The Impact of HIV/AIDS on Medical Schemes in South Africa

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Agenda

- HIV modelling
- Medical scheme population
- Prescribed Minimum Benefits
- Models
- Family unit algorithm
- Sample population
- Results
- Discussion
The four stages of HIV

- The progression of the infection is measured in terms of the CD4 count, and the viral load (the amount of virus in the blood).
- The CD4 count generally determines the rate of deterioration of the patients resistance

<table>
<thead>
<tr>
<th>Stage</th>
<th>Clinical Indicator</th>
<th>Average Duration</th>
<th>Symptom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage1</td>
<td>CD4&gt;500</td>
<td>4 to 6 years</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>Stage2</td>
<td>CD4 between 350 and 500</td>
<td>2 to 3 years</td>
<td>Some opportunistic infections</td>
</tr>
<tr>
<td>Stage3</td>
<td>CD4 between 200 and 350</td>
<td>2 to 3 years</td>
<td>Opportunistic infections</td>
</tr>
<tr>
<td>Stage4</td>
<td>CD4&lt;200</td>
<td>6 months to 1 year</td>
<td>AIDS</td>
</tr>
</tbody>
</table>
Modelling HIV/AIDS

- UNAIDS
- ASSA2003 Suite:
  - Census 2001 for national and provincial populations and prior censuses for fertility rates.
  - Antenatal prevalence data for 2003
  - Mortality data for 2002/3
  - Data from the 2002 Nelson Mandela/Human Sciences Research Council household survey
  - The Reproductive Health Research Unit survey of sexual behaviour and prevalence of youth in South Africa.
The ASSA2003 version includes five interventions:
- improved treatment for sexually transmitted infections (STIs);
- information and education campaigns (IEC);
- voluntary counselling and testing (VCT);
- mother-to-child transmission prevention (MTCTP);
- anti-retroviral treatment (ART).
ANC Prevalence

Some Results

- ANC data
  - The prevalence measured in 2005 was 30.2% (95% confidence interval 29.1% to 31.2%)
  - Population extrapolation estimate of 5.54m
- HSRC household survey
  - 10.8% or 4.8m (4.2-5.3)
- UNAIDS
  - 5.5m
  - 18.8% of adults
UNAIDS analysis of sub-Saharan epidemic

<table>
<thead>
<tr>
<th>People living with HIV</th>
<th>64%</th>
</tr>
</thead>
<tbody>
<tr>
<td>New infections</td>
<td>66%</td>
</tr>
<tr>
<td>AIDS deaths</td>
<td>71%</td>
</tr>
<tr>
<td>Women living with HIV</td>
<td>75%</td>
</tr>
<tr>
<td>Children living with HIV</td>
<td>90%</td>
</tr>
<tr>
<td>People in need of ART</td>
<td>72%</td>
</tr>
</tbody>
</table>
Population Forecasts (ASSA2003)

Total population

Year

Millions

AIDS

No AIDS

## Update from the ASSA2003 Model for 2006

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS deaths per day</td>
<td>947</td>
</tr>
<tr>
<td>New HIV infections per day</td>
<td>1443</td>
</tr>
<tr>
<td>People living with HIV</td>
<td>5,372,476</td>
</tr>
<tr>
<td>AIDS deaths</td>
<td>345,640</td>
</tr>
<tr>
<td>New HIV infections</td>
<td>526,771</td>
</tr>
<tr>
<td>Adults on ART</td>
<td>154,832</td>
</tr>
<tr>
<td>Children on ART</td>
<td>20,050</td>
</tr>
</tbody>
</table>

Source: AIDS Analysis Africa Online
## Population prevalence by category

<table>
<thead>
<tr>
<th>Category</th>
<th>2005</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>11.0%</td>
<td>11.8%</td>
<td>12.0%</td>
<td>11.9%</td>
</tr>
<tr>
<td>Adult Population</td>
<td>18.8%</td>
<td>19.7%</td>
<td>19.6%</td>
<td>19.3%</td>
</tr>
<tr>
<td>Labour force</td>
<td>21.5%</td>
<td>22.2%</td>
<td>21.4%</td>
<td>20.2%</td>
</tr>
</tbody>
</table>
Medical Scheme Population

- Select population
- Approx 16% of South African population
- ‘Twin peaks’ age profile
- Socio-economic status
- Racial profile
Evolution of the Prescribed Minimum Benefits

- Legislated set of minimum benefits that each registered medical scheme is compelled to offer as part of each benefit option
- Stipulated in Annexure A of the Regulations to the Medical Schemes Act (Act 131 of 1998)
- **January 2000**: VCT, Co-trimoxazole, screening and preventative therapy for TB, STI diagnosis and treatment, palliative care, treatment of opportunistic infections, MTCTP, PEP following occupation exposure or sexual assault
- **January 2005**: “medical management and medication, including the provision of anti-retroviral therapy… to the extent provided for in the national guidelines…”
- Link between public sector and private sector provision
Age profile of the Medical Scheme Population
(Sources: ASSA 2003 Lite Model, REF grid)

REF industry age profile and estimated HIV prevalence

- REF industry age profile per 1000 beneficiaries
- HIV prevalence by age

HIV prevalence by age

- Under 1
- 5-9
- 15-19
- 25-29
- 35-39
- 45-49
- 55-59
- 65-69
- 75-79
- 85+

Per 1,000 beneficiaries

0
0.5%
1.0%
1.5%
2.0%
2.5%
Racial split of the Medical Scheme Population
(Source: McLeod et al, 2004)
Racial adjustments

- Adjustment to national racial profile to reflect medical scheme profile → reduction in HIV prevalence rates
Modelling –
ASSA2003 Select Model

- Model staging system: HIV stages 1-4, ART stages 1-4
  (Source: Rosenberg et al, 2000)
- Construction of HIV prevalence scenarios: various multiplicative adjustments to HIV prevalence rates for new entrants and HIV incidence rates

<table>
<thead>
<tr>
<th>Multiplicative adjustments</th>
<th>To HIV prevalence rates for new entrants</th>
<th>To HIV incidence rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill level</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Scenario 1</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>124%</td>
<td>90%</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Scenario 4</td>
<td>100%</td>
<td>80%</td>
</tr>
</tbody>
</table>
Family Unit Model and Assumptions

- Referred to studies on HIV sero-discordant couples
- Principal member (P) with spouse (S): Assume each HIV+ P has a corresponding HIV- S
- Transmission dynamics:
  - **Male → female**: 44% probability of male infecting female, females twice as likely to contract HIV from their HIV+ male partner (Sources: Quinn et al, 2000, Hugonnet et al, 2002, Carpenter, 1999)
  - **Female → male**: 22% probability of female infecting male (Source: Quinn et al, 2000)
    - Ignore infection of S other than from P
- Applied over 4 year periods starting from 4
- P without S: infection independent of family structure
Family Unit Model and Assumptions

- New born child dependants (C) infection through MTCT:
  - **HIV+ P or S, 75% know HIV status:** 2% probability of MTCT (assuming ART administered during pregnancy, labour and delivery, and elective caesarian section if high viral load, ART administered to child.) (Source: CDC, 2006)
  - **HIV+ P or S, 25% not know HIV status:** 25% probability of MTCT (Source: CDC, 2006)

- Cover age of 14: infection independent of family
  - Modelled using National model

- Adult dependants (A): infection independent of family
  - Modelled separately using Select model

- Aggregate HIV prevalence rates for each beneficiary group
Sample Population

- Demographic data obtained from 3 open medical schemes in 2004
- 2.202 million lives, 31.3% of beneficiaries
- Data at beneficiary level: member number, date of birth, gender, benefit option, province
- Stable population assumed
- Calibration
Age Distribution of Sample Population

![Age Distribution Graph](image-url)
## Socio-Economic Classification

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Patterson bands</th>
<th>Peromnes grades</th>
<th>TASK grades</th>
<th>Castellion grades</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Employees living in single sex hostels and construction camps</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>Semi-skilled employees</td>
<td>A, B</td>
<td>12 to 19</td>
<td>1 to 8</td>
<td>1 to 7</td>
</tr>
<tr>
<td>3</td>
<td>Skilled employees</td>
<td>C</td>
<td>8 to 11</td>
<td>9 to 13</td>
<td>8, 9</td>
</tr>
<tr>
<td>4</td>
<td>Middle management</td>
<td>D</td>
<td>5 to 7</td>
<td>14 to 18</td>
<td>10 to 12</td>
</tr>
<tr>
<td>5</td>
<td>Senior management</td>
<td>E, F</td>
<td>1++ to 4</td>
<td>19 to 28</td>
<td>13, 14</td>
</tr>
</tbody>
</table>

- Benefit options are proxies for job categories
- Benefit option movement ignored
Results – HIV prevalence by Scenario
Results – HIV Prevalence
Scenario 4:
20%, 80% ART Uptake
Results – HIV Prevalence

Scenario 4: 60%, 80% ART Uptake
Comparison of Modelling Results

- Johnson and Dorrington (2003, appendix), modelled 3 scenarios:
  - A: no change in profile by age, gender, skill level or race
  - B: change in skill profile
  - C: change in race profile

- Peak of 7.5% expected in 2008 (A)
- B, C not differ substantially from A
Financial Impact

- Cost structure based on prices in private health care sector in 2005
- Costed elements:
  - ART
  - Other meds (immune boosters pre-ART and with ART)
  - Pathology testing
  - MTCTP per birth
  - Outpatient costs (doctor consultations)
  - Hospitalisation (in-patient and out-patient)
- Costs applied to each HIV and ART stage
- MTCTP costs calculated on a per birth basis
Financial Assumptions

- Use of brand drugs and generics
- Inflation assumptions
- Salvage regimen (ART stage 4)
- Managed cost scenario only
### Treatment Protocols – Utilisation per infected person per annum

<table>
<thead>
<tr>
<th>Stage/Category</th>
<th>ART</th>
<th>Immune modulators</th>
<th>Pathology testing</th>
<th>Doctor consultations</th>
<th>Hospitalisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV stage 1</td>
<td>0</td>
<td>Monthly</td>
<td>Biannually</td>
<td>Biannually</td>
<td>Cost per HIV-positive or AIDS-sick beneficiary per annum</td>
</tr>
<tr>
<td>HIV stage 2</td>
<td>0</td>
<td>Monthly</td>
<td>Biannually</td>
<td>Biannually</td>
<td></td>
</tr>
<tr>
<td>HIV stage 3</td>
<td>0</td>
<td>Monthly</td>
<td>Biannually</td>
<td>Biannually</td>
<td></td>
</tr>
<tr>
<td>HIV stage 4</td>
<td>0</td>
<td>Monthly</td>
<td>Biannually</td>
<td>Biannually</td>
<td></td>
</tr>
<tr>
<td>ART stage 1</td>
<td>Monthly</td>
<td>Monthly</td>
<td>Biannually</td>
<td>Biannually</td>
<td></td>
</tr>
<tr>
<td>ART stage 2</td>
<td>Monthly</td>
<td>Monthly</td>
<td>Biannually</td>
<td>Biannually</td>
<td></td>
</tr>
<tr>
<td>ART stage 3</td>
<td>Monthly</td>
<td>Monthly</td>
<td>Biannually</td>
<td>Biannually</td>
<td></td>
</tr>
<tr>
<td>ART stage 4</td>
<td>Monthly</td>
<td>Monthly</td>
<td>Quarterly</td>
<td>Quarterly</td>
<td></td>
</tr>
<tr>
<td>Children pre-AIDS</td>
<td>0</td>
<td>Monthly</td>
<td>Biannually</td>
<td>Biannually</td>
<td></td>
</tr>
<tr>
<td>Children AIDS</td>
<td>Monthly</td>
<td>Monthly</td>
<td>Quarterly</td>
<td>Quarterly</td>
<td></td>
</tr>
</tbody>
</table>
Estimated Cost per HIV and ART stage per annum

- Children AIDS: R 30,000
- Children pre-AIDS: R 10,000
- ART stage 4: R 50,000
- ART stage 3: R 30,000
- ART stage 2: R 20,000
- ART stage 1: R 10,000
- HIV stage 4: R 40,000
- HIV stage 3: R 30,000
- HIV stage 2: R 20,000
- HIV stage 1: R 10,000
Numbers infected:
Scenario 2 & Scenario 4

Scenario 2: 20%, 80%
Scenario 2: 60%, 80%
Scenario 4: 20%, 80%
Scenario 4: 60%, 80%
Results: Impact of ART initiation assumption: cost pbpm

- Scenario 2: 20%, 80%
- Scenario 2: 60%, 80%
- Scenario 4: 20%, 80%
- Scenario 4: 60%, 80%
Cost components 2005: Scenario 4 - 60%, 80%

- Relative costs fairly similar across scenarios
- 20% assumption leads to higher proportion of costs for MTCT and children
Cost of HIV as % of gross and average contributions: Scenario 4

- Scenario 1: 4% - 9%
- Scenario 2: 1.5% - 3%
- Scenario 3: 3% - 6.5%
Discussion

• Further research
  – Change in medical scheme population
  – Take-up and compliance rates
  – Unmanaged costs
• REF implications
• Low Income Medical Scheme (LIMS)
• Need for risk-pooling of SMMEs