SECOND NATIONAL BURDEN OF DISEASE STUDY

Prof Debbie Bradshaw
Dr Victoria Pillay-van Wyk
BURDEN OF DISEASE RESEARCH UNIT

Director: Prof Debbie Bradshaw

Mission: To assess and monitor the country's health status and determinants of disease

Key projects:
- 2nd National Burden of Disease Study & Comparative Risk Assessment
- Improving mortality surveillance
- South African Demographic and Health Survey (with NDOH and Stats SA)
- Eastern Cape Cancer Register
- Jhb Cancer Case Control Study (with NCR, Imperial College)
- Evaluation of clinically coded information
- WHO-FIC Collaborating Centre
SECOND NATIONAL BURDEN OF DISEASE SUMMARY REPORTS

• 10 reports released in November 2016
• 16-year trends in mortality
• Implications for planning and policy highlighted for each province
# TOP 10 CAUSES OF DEATH, SOUTH AFRICA 2012

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause</th>
<th>No. of deaths</th>
<th>% deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HIV/AIDS</td>
<td>153 661</td>
<td>29.1</td>
</tr>
<tr>
<td>2</td>
<td>Cerebrovascular disease</td>
<td>39 830</td>
<td>7.5</td>
</tr>
<tr>
<td>3</td>
<td>Lower respiratory infections</td>
<td>25 977</td>
<td>4.9</td>
</tr>
<tr>
<td>4</td>
<td>Ischaemic heart disease</td>
<td>24 969</td>
<td>4.7</td>
</tr>
<tr>
<td>5</td>
<td>Tuberculosis</td>
<td>23 817</td>
<td>4.5</td>
</tr>
<tr>
<td>6</td>
<td>Diabetes mellitus</td>
<td>18 894</td>
<td>3.6</td>
</tr>
<tr>
<td>7</td>
<td>Hypertensive heart disease</td>
<td>18 755</td>
<td>3.5</td>
</tr>
<tr>
<td>8</td>
<td>Interpersonal violence</td>
<td>18 741</td>
<td>3.5</td>
</tr>
<tr>
<td>9</td>
<td>Road injuries</td>
<td>17 597</td>
<td>3.3</td>
</tr>
<tr>
<td>10</td>
<td>Diarrhoeal diseases</td>
<td>16 349</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td><strong>Top 10 causes</strong></td>
<td><strong>358 590</strong></td>
<td><strong>67.8</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>528 947</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>
OVERALL TRENDS IN MORTALITY IN SOUTH AFRICA

- **Communicable diseases, materanal causes, perinatal conditions, nutrition deficiencies**
- **HIV/AIDS and TB**
- **Non-communicable diseases**
- **Injuries**

The graph shows the number of deaths over the years from 1997 to 2012, with different categories of causes contributing to mortality.
GAINS HAVE BEEN MADE IN THE FIGHT AGAINST THE HIV/AIDS EPIDEMIC

- HIV/AIDS and TB accounts for the marked change in mortality in South Africa over this period

- 153,000 people died from the HIV/AIDS in 2012 compared to 300,000 in 2006 - decline corresponds with the roll-out of ART and the earlier PMTCT intervention

- HIV/AIDS remains the leading cause of death
  - efforts to provide access to treatment must be enhanced
  - prevention efforts must be strengthened, particularly among young women, and
  - a sizable number of HIV/AIDS deaths are associated with TB therefore efforts to strengthen and integrate the TB programme are needed

SECOND NATIONAL BURDEN OF DISEASE STUDY 1997-2012
OVERALL TRENDS IN MORTALITY IN SOUTH AFRICA

Deaths

<table>
<thead>
<tr>
<th>Years</th>
<th>Number of deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td></td>
</tr>
</tbody>
</table>

- **Communicable diseases, materanal causes, perinatal conditions, nutrition deficiencies**
- **HIV/AIDS and TB**
- **Non-communicable diseases**
- **Injuries**
OVERALL TRENDS FOR CARDIOVASCULAR, DIABETES AND RENAL DISEASE IN SOUTH AFRICA

A. Males

B. Females

Deaths per 100,000 population

Years

Cerebrovascular disease
Ischaemic heart disease
Hypertensive heart disease
Diabetes mellitus
Renal disease
OVERALL TRENDS FOR CANCERS IN SOUTH AFRICA

A. Males

B. Females

Deaths per 100,000 population

Years

- Oesophagus
- Lung
- Stomach
- Colo-rectal
- Prostate
- Cervical
- Female breast
NON-COMMUNICABLE DISEASES HAVE COME TO THE FOREFRONT

- Non-communicable diseases, as a group, now account for the highest number of deaths in South Africa

- *Cardiovascular conditions* are the leading category of non-communicable disease deaths in South Africa

- **Different trends in non-communicable diseases were observed**
  - Tobacco related mortality has declined
  - Deaths from diabetes has been increasing (now 6th leading cause)
  - Deaths from renal disease has also been increasing

- Essential to address leading risk factors for non-communicable diseases e.g. smoking, alcohol, physical inactivity and diet

*Sources: Nojilana et al, S Afr Med J 2016;106(5):477-484*
*Pillay van Wyk et al, Lancet Global Health 2016;4: e642–53*
OVERALL TRENDS IN MORTALITY IN SOUTH AFRICA

Deaths

Yearly death rates for different causes of death from 1997 to 2012:

- **Communicable diseases, materanal causes, perinatal conditions, nutritition deficiencies**
- **HIV/AIDS and TB**
- **Non-communicable diseases**
- **Injuries**

The graph shows a significant increase in deaths from communicable diseases, materanal causes, perinatal conditions, and nutritition deficiencies from 1997 to 2004, followed by a peak around 2007. deaths from HIV/AIDS and TB also increased significantly during this period. Non-communicable diseases and injuries show a steady trend over the years.
INFECTIOUS DISEASES AND NEONATAL CONDITIONS ARE A CHALLENGE IN CHILDREN <5 YEARS OLD

Aside from HIV/AIDS, diarrhoeal disease and lower respiratory infections/pneumonia persist in South Africa and contribute to child mortality rates that are still too high.

Neonatal conditions need to be addressed through better care for mothers and newborn babies.

SECOND NATIONAL BURDEN OF DISEASE STUDY 1997-2012
OVERALL TRENDS IN MORTALITY IN SOUTH AFRICA

Deaths

Number of deaths

Years

Communicable diseases, materanal causes, perinatal conditions, nutrition deficiencies
HIV/AIDS and TB
Non-communicable diseases
Injuries
INJURY MORTALITY TRENDS IN SOUTH AFRICA, 1997-2012

South Africa vs Global Injury Mortality

Death rates per 100,000 population

Interpersonal violence
Road traffic
Suicide
Other unintentional

INJURY DEATHS HAVE DECLINED SINCE THE LATE 1990’S

• There has been a 49% reduction in death rates from interpersonal violence (homicide) over the period
  – accompanied political stabilisation in the country, and
  – Fire Arms Control Act of 2000

• However, homicide rates in South Africa remain much higher than the global average

• Interpersonal violence and road traffic injuries account for considerable premature loss of life
  – inter-sectoral actions are needed to change norms in society and build social cohesion and reduce injuries
YEARS OF LIFE LOST DUE TO PREMATURE MORTALITY

- Premature mortality is measured by counting the years of life lost depending on the age at which a death occurs and compared with a standard life expectancy
  - For example, a death at age 5 years counts much more than a death at age 85 years

- Policy makers are urged to use this information to prioritise activities that will address the upstream causes of disease as well strengthen their health service response

SECOND NATIONAL BURDEN OF DISEASE STUDY 1997-2012
Older age conditions rank lower while childhood and young adult conditions rank higher when assessing years of life lost due to premature mortality.

Years of life lost, 2012 (N= 10 million)

- HIV/AIDS: 35.7%
- Cerebrovascular disease: 4.8%
- Lower respiratory infections: 4.6%
- Tuberculosis: 4.6%
- Interpersonal violence: 4.6%
- Road injuries: 4.2%
- Diarrhoeal diseases: 3.7%
- Ischaemic heart disease: 3.1%
- Diabetes mellitus: 2.5%
- Hypertensive heart disease: 2.1%

Deaths, 2012 (N=528,947)

- HIV/AIDS: 29.1%
- Cerebrovascular disease: 7.5%
- Lower respiratory infections: 4.9%
- Ischaemic heart disease: 4.7%
- Tuberculosis: 4.5%
- Diabetes mellitus: 3.6%
- Hypertensive heart disease: 3.5%
- Interpersonal violence: 3.5%
- Road injuries: 3.3%
- Diarrhoeal diseases: 3.1%
LEADING CAUSES OF PREMATURE MORTALITY (YEARS OF LIFE LOST) BY PROVINCE FOR 2012

<table>
<thead>
<tr>
<th>Rank</th>
<th>Western Cape</th>
<th>Eastern Cape</th>
<th>Northern Cape</th>
<th>Free State</th>
<th>KwaZulu Natal</th>
<th>North West</th>
<th>Mpumalanga</th>
<th>Gauteng</th>
<th>Limpopo</th>
<th>South Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HIV/AIDS (20.0%)</td>
<td>HIV/AIDS (29.8%)</td>
<td>HIV/AIDS (31.9%)</td>
<td>HIV/AIDS (36.0%)</td>
<td>HIV/AIDS (41.2%)</td>
<td>HIV/AIDS (34.5%)</td>
<td>HIV/AIDS (42.7%)</td>
<td>HIV/AIDS (40.2%)</td>
<td>HIV/AIDS (35.5%)</td>
<td>HIV/AIDS (35.7%)</td>
</tr>
<tr>
<td>2</td>
<td>HIV/AIDS (20.0%)</td>
<td>HIV/AIDS (29.8%)</td>
<td>HIV/AIDS (31.9%)</td>
<td>HIV/AIDS (36.0%)</td>
<td>HIV/AIDS (41.2%)</td>
<td>HIV/AIDS (34.5%)</td>
<td>HIV/AIDS (42.7%)</td>
<td>HIV/AIDS (40.2%)</td>
<td>HIV/AIDS (35.5%)</td>
<td>HIV/AIDS (35.7%)</td>
</tr>
<tr>
<td>3</td>
<td>HIV/AIDS (20.0%)</td>
<td>HIV/AIDS (29.8%)</td>
<td>HIV/AIDS (31.9%)</td>
<td>HIV/AIDS (36.0%)</td>
<td>HIV/AIDS (41.2%)</td>
<td>HIV/AIDS (34.5%)</td>
<td>HIV/AIDS (42.7%)</td>
<td>HIV/AIDS (40.2%)</td>
<td>HIV/AIDS (35.5%)</td>
<td>HIV/AIDS (35.7%)</td>
</tr>
<tr>
<td>4</td>
<td>HIV/AIDS (20.0%)</td>
<td>HIV/AIDS (29.8%)</td>
<td>HIV/AIDS (31.9%)</td>
<td>HIV/AIDS (36.0%)</td>
<td>HIV/AIDS (41.2%)</td>
<td>HIV/AIDS (34.5%)</td>
<td>HIV/AIDS (42.7%)</td>
<td>HIV/AIDS (40.2%)</td>
<td>HIV/AIDS (35.5%)</td>
<td>HIV/AIDS (35.7%)</td>
</tr>
<tr>
<td>5</td>
<td>HIV/AIDS (20.0%)</td>
<td>HIV/AIDS (29.8%)</td>
<td>HIV/AIDS (31.9%)</td>
<td>HIV/AIDS (36.0%)</td>
<td>HIV/AIDS (41.2%)</td>
<td>HIV/AIDS (34.5%)</td>
<td>HIV/AIDS (42.7%)</td>
<td>HIV/AIDS (40.2%)</td>
<td>HIV/AIDS (35.5%)</td>
<td>HIV/AIDS (35.7%)</td>
</tr>
<tr>
<td>6</td>
<td>HIV/AIDS (20.0%)</td>
<td>HIV/AIDS (29.8%)</td>
<td>HIV/AIDS (31.9%)</td>
<td>HIV/AIDS (36.0%)</td>
<td>HIV/AIDS (41.2%)</td>
<td>HIV/AIDS (34.5%)</td>
<td>HIV/AIDS (42.7%)</td>
<td>HIV/AIDS (40.2%)</td>
<td>HIV/AIDS (35.5%)</td>
<td>HIV/AIDS (35.7%)</td>
</tr>
<tr>
<td>7</td>
<td>HIV/AIDS (20.0%)</td>
<td>HIV/AIDS (29.8%)</td>
<td>HIV/AIDS (31.9%)</td>
<td>HIV/AIDS (36.0%)</td>
<td>HIV/AIDS (41.2%)</td>
<td>HIV/AIDS (34.5%)</td>
<td>HIV/AIDS (42.7%)</td>
<td>HIV/AIDS (40.2%)</td>
<td>HIV/AIDS (35.5%)</td>
<td>HIV/AIDS (35.7%)</td>
</tr>
<tr>
<td>8</td>
<td>HIV/AIDS (20.0%)</td>
<td>HIV/AIDS (29.8%)</td>
<td>HIV/AIDS (31.9%)</td>
<td>HIV/AIDS (36.0%)</td>
<td>HIV/AIDS (41.2%)</td>
<td>HIV/AIDS (34.5%)</td>
<td>HIV/AIDS (42.7%)</td>
<td>HIV/AIDS (40.2%)</td>
<td>HIV/AIDS (35.5%)</td>
<td>HIV/AIDS (35.7%)</td>
</tr>
<tr>
<td>9</td>
<td>HIV/AIDS (20.0%)</td>
<td>HIV/AIDS (29.8%)</td>
<td>HIV/AIDS (31.9%)</td>
<td>HIV/AIDS (36.0%)</td>
<td>HIV/AIDS (41.2%)</td>
<td>HIV/AIDS (34.5%)</td>
<td>HIV/AIDS (42.7%)</td>
<td>HIV/AIDS (40.2%)</td>
<td>HIV/AIDS (35.5%)</td>
<td>HIV/AIDS (35.7%)</td>
</tr>
<tr>
<td>10</td>
<td>HIV/AIDS (20.0%)</td>
<td>HIV/AIDS (29.8%)</td>
<td>HIV/AIDS (31.9%)</td>
<td>HIV/AIDS (36.0%)</td>
<td>HIV/AIDS (41.2%)</td>
<td>HIV/AIDS (34.5%)</td>
<td>HIV/AIDS (42.7%)</td>
<td>HIV/AIDS (40.2%)</td>
<td>HIV/AIDS (35.5%)</td>
<td>HIV/AIDS (35.7%)</td>
</tr>
</tbody>
</table>
HOW WAS THIS STUDY DONE
# LEADING CAUSES OF DEATH IN SOUTH AFRICA, 2012

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause of death</th>
<th>Number</th>
<th>% of all deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ill-defined and unknown causes</td>
<td>65,033</td>
<td>13.5%</td>
</tr>
<tr>
<td>2</td>
<td>Tuberculosis</td>
<td>47,472</td>
<td>9.9%</td>
</tr>
<tr>
<td>3</td>
<td>Influenza and pneumonia</td>
<td>26,385</td>
<td>5.5%</td>
</tr>
<tr>
<td>4</td>
<td>Cerebrovascular disease</td>
<td>23,994</td>
<td>5.0%</td>
</tr>
<tr>
<td>5</td>
<td>Other forms of heart disease</td>
<td>21,612</td>
<td>4.5%</td>
</tr>
<tr>
<td>6</td>
<td>Diabetes mellitus</td>
<td>21,230</td>
<td>4.4%</td>
</tr>
<tr>
<td>7</td>
<td>HIV/AIDS</td>
<td>18,663</td>
<td>3.9%</td>
</tr>
<tr>
<td>8</td>
<td>Hypertensive diseases</td>
<td>16,195</td>
<td>3.4%</td>
</tr>
<tr>
<td>9</td>
<td>Other viral diseases</td>
<td>15,057</td>
<td>3.1%</td>
</tr>
<tr>
<td>10</td>
<td>Intestinal infections</td>
<td>14,948</td>
<td>3.1%</td>
</tr>
</tbody>
</table>

*Source: Own analysis of Statistics South Africa data*
METHODS

HOW DO OUR CAUSE OF DEATH ESTIMATES DIFFER FROM THE GLOBAL BURDEN OF DISEASE (GBD) STUDY?

SA NBD uses adjusted data to generate estimates

WHILE

GBD applies models to data and then predicts estimates for years where no data is available
SA GBD has different trends in HIV/AIDS mortality – which then impacts on estimates of all other causes.

CONCLUSION

• Even though other mortality estimates are available for South Africa
  – reported cause of death data from Statistics South Africa cannot be taken at face value and
  – global estimates for our country need to be better calibrated to local data

• Our study provides a good understanding of historical trends which must be used to guide South Africa towards meeting the Sustainable Development Goals
  – Overall, these trends highlight the continued decline for HIV/AIDS and TB, with non-communicable diseases coming to the forefront
  – Furthermore, the unfinished agenda of maternal/child health, infectious diseases and injuries persist
CONCLUSION (cont)

• Years of life lost should be used to help identify activities that will affect the upstream causes of disease as well as strengthening the health system response required to reduce premature loss of life.

• Differences in the provincial profiles were observed, for example:
  – Western Cape need to involve other sectors in order to address the mortality of young people due to interpersonal violence.
  – Limpopo needs to focus on improving quality of care in health services and improving water and sanitation to address large burden from infectious diseases.
  – All provinces need to prioritize AIDS awareness and HIV reduction programs, including access to treatment.

• Much of the premature loss of life can be avoided if appropriate action is taken.