
<td>2020/21</td>
<td>6.7%</td>
</tr>
<tr>
<td></td>
<td>2025/26</td>
<td>6.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Funding shortfall in 2025/26 if GDP increases by:</th>
<th>Actual GDP/forecasts</th>
<th>R 132,399</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0%</td>
<td>R 108,080</td>
<td>2.0% R 135,521</td>
</tr>
<tr>
<td>3.5%</td>
<td>R 71,914</td>
<td>3.5% R 120,086</td>
</tr>
<tr>
<td>5.0%</td>
<td>R 27,813</td>
<td>5.0% R 103,248</td>
</tr>
</tbody>
</table>

Source: NHI White Paper; Econex calculation

Figure 16: Calculated funding shortfall under Econex GDP forecasts and 12% annual increase in NHI costs

- Health Expenditure
- Medium Term Expenditure Forecast
- NHI Costs (White Paper)
- Econex 1
- Forecasted Health Expenditure (Econex GDP Forecasts)
- 12% Growth
- Shortfall: R 132,399
- R 278,977
- R 255,815
- R 146,578
Table 10: NHI cost projections under different demand and GDP assumptions – Econex 2 scenario

<table>
<thead>
<tr>
<th></th>
<th>NHI White Paper</th>
<th>Econex 2</th>
<th>Figure 17: Calculated funding shortfall under Econex GDP forecasts and 14% annual increase in NHI costs</th>
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<tbody>
<tr>
<td></td>
<td>Average annual</td>
<td>Cost</td>
<td>Average annual per cent increase</td>
</tr>
<tr>
<td>Baseline public health</td>
<td>per cent</td>
<td>projection</td>
<td>per cent increase</td>
</tr>
<tr>
<td>budget 2010/11</td>
<td>4.1%</td>
<td>R 134,324</td>
<td>Actual</td>
</tr>
<tr>
<td>Projected NHI expenditure</td>
<td>2015/16</td>
<td>R 185,370</td>
<td>14% (2019/20 onwards)</td>
</tr>
<tr>
<td></td>
<td>6.7%</td>
<td>R 255,815</td>
<td>14% (2019/20 onwards)</td>
</tr>
<tr>
<td>Funding shortfall in 2025/26 if GDP increases by:</td>
<td>2.0%</td>
<td>R 108,080</td>
<td>2.0%</td>
</tr>
<tr>
<td></td>
<td>3.5%</td>
<td>R 71,914</td>
<td>3.5%</td>
</tr>
<tr>
<td></td>
<td>5.0%</td>
<td>R 27,613</td>
<td>5.0%</td>
</tr>
</tbody>
</table>

Source: NHI White Paper; Econex calculation
### Table 11: NHI cost projections under different demand and GDP assumptions – Econex 3 scenario

<table>
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<tr>
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<th>NHI White Paper</th>
<th>Econex 3</th>
</tr>
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<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>Baseline public health budget</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010/11</td>
<td>R 109,769</td>
<td>R 101,744</td>
</tr>
<tr>
<td>Projected NHI expenditure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015/16</td>
<td>4.1%</td>
<td>R 134,324</td>
</tr>
<tr>
<td>2020/21</td>
<td>6.7%</td>
<td>R 185,370</td>
</tr>
<tr>
<td>2025/26</td>
<td>6.7%</td>
<td>R 255,815</td>
</tr>
<tr>
<td>Funding shortfall in 2025/26 if GDP increases by:</td>
<td>Actual GDP/forecasts</td>
<td>R 210,077</td>
</tr>
<tr>
<td>2.0%</td>
<td>R 108,080</td>
<td>2.0%</td>
</tr>
<tr>
<td>3.5%</td>
<td>R 71,914</td>
<td>3.5%</td>
</tr>
<tr>
<td>5.0%</td>
<td>R 27,813</td>
<td>5.0%</td>
</tr>
</tbody>
</table>

**Figure 18: Calculated funding shortfall under Econex GDP forecasts and 16% annual increase in NHI costs**

Source: NHI White Paper; Econex calculation
Assuming that growth follows the actual GDP/forecasts scenario (Table 8), public health expenditure will be R 147 billion (without NHI implementation). Therefore, the NHI cost in 2025/26 of R 256 billion will result in a shortfall of R 109 billion. For a 12% annual increase in NHI costs, the final cost amounts to R 279 billion, yielding a funding shortfall of approximately R 132 billion. Under the 14% annual increase in NHI costs, the final cost amounts to R 316 billion which will result in a R 169 billion shortfall. Lastly, for a 16% annual increase in NHI costs, the final cost amounts to R 357 billion, which implies that there will be a funding shortfall of approximately R 210 billion.

We note that the actual GDP/forecasts growth scenario is more in line with the 2% scenario shown in the White Paper and not the 3.5% scenario which is used as the illustrative scenario. Although the model is based on assumptions that the costs may increase at a higher rate than proposed in the NHI White Paper, we find that South Africa’s unique burden of disease and the heavily constrained supply of healthcare resources (discussed in section 5) may bring the additional scenarios to fruition, which implies that the funding shortfall may be larger than proposed in the White Paper.

According to the White Paper, the NHI will be funded by general tax revenue and mandatory NHI contributions, although the exact mixture and amounts are yet to be finalised. In the next section, we examine some of the fiscal requirements that may result from the implementation of the NHI system.

4.3 Fiscal requirements

The shortfall in funding the NHI system will have to be financed from other revenue sources and/or government departments. The subsections that follow will discuss this funding requirement as well as the potential implications for the national budget and tax policy. The consolidated South Africa tax revenue for all spheres of government (national, provincial and local government) was estimated to be 26.3% of GDP, or R 1,069,700 million in 2015/16. This figure has been relatively consistent over time. Consequently, given Treasury’s and Econex’s estimates, we find the following:

- If the final figure for the NHI (based on the GDP growth forecast shown in Table 6) of 6.56% of GDP is compared to the current health budget of 4.1% (estimated by Treasury), this implies that an additional 2.46% will have to originate from tax sources.
- If the final figure for the NHI (based on the GDP growth forecast shown in Table 6) of 6.56% of GDP is compared to the current health budget of 3.76% (estimated by Econex), this implies that an additional 2.66% will have to originate from tax sources.
- In other words, tax revenue would have to increase by more or less 10% (based on either the Treasury or Econex estimate).

Figure 19 shows how the size of the NHI in 2025/26 compares to the current budget tax revenue, both in 2010 terms.
As is clear from the figure, the total amount required to fund the NHI in 2025/26 is almost as large as the estimated total revenue generated from personal income tax (0.9 times) in the 2015/16 fiscal year and is larger than any of the other tax income categories. For example, it is 1.7 times larger than corporate income tax, 1.2 times larger than VAT and 5.1 times larger than other tax income categories.

As noted in the NHI White Paper, there will be a funding shortfall of R 108,080 million in 2025/26 if GDP is assumed to grow by 2% per year. To put this in perspective, consider Figure 20 which shows this shortfall alone as a percentage of the different tax revenue categories.
The funding shortfall in 2025/26 (expressed in 2010 terms), assuming a growth rate of 2% per annum, would equal more than a third of tax revenue generated from personal income tax, 75% of corporate income tax or 51% of VAT. In total, the funding shortfall under this scenario is projected to be 13% of total tax revenue generated in the 2015/16 fiscal year. Figure 21 shows how this funding shortfall compares to spending on other categories in the 2015/16 budget.
Figure 21: NHI Shortfall of R 108,080 million (under 2% GDP growth) as percentage of spending on other categories in the 2015/16 budget (in real 2010 terms)

Source: National Treasury

The funding shortfall in 2025/26, under the 2% growth rate scenario, would be almost 90% of the current estimated spending on health for the 2015/16 fiscal year. The shortfall would equal roughly 10% of total estimated expenditure in the 2015/16 budget.

4.4 Summary

It is clear from this section, that GDP growth rates have to be adjusted downwards, and that the White Paper primary assumption of 3.5% growth is not realistic. Combining lower expected growth rates with increased demand (due to pent-up demand, insurance-induced demand and burden of disease), we modelled the growth rate currently assumed in the health budget (10.8%) as well as increases of 12%, 14% and 16%. These assumptions all yield larger shortfalls than those estimated in the White Paper. Putting the shortfall into perspective, one can see that the amounts are large, with a shortfall of up to R210 billion.
5 Supply constraints

The simulations in the previous section do not take supply constraints into account. Given the substantial anticipated increase in the demand for visits to doctors and specialists and the constraints relating to these and other resources, it is unlikely that the South African system will be able to meet this increased demand. Unless the National Health Insurance Authority devises a careful and thorough strategy to ration and manage demand, the NHI could increase the strain on the health system further, which could spark a plethora of perverse unintended consequences in terms of access and service delivery. As it stands, one of the key features of the NHI is financial risk protection, which states that "NHI will ensure that individuals and households do not suffer financial hardship and/or are not deterred from accessing and utilising needed health services. It involves eliminating various forms of direct payments such as user charges, co-payments and direct out-of-pocket payments to accredited health service providers." 22 This implies that there is currently no rationing strategy in place.

In this section, we deal with supply-side issues in healthcare and the extent to which supply can react to expanded demand. There seems to be a widely held assumption that private healthcare providers (both doctors and hospitals) have excess capacity. However, such an assumption should be examined in more detail. In the subsections that follow, we evaluate the private and public sectors in order to form a general picture of the entire healthcare system’s supply constraints.

5.1 Hospitals

Here we look at the number of available hospital beds and the occupancy rates in both the private and public sectors. The complete picture is then compared internationally, to determine if South Africa’s supply constraint is similar to other countries. This may enable us to determine whether or not it is useful to compare South Africa’s move towards UHC with the experience of other countries.

5.1.1 Hospital beds

The figure below shows how the number of hospital beds in South Africa has changed since 1976. Importantly, although the total number of hospital beds was at a high in 1996, it stood at approximately the same level in 2014 as in 1976. 23 Additionally, we note that the composition has changed over time, with private hospitals continually contributing more beds.

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22 NHI White Paper, para. 52 (iv).
23 2014 is the most recent year for which we have data on both the private and public hospital beds.
From these figures, we note that although the total number of beds has stayed relatively constant over time, the private sector has managed to grow its bed numbers, while the public sector’s beds have decreased over the same period. In 2012 there were 87,141 beds in the public sector and 34,600 in the private sector, a total of 121,741 beds countrywide.

5.1.2 Occupancy rates

When interpreting occupancy rates/levels, there are many factors to keep in mind. Firstly, a 100% occupancy rate is neither practical nor possible. All hospitals require vacant beds at all times in order to accommodate emergency admissions. Furthermore, quoted occupancy rates are calculated as an average which included periods of abnormally low occupancy (such as weekends and holiday seasons). High occupancy rates (of over 80%) place significant strain on the hospital support services (cleaning, linen, catering, administration and security) and increases the pressure on nursing staff and patient care, resulting in a relative or absolute decline in staff to patient ratios. In addition, it has been suggested in the literature that occupancy levels approaching 90% increase the risk of adverse events (such as skin lesions, falls, medication errors and others). A further major concern at high

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24 For the private sector, we only include hospital bed numbers up to 2012, since this is the most up to date verified number we have at our disposal. We note that from HASA’s own data, there were 30,636 private hospital beds in 2016. However, it was communicated that this may not be a comprehensive list, and thus we are not able to verify this number.

25 For the public sector hospital beds, we only have data available for 2010 (88,920 beds) and 2014 (85,362 beds). Therefore, to arrive at 2011 and 2012 values, we used linear interpolation.
occupancy levels is infection control. These risks to clinical quality have added financial implications as well.

It should also be kept in mind that occupancy rates are expressed as a percentage of registered beds, but occupancy can never exceed the number of operational beds (which often is less than total registered beds). Additionally, higher occupancy rates are specifically constraining given the current shortage of medical professionals (see section 5.2).

The 2009 Private Hospital Review indicates that the average hospital occupancy across the industry, calculated as the ratio of bed days used to bed days available, was 65.5% in 2008. In more recent years, this rate has been somewhat higher with the occupancy ratio of the three largest hospital groups in South Africa (Life, Netcare and Mediclinic) all exceeding 70% (when only considering Netcare’s full-week rate), as seen in Figure 23.

**Figure 23: Occupancy rates in the private sector, 2013 – 2015**

![Occupancy rates chart](image)

**Source: Annual statements of private hospitals**

According to a study conducted by Childs, the distribution of hospital occupancy across all private hospitals is key to determining available occupancy. Distribution of occupancy refers to the probability of a hospital being occupied at a certain level. For instance, modelling South Africa’s private hospital occupancy in 2007, Childs finds that there is a 20.1% probability to find a hospital 60-69% full of patients on any given day, and a 3.4% chance of finding it 100% occupied.

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28 As mentioned in Econex Health Reform note 4, these figures include weekends and public holidays (i.e. occupancy ratios are calculated over all days of the year) and are based on licensed beds, not actual beds.
Based on Childs’ model (see Table 12), increasing overall 2007 private hospital industry occupancy levels by 20% will increase the chances of finding a hospital operating at maximum capacity (over 80% full) to 41% (top right cell in the table). The model further indicates that there will be a 15% probability of a hospital being 100% full, i.e. 3 out of every 20 people will arrive at a hospital with no beds available (bottom right cell in the table). As aggregate occupancy increases over the years, these effects will become worse.

Table 12: Probability of arriving at a hospital with occupancy over 80%, 90% and 100% of 2007 registered beds under different private hospital industry occupancy

<table>
<thead>
<tr>
<th>Probability</th>
<th>Base (62%)</th>
<th>Base + 5%</th>
<th>Base + 10%</th>
<th>Base + 15%</th>
<th>Base + 20%</th>
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<tbody>
<tr>
<td>Over 80%</td>
<td>18%</td>
<td>24%</td>
<td>30%</td>
<td>35%</td>
<td>41%</td>
</tr>
<tr>
<td>Over 90%</td>
<td>8%</td>
<td>12%</td>
<td>12%</td>
<td>21%</td>
<td>26%</td>
</tr>
<tr>
<td>100%</td>
<td>3%</td>
<td>5%</td>
<td>5%</td>
<td>11%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Source: Childs (2009)

As mentioned above, the implementation of the NHI will result in a large inflow of newly insured patients, which will put further strain on the already high occupancy rates in the private sector. Especially since a similar trend is observed for public sector occupancy rates (see Figure 24 below).

Figure 24: Inpatient bed utilisation rate – total, 2003-2014

Source: Health Systems Trust

More specifically, we note that the total inpatient bed utilisation rate in the public sector has increased from an average of 68% in 2003 to 72% in 2014. If the number of total hospital beds in the country is not increased sufficiently, it will be very difficult for both the public and private hospitals to function optimally when occupancy rates increase as expected with introduction of the NHI.
5.1.3 International comparison

Looking at the number of available hospital beds in South Africa (private and public combined), we found that there were 121,741 beds in total. If we consider this number relative to South Africa’s more or less 52.3 million\(^3\) residents in 2012, we find that there are 2.3 beds per 1,000 of the population. These figures are comparable to those calculated in Econex’s Health Reform Note 4. The figure below compares this number to other countries. It is evident that South Africa has significantly fewer beds per 1,000 of the population.

Figure 25: Hospital beds per 1,000 of the population, 2013 (or most recent available year)

Source: OECD (2016); Econex estimate

\(^3\) Statistics SA mid-year estimate for 2012 (revised).
From this figure, we note that according to international standards, South Africa has a relatively low number of hospital beds imposing a significant constraint on service delivery. As noted earlier, the total number of hospital beds is currently at the same level as in 1976. Given that this has been outpaced by population growth and the increasing burden of disease, stagnant growth in the total number of hospital beds places pressure on the occupancy rates which are already at high levels in both the private and public sector, as discussed earlier in this section.

Importantly, this estimate would be even lower without the beds in the private sector, which has been increasing over time. The private sector’s hospital beds therefore acts to lessen the load on the public sector’s beds, which has seen a consistent decrease since 1976. In the face of this total shortage of hospital beds, we note that this will only be exacerbated following the demand increase that will necessarily occur following the implementation of the NHI system.

5.2 Doctors

In addition to the shortage of beds and the increasing occupancy rates, South Africa has an acute shortage of qualified medical professionals, specifically general practitioners, medical specialists and nurses. The total numbers of these professionals are shown in Table 13 for the private and public sectors (filled posts) as well as the combined total. The last row in the table looks at the number of respective medical professionals per 100,000 of the total South African population.

Table 13: Number of medical professionals working in the private and public sectors by profession, 2014

<table>
<thead>
<tr>
<th>Sector</th>
<th>General Practitioners</th>
<th>Medical Specialists</th>
<th>Total doctors</th>
<th>Total Nurses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>8 234</td>
<td>7 418</td>
<td>15 652</td>
<td>89 328</td>
</tr>
<tr>
<td>Public</td>
<td>14 097</td>
<td>4 920</td>
<td>19 017</td>
<td>132 430</td>
</tr>
<tr>
<td>Total in SA</td>
<td>22 331</td>
<td>12 338</td>
<td>34 669</td>
<td>221 758</td>
</tr>
<tr>
<td>Per 100,000 of the total population</td>
<td>41</td>
<td>23</td>
<td>64</td>
<td>410</td>
</tr>
</tbody>
</table>

Source: Econex calculations using data provided by private medical scheme administrators and Persal data

The table shows that there were 22,331 GPs, 12,338 medical specialists and an estimated 221,758 nurses working in South Africa in 2014. Looking at these numbers per 100,000 of the population shows that there were 41 GPs, 23 medical specialists (in total, 64 doctors) and 410 nurses per 100,000 of the population in 2014.

Figure 26 shows how these figures compare to international standards. It is based on previous work by Econex for the 2014 HASA Conference. From this comparison, we note that South Africa is significantly supply constrained compared to its peer countries. More specifically, while South Africa

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31 Different countries have different definitions and include various categories (i.e. registrars; certified; self-reported; foreigners). In addition, training requirements differ, data per specialty are scarce and/or out-dated and the health systems differ. Consequently, the international comparison is for a catch-all category called “All physicians”.
has 64 doctors per 100,000 of the total population, countries such as Brazil, Russia, China and OECD countries do not have similar supply constraints in terms of human resources.

**Figure 26: All physicians per 100,000 of the population, 2014**

![Bar chart showing physicians per 100,000 population]

*Source: World Health Organization*

From the figure, we note that South Africa’s ratio of physicians per 100,000 of the population is low compared to other countries and regions. However, Figure 27 shows that South Africa fares better internationally in terms of the nursing staff per 100,000 of the population.

**Figure 27: Nurses per 100,000 of the population, 2014**

![Bar chart showing nurses per 100,000 population]

*Source: World Health Organization; World Bank*
Although the ratios quoted here are representative of the country as a whole, geographical disparities imply that the ratios may look very different between the various provinces, as seen in Figure 28 and Figure 29 below. These figures show the number of doctors and specialists per 100,000 (as adapted from the 2014/15 SA Health Review) and of the uninsured population (non-members) in 2014 per province in South Africa, respectively. Although we only have public sector data available for the provincial comparison, we note that adding the private sector data would exacerbate the disparities between the provinces, since private sector medical practitioners and medical specialists are more prevalent in and around the country’s economic hubs (i.e. Johannesburg, Cape Town, Durban, etc.) where most of the medical scheme beneficiaries also reside.

**Figure 28: Medical practitioners in the public sector per 100,000 of the uninsured population, 2014**

<table>
<thead>
<tr>
<th>Province</th>
<th>Per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Cape</td>
<td>33.9</td>
</tr>
<tr>
<td>North West</td>
<td>20.2</td>
</tr>
<tr>
<td>Northern Cape</td>
<td>45.0</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>24.5</td>
</tr>
<tr>
<td>Limpopo</td>
<td>23.1</td>
</tr>
<tr>
<td>KwaZulu Natal</td>
<td>38.1</td>
</tr>
<tr>
<td>Gauteng</td>
<td>34.9</td>
</tr>
<tr>
<td>Free State</td>
<td>31.0</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>24.5</td>
</tr>
</tbody>
</table>

*Source: South African Health Review; Econex calculations*
Figure 29: Medical specialists in the public sector per 100,000 of the uninsured population, 2014

Given the geographic disparities illustrated by the public sector ratios, one can assume that the aggregate ratios (including the private sector distributions) are worse in some of the less populated regions of the country. In addition to these supply constraints (which are worse in some areas than others), the utilisation of benefits that would be available under an NHI type system should be considered carefully. I.e. the rationing of services and limited resources need to be considered carefully.

The shortage of doctors is even more pronounced when looking at the vacancy rates in the public health sector, which is illustrated in Figure 30. It shows the proportion of posts in the public sector which were filled and vacant in 2014.
The figure shows that the vacancy rate for GPs and specialists was 17% in 2014, while the vacancy rate for all nurses (RNs, ENs and ENAs) was 14% in 2014.

5.2.1 Summary

Our analysis shows that South Africa faces a significant supply constraint. Internationally, South Africa’s hospital bed availability is far lower than that of its peer countries. This situation has resulted from stagnant growth in hospital beds since 1976, which has ultimately contributed to more pressure on rising occupancy rates. This supply constraint also holds for human resources. The availability of physicians per 100,000 of the population shows that South Africa fares poorly against other countries/regions. Although this is less problematic for nursing, South Africa still performs poorly by international standards. In addition, the provincial distribution of the public health sector’s human resources indicates that there is a maldistribution of medical professionals which exacerbates the supply constraints in rural areas.

It is important to note that the implementation of a NHI plan will have to overcome all of these supply constraints, in addition to the significant increase in demand that will materialise as a result of South Africa’s rising disease burden. Ultimately, this will translate into added financial pressure.
6 Conclusion

The aim of this report was to assess the validity of the NHI cost projections, as well as the underlying assumptions informing costings, as included in the NHI White Paper. First these projections were presented in the context of the current health budget, finding that the NHI White Paper’s expenditure estimates are not in line with the National Treasury’s most recent estimates for health expenditure in the next two to three years. It was also found that the annual increases in the public health budget, as assumed in the White Paper, are not sufficient and that the health budget will have to grow with more than 10% annually from 2019 until 2026 to reach the estimated R255 billion NHI spending in that year (total health budget). The conclusion reached was that, given low expected GDP growth rates coupled with increased demand and severe supply side constraints, the NHI costs as estimated in the White Paper are not realistic and will require large increases in the health budget.
Appendix A: Evidence of Demand Increases

Insurance-induced demand

Given certain demand side barriers, one can ask what will happen if people are fully insured against healthcare expenditures. For consumers health insurance turns unpredictable health expenditures into predictable insurance payments. However, not everyone can afford to purchase health insurance and various factors that play a role in the decision to purchase health insurance are discussed in the literature. These are e.g. access to healthcare services, quality of services in healthcare centres, healthcare expenditures, households’ or individuals’ income levels, education levels, age, family size, and the number of adults in households. Other factors that could be important are geographic factors, such as whether the household is urban or rural, housing conditions, ownership of a private vehicle, as well as health status, amongst others. These factors usually mean that not all people will have health insurance (it will be shown below that in South Africa currently only 16.3% of the population are covered by medical schemes). However, under the NHI, it is envisaged that there will be universal coverage, i.e. all South Africans will have medical insurance, regardless of whether they pay for it or whether they qualify for free coverage. The question that needs to be addressed is how the demand for healthcare will change under the NHI, and whether the whole population is automatically insured against the majority of health-related costs.

One way to answer the question of how the demand for healthcare differs between insured and uninsured people, is by looking at the literature on this aspect. When one considers the determinants of the demand for health insurance, then it is clear that people who expect to demand more services have a clear incentive to obtain medical insurance. One important example of a natural experiment to determine the demand for healthcare when insured is the 'RAND Health Insurance Experiment' (HIE) which was conducted in the USA between 1971 and 1982. Although this experiment was conducted a few decades ago, the HIE remains an important long-term, experimental study on cost sharing and the results are still referred to in the more recent literature. This study made a significant contribution to what we know about the demand for healthcare when insured or not. In the RAND experiment, families were provided with different levels of insurance in terms of co-insurance rates (percentage paid out-of-pocket), and an upper limit on annual out-of-pocket expenses. Co-insurance rates were either 0%, 25%, 50% or 95% and the upper limit on annual out-of-pocket expenses were 5%, 10% or 15% of family income, up to a maximum of $1000. The study found a positive relationship between the level of co-insurance (free) and doctor visits and hospital admissions and overall expenses. In a later article by Vera-Hernandez (2003), the RAND dataset was analysed using a panel dataset. The analysis by Vera-Hernandez confirms the earlier findings, i.e. that “those who enjoy a zero co-

33 To indicate the size of this experiment, consider the fact that the cost was more than $80 million at the time (1974). Participants in the study did not pay any insurance premium. RAND recruited 2 750 families encompassing more than 7 700 individuals. Families participated in the experiment for 3-5 years.
payment rate seek care more often than those who face cost-sharing contracts. In another study, Newhouse et al. (1993) also looked at other characteristics of participants in the RAND experiment and tried to find differences between users of the free care and other plans, looking at 20 different variables. The only characteristic that turned out to be significant was gender. The results are conclusive on the relationship between healthcare demand and insurance.

Results from Vera-Hernandez show how frequency of episodes treated varies with co-payment rates. These results confirm the earlier results reported by Manning et al. (based on the same RAND experiment). The data also indicate that there is a higher frequency of face-to-face visits when there is no co-payment (4.55 visits per capita p.a.) than when there is a 95% co-payment (2.73 visits per capita p.a.). Total expenses are also more, although this is a reflection of the higher frequency. These results from the literature are hardly surprising. However they have important implications for a NHI that will provide cover with zero co-payments. The results from Vera-Hernandez and Manning et al. show that a 0% co-payment option resulted in significantly more face-to-face visits, admissions and total expenses as these people generally seek more care than those facing higher co-payments.

In 2008, a similar experiment was conducted in the United States. The Oregon Medicaid health experiment looked at the effects of the Medicaid expansion in the state of Oregon. This expansion was based on lottery drawings from a waiting list. The people selected in the lottery were classified as the treatment group, while others on the waiting list were classified as the control group. The results of the study show a clear increase in the utilisation of healthcare services. People associated with Medicaid coverage made more frequent use of hospital admissions, prescription drug use and outpatient visits. In addition, they experienced a 30% increase in the likelihood of having a hospital admission, a 15% increase in the likelihood of taking prescription drugs and a 35% increase in the likelihood of having an outpatient visit. There was also an increase in the likelihood of receiving preventative care, which included a 60% increase in mammograms within one year for women over 40 years old.

Another example is that of the implementation of universal health insurance in Taiwan in 1995. A study conducted by examining the utilisation behaviour of 1,021 randomly selected Taiwanese adults, reported that there was an increase in utilisation by the newly insured. The study found that after the introduction of universal health insurance, the newly insured consumed more than twice the number of outpatient physician visits (0.21 vs. 0.11) than before, bringing them to the same level of healthcare utilisation as the previously insured group. The study concluded that, “The universal health insurance removed some barriers to healthcare for those newly ensured.”

It is therefore expected that the implementation of NHI will also have the effect of increasing utilisation in South Africa.

35 Ibid.
38 Ibid.
Evidence of pent-up demand

Another way of looking at the issue of access and utilisation, is to look at what happened to the demand for healthcare in one specific case when the price constraint was eliminated. In 1994 a new policy was implemented in South Africa where free healthcare was made available to pregnant women and children under six. This can therefore be considered a natural experiment that can give some indication of changes in demand when services are free (the same as fully insured or zero co-payments). A study by McCoy collected data from the records of hospitals and clinics in twelve sites in four provinces for the period January 1993 to July 1995 in order to analyse utilisation before and after implementation of this policy. This study found that utilisation has increased, e.g. in the Free State, visits by pregnant women and children under six rose by 51% and 198% respectively. In the Western Cape, it was found that district surgeon utilisation by pregnant women and children under six increased by 659% and 300%, respectively. There was also an increase in the number of antenatal visits, with women also starting to attend antenatal care earlier in pregnancy than before the implementation of the policy.

Interestingly, this study also reported an increased tendency for patients to use hospitals rather than clinics. One of the reasons cited was inadequate levels of service at clinics due to lack of staff and equipment and that this was prompting patients to bypass clinics and rather visit hospitals. Other reasons cited as barriers to the use of primary healthcare facilities were “long queues, the attitude of staff and lack of medicine.”

Another indication of pent-up demand is the difference in utilisation ratios of GPs in the private and public sectors. In Econex’s 2009 report, it was explained that GP visits in the private sector are on average 3.5 per person p.a. while the corresponding figure is between 2.1 and 2.3 for people in the public sector. When estimating the resource requirements, it may therefore be assumed that the demand in the public sector will rise to the same levels than that in the private sector.

In order to better illustrate the potential increased demand and utilisation following the implementation of universal health coverage, we present several case studies that showcase the experiences of other countries.

Case studies of demand and cost increases

Thailand

Thailand introduced the Universal Coverage Scheme (UCS) in 2001, covering 95.5% of the population by 2004. Its alternative name – the 30 Baht Scheme – refers to the maximum of 30 baht co-payment by members for services included in the defined benefit package. However, less than 2%
of the scheme’s funding comes from co-payments. The government pays healthcare facilities a fixed amount per person signed up, funded by general taxes.\textsuperscript{41}

Government expenditure on health showed a marked increase after the implementation of UCS, increasing from 84.5 billion baht in 2001 to 116.3 billion baht in 2002. Expenditure increase annually to reach 247.7 billion baht in 2008 – a 76\% real increase from 2002. Figure 31 shows the total per capita health expenditure, expressed in terms of 2005 US\$ prices, adjusted for purchasing power parity (PPP).\textsuperscript{42,43} This increase is attributed to the rising cost of production and increased utilisation of health services.\textsuperscript{44} The effect of UCS on utilisation is clearly seen when comparing the number of outpatients and number of outpatient visits for 2001 to that of 2002: the number of outpatients more than doubled from 18 million to 40 million, while the number of outpatient visits almost doubled from 52.7 million to 99.4 million. Both of these again decreased in 2003 due to long waiting times and a decline in service quality.\textsuperscript{45}

\textbf{Figure 31: Thailand health expenditure, 2005 US\$ prices, adjusted for PPP}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure31}
\caption{Thailand health expenditure, 2005 US\$ prices, adjusted for PPP}
\end{figure}

Source: WHO (2016)

\textbf{Mexico}

\textsuperscript{41} Hughes, D. & Leethongdee, S., 2007. Universal coverage in the land of smiles: lessons from Thailand’s 30 Baht health reforms. \textit{Health Affairs}, Vol.26, No.4, pp.999-1008 (p.1000)

\textsuperscript{42} Purchasing power parity refers to the rates of currency conversion that ensure an identical good or service has the same price in different countries when expressed in the same currency – money has the same purchasing power in all the countries.

\textsuperscript{43} Organisation for Economic Co-Operation and Development. Available online: http://www.oecd.org/std/prices-ppp/purchasingpowerparities-frequentlyaskedquestionsfaqs.htm


In 2003 Mexico’s Seguro Popular (SP) was rolled out gradually from 2001 to 2005. It is available to all citizens that are not employed in the formal sector, but enrolment is voluntary. SP therefore specifically targeted poor families, previously uninsured, to reach the goal of universal health coverage. It operates alongside mainly the Mexican Social Insurance Institute and Government Workers’ Social Security and Services Institute for those working in the formal sector.\(^{46}\)

SP is funded mainly by federal contributions, with complementary contributions by states and small premiums by beneficiaries based on a means-tested sliding scale. In 2006 and 2007, 75% of funds available to SP was federal contributions, about 24% were state contributions and 0.6% came from beneficiaries’ contributions.\(^{47}\) Federal contributions are based on the number of individuals enrolled. The budget of the Ministry of Health, which is responsible for SP, increased by 72.5% in real terms over the period 2000 to 2006. The proportion of the Ministry of Health’s budget allocated to healthcare infrastructure also increased from 3.8% to 9.1% between 2000 and 2006. The increase in total healthcare expenditure is mainly due to the increased public spending, although part of it can be attributed to the change in the burden of disease, with the prevalence of more costly non-communicable diseases increasing.\(^{48}\) Figure 32 illustrates the total per capita health expenditure, expressed in constant 2005 US dollars and adjusted for PPP.

**Figure 32: Mexico health expenditure, 2005 US$ prices, adjusted for PPP**

![Graph showing Mexico health expenditure from 1995 to 2013](image)

Source: WHO (2016)

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A national survey in 2006 indicated that individuals that are enrolled have a higher probability of visiting a healthcare facility and using hospitals for electives surgeries.\textsuperscript{49}

**Turkey**

Turkey's Health Transformation Program (HTP) was instituted in 2003, followed by the consolidation of five health insurance schemes to form the General Health Insurance Scheme (GHIS) in 2006.\textsuperscript{50} Membership of the GHIS is compulsory. It is predominantly funded by earmarked payroll taxes, while healthcare for the non-paying portion of the population is funded by tax revenue.\textsuperscript{51} The strong economic growth Turkey experienced between 2005 and 2008, leading to higher employment, increased health insurance coverage and a larger amount of premium revenue, was therefore an important factor in government's ability to fund healthcare.

Health expenditure increased substantially following the start of the HTP, with government funding of healthcare expenditure increasing at average annual rate of 9.1\% for the period 2000 to 2008. Public sector investment in health infrastructure also increased (in nominal terms) from 603 million Turkish lira to 5.4 billion Turkish lira over the same period. The government encouraged private sector investment in health, resulting in an increase from 100 million Turkish lira invested by the private sector in 2000 to 1.3 billion Turkish lira in 2008 (in nominal terms).\textsuperscript{52} Figure 33 illustrates the total amount per capita spent on healthcare in terms of constant US dollars (2005 prices) adjusted for purchasing power parity (PPP).

Figure 33: Turkey health expenditure, 2005 US$ prices, adjusted for PPP

Part of the increase in the costs stems from the increased utilisation of services: the number of primary care visits increased from 74.8 million in 2002 to 244.3 million in 2011, while hospital visits increased from 124.3 million to 337.8 million over the same period. The utilisation of maternal and child health services also increased significantly over the period 2003 to 2008, especially by the socioeconomically disadvantaged population and those in rural areas. However, the government put in place demand restrictions and co-payments on medication and outpatient visits to hospitals following 2009’s economic slowdown and resulting decreased tax revenues due to the global finance crisis.

Brazil

In 1988 Brazil introduced its Unified Health System (Sistema Único de Saúde – SUS), providing free primary, secondary and tertiary health care to all citizens. The Family Health Plan (Programa Saúde da Família – PSF) was added in 1994 to increase access to primary healthcare. The health system is made up of this public subsector along with the private and private health insurance subsectors.

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This parallel health system has resulted in double coverage, with individuals with private health insurance also being eligible to use free public care.\(^\text{57}\)

The SUS is funded by tax revenues from levies on financial transactions, income, sales of goods and services, among others, and social contributions from the federal, state and municipal budgets.\(^\text{58}\) In 2003 public spending made up 45.3% of total healthcare expenditure.\(^\text{59}\) The SUS has been underfinanced, and a social contribution specifically to fund healthcare was instated in 1997.\(^\text{60}\) However, the health sector did not receive the full revenue: in 2006, for example, only 40% of income went to the health sector. This contribution was repealed in 2007.

A study of the proportion of women receiving antenatal care in two urban areas indicated that of those exclusively making use of public financing 3% did not receive any antenatal care in 1982 (before the implementation of SUS), compared to 2.2% in 2004. For the lowest income group, the proportion not receiving healthcare dropped from 13% in 1982 to 9.9% in 1993 and 3.3% in 2004.\(^\text{61}\)

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