

**The relationship between the hiv statistics and child mortality in South Africa-1996 to 2012**  
**Summary Version of Previous Analyses on TIG.org.za**

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This analysis summarises the principal statistical and mathematical evidence, conclusively demonstrating the impossibility of any relationship between the measurement labelled hiv and child mortality in South Africa. It is based on the official statistics published in accordance with the highest professional standards by South Africa's foremost research and statistical bodies. The publication references are listed in the author's original analyses.

The failure of the hypothesis known as hiv is seen most starkly in the complete lack of any correlation between the huge estimates of the hiv measurement among children from 0 to 14 by 2002, and the lack of any unexplained increase in mortality from age 0 to 19 in subsequent years.

**Prevalence of children aged 2 to 14 from HSRC Surveys**

Beginning in 2002, the Human Sciences Research Council (HSRC) have carried out 4 national hiv prevalence surveys using scientific sampling and testing. They reported their results by percentage for age groups of children between 2 and 14 which are easily converted to actual numbers using the populations reported by StatsSA in their annual mid year estimates. Table 1 below shows the prevalence by age group for each of the 4 successive surveys

**Table 1**

Survey Year	Age 2-4			Age 5-9			Age 10-14			Age 2-14	
	Pop 000's	hiv %	hiv 000's	Pop 000's	hiv %	hiv 000's	Pop 000's	hiv %	hiv 000's	hiv %	hiv 000's
2002	2,775	6.2	170	4,950	6.2	307	4,950	4.7	233	5.6	710
2005	2,920	5.1	130	5,031	4.4	214	5,099	1.7	86	3.3	430
2008	3,067	4.5	120	5,254	2.9	152	5,279	1.3	68	2.5	340
2012	3,175	1.8	57	5,091	2.4	122	5,071	2.9	147	2.4	326

The HSRC show a 2 to 14 decrease of 280,000 from 2002 to 2005, despite the negligible use of the drugs labelled arv, which calculates to an average annual deaths of 93,000 without accounting for the new annual incidence. Tracking the individual age cohorts reveals the same very large estimate of deaths. 307,000 from 5 to 9 in 2002 becomes 86,000 from 10 to 14 in 2005 without accounting for new incidence. 214,000 from 5 to 9 in 2005 becomes 68,000 from 10 to 14 in 2008 even after the introduction of the drugs. The HSRC continue to show a large decrease of 90,000 from 2005 to 2008 or 30,000 deaths annually, before taking into account the annual new incidence.

**Incidence of children aged 2 to 14 from HSRC Surveys**

In 2005 the HSRC began using highly scientific testing methods to estimate the annual incidence or new hiv cases occurring during the year. They reported as follows:

**Table 2**

Survey Year	Age 2-4			Age 5-9			Age 10-14			Age 2-14		
	Pop 000's	hiv %	hiv 000's	Pop 000's	hiv %	hiv 000's	Pop 000's	hiv %	hiv 000's	Pop 000's	hiv %	hiv 000's
2005	2,920	0.8	23	5,031	1.5	75	5,099	0.4	20	13,050	0.9	118
2012											0.25	29

The HSRC showed a large decrease of 89,000 in annual incidence of 2 to 14 from 2005 to 2012. They reported in table 3.28 on page 58 that all of the 29,000 incidence in 2012 was female with no male incidence, despite the HSRC showing almost equal male to female prevalence from 0 to 14.

### **Incidence of children aged 0 to 14 from Metropolitan Life and ASSA Computer Models**

Following the widespread publicity in the USA and the UK, the Actuarial Society of SA (ASSA) set up a committee in 1987 to model the impact of the alleged epidemic in South Africa which was faced with a legacy of centuries of health inequality. One of the stated purposes was to counter what they termed aids denialism. Modelling began with the Metropolitan model developed in 1989 by Peter Doyle, who later became president of ASSA. This model was updated as part of a paper for the UN Development Programme in 1998. As it was proprietary, ASSA felt that it was necessary for the general public to have access to a model that users could alter to suit their needs. In 1996 the first ASSA500 model was released which was continuously recalibrated as they realised that predicted deaths were hugely overstated. In 2010 the sixth revision ASSA2008 was released, which assumed those children allegedly acquiring hiv from the mother through perinatal birth to have a median survival of 7.29 years and through breastmilk 14.65 years. The model predictions of annual incidence are in Table 3 below.

**Table 3**

Year	D of H Antenatal %	ASSA Births 000's	ASSA Breast 000's	ASSA Total 000's	Doyle Total 000's
1997	17.0	25	14	39	40
1998	22.8	32	18	50	46
1999	22.4	38	22	60	55
2000	23.0	43	26	69	60
2001	24.8	46	28	74	64
2002	26.5	48	30	78	67
2003	27.9	46	30	76	71
2004	29.5	45	28	73	73
2005	30.2	42	27	69	76
2006	29.1	38	24	62	78

The ASSA total annual incidence is only that defined as transmitted from mother to child but is very close to the predicted estimates of the Doyle model. By the peak mortality year of 2006 ASSA estimate 62,000 and Doyle 78,000, as against the scientific fieldwork calculation by the HSRC of 118,000 in 2005 and 29,000 in 2012.

**Prevalence of children 0 to 14 from 2002 to 2012 estimated by ASSA, HSRC and Doyle**

The prevalence estimates of the hypothetical ASSA and Doyle models are compared to the actual scientific fieldwork results of the HSRC in table 4 below.

**Table 4**

Year	ASSA 0-4 000's	HSRC 2-4 000's	ASSA 5-9 000's	HSRC 5-9 000's	ASSA 10-14 000's	HSRC 10-14 000's	ASSA 0-14 000's	HSRC 2-14 000's	Doyle 0-14 000's
2002	282	170	32	307	1	233	315	710	226
2003	210		47		2		259		250
2004	223		65		4		292		271
2005	230	130	85	214	8	86	323	430	291
2006	232		105		13		350		309
2007	228		126		22		376		326
2008	219	120	144	152	33	68	396	340	342
2009	211		160		47		418		354
2010	202		173		64		439		365
2011	191		181		82		454		
2012	184	57	182	122	100	147	466	326	

*The HSRC fieldwork results are diametrically opposed to the hypothetical predictions of the Doyle and ASSA models. The HSRC report sharply decreasing prevalence from 2002 to 2012 while Doyle and ASSA show steadily rising prevalence. The HSRC show the decrease in all age groups throughout their 4 surveys except for an increase in 10 to 14 from 2008 to 2012.*

**Deaths of children 0 to 14 estimated by Doyle, ASSA and HSRC from 1997 to 2012**

**Table 5**

Year	Doyle 0-14	ASSA 0-14	HSRC 2-14
1997	14,000	12,808	
1998	19,000	17,545	
1999	25,000	22,676	
2000	31,000	27,701	
2001	36,000	32,438	
2002	42,000	36,677	
2003	47,000	39,480	211,000
2004	52,000	39,917	211,000
2005	56,000	37,571	211,000
2006	60,000	35,157	59,000
2007	64,000	32,660	59,000
2008	68,000	24,191	59,000
2009	71,000	19,913	32,500
2010	73,000	20,934	32,500
2011		22,022	32,500
2012		23,005	32,500

Deaths predicted by the Doyle and ASSA models and calculated by the HSRC scientific survey from 0 to 14 between 1997 and 2012 are compared in Table 5 above. The HSRC totals have been calculated by adding the average annual decrease in prevalence between surveys to the average annual incidence estimated by the HSRC in 2005 and 2012. Thus for the peak deaths year of 2006 the 30,000 decrease from 2005 to 2008 is added to the 29,000 annual incidence calculated from scientific testing in 2012. *While the estimates for 2006 vary from 35,000 by ASSA to 59,000 by the HSRC, they are in agreement that a substantial number of deaths from hiv disease occur every year*

### **Statistics South Africa Death Registration And Estimated Completion Percentage**

StatsSA registered deaths are converted to actual deaths by dividing by the estimated registration completion percentage. In April 2012 under the direction of the Burden of Diseases Unit of the Medical Research Council, eight authors published a study of under 5 mortality statistics in South Africa from 1997 to 2007. Some of the authors like Dr Debbie Bradshaw and Prof. Rob Dorrington had been publishing on the subject for several years. *On page 73 of this report they concluded that StatsSA registration completeness had increased from less than 50% in 1997 to 88% for infants under 1 and 60% for children aged from 1 to 4 years in 2006.*

One of the authors of the MRC 2012 report, Timotheus Darikwa, published an analysis of child mortality in South Africa from 1996 to 2006 as a doctoral thesis at the University of Cape Town in August 2009. Using the 2007 Community Survey by StatsSA he concluded that under 5 death registration was 44.8% in 1997 which would result in actual deaths of 72,511 (32,485/44.8). Using StatsSA registered births for 1997 of 960,000 results in an under 5 mortality rate (U5MR) of 75.5 (72,511/960) which is inconsistent with the mortality rates shown in Table 5 on page 55 of the MRC report. *Applying a trend consistent mortality rate of 72 results in an under 5 registration completion rate of 47% (32485/ 960x72) for 1997.*

On page 73 the MRC report states that despite the variations in the estimates of U5MR from other models, they all confirm the age pattern of completeness, i.e. higher levels of completeness for the infants under 1 compared with the older children of 1 to 4 years of age. It is significant that the ratio of 1 to 4 registered deaths relative to 0 to 4, as seen in Table 7, remains at a constant average of 25% from 1997 to 2006. *Based on the 2006 ratio of 88% under 1 and 60% 1 to 4, the 47% under 5 completeness registration in 1997 converts to 52% under 1 (47/79x88) and 36% 1 to 4 (47/79x60).*

In the census year of 1996 StatsSA demographer, Dr Sulaiman Bah, calculated an overall death registration completion of 63.4% comprised of 37% in the 46% rural and 86% in the 54% urban areas. The government campaigns to improve person and vital registration did not begin until February 1998 so there was no reason to expect a change by 1997. *The under 5 registration completion of 47% in 1997 results in an over 5 completion percentage of 66% as under 5 deaths are 10% of total deaths.*

StatsSA have calculated that over 14 registration completion was 93% in 2006. They have not yet estimated completion for age 5 to 14 which represents less than 15% of 0 to 14 registered deaths. *These completion percentages must logically be consistent with the percentages from 1 to 4 and over 14, thus between 60% and 93% in 2006 and between 36% and 66% in 1997.*

### **Increase in Actual 0 to 19 Deaths from 1997 to 2006**

Applying the above registration completion percentages to StatsSA registered deaths results in the following increases in actual deaths from 1997, when the models estimate very few hiv deaths, to 2006, when registered mortality reached a peak, as seen in Table 6 below:

**Table 6**

<b>Age Group</b>	<b>1997 StatsSA Deaths</b>	<b>% Complete</b>	<b>1997 Actual Deaths</b>	<b>2006 StatsSA Deaths</b>	<b>% Complete</b>	<b>2006 Actual Deaths</b>	<b>1997 Actual @ 1.9% p.a.</b>
0	24,734	52	47,565	48,239	88	54,817	56,344
1	4,324	36	12,011	9,524	60	15,873	14,228
2- 4	3,427	36	9,519	6,534	60	10,890	11,276
5- 9	2,974	45	6,608	5,584	75	7,445	7,827
10-14	2,754	55	5,007	4,311	85	5,071	5,931
15-19	6,274	66	9,506	9,467	93	10,179	11,260

*The major portion of the increase in StatsSA registered deaths from 1997 to 2006 is a result of the increase in registration completion. Nannan et al acknowledge this in their MRC report of April 2012, when they state on page 74 that South Africa has seen vast improvements in the registration of child deaths over the period 1997 to 2007.*

In section 2 of this author's May 2015 analysis, the population growth rate over the decade to 2006 has been calculated at 1.9% compounded annually. When this rate is applied to the 1997 actual deaths, as in the final column of Table 6, expected actual deaths in 2006 are in excess of the 2006 actual reported deaths after registration improvement. The only exception is in age 1, but ages 0 and 1 together are precisely as expected from population growth including increase in annual births.

*Despite the estimates from Table 4 by ASSA of hiv prevalence of 315,000 from 0 to 14 and by the HSRC of 710,000 from 2 to 14 by 2002, and the evidence from Table 5 of a large number of hiv deaths from 1997 through to the peak mortality year of 2006, the irrefutable evidence from Table 6 is that StatsSA reported no increase at all in deaths from 0 to 19 or 2 to 19, beyond that expected from registration improvement and population growth. There is no correlation whatsoever between the child hiv measurement and mortality.*

This complete lack of correlation is confirmed when the precise predictions of ASSA are compared to the age group mortality reported by StatsSA. *As seen in Table 3, ASSA2008 shows 403,000 perinatal and 247,000 breastmilk hiv transmissions from 1997 to 2006, with a median survival of 7 and 14 years respectively, yet, as Table 6 shows, 5 to 19 actual deaths remain at historically low levels throughout the period.* In an MRC policy brief published in 2003 by 3 of the 2012 authors, Nannan, Bradshaw and Dorrington, studying child mortality in detail for the year 2000, they reported that hiv deaths from age 10 to 14 were effectively zero. In their 2008 national prevalence study the HSRC stated that they were able to calculate accurate incidence rates from age 15 to 19 because hiv deaths in that cohort were of minimal significance.

As seen in Table 7 below, the 5 to 9 deaths peaked in 2005 in the cohort born between 1996 to 2000 when the maternal hiv rates were much lower than the rate of 30% reported by the Department of Health for 2005, as seen in column 1 of Table 3. Similarly the 10 to 19 deaths peaked in 2006 in the cohort born between 1987 and 1996 when the reported antenatal maternal rates were very small, only rising to 4.3% by 1993. *There is no correlation whatsoever between the antenatal rates, ASSA's precisely recalibrated median survival rates and StatsSA's registered deaths.*

**Ratio analysis of 0 to 14 StatsSA registered deaths 1997 to 2006**

Table 7 below shows the number of deaths for each age from 0 to 14 reported by StatsSA from 1997 to 2006 and several age group ratios calculated from the StatsSA registered deaths. Thus, for example, the 1997 ratio of age 1 to age 0 is 4324/24734 or 17.5.

**Table 7**

Year	Age at death							Age group ratio						
	0	1	2	3	4	5-9	10-14	1/ 0	1-4/ 0	1-4/ 0-4	2-4/ 0-1	5-9/ 2-4	5-9/ 1-4	5-14/ 0-4
1997	24734	4324	1696	958	773	2974	2754	17.5	31.3	23.9	11.8	86.8	38.4	17.6
1998	28493	5160	2196	1195	889	3250	3004	18.1	33.1	24.9	12.7	75.9	34.4	16.5
1999	28264	5556	2109	1214	923	3433	2977	19.4	34.2	25.5	12.4	80.9	35.0	16.7
2000	28872	5547	2428	1366	1040	3619	3083	19.2	36.0	26.4	14.0	74.9	34.9	17.0
2001	29842	6091	2583	1416	1162	3852	3227	20.4	37.7	27.4	14.4	74.6	34.2	17.2
2002	34390	6249	2947	1695	1187	4376	3373	18.2	35.1	26.0	14.3	75.1	36.2	16.6
2003	38405	7066	3113	1884	1413	4998	3667	18.4	35.1	26.0	14.1	78.0	37.1	16.7
2004	41414	8351	3550	2235	1804	5995	3923	20.2	38.5	27.8	15.2	79.0	37.6	17.2
2005	46427	8359	3471	2072	1694	6177	4016	18.0	33.6	25.1	13.2	85.4	39.6	16.4
2006	48239	9524	3196	1887	1451	5584	4311	19.7	33.3	25.0	11.3	85.5	34.8	15.4

If two variables are divided in a certain ratio before an additional sum is added to both, then the existing ratio will change unless the additional sum is added in the existing ratio. A relatively small difference in the ratio of the additional sum will be detected by a change in the new ratio. The various scenarios proposed by the proponents of the mother to child hypothesis have been examined in detail on page 8 of this author's 2009 Harvard rebuttal and section 17 of his 2015 analysis. None of the scenario age group ratios are remotely similar to the 1997 existing ratios, which remain remarkably consistent throughout the decade to 2006, both for the actual deaths and registered deaths, as seen in Table 7. *It is mathematically impossible for a new cause of death to have been introduced on the scale estimated in Table 5, unless in the existing 1997 ratio of approximately 65% under 1, 20% in 1 to 4 and 15% in 5 to 14.*

**Deaths attributed to hiv disease by StatsSA for 0 to 14 from 1997 to 2010**

Table 8 below shows the 0 to 14 deaths attributed to hiv disease by StatsSA from 1997 to 2010. The age group totals have been extracted from the annual cause of death reports which rank the top ten causes of death for different age groups. In most years exact totals are given by StatsSA for age 1 to 4 and 0 to 14 but when hiv disease is not ranked in the top ten causes an estimate to the nearest 50 has been made, based on the tenth ranked total and the preceding or following year actual total.

StatsSA reported a highest total of 1,235 deaths from hiv disease from 0 to 14 in the peak mortality year of 2006, compared to the estimate of ASSA of 35,157. An annual average of 950 deaths from hiv disease were recorded by StatsSA from 1997 to 2010 from age 0 to 14. This comprised an annual average of 450 or 47% under 1, 300 or 32% from 1 to 4 and 200 or 21% from 5 to 14. *As above, this ratio applied to the model predictions of deaths is both mathematically impossible and irreconcilable with the various expert scenarios of 0 to 14 hiv deaths.*

**Table 8**

Year	0-14	Age Group		
		0	1-4	5-14
1997	602	200	219	183
1998	800	350	250	200
1999	893	350	338	205
2000	900	350	350	200
2001	900	350	334	216
2002	900	350	350	200
2003	900	400	298	202
2004	900	400	302	198
2005	1000	450	363	187
2006	1235	598	348	289
2007	1046	500	246	300
2008	1103	500	303	300
2009	1011	486	279	246
2010	1011	410	273	328

In terms of the International Classification of Diseases (ICD-10), codes existed prior to 1997 for disorders involving the immune system and immunodeficiencies (D80-D89). In their mortality and causes of death report for 2004 StatsSA described the workshop held in November 2003 between the SA Medical Association, the Cancer Association of SA, the Medical Research Council and the National Department of Health, where certain decisions were taken regarding coding problems in terms of the ICD. As there was no code in the ICD-10 manuals for acquired immune suppression it was agreed this would be interpreted as hiv disease and given an hiv code (group B20-B24). If hiv was written on the death certificate form that would also be coded in the hiv group as required by ICD-10. The approach followed the principle of 'what you see is what you code'.

In their mortality report appendices StatsSA provide a detailed analysis of the total number of deaths coded to hiv disease under B20-B24 and this shows that approximately 90% were coded B20 to B23, which are defined as hiv disease resulting in other specified diseases. B24 is defined as unspecified hiv disease. In other words the other diseases, which have their own specific codes, were identified but coded hiv disease because hiv was written on the death notification form. From 1998 this form provided for up to 5 causes of death but it was agreed that any mention of hiv would be coded B20 to B24. Despite this agreement StatsSA record only a tiny percentage of the hiv deaths estimated by the HSRC, ASSA etc, although StatsSA provide an annual table showing that two thirds of death certificates are completed by medical professionals or from autopsies.

As seen in Table 8, StatsSA reported an average of only 500 deaths from hiv disease from age 1 to 14 from 1997 to 2006, in contrast to the minimum 315,000 prevalence and 35,000 deaths calculated by the HSRC from their scientific fieldwork and testing and by ASSA from their highly sophisticated modelling.

The tiny numbers reported by StatsSA do not vary in proportion to the ASSA and HSRC predictions and findings. The 0 to 14 deaths vary from 893 in 1999 to 1,235 in the peak year of 2006 and 1,011 in 2010, even after a significant decrease in total 0 to 14 deaths. *The death notices specifying hiv have resulted from the known results of testing on the mother or child not from any identification of disease symptoms, and the number of deaths coded B20-B24 vary in accordance with the change in total registered deaths and the recording habits of individual medical professionals.*

## **StatsSA mortality decrease 2006 to 2012 and HSRC antiretroviral exposure 2012**

From the peak mortality year of 2006 up to the latest publication for 2014, StatsSA reported steadily decreasing mortality in the younger age groups. In their 2012 survey the HSRC reported in Table 3.27 on page 57 the exposure to antiretroviral treatment among individuals identified hiv, analysed by age. These two variables are compared in Table 9 below

**Table 9**

<b>Age</b>	<b>StatsSA Deaths 2006</b>	<b>StatsSA Deaths 2012</b>	<b>Decrease deaths</b>	<b>Decrease %</b>	<b>HSRC hiv</b>	<b>HSRC % art</b>	<b>HSRC People art</b>
0-14	74,397	46,735	27,662	37	369,000	45.1	166,000
15-24	35,307	23,839	11,468	33	720,000	14.3	103,000
0-1	57,885	32,279	25,606	44	43,000	45.1	19,000
2-4	6,534	5,149	1,385	21	57,000	45.1	26,000
5-9	5,602	4,886	716	13	122,000	45.1	55,000
10-14	4,322	4,154	168	4	147,000	45.1	66,000
2-14	16,458	14,189	2,269	14	326,000	45.1	147,000
15-19	9,497	7,541	1,956	21	162,000	14.3	23,000
20-24	25,810	16,298	9,512	37	556,000	14.3	80,000

It is unnecessary to perform a chi square correlation analysis of the age group death percentage decrease and the numbers on the drugs labelled antiretroviral, because the complete absence of correlation is self evident. The death decrease is 44% in age 0 to 1 which includes 19,000 on the drugs but only 4% in age 10 to 14 which includes 66,000 on the drugs. Even if the 0 to 1 percentage of 45.1 is heavily weighted to the younger ages with 0 to 1 say 70%, the lack of correlation remains distinct. A decrease of 44% in 0 to 1 is related to 30,000 on drugs while a decrease of 14% in 2 to 14 relates to 136,000 on the drugs. *On the basis of the scientific fieldwork studies of the HSRC there is no evidence whatsoever that the decrease in mortality from 0 to 24 from 2006 to 2012 is related to the use of the drugs labelled antiretroviral.*

StatsSA have published recent studies providing the real explanation for the decrease in mortality from the peak year of 2006 to the latest report of 2014. They have shown that there were 23 million citizens living below the poverty line in 2006 which has since reduced to 16 million by 2011, partly because of a dramatic increase in social grants, which rose from 3 million in 2000 to 15 million in 2011. StatsSA reported that 61.3% of the poor are under the age of 25.

### **Conclusions from the above official published statistics**

*There is no evidence whatsoever that the huge estimates of prevalence and deaths of children from 0 to 14 as early as 1997, as published by the leading statistical bodies as shown in Tables 1 to 5, have been followed by any increase in actual mortality from 2 to 19 in the succeeding 17 years.*

*The consistency of the age group ratios since 1997 make it mathematically impossible for a new cause of child mortality to have occurred and the tiny number of hiv disease deaths reported by StatsSA is a result of linking disease classification to tests which are unrelated to mortality.*

*It is impossible for drugs labelled antiretroviral to be acting on a virus identified by a test because the decrease in 0 to 24 registered deaths after the peak mortality year of 2006 is unrelated to the actual drug exposure of individuals identified by a test.*

