

The impact of HIV/AIDS on adult mortality in South Africa



Technical Report

*Burden of Disease Research Unit
Medical Research Council*

By

Rob Dorrington

David Bourne

Debbie Bradshaw

Ria Laubscher

Ian M. Timæus

September 2001



Rob Dorrington	Centre for Actuarial Research	University of Cape Town
David Bourne	Department of Public Health	University of Cape Town
Debbie Bradshaw*	Burden of Disease Research Unit	South African Medical Research Council
Ria Laubscher	Biostatistics Unit	South African Medical Research Council
Ian M. Timæus	Centre for Population Studies	London School of Hygiene and Tropical Medicine

**Correspondence to be addressed to:*

*Dr D Bradshaw
Burden of Disease Research Unit
Medical Research Council
PO Box 19070
Tygerberg 7505
South Africa*

*A copy of this report is available on the internet at: www.mrc.ac.za/bod
Further work on this project can also be found at this site.*

Design & layout by  BUTLERTOWNSEND Design Studio

ISBN 1-919809-14-7

Copyright © 2001 South African Medical Research Council

Disclaimer

The research presented in this report is based in part on data supplied by Departments and Agencies of the Government of South Africa. These data have been analysed and in some cases reworked by the Medical Research Council and its collaborators. The results and interpretations presented here are those of the Medical Research Council and its collaborators and are not necessarily endorsed by any Department or Agency of the Government of South Africa.

Acknowledgements

We thank the Director General of the Department of Home Affairs for access to the data from the Population Register, Statistics South Africa for earlier mortality data and the Department of Health for data from 1997-1999. Further we would like to thank Dr Mervyn Susser, Dr Michel Garenne, Dr Rodney Ehrlich and Dr Peter Goldblatt for reviewing this work and offering useful advice, although the responsibility for its contents remains with the authors. We thank Professor Malagepuru Makgoba for his encouragement and support of this project. This work was partially funded by the Global Forum for Health Research and the Secure the Future project, sponsored by Bristol-Myers-Squibb.

List of Figures	1
List of Tables	2
Glossary	2
Preface	3
Executive Summary	5
Introduction	7
Data on deaths	8
Data sources	10
Data limitations	10
Mortality patterns	10
Completeness of registration	17
Projections of mortality in South Africa	19
ASSA600	19
Assumptions	19
Calibration of ASSA600	19
ASSA600 projections	21
Comparison of ASSA600 projections with other models	23
Comparison of the estimates of the impact of HIV/AIDS	24
Comparison of the reported deaths and model projections	26
Number of deaths	26
Age-specific death rates	26
Estimates of the proportion of deaths due to AIDS	30
Discussion	31
Alternative explanations	31
Additional supporting evidence	35
Interventions	38
Recommendations	39
Appendix A: Death Data	40
Appendix B: Processing Population Register Data	50
Appendix C: Brief description of the workings of ASSA600 model	52
Appendix D: Percentage under-registration of adult deaths:ASSA600 vs specific effort to determine the extent of under-registration	53
References	54

Figure 1.1:	Cause of death by age and sex by year of occurrence, 1988,1989 and 1990 (Stats SA Data).	11
Figure 1.2:	Cause of death by age and sex by year of occurrence, 1991,1992 and 1993 (Stats SA Data).	12
Figure 1.3:	Cause of death by age and sex by year of occurrence, 1994, 1995 and 1996 (Stats SA Data).	13
Figure 2.1:	Adult deaths by age and sex by year of occurrence, August 1997- July 1998 (DHA data)	14
Figure 2.2:	Adult deaths by age and sex by year of occurrence, August 1998- July 1999 (DHA data)	15
Figure 2.3:	Adult deaths by age and sex by year of occurrence, August 1999- July 2000 (DHA data).....	16
Figure 3:	Prevalence of HIV amongst antenatal attendees,ASSA600 estimates and annual antenatal survey	20
Figure 4:	Age-specific prevalence of HIV amongst antenatal attendees,ASSA600 estimates and annual antenatal survey	20
Figure 5:	Projected overall HIV prevalence by age group,ASSA600.....	21
Figure 6:	Projected mortality rates per 1000,ASSA600.....	21
Figure 7:	Projected numbers of people living with HIV,AIDS sick and accumulated AIDS deaths (thousands),ASSA600.....	22
Figure 8:	Projected age and sex patterns of mortality for 1990, 2000 and 2010,ASSA600	22
Figure 9:	Age-specific prevalence of HIV projected by ASSA600 and Metropolitan/Doyle models in 2000 and 2010.....	25
Figure 10:	Comparison of reported deaths (DHA) with model projections 1990 to 1999/00	26
Figure 11.1:	Age- specific mortality rates for males 1985-2000.....	28
Figure 11.2:	Age- specific mortality rates for females 1985-2000	28
Figure 12.1:	Relative mortality rates for males 1994-2000 compared to 1985	29
Figure 12.2:	Relative mortality rates for females 1994-2000 compared to 1985	29
Figure 13:	Mortality rates for males and females - model 1990, 2000 and 2010.....	29
Figure 14.1:	Age distribution of total male deaths (5 years and older) reported and corrected for under-reporting for 1990.....	31
Figure 14.2:	Age distribution of total female deaths (5 years and older) reported, and corrected for under-reporting for 1990.....	31
Figure 15:	Age distribution of total reported and African/Black reported deaths 1990	32
Figure 16:	Comparison of 1996 Stats SA deaths and Home Affairs 1997/98.....	33
Figure 17:	Age distribution of reported AIDS deaths, South Africa 1996.....	35
Figure 18:	Comparison of corrected mortality rates, Zimbabwe 1986 to 1995 and South Africa 1990 to 2000	36
Figure 19:	Age distribution of certified AIDS deaths, Zimbabwe 1995.....	37
Figure 20:	Age distribution of total deaths, Zimbabwe 1995.....	37
Figure 21:	The projected prevalence of HIV with interventions.....	38
Figure C1:	A schematic diagram of the ASSA600 AIDS model.....	52

List of Tables

Table 1:	Ratio of deaths aged 15-49 to deaths aged 50+ for reported deaths by year of occurrence and sex.....	17
Table 2:	Number of deaths, completeness of registration and estimated number of deaths 15 years and older by year of occurrence.....	18
Table 3:	Balance equations (figures in thousands).....	23
Table 4:	Recast of balance equations to ASSA600 base population and migration (figures in thousands).....	24
Table 5:	Comparison of output of the models (figures in thousands).....	25
Table 6:	Percentage of total adult deaths estimated to be due to AIDS, ASSA600	30
Table 7:	Deaths from political violence in South Africa (including TVBC states)	34
Table 8:	Burials in Durban cemeteries and crematoria	35
Table A1:	Number of registered deaths according to year of occurrence and year of reporting, 1985-1996.....	40
Table A2:	Total deaths by year of occurrence as at 31 December 2000, by sex and age for 1985-1996	40
Table A3:	Deaths by cause by year of occurrence as at 31 December 2000, by sex and age for 1985-1996	42
Table A4:	Deaths from Department of Home Affairs adjusted for missing Ids, as at 31 December 2000	48
Table B1:	The number of records excluded for analysis according to source	50
Table B2:	Composition of annual data sets 1997 to 2000.....	50
Table D1 :	Percentage under-registration of adult (15+) deaths	53

Glossary

ANC	Antenatal care
ASSA	Actuarial Society of South Africa
DoH	Department of Health
DHA	Department of Home Affairs
MTC	Mother to child
RSA	South Africa excluding the TBVC homelands
Stats SA	Statistics South Africa
TBVC	Transkei, Bophuthatswana, Venda, and Ciskei - the former "independent" homelands