Tools for IMSA from REF Study 2005

IMSA Workshop
27 September 2007
Study of the Prevalence of Chronic Disease in Medical Schemes

April 2007

Risk Equalisation Fund
REF Study 2005 Beneficiaries

REF Study 2005 used 63.4% of beneficiaries in industry in REF Grids September 2005

There were 54 schemes with 149 options.
9 options in REF Grids not submitted to Study
REF Study 2005

- Tables derived from data in **REF Study 2005**:  
  - Four administrators: Discovery Health, Medscheme, MHG and Old Mutual Healthcare.  
  - Data on prevalence and PMB expenditure for calendar 2005.  
  - **TREATED** data is beneficiaries meeting all criteria in REF Entry and Verification Criteria v2, in force from 1 January 2007.  
  - **CASES** data is before test for “treated patient”.

- Graphs show final prevalence table published with REFCT2007:  
  - Uses **TREATED Revised Prevalence**: TREATED data after application of multiple disease rules.  
  - Final REFCT2007 used for order of diseases.  
  - Female, Male and Total tables, no smoothing.  
- The tables are effectively for calendar 2007. HIV has been adjusted to the expected level of the epidemic in 2007.  

Source: REF Study 2005
TREATED Revised Prevalence

- The tables are for calendar 2007. HIV has been adjusted from the 2005 Study to the expected level of the epidemic in 2007.
- TREATED data is beneficiaries meeting all criteria in REF Entry and Verification Criteria v2, in force from 1 January 2007.
- Uses TREATED Revised Prevalence: TREATED data after application of multiple disease rules.
- This removes any effects of up-coding or multiple coding amongst similar diseases. It has the effect of equalising the coding practice between administrators in the Study.
- For example, the multiple disease rules allow only one of Asthma, COPD and Bronchiectasis.
- Schemes need to compare their own results to this tighter definition and not to prevalence that contains multiple coding for the same disease.
- Final REFCT2007 disease values used for order of diseases.

Source: REF Study 2005
Ranking of Diseases in Multiple Disease Rules

- Effectively uses an approach similar to hierarchical co-existing conditions methodology.
- Order of diseases from REFCT2007 using gender as a risk factor.
- Only one disease in the following groups may be selected. Highest cost disease in **bold**:
  - respiratory: **COP**+AST+BCE
  - cardiac: **CMY**+CHF+IHD+DYS+HYP
  - renal: **CRF**+HYP
  - gastro: **CSD**+IBD
  - diabetes: **DM1**+**DM2** (always default to DM2)
  - mental: **BMD**+SCZ
  - neuro: **MSS**+BMD+EPL
  - skeletal: **SLE**+RHA (other way around in REF Study 2002)

Source: REF Study 2005
Hyperlipidaemia Prevalence

Not included in cardiac multiple rule. Levels similar to 2002. Predominantly male.

Source: REF Study 2005
Impact of renal and cardiac multiple rules at older ages.

Source: REF Study 2005
Cardiomyopathy and Cardiac Failure Prevalence

Diseases now combined but prevalence exceeds CHF+CMY in 2002.

Source: REF Study 2005
Diabetes Type 2 Prevalence

Similar to previous levels. Predominantly male.

Source: REF Study 2005
Rheumatoid Arthritis Prevalence

Female prevalence nearly double that of males.

Source: REF Study 2005
Expected epidemic in 2007 using TREATED data very similar to previous estimate for 2005.

Source: REF Study 2005
Study of the Impact on REF of Autochronic Definitions

April 2007
Source of Chronic Identification

- Three columns for the source of chronic identification, populated "Y" for True and "N" for False.
- These are not mutually exclusive, as the patient may be identifiable by all three methods.

- **AuthICD**: a granted authorisation was found outside 2005, (during 2006 or before 2005)
- **ClaimICD**: either the dispensing provider or the prescribing provider on a claim from any period was a medical practitioner (GP or Specialist)
- **CrosswalkICD**: a proxy diagnosis was made using the MHG in-house NAPPI-ICD crosswalk.

Source: REF Study 2005
Risk Equalisation Fund

MHGr Beneficiaries

TREATED: must meet additional criteria for “treated patient”.

Source: REF Study 2005
MHG Data Sets

Four sets of data extracted for analysis

Source: REF Study 2005
Four Sets of MHGr Data

- Four sets of data were analysed for MHG (for each of CASES and TREATED):
  - **MHGr1**: MHG No Autochronic: all lives identified in Autochronic runs (contains the three Autochronic source columns) are defaulted to NON.
  - **MHGr2**: MHG using AuthICD: all MHG1 lives plus those with AuthICD=Y. Others with chronic disease defaulted to NON.
  - **MHGr3**: MHG using AuthICD or ClaimICD: all MHG1 lives plus those with AuthICD=Y or ClaimICD=Y. Others with chronic disease defaulted to NON.
  - **MHGr4**: MHG with Autochronic: as submitted by MHG to the REF Study 2005.

Source: REF Study 2005
**Impact on Share of Chronic Lives**

<table>
<thead>
<tr>
<th>Chronic Lives</th>
<th>Member Years</th>
<th>REF Study 2005</th>
<th>All Lives</th>
<th>Member Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TREATED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MHGr1</td>
<td>97,969</td>
<td>24.4%</td>
<td></td>
<td></td>
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<tr>
<td>DH</td>
<td>135,046</td>
<td>33.6%</td>
<td></td>
<td></td>
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<tr>
<td>MS</td>
<td>133,199</td>
<td>33.1%</td>
<td></td>
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<tr>
<td>OMHC</td>
<td>36,011</td>
<td>9.0%</td>
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</tr>
<tr>
<td>MHGr2</td>
<td>116,070</td>
<td>20.8%</td>
<td></td>
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<td>MHGr3</td>
<td>166,901</td>
<td>24.4%</td>
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<tr>
<td>MHGr4</td>
<td>270,362</td>
<td>47.1%</td>
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</tr>
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<td></td>
</tr>
<tr>
<td>MHGr1</td>
<td>863,525</td>
<td>20.8%</td>
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<td></td>
</tr>
<tr>
<td>DH</td>
<td>1,765,066</td>
<td>43.0%</td>
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<tr>
<td>MS</td>
<td>1,156,148</td>
<td>27.8%</td>
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</tr>
<tr>
<td>OMHC</td>
<td>349,146</td>
<td>8.4%</td>
<td></td>
<td></td>
</tr>
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</table>

**Source:** REF Study 2005

Risk Equalisation Fund

MHGr1  97,969 chronic lives
MHGr2  116,070 chronic lives
MHGr3  166,901 chronic lives
MHGr4  270,362 chronic lives
Impact on Chronic Rate per 1,000

MHGr4 impossible shape. MHGr3 too high. Choice between MHGr2 and MHGr1. MHGra is essentially MHGr2 with amended COP, DM1 and DM2

Source: REF Study 2005
Autochronic Impact on AST

MHGr4 and MHGr3 clearly presents an over-estimation of chronic disease.

Source: REF Study 2005
Autochronic Impact on COP

MHGr4 and MHGr3 clearly over-estimates. MHGra is MHGr2 but adjusted manually to convert CASES data to TREATED data.

Source: REF Study 2005
Autochronic Impact on IBD

MHGr4 and MHGr3 clearly too high.

Source: REF Study 2005
Autochronic Impact on RHA

MHGr4 and MHGr3 clearly too high. MHGra similar to two other administrators.

Source: REF Study 2005
Autochronic Impact on SLE

MHGr4 and MHGr3 clearly too high. MHGra similar to two other administrators.

Source: REF Study 2005
Autochronic Impact on EPL

MHGr4 and MHGr3 clearly too high. MHGra is somewhat higher than nearest two administrators

Source: REF Study 2005
Conclusions from the Study

- The decision by the REF pricing team was to use MHGr2, except for:
  - Multiple diabetes rule applied to default all with DM1+DM2 to DM2.
  - COPD manually adjusted to deal with serious definitional issues.
- The only chronic definition acceptable to the REF Study was where there was a granted authorisation for a CDL disease, even if the authorisation was found outside that year (mostly during 2006 as schemes worked to record the authorisations required by the Verification Criteria).
- All other auto-chronic definitions / and or claims identification methods were not acceptable for the REF pricing.
- By extension, all other auto-chronic definitions are unacceptable for inclusion in REF Grid Counts submitted to Council and for REF shadow payments using REFCT2007.

Source: REF Study 2005
Summary of Decision

- In terms of REF submissions: the only acceptable chronic definition is where there is a granted authorisation for a CDL disease, even if the authorisation is found in a period outside the submission period.

- All other auto-chronic definitions are unacceptable for REF purposes. Unacceptable definitions include:
  - any diagnosis made from a claim that contains an ICD-10 code from a healthcare professional (even if the dispensing provider or the prescribing provider on a claim was a medical practitioner (GP or Specialist)); and
  - any diagnosis made by proxy using the medicine or class of medicine prescribed to arrive at a diagnosis (for example, a NAPPI-ICD crosswalk or any similar tool).

Source: REF Study 2005
The Impact of the Verification Criteria on the REF Grid Count

April 2007
**Risk Equalisation Fund**

**CASES and TREATED**

TREATED requires Proof of Treatment i.e. evidence of payment for ARVs

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**Table 25: HIV / AIDS**

<table>
<thead>
<tr>
<th>Diagnosis-related Information</th>
<th>Proof of Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider code of the diagnosing provider</td>
<td>Evidence of payment of claims for any product included in the ATC categories below, in two different calendar months in the three calendar months preceding the current month:</td>
</tr>
</tbody>
</table>
| ICD10 Codes (Any of the following) | J05AE  
J05AF  
J05AG |
| Z21 | AND |
| B20 | AND |
| B20.0 | AND |
| B20.1 | B21.3 |
| B20.2 | B21.7 |
| B20.3 | B21.8 |
| B20.4 | B21.9 |
| B20.5 | B22 |
| B20.6 | B22.0 |
| B20.7 | B22.1 |
| B20.8 | B22.2 |
| B20.9 | B22.7 |
| B21 | B23 |
| B21.0 | B23.0 |
| B21.1 | B23.1 |
| B21.2 | B23.2 |
| B24 | B23.3 |
| B24 | B23.4 |
HIV on ARVs Prevalence

Expected epidemic in 2007 using TREATED data very similar to previous estimate for 2005.

Source: REF Study 2005
HIV on ARVs Prevalence

CASES expected in 2007 almost double the expected level in 2005.

Source: REF Study 2005
Effect of Verification Criteria on HIV on ARVs Prevalence

CASES and TREATED now projected to expected epidemic in 2007. TREATED in 2007 should be similar to originally expected in 2005.

Source: REF Study 2005
Definition of TREATED and CASES

- Two sets of data were extracted:
  - The first used the full Entry and Verification definitions and was called the “Treated Patient Data set” or “TREATED”.
  - The second set was extracted without the test for “treated patient” and was called the “Total Cases Data set” or “CASES”.
- While this meant a doubling of the extractions, it provided a powerful tool to investigate potential prevalence and cost if compliance improves and to be able to determine the impact if more people in future fall within the definition of “treated patient”.
- Most important comparison for REF financial sensitivity is CASES Count vs. TREATED Count. Difference represents “bubbling under” for each disease.

Source: REF Study 2005
# Amounts above NON for Diseases

<table>
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<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
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<td>ADS</td>
<td>249.24</td>
<td>223.25</td>
<td>218.86</td>
<td>147.35</td>
<td>147.35</td>
<td>119.45</td>
<td>ADS</td>
<td>67.3%</td>
<td>81.1%</td>
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<td>AST</td>
<td>404.55</td>
<td>379.09</td>
<td>383.86</td>
<td>303.90</td>
<td>304.73</td>
<td>154.08</td>
<td>AST</td>
<td>79.2%</td>
<td>50.7%</td>
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<td>BCE</td>
<td>242.9</td>
<td>217.56</td>
<td>213.28</td>
<td>463.70</td>
<td>464.97</td>
<td>298.02</td>
<td>BCE</td>
<td>217.4%</td>
<td>64.3%</td>
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<td>BMD</td>
<td>953.6</td>
<td>922.52</td>
<td>954.29</td>
<td>1178.43</td>
<td>1178.97</td>
<td>690.19</td>
<td>BMD</td>
<td>123.5%</td>
<td>58.6%</td>
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<td>CHF</td>
<td>1155.81</td>
<td>1200.4</td>
<td>1328.36</td>
<td>1179.94</td>
<td>1173.80</td>
<td>1233.60</td>
<td>CHF</td>
<td>88.8%</td>
<td>104.5%</td>
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<td>CMY</td>
<td>1370.97</td>
<td>1418.24</td>
<td>1328.36</td>
<td>1179.94</td>
<td>1173.80</td>
<td>1233.60</td>
<td>CMY</td>
<td>88.8%</td>
<td>104.5%</td>
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<td>COP</td>
<td>823.5</td>
<td>815.48</td>
<td>856.28</td>
<td>1371.42</td>
<td>1356.44</td>
<td>658.76</td>
<td>COP</td>
<td>160.2%</td>
<td>48.0%</td>
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<tr>
<td>CRF</td>
<td>5350.59</td>
<td>5607.69</td>
<td>6092.36</td>
<td>15899.13</td>
<td>15886.07</td>
<td>3610.19</td>
<td>CRF</td>
<td>261.0%</td>
<td>22.7%</td>
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<tr>
<td>CSD</td>
<td>1635.2</td>
<td>1646.52</td>
<td>1746.88</td>
<td>1206.23</td>
<td>1205.70</td>
<td>921.30</td>
<td>CSD</td>
<td>69.1%</td>
<td>76.4%</td>
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<tr>
<td>DBI</td>
<td>1252.51</td>
<td>1121.87</td>
<td>1099.81</td>
<td>833.64</td>
<td>821.29</td>
<td>117.19</td>
<td>DBI</td>
<td>75.8%</td>
<td>14.1%</td>
</tr>
<tr>
<td>DM1</td>
<td>981.19</td>
<td>924.06</td>
<td>938.88</td>
<td>1418.31</td>
<td>1411.20</td>
<td>640.72</td>
<td>DM1</td>
<td>151.1%</td>
<td>45.2%</td>
</tr>
<tr>
<td>DM2</td>
<td>239.2</td>
<td>214.25</td>
<td>210.04</td>
<td>447.83</td>
<td>436.33</td>
<td>187.56</td>
<td>DM2</td>
<td>213.2%</td>
<td>41.9%</td>
</tr>
<tr>
<td>DYS</td>
<td>462.31</td>
<td>475.25</td>
<td>510.54</td>
<td>606.18</td>
<td>595.00</td>
<td>594.35</td>
<td>DYS</td>
<td>118.7%</td>
<td>98.0%</td>
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<td>EPL</td>
<td>832.72</td>
<td>815.1</td>
<td>849.62</td>
<td>708.16</td>
<td>705.92</td>
<td>533.50</td>
<td>EPL</td>
<td>83.4%</td>
<td>75.3%</td>
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<td>GLC</td>
<td>205.09</td>
<td>183.7</td>
<td>180.08</td>
<td>223.88</td>
<td>224.27</td>
<td>109.03</td>
<td>GLC</td>
<td>124.3%</td>
<td>48.7%</td>
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<td>HAE</td>
<td>10018.77</td>
<td>6307.2</td>
<td>6702.98</td>
<td>10727.77</td>
<td>10727.77</td>
<td>5815.20</td>
<td>HAE</td>
<td>160.0%</td>
<td>54.2%</td>
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<td>HYL</td>
<td>359.45</td>
<td>321.96</td>
<td>315.63</td>
<td>225.17</td>
<td>225.02</td>
<td>123.44</td>
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<td>71.3%</td>
<td>54.8%</td>
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<td>HYP</td>
<td>282.13</td>
<td>260.69</td>
<td>261.38</td>
<td>169.64</td>
<td>170.70</td>
<td>131.75</td>
<td>HYP</td>
<td>64.9%</td>
<td>77.7%</td>
</tr>
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<td>IBD</td>
<td>940.7</td>
<td>917.34</td>
<td>953.87</td>
<td>426.49</td>
<td>426.50</td>
<td>255.12</td>
<td>IBD</td>
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<td>59.8%</td>
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<td>876.72</td>
<td>936.60</td>
<td>855.68</td>
<td>837.89</td>
<td>836.68</td>
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<td>97.8%</td>
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<tr>
<td>MSS</td>
<td>1238.3</td>
<td>1109.13</td>
<td>4596.03</td>
<td>8925.82</td>
<td>8924.99</td>
<td>3477.60</td>
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<td>194.2%</td>
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</tr>
<tr>
<td>PAR</td>
<td>825.64</td>
<td>739.52</td>
<td>724.98</td>
<td>889.09</td>
<td>876.89</td>
<td>623.42</td>
<td>PAR</td>
<td>122.6%</td>
<td>70.1%</td>
</tr>
<tr>
<td>RHA</td>
<td>306.61</td>
<td>274.63</td>
<td>269.23</td>
<td>366.03</td>
<td>377.01</td>
<td>153.76</td>
<td>RHA</td>
<td>136.0%</td>
<td>42.0%</td>
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<td>SCZ</td>
<td>759.31</td>
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<td>666.74</td>
<td>639.44</td>
<td>639.45</td>
<td>339.64</td>
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<td>SLE</td>
<td>251.37</td>
<td>225.15</td>
<td>220.73</td>
<td>1254.40</td>
<td>1261.61</td>
<td>416.28</td>
<td>SLE</td>
<td>568.3%</td>
<td>33.2%</td>
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<tr>
<td>TDH</td>
<td>49.82</td>
<td>44.63</td>
<td>43.75</td>
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<td>69.78</td>
<td>TDH</td>
<td>190.3%</td>
<td>83.8%</td>
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<tr>
<td>HIV</td>
<td>1471.59</td>
<td>1326.09</td>
<td>1434.75</td>
<td>997.33</td>
<td>995.29</td>
<td>748.62</td>
<td>HIV</td>
<td>69.5%</td>
<td>75.1%</td>
</tr>
</tbody>
</table>

Source: REF Study 2005
Explanation of graphs using AST

respiratory: COP+AST+BCE

COP>BCE>AST

Source: REF Study 2005
CHF no longer exists – combined with CMY. New combined disease exceeds CHF+CMY in 2002.

cardiac: CMY+CHF+IHD+DYS+HYP

Source: REF Study 2005
Impact of renal and cardiac rules at older ages.

cardiac: CMY+CHF+IHD+DYS+HYP
renal: CRF+HYP

Source: REF Study 2005
SLE now greater than RHA but very little impact from rule.

skeletal: RHA+SLE

Source: REF Study 2005
REF Contribution
Table 2007
[Base 2005, Use 2007]

RETAP Meeting, 24 January 2007
Definitions and Guiding Principles

- In the context of the REF, **risk** is defined as:
  - The expected and predictable significant deviation from the theoretical national community-rated price for groups of beneficiaries with a measurable set of **risk factors**.
  - The national community-rated price is the **reasonably efficient achievable price** for the common set of benefits, which is the **PMBs**.
The REF Contribution Table is a table of amounts payable by the REF per beneficiary, according to the REF risk factors. The amount is determined from historic data and other inputs on costs per disease. The amount is set in order to cover:

- a defined benefit package (the Prescribed Minimum Benefits (PMBs));
- for the entire medical scheme industry population that is expected for the next year (the Target Population); and
- with an agreed dispensation of cost and other (managed care) efficiencies.
Risk Factors in SA Formula

- **Age**
- **Deliveries**
- **Gender** (recommended from 2007)
- Not ethnicity. Not geographic region
- Not open/restricted scheme
- Not primary member, marital status or family size
- Not income

**Measures of chronic disease burden:**
- **Numbers with each CDL disease**
- **Numbers with multiple CDL diseases**
- **Numbers with HIV/AIDS on ARV therapy**
- Not high cost, low frequency conditions.

Source: FCTT 5 November 2003; RETAP 2007
The actual Industry Community Rate for each payment period is determined according to the REF Grids that are approved for shadow payments.

### Combined Female and Male Tables for Comparison

<table>
<thead>
<tr>
<th>HAE</th>
<th>HYL</th>
<th>HYP</th>
<th>IBD</th>
<th>IHD</th>
<th>MSS</th>
<th>PAR</th>
<th>RHA</th>
<th>SCZ</th>
<th>SLE</th>
<th>TDH</th>
<th>HIV</th>
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<td>21</td>
<td>22</td>
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<td>24</td>
<td>25</td>
<td>26</td>
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<td>10,815.39</td>
<td>312.80</td>
<td>527.26</td>
<td>514.01</td>
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<td>901.35</td>
<td>976.71</td>
<td>453.66</td>
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<td>896.12</td>
<td>8,686.27</td>
<td>929.54</td>
<td>406.48</td>
<td>679.89</td>
<td>1,294.85</td>
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### HIV/AIDS

#### Number of Conditions

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Amount is per beneficiary per month. Add to amounts obtained from columns 2 to 5. Not applicable to Under 1s.

### Modifier for Maternity

| MAT | All Ages | 17,515.39 |

Amount is per beneficiary per month. Use only once per delivery, not monthly.

### Risk Equalisation Fund
Risk Equalisation Fund

Amount pbpm Payable to REF

Truncated at -R100. Maximum received from REF over R600 pbpm.

Industry Community Rate for March 2006 is R224.90
REF Contribution Table 2007

Applicable year: 2007
Historic data: 2005

Analysis: 2006
- Data extraction with run-off of claims to 31 Mar.
- Publish planned methodology.

Analysis and pricing

Planned publication

Shadow REF period

Applicable year: 2007


Data extraction with run-off of claims to 31 Mar.
Publish planned methodology.

Finalise, approve and publish REFCT2007
Pricing of REF Contribution Table

- Demographic correction for Target Population
- Adjustment for policy issues
- Adjustment for efficiency
- Adjustment for inflation to period of use
- Margins and adjustments for uncertainty in study
- Adjust to industry demographic profile

Base price from formula fitted to sample of industry data
Prevalence of Chronic Disease

“Chronic not verified” are those identified with a chronic disease who do not meet the “treated patient” criteria for 2007.

Source: REF Contribution Table 2007
Prevalence by Age of Chronic Disease

Source: REF Contribution Table 2007
Proportion of Chronic Disease by Age

Source: REF Contribution Table 2007
Price by Age of Chronic Disease

Source: REF Contribution Table 2007
Price by Age of Chronic Disease

Source: REF Contribution Table 2007
Proportion of Price by Age

Source: REF Contribution Table 2007
Price by Age of Chronic Disease

The burden of heart disease is clear.

Source: REF Contribution Table 2007
Chronic Disease in Price of PMBs

Source: REF Contribution Table 2007
Sensitivity of Price of PMBs

Community-rated PMB Price increases from R257.05 to R332.75 pbpm

Source: REF Contribution Table 2007
Hospital, Medicine and Related Components
Components of PMB Price by Age

Source: REF Contribution Table 2007
Components of PMB Price by Age

Source: REF Contribution Table 2007

Risk Equalisation Fund
Components of PMB Price

Source: REF Contribution Table 2007
Comment on Sensitivity

- The Community Rate would be highly unlikely to reach the higher levels.
- As more chronic people become “treated patients”, so the values for each disease should be altered to be closer to the CASES regression (with additional CDL medicine costs). The average cost comes down as people are added with less serious disease.
- There is a timing issue – the adjustment to the REF Table takes place annually while there could be an increase in the number of “treated patients” during the year.
- Schemes only need to consider changes in industry numbers of “treated patients” during a year, until the next revision of the REF Table.
REFCT2007 uses “treated patient” data. If all “chronic not verified” become treated, then the correct values would be from the CASES data, adjusted for additional medicine expenditure.

CASES values for diseases are usually much lower than TREATED values: patients added are less severe so average cost decreases.

Source: REF Contribution Table 2007
Sensitivity of REF Table

Source: REF Contribution Table 2007