A CRITICAL ANALYSIS OF THE UNDERLYING ASSUMPTIONS USED BY CHIGWEDERE ET AL IN THEIR ARTICLE 'ESTIMATING THE LOST BENEFITS OF ANTIRETROVIRAL DRUG USE IN SOUTH AFRICA' PUBLISHED IN JAIDS IN DECEMBER 2008

Christopher Rawlins, Secretary, Treatment Information Group

Summary

The authors from Harvard University present a statistical argument that the South African government was responsible for the loss of many lives because of a failure to accept the use of available ARVs to prevent and treat HIV/AIDS in a timely manner. In particular they argue that 60,000 babies were born each year from 2000 to 2005 with HIV acquired from their mother, resulting in 1,6 million person-years lost by not implementing a mother to child transmission prophylaxis program. This argument is predicated on the twin assumptions that there has been an increase in real child deaths and there is a causal relationship between HIV measurement and mortality in South Africa.

Having regard to the official statistics of our government and leading research experts and organizations, this analysis demonstrates that there is no relationship of any kind between the measurement of the various HIV tests and child mortality, that there has been no unusual increase in child mortality in South Africa, that the HIV prevalence and incidence estimates cannot be reconciled, that the computer models have constantly failed to predict and that, based on these statistics, the HIV/AIDS hypothesis is a mathematical impossibility.

Introduction

Any serious student of HIV/AIDS statistics, particularly in South Africa, will be aware of the huge variations in those produced by different experts and organizations, and the glaring contradictions between predicted and actual data. In January 2002 national newspapers reported the prediction of a professional insurance body that by 2006 the death rate in South Africa would peak at 16,000 per day, or 6 million a year. In the same year UNAIDS estimated worldwide HIV cases at 42 million with a prediction of 60 million by 2010. Their most recent estimate has been revised down to 33 million. Also in 2002 the National Intelligence Council of the USA predicted that there would be 50 to 75 million cases in India, China, Ethiopia, Nigeria and Russia by 2010. At a Medical Research Council AIDS forum in 2003 Professor Alan Whiteside, a director of HIV/AIDS research at the University of KwaZulu-Natal predicted 8 million cases by 2007, and in May 2008 national

newspapers reported the estimate by the Development Bank of South Africa of HIV prevalence of 7.6 million. In their 2000 book 'AIDS: the Challenge for South Africa, Whiteside and scenario planner Clem Sunter projected a population for KwaZulu-Natal in 2007 of 9.1 million compared to the 10 million reported by Statistics South Africa in their mid-year estimate for 2007. Barnett and Whiteside in their book 'AIDS in the 21st Century' twice quote the prediction by the US Bureau of Census of a negative population growth rate in South Africa by 2003 compared to a present positive rate of almost 1%. This is just a small sample of the statistical contradictions on which a huge information industry has been built. In the field of HIV/AIDS statistics it's literally a free for all.

However certain organizations can lay claim to a greater degree of credibility in view of their historical background. The Actuarial Society of South Africa, a long established professional body of sober minded actuaries, positioned itself early in the market under the initiative of Professor Rob Dorrington by producing a succession of AIDS models. As the earlier models were found to be overstating deaths by a large margin, continuous refinements were made resulting in the current ASSA2003 model published in 2005. ASSA formed a 22- person AIDS committee to assist in the recalibrations of the models whose data are produced in enormous detail. The Society states that one of the objectives in producing realistic current and future estimates of HIV and AIDS related statistics is to counter AIDS denialism. Other research organizations like the Human Sciences Research Council and the Medical Research Council, whose Burden of Disease Unit is directed by Dorrington's partner Dr Debbie Bradshaw, have vast experience in scientific sampling and research methodology. Finally there are the government organizations producing official statistics, in particular Statistics South Africa with its annual reports of mortality and causes of death, and the Department of Health with its annual report of HIV prevalence at antenatal clinics based on a sample of pregnant women.

Method of Analysis

This analysis is limited to an examination of the child statistics and will be followed later by a similar study of the adult statistics.

1) StatsSA registered deaths up to age 19 from 1997 to the latest reported year of 2007 have been presented in Table 1. These are usually made public in 5 year age ranges but the breakdown of age 0 to 4 was obtained from StatsSA.

2) Explicit estimates of death registration completion are presented in Table 2 with a detailed explanation of how these estimates have been arrived at.

3) Real deaths based on the estimates of registration completion have been presented in Table 3.

4) Maximum HIV deaths are presented in Table 4 based on explicit estimates of the percentage of deaths caused by HIV with a detailed explanation of how these estimates have been arrived at.

5) The maximum estimated HIV deaths are examined in relation to the model predictions as presented in Table 5.

6) The estimated real and maximum HIV deaths are examined in relation to the HSRC survey data in Table 6 and the model predictions in Table 5.

7) Age group percentage ratios are presented in Table 7 based on StatsSA registered deaths and estimated real deaths and analyzed to show that it is mathematically impossible for a new cause of child deaths to have been introduced.

StatsSA Registered Deaths

Table 1

StatsSA Registered Deaths

Year of	Age at death					Age group totals						
Death	0	1	2	3	4	0 to 4	0 to 1	1 to 4	2 to 4	5 to 9	10to14	15to19
1997	24734	4324	1696	958	773	32485	29058	7751	3427	2974	2754	6274
1998	28493	5160	2196	1195	889	37933	33653	9440	4280	3250	3004	7069
1999	28624	5556	2109	1214	923	38426	34180	9802	4246	3433	2977	7763
2000	28872	5547	2428	1366	1040	39253	34419	10381	4834	3619	3083	7856
2001	29842	6091	2583	1416	1162	41094	35933	11252	5161	3852	3227	8434
2002	34390	6249	2947	1695	1187	46468	40639	12078	5829	4376	3373	9072
2003	38405	7066	3113	1884	1413	51881	45471	13476	6410	4998	3667	9455
2004	41414	8351	3550	2235	1804	57354	49765	15940	7589	5995	3923	9326
2005	46427	8359	3471	2072	1694	62023	54786	15596	7237	6177	4016	9357
2006	48239	9524	3196	1887	1451	64297	57763	16058	6534	5584	4311	9467
2007	46546	8537	3247	1675	1323	61328	55083	14782	6245	5347	4127	9038

These figures are taken from the most recent 2007 report which has updated the earlier years for late registrations. As seen in Table 1, under 5 deaths have approximately doubled over the decade while age 5 to 19 deaths have risen by approximately 50%. It is noticeable that age 0 to 4 deaths drop sharply after the age of 1 so the number dying between age 2 to 4 is small in comparison to those from age 0 (under 1) to 1.

Estimates of death registration completion

Table 2

Year of Death	Estimated Death Registration Completion %											
	0	1	2	3	4	0 to 4	0 to 1	1 to 4	2 to 4	5 to 9	10to14	15to19
1997	35	33	39	46	50	35	35	37	43	59	69	69
1998	41	39	45	52	55	41	41	43	49	64	70	76
1999	44	42	48	55	58	44	44	46	52	67	70	82
2000	45	43	50	57	62	46	45	48	54	70	70	82
2001	46	44	51	59	64	47	46	49	56	74	74	87
2002	52	50	58	66	68	53	52	55	62	80	80	92
2003	58	56	64	72	76	59	58	61	69	88	86	95
2004	63	61	72	80	83	64	63	68	77	94	90	95
2005	69	67	74	81	84	70	69	72	78	95	91	95
2006	71	69	75	82	85	71	71	73	79	95	95	95
2007	71	69	75	82	85	71	71	73	79	95	95	95

All studies that purport to make estimates of deaths generally or AIDS deaths specifically, make assumptions about the level of death registration completion, and the Harvard study is no different in this respect. When the Harvard authors claim that a minimum of 60,000 children died annually of HIV prior to the introduction of ARVs, they are making assumptions about the percentage of death registration completion and the real total of child deaths. It is not possible to estimate total deaths without making an assumption of registration completion. In the Harvard study their estimate of registration completion is implicit, unstated and unsupported by evidence whereas this analysis makes explicit, transparent estimates based on all the available evidence.

In an article entitled ‘Child mortality in South Africa - we have lost touch’ published in the South African Medical Journal of August 2007, Bradshaw and Dorrington state that it is impossible to decide to what extent the increase in the number of under 5 registered deaths represents an increase in child mortality as opposed to simply an increase in the completeness of registration. In contrast this author argues that it is possible to make accurate estimates of completion based on a comparative analysis of data from different studies and corroborating calculations from different sources.

Dr Rodney Richards, a biochemist who collaborated in producing the earliest HIV diagnostic tests at Amgen Laboratories in the US presented a seminal statistical paper to our Medical Research Council in response to the article on the rise in adult mortality in the SAMJ of 2004 by Bradshaw, Dorrington et al. The MRC declined to respond to Richards’ paper and the SAMJ would not publish it. In his paper Richards summarized the series of initiatives, starting in 1998, launched by our government designed to improve all forms of registration. These included an unprecedented ID

campaign by the Department of Home Affairs, a major campaign by StatsSA and other departments to improve registration of vital events, particularly in rural areas and among the urban poor, a major expansion of satellite offices by Home Affairs, and in 2002 and 2003 another massive ID campaign linked to the rollout of the Child Support Grant.

Clearly the most important estimates of registration completion are those at the start of the period in 1997 and at the end in 2007. The MRC Burden of Disease Unit study of the year 2000 estimated the number of total child and HIV deaths for the 12 month period starting in mid 2000 using the ASSA 2000 model. The later ASSA2003 model was recalibrated to decrease the estimates of deaths and my calculations of registration completion confirm that the MRC total of 106,000 deaths for year 2000 from age 0 to 4 was an overestimate. Based on StatsSA registrations for 2000 and 2001 the MRC's estimate of total deaths gives an age 0 (under 1) registration completion of 38% and 1 to 4 of 37% whereas StatsSA in their 2006 report estimated 0 to 4 completeness at 43% in 2000, after the first registration improvement campaigns. StatsSA demographer Dr Sulaiman Bah, pre-eminent in the field of death registration, has stated that concerted efforts to improve the coverage of death registration had an effect in the rural areas from 1996 to 2000. In 1996 he estimated overall completion at 37% in the rural areas comprising 46% of the population and with children over-represented as a legacy of apartheid. In their SAMJ article Bradshaw and Dorrington quote the finding of demographic surveillance in the Agincourt site in the Northern Province that registration of child deaths had increased but remained below 30% from 1997 to 2005.

Clearly there has been a significant increase in under 5 registration with the MRC and ASSA estimating 75,000 under 5 deaths in 2005 in the 2008 report 'Every death counts' which equates to a completeness of 82.7%, which is the same percentage of completeness which StatsSA estimate for above 5 registration in their latest 2007 report using the Preston and Hill method. This method has limitations as they point out, including that it cannot be used for under 5. My estimate of 71% under 5 completion in 2007 translates to total under 5 deaths of 85,859 compared to 94,350 for 2007 and 98,918 for 2006 should an estimate of 65% be used.

In 1996 Dr Bah estimated overall completion at 63.5% (37x0.46+86x0.54) which equates to over 5 completion of 66.5% (63.5-3.5)/0.9 with under 5 deaths approximately 10% of the total deaths. In their study of child mortality for year 2000 the MRC estimate 5 to 9 completeness at 95% and 10 to 14 at 82% based on StatsSA registrations for 2000 and 2001. It is clearly improbable that completeness would jump from 35% in 0 to 4 to 95% in 5 to 9, and further evidence that the MRC significantly underestimated 5 to14 deaths in 2000 comes from an analysis of the male and female breakdown of StatsSA registration. In their 2006 report StatsSA estimate over 5 completion of 70% for 2001.

Acknowledging that their Preston and Hill method has limitations, StatsSA state that their calculation of over 5 completeness at 82.5% for 2007 does not account for possible late registrations and deaths not yet updated from the population register. The MRC estimated adult completeness at 90% by 2000 in their 2004 SAMJ article and the fact that 5 to 19 registered deaths have stabilised and decreased since 2004 indicates that a ceiling of completeness has been reached which is more likely to be at 95% than 85%. The assumption has also been made of a gradual increase in completeness as age increases from 1 to 19 rather than, for example, the unlikely event of a dramatic jump in completeness from age 4 to age 5.

Table 3
Estimated Real Deaths

Year of Death	0	1	2	3	4	0 to 4	0 to 1	1 to 4	2 to 4	5 to 9	10to14	15to19
1997	70669	13103	4349	2083	1546	91749	83772	21080	7977	5041	3991	9093
1998	69495	13231	4880	2298	1616	91520	82726	22025	8794	5078	4291	9301
1999	65055	13229	4394	2207	1591	86476	78283	21421	8192	5124	4253	9467
2000	64160	12900	4856	2396	1677	85990	77060	21830	8930	5170	4404	9580
2001	64874	13843	5065	2400	1816	87997	78717	23124	9280	5205	4361	9694
2002	66135	12498	5081	2568	1746	88027	78633	21893	9395	5470	4216	9861
2003	66216	12618	4864	2617	1859	88173	78833	21958	9340	5680	4264	9953
2004	65737	13690	4931	2794	2173	89324	79427	23588	9898	6378	4359	9817
2005	67286	12476	4691	2558	2017	89027	79762	21741	9265	6502	4413	9849
2006	67942	13803	4261	2301	1707	90015	81745	22073	8270	5878	4538	9965
2007	65558	12372	4329	2043	1556	85859	77930	20301	7928	5628	4344	9514

Estimated Real Deaths

Estimated real deaths are shown in Table 3 above calculated using the estimates of completion registration shown in Table 2. These estimates do not show any increase in real deaths over the decade from age 0 to 4 and a marginal increase from age 5 to19 in line with population growth. Neither do the real deaths show any temporary increase followed by a decrease as predicted by the ASSA2003 model. There is no evidence at all of any increase in child deaths in South Africa over the past decade.

Maximum HIV Deaths

Table 4

Maximum HIV Deaths

Death	40% 0	40% 1	40% 2	40% 3	40% 4	40% 0 to 4	40% 0 to 1	40% 1 to 4	40% 2 to 4	30% 5 to 9	2% 10to14	2% 15to19
1997	28267	5241	1739	833	618	36700	33509	8432	3191	1512	80	182
1998	27798	5292	1952	919	647	36608	33090	8810	3518	1523	86	186
1999	26022	5291	1758	883	637	34590	31313	8568	3277	1537	85	189
2000	25664	5160	1942	959	671	34396	30824	8732	3572	1551	88	192
2001	25950	5537	2026	960	726	35199	31487	9249	3712	1562	87	194
2002	26454	4999	2032	1027	698	35211	31453	8757	3758	1641	84	197
2003	26486	5047	1946	1047	744	35269	31533	8783	3736	1704	85	199
2004	26295	5476	1972	1118	869	35730	31771	9435	3959	1913	87	196
2005	26914	4990	1876	1023	807	35611	31905	8697	3706	1951	88	197
2006	27177	5521	1705	920	683	36006	32698	8829	3308	1763	91	199
2007	26223	4949	1732	817	623	34343	31172	8120	3171	1689	87	190

Having made implicit, unstated, unevidenced assumptions as to the actual level of death registration completeness and the real increase in total child deaths in South Africa, the Harvard authors proceed to make estimates of child AIDS deaths using the assumption of a relationship between HIV measurement and mortality. Estimating a minimum of 60,000 HIV babies annually they assume that the increase in StatsSA registered deaths is an increase in real deaths consequent on the death of these babies within 5 years. They are not making that judgement from the evidence of medical or death certificates or specific medical symptoms identifiable only to those dying from AIDS. The classic example of this comes from the age-old disease of tuberculosis to which the majority of AIDS deaths in South Africa are attributed. Two patients have identical symptoms recognised by the medical profession for centuries as those of tuberculosis and the only way of distinguishing those dying from AIDS from those dying from tuberculosis is by the former having a positive reading on an HIV antibody test. On the basis of these two assumptions the experts proceed to make age specific estimates of those dying from HIV/AIDS, which are examined in Table 4 above using estimated percentages of AIDS deaths in each age group to calculate the maximum total of AIDS deaths based on the estimated real deaths in Table 3.

The starting point is again the MRC Burden of Disease Research study of child mortality in year 2000. This estimated that deaths caused by HIV were 32% of under 1, 61% of 1 to 4, 26% of 5 to 9 and less than 2.8% of 10 to 14, in which group it is not listed as a cause of death. The combined 0 to 4 estimate is 40%, and 2001 was considered to be the peak year of HIV from mother to child by the ASSA2003 predictions and by the MRC estimates of under 5 mortality. However the MRC estimate 44% of 0 to 14 deaths were caused by HIV in their 2006 National Indicators. A useful comparison

can be made with the findings of the MRC study of mortality in the Cape Metropole from 2001 to 2006, an area containing approximately one fifteenth of the national population and estimated to have an antenatal HIV prevalence rate of approximately half of the national average. From 2003 to 2006 HIV was recorded as the cause of death in 11.3% of under 1, 20.6% of 1 to 4, 10.9% of 5 to 9, 1.5% of 10 to 14 and 3.0% of 15 to 19. In the last year 2006 HIV was the cause in 7.9% of under 1, 13% of 1 to 4 and 10.9% of 5 to 9. These figures show a higher proportion of under 1 relative to 1 to 4 compared to the MRC study of year 2000. Another source comes from the ASSA2003 model which predicted a non-AIDS mortality rate in 2000 for age 2 of 0.00334 for males and 0.00265 for females which relative to total deaths computes to an HIV death rate of approximately 40%. Taking into account these differing estimates, 40% has been used for all ages from 0 to 4 in Table 4, observing that total estimated 0 to 4 HIV deaths would be lower if 30% was used for under 1 and 60% for 1 to 4. The MRC studies of the Cape Metropole show a declining HIV % as a cause of child death from 2001 to 2006. If the use of a constant percentage over the whole decade in Table 4 has overestimated maximum HIV deaths in the later years, this would mean that the non-AIDS percentage of deaths in the estimated real total deaths had correspondingly increased. As confirmation of the 2% used for age 15 to 19, reference is made to the latest 2008 HSRC prevalence survey in which single year HIV incidence levels from 15 to 19 are mathematically derived with the justification that the calculations are not affected by AIDS related mortality.

Maximum HIV deaths relative to model predictions

Table 5

			Computer Model Predictions						
	1	2	3	4	5	6	7	8	9
Year of Death	HIV Clinic % Rate	HIV Clinic Births	HIV Doyle 0 to 14	HIV ASSA Births	HIV ASSA Milk	HIV Deaths 0 to4	HIV Deaths 5 to 14	HIV Deaths 0 to 14	Doyle Deaths 0 to14
1997	17.0	51000	87000	32935	19852	36700	1592	38292	14000
1998	22.8	68400	114000	44171	26625	36608	1609	38217	19000
1999	22.4	67200	144000	43396	26158	34590	1622	36212	25000
2000	23.0	69000	173000	44559	26859	34396	1639	36035	31000
2001	24.8	74400	201000	47840	29620	35199	1649	36848	36000
2002	26.5	79500	226000	47187	30694	35211	1725	36936	42000
2003	27.9	83700	250000	44259	29919	35269	1789	37058	47000
2004	29.5	92900	271000	41346	28333	35730	2000	37730	52000
2005	30.2	99600	291000	38903	26752	35611	2039	37650	56000
2006	29.1	96000	309000	38268	25817	36006	1854	37860	60000
2007	28.0	84000	326000	38510	25705	34343	1775	36119	64000

The maximum HIV deaths in Table 4 can now be analyzed in comparison with the predictions of the computer models. Column 1 in Table 5 above shows the antenatal HIV prevalence rates

calculated by the annual Department of Health sample tests of pregnant women. Column 2 shows the number of infants acquiring HIV from their mother based on annual births ranging from approximately 1 million in 1997 to1.05 million in 2004, 1.1 million in 2005 and 2006 to1 million in 2007. This calculation is based on the widely quoted conversion rate of 30% but does not take into account the purported life-saving benefits of the highly toxic chemotherapy drugs known as ARVs. According to the Harvard authors less than 3% of HIV positive mothers were receiving these drugs by 2002 and only 10% by 2004. Column 3 shows the 0 to 14 HIV prevalence projected by the early computer model of Peter Doyle of Metropolitan Life. The early ASSA models were found to be overestimating child deaths with the result that the ASSA2003 model was recalibrated by distinguishing between those infants acquiring HIV intrapartum and those via breast feeding. The 60% perinatal transmissions shown in column 4 were estimated to have a median survival of only 1 year, whereas the 40% breast milk transmissions shown in column 5 have a predicted median survival of 9 years. Columns 6 to 8 show the maximum HIV deaths from 0 to 14 as calculated in Table 4 using the official research estimates and column 9 shows the 0 to 14 HIV deaths predicted by the original Doyle model. The following comparisons can be made from Table 5.

1) The antenatal clinic rates predict an increase in HIV transmissions of 28,500 from 1997 to 2002, whereas the estimated real deaths and HIV deaths show no increase over the whole decade.

2) The Doyle model shows an increase in 0 to 14 prevalence of 139,000 from 1997 to 2002, whereas the estimated real deaths and HIV deaths show no increase over the whole decade.

3) The ASSA2003 model shows an increase in perinatal HIV births of 14,905 from 1997 to 2001 followed by a decrease of 9,330 from 2001 to 2007, whereas the estimated real deaths and HIV deaths show no significant change over the whole decade.

4) The ASSA2003 model shows an increase in breast milk transmissions of 10,842 from 1997 to 2002 followed by a decrease of 4,989 from 2002 to 2007, whereas the estimated real deaths and HIV deaths show no significant change over the whole decade.

5) The ASSA2003 model shows a total of 159,808 breast milk transmissions from 1997 to 2002 with a median survival of 9 years, whereas 5 to 14 maximum HIV deaths show an annual average of 1,750 over the whole decade.

6) The Doyle model shows an increase in 0 to 14 HIV deaths of 28,000 from 1997 to 2002 and 50,000 over the whole decade, whereas estimated real deaths and HIV deaths show no increase over the whole decade.

Reconciliation of HSRC prevalence surveys, computer models and estimated real and HIV deaths.

Table 6

HIV Prevalence from HSRC Surveys

		2002				2005				2008		
Age Group		Pop'n 000's	HIV %	HIV 000's		Pop'n 000'S	HIV %	HIV 000'S		Pop'n 000's	HIV %	HIV 000's
2 to 4		2775	6.2	170		2920	5.1	130		3067	4.5	120
5 to 9		4950	6.2	307		5031	4.4	214		5254	2.9	152
10 to 14		4950	4.7	233		5099	1.7	86		5279	1.3	68
Total		12675	5.6	710		13050	3.3	430		13600	2.5	340

Table 6 shows the 2 to 14 HIV prevalence in thousands from the three HSRC surveys based on testing, calculated by applying the percentages to the age group population from StatsSA mid year estimates. The lack of any relationship between the prevalence calculations of the three HSRC surveys and the maximum HIV deaths, and the mathematical impossibility of the 2 to14 total being lower in 2008 than in 2002 has already been demonstrated in my previous critique of child HIV prevalence as presented in the South African National survey of 2008. The principle irreconcilable contradictions are as follows:

1) Using the estimated HIV deaths from Table 4 as the 2 to 14 cohort moves through to 7 to 19 from 2002 to 2007, a maximum of 16,800 could have died out of the 710,000 prevalence from 2 to 14 estimated by the HSRC using scientific sampling and testing in 2002. This is a tiny percentage even if measured against the 340,000 prevalence of 2008 and the 2 to19 HIV deaths show no increase from 2002 to 2007.

2) The HSRC et al show 2 to 14 prevalence decreasing from 710,000 in 2002 to 430,000 in 2005 to 340,000 in 2008 whereas the Doyle model shows 0 to 14 prevalence increasing from 226,000 to 291,000 to 326,000. In a comparative study between the HSRC 2005 survey and ASSA2003 the AIDS committee of ASSA observed in January 2006 that the trend of falling prevalence in children was quite implausible.

3) The cohort prevalences cannot be reconciled between the surveys. For example the 5 to 9 prevalence of 307,000 in 2002 becomes 68,000 in 10 to 14 in 2008 despite the maximum HIV deaths of 5,000 as the cohort moves through and disregarding the annual 5 to 9 incidence of 75,000 as calculated by the 2005 HSRC survey.

Ratio Analysis of age 0 to 9 StatsSA registered deaths and estimated real deaths.

Table 7

Age Group % Ratios

Year of	StatsSA Registered Deaths						Estimated Real Deaths					
Death	1/0	1-4/0	1-4/0-4	2-4/0-1	5-9/2-4	5-9/1-4	1/0	1-4/0	1-4/0-4	2-4/0-1	5-9/2-4	5-9/1-4
1997	17.5	31.3	23.9	11.8	86.8	38.4	18.5	29.8	23.0	9.5	63.2	23.9
1998	18.1	33.1	24.9	12.7	75.9	34.4	19.0	31.7	24.1	10.6	57.7	23.1
1999	19.4	34.2	25.5	12.4	80.9	35.0	20.3	32.9	24.8	10.5	62.5	23.9
2000	19.2	36.0	26.4	14.0	74.9	34.9	20.1	34.0	25.4	11.6	57.9	23.7
2001	20.4	37.7	27.4	14.4	74.6	34.2	21.3	35.6	26.3	11.8	56.1	22.5
2002	18.2	35.1	26.0	14.3	75.1	36.2	18.9	33.1	24.9	11.9	58.2	25.0
2003	18.4	35.1	26.0	14.1	78.0	37.1	19.1	33.2	24.9	11.8	60.8	25.9
2004	20.2	38.5	27.8	15.2	79.0	37.6	20.8	35.9	26.4	12.5	64.4	27.0
2005	18.0	33.6	25.1	13.2	85.4	39.6	18.5	32.3	24.4	11.6	70.2	29.9
2006	19.7	33.3	25.0	11.3	85.5	34.8	20.3	32.5	24.5	10.1	71.1	26.6
2007	18.3	31.8	24.1	11.3	85.6	36.2	18.9	31.0	23.6	10.2	71.0	27.7

Ratio analysis of StatsSA registered deaths and estimated real deaths as in Table 7 above demonstrates that it is mathematically impossible for a new cause of death to have become operative after 1997 in the age ratios claimed by the research studies.

Ratio analysis is easily understood. If you have two variables divided in a certain ratio before an additional factor is added to both, then the ratio of the two variables will change unless the additional factor is added in the existing ratio. Thus if age 1 to 4 deaths are 10 and age 0 deaths are 30 the ratio of age 1 to 4 compared to age 0 is 10/30 or 33%. If you now add a further 15 deaths in the ratio of 2 for age 1 to 4 and 1 for age 0 then 1 to 4 deaths become 20 (10+10) and 0 deaths become 35 (30+5) and the ratio of 1 to 4 deaths compared to 0 deaths is now 20/35 or 57%. If the additional factor is small relative to the existing total then the ratio change will be small. The greater the additional factor the greater the magnitude of change in the existing ratio. Changes in the ratio of the additional factor relative to the existing ratio can be detected by very small changes in the new ratio.

In Table 7 above, 6 different ratios have been calculated for both the StatsSA registered deaths and the estimated real deaths. For example the ratio of age 1 to age 0 of StatsSA registered deaths in 1997 is 4324 divided by 24734 multiplied by 100 or 17.5%. It is evident that the ratios are remarkably consistent throughout the eleven year period. We can now examine the various scenarios presented by the HIV/AIDS experts.

The Harvard authors make the claim, based on a pooled analysis of babies born to HIV 'infected' women, that one third of babies (35%) born HIV positive die before the age of 1 year and one half (52%) before the age of 2 years or a ratio of 2 in age 0 (under 1) to 1 in age 1. They state that they used 3 years as a conservative estimate of the mean survival of HIV 'infected' babies. As we have seen, the predicted increase in HIV under 5 deaths from 1997 varies widely, so we will use the conservative estimate of 15,000 made by ASSA2003 taking into account the estimated registration completion percentage. If 6000 new cause deaths are added to the 1997 StatsSA registered totals in the ratio of 1 for age 1 and 2 for age 0 the new totals become 6,324 for age 1 and 28,734 for age 0 or a ratio of 22.0%. If 9,000 new cause deaths are added in the ratio of 1 to 2 then the new ratio becomes 23.8% (7,324/30,734). As can be seen in Table 7 the ratio of 1 to 0 remains consistently below these percentages and can only be reconciled with a new factor ratio of at least 1 in age 1 to 3 in age 0. The evidence from a pooled analysis of babies born to HIV infected women as published in the Lancet in 2004 cannot be reconciled with the evidence of registered deaths in South Africa published by StatsSA.

The Harvard authors state that they used 3 years as a conservative estimate of the mean survival of HIV 'infected' babies or in other words they estimate all to have died by the age of 5. If 52% die in age 0 to 1 then 48% would die from age 2 to 4. If 3,000 new cause deaths are added to StatsSA registered 2 to 4 deaths in 1997 of 3,427 and 3,250 added to 0 to 1 deaths of 29,058 the new ratio would become 19.9% (6,427/32,308) but the ratio remains way below this throughout the decade. That it is mathematically impossible for only 52% to have died before age 2 is confirmed by the maximum HIV deaths calculated in Table 4 which show a maximum of 5,500 deaths annually from age 2 to14. According to the Harvard authors' conservative estimate of 60,000 HIV babies born annually 48% or 28,800 survive to age 2 whereas maximum HIV deaths are 5,500. If 48% of HIV deaths are 5,500 then the total HIV deaths are 11,460. It is again clear that the estimate of the pooled analysis published in the Lancet of 52% dying before age 2 cannot remotely be reconciled with the registered deaths from StatsSA.

As an alternative scenario we may examine the estimate of Bradshaw and Dorrington in their SAMJ article of August 2007 that around 60% of HIV babies can be expected to die before age 5. This prediction conforms to that of ASSA2003 in which 40% are estimated to have been infected via their mother's breast with a median survival of 9 years as opposed to the 1 year of the 60% infected perinatally. If this median survival of 1 year is interpreted as all dying before age 2 then 6,000 added to the StatsSA total for 0 to 1 in 1997 would give a new ratio of 2 to 4 against 0 to 1 of 9.7% (3,427/35,058), again way below the consistent ratio throughout the decade. Even if the survival of 1 year is interpreted as before the age of 3, the new ratio would not be achieved by any ratio of 3 to

4 against 0 to 2 throughout the period. The principal contradiction of this scenario has already been observed in the comparison of maximum HIV deaths with the ASSA2003 predictions. This shows an annual average of 27,000 breast milk transmissions whereas maximum HIV deaths from 2 to14 are 5,500 and 1,750 from 5 to 9.

It is clear from the above ratio analysis that a new cause of death factor for children from 0 to 9 could not have become operative after 1997, unless it had been introduced in approximately the same existing ratios of 70% under 1, 20% in 1 to 4 and 10% in 5 to 9. If this was the case, in contrast to the evidence of pooled analysis published in the Lancet and the MRC study of year 2000, then total annual HIV deaths from 0 to 19 still could not have exceeded an annual average of 37,000 based on the calculations in Table 4. This is considerably below the Harvard authors' conservative estimate of 60,000 HIV infections annually and conflicts with the evidence from Table 3 that there has been no increase in real child deaths over the decade.

Conclusions

1) Based on StatsSA registered deaths and estimates of registration completion supported by considerable research, there is no evidence of any increase in child deaths from 1997 to 2007 beyond that expected from population growth.

2) Based on the findings from the MRC, ASSA and HSRC research of age group estimates of HIV deaths, the maximum possible total of HIV deaths over the decade is just over half of that predicted by ASSA2003.

3) There is zero correlation between the child prevalence predictions of the antenatal surveys and the maximum possible HIV deaths based on the research evidence of the MRC.

4) There is zero correlation between the child prevalence predictions of the computer models and the maximum possible HIV deaths based on the research evidence of the MRC.

5) The age group child prevalence estimates of the successive HSRC surveys cannot be reconciled.

6) There is zero correlation between the prevalence and incidence estimates of the HSRC and the maximum possible HIV deaths based on StatsSA registered deaths, evidence supported estimates of registration completion, and HIV age group deaths.

7) There is zero correlation between the child prevalence estimates of the HSRC and those of the computer models.

8) Based on ratio analysis of registered and real deaths the estimated ratios of child HIV deaths from pooled published research are mathematically impossible and irreconcilable with the estimates of child HIV deaths.

9) There is zero evidence that the lives of any children in South Africa have been lost by failing to administer chemotherapeutic, cell poisoning drugs, which an extensive amount of scientific research literature confirms as injurious to health.

Despite the impressive list of references provided by the Harvard authors they have made little or no effort to study and analyze the statistical evidence on which their assumptions are based. Dr Rodney Richards' detailed correlative analysis of mortality in South Africa, available online, is widely known to researchers as is the seminal research of vital registration by Professor Bah, available in a standard reference like 'The Demography of South Africa' by Zuberi et al, yet the Harvard authors ignored these important research studies. They state that they obtained from UNAIDS the number of deaths from AIDS in South Africa. UNAIDS do not estimate deaths from StatsSA registrations and studies of registration completion but from computer models based on inputs such as antenatal HIV rates. As with the ASSA models these have been continuously revised as the estimates of deaths have proved to be overstated. Once the dual assumptions of an increase in real deaths and a correlation between HIV measurement and mortality have been invalidated by empirical data and detailed statistical analysis, the Harvard authors' calculations of person-years lost become entirely irrelevant and a meaningless exercise in political propaganda.

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