

An analysis of the relationship between the hiv measurement and mortality in South Africa from 1996 to 2012 based on the official research statistics

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Summary

The official statistics published by the South African government, professional and research bodies have been analysed in detail over a period of sixteen years to demonstrate that the hiv causes death hypothesis is a mathematical impossibility and unsupported by every comparative method of analysis. The huge estimates of alleged incidence and prevalence among children from 2002 are not associated with any increase in child mortality after death registration improvements and birth increases are accounted for. The huge adult gender imbalance estimated by the research bodies from 2002 is not reflected in the official death registrations. A comparison of the annual incidence and prevalence estimates, together with the official registered mortality over time, reveals irreconcilable contradictions within and between the research bodies. Whatever the various hiv tests are measuring they have no reliability or validity as a constant, repeatable scientific measurement. There is no statistical evidence of any increase in mortality in South Africa above that predicted by the improvement in death registration, population growth, the residual impact of apartheid malnutrition and the huge influx of impoverished immigrants. There is no statistical evidence that the drugs labelled antiretroviral have caused a decline in mortality in South Africa.

1) Statistical Sources

The statistics quoted are all from official reports and documents. These emanate firstly from the Human Sciences Research Council (HSRC), where Prof. Olive Shisana is the President and CEO and Prof. Thomas Rehle serves as a Director and Senior Programme Advisor. From 1987 to 1993 Prof. Rehle directed the German Support Program on aids for Developing Countries, serving on many international scientific committees and advisory boards before joining the HSRC in 2005.

Secondly, they originate from the Actuarial Society of South Africa (ASSA), which set up an aids committee in 1987 'to assist the actuarial profession and later the wider public in estimating the impact of the aids epidemic on South Africa'. Its stated objectives were to provide realistic current and future estimates of hiv and aids related statistics in order to counter aids denialism and dispel aids fatalism and excessively pessimistic aids forecasts. Modelling of the alleged hiv and aids epidemic in SA began with the Metropolitan Life model developed by Peter Doyle in 1989 but in 1996 ASSA released their first model, ASSA 500, which they presented as a simplified version of the Metropolitan model. Subsequently, successive models were released, recalibrated to reflect the reality of the latest antenatal clinic and mortality data as closely as possible. The latest model ASSA2008, referring to the year of the latest antenatal clinic data, was released in Mar 2011. Prof. Rob Dorrington, based at the Centre for Actuarial Research at UCT (CARE), has been at the forefront of developing the aids ASSA models.

Thirdly, the official data emanate from the Medical Research Council (MRC) whose Burden of Disease Unit headed by Dr Debbie Bradshaw has been producing research reports since 2000, usually in close collaboration with ASSA, including annual national indicator reports on the demographic impact of hiv in South Africa.

Fourthly, the analysis is based on the annual mortality and causes of death reports from Statistics South Africa (StatsSA), whose Statistician-General is Mr Pali Lehohla. StatsSA also publish annual estimates of birth occurrences and mid-year population as well as census statistics. Estimates based on the annual testing of pregnant women at antenatal clinics are produced by the SA Dept. of Health.

2) Population Growth Rate

According to StatsSA the census population was 40.5 million in 1996, 44.8 m in 2001 and 51.8 m in 2011. They had estimated the 2011 population as 50.6 m in their mid-year estimates and subsequently didn't publish an estimate for 2012 but their 2013 estimate increased to 53 m, which agreed with the estimate of Dorrington in his alternative mid-year estimates published by CARE in October 2013. StatsSA reported a further 1 million increase to 54 m in their 2014 estimates. They had reported the 2006 population at 47.8 m before the 2011 census but adjusting for the census increase of 1.2 m on their original 2011 estimate of 50.6 m brings the 2006 total closer to 49 m, which is in line with the census increase from 1996 to 2001.

In their mid year population estimates for 2014 in Table 6, StatsSA estimate births and deaths for the period 2002 to 2014 with the annual excess of births over deaths ranging from 480,000 in 2002 to 656,000 in 2014, an annual average of 525,000. Their estimate of recorded live births from 1992 in Table 3 of their 2012 report confirms that the net excess from 1997 to 2001 did not exceed this annual average. Thus the population increase from 1996 to 2014 from the excess of births over deaths did not exceed 9.5 million (18 x 525). As the total increase over the period of 18 years was 13.5 m (54 less 40.5) net immigration was 4 m, which was approximately 4.5 m immigrants less 0.5 m emigrants.

Based on these StatsSA estimates the population increased from 40.5 m in 1996 to 49 m in 2006, which resulted from 5 m excess of births over deaths and 3.5 m net immigration increase. This is an average population growth rate over the 10 years of 1.9% compounded annually.

3) Adult Death Registration Completeness

In their 2011 mortality report StatsSA estimated registration completeness for adults 15 years and over at 93% for the period 2001 to 2007 and 94% for 2007 to 2011, based on the 2011 census results that allowed the use of methods employing intercensal growth rates. In their latest 2013 mortality report they repeat the estimate of 94% for the period 2007 to 2011 stating that it will be assumed for each year from 2012 until the results of the next census are available. As before, they state that estimation procedures for deaths occurring at ages younger than 15 years are still being explored.

4) Child Death Registration Completeness

Several different official statistics can be combined with mathematical logic to provide reasonable estimates of child death registration completion. Under 5 child mortality, which is the number of deaths per 1,000 live births, was estimated as 67 in 2004 by the Child Mortality Coordination Group on the basis of the Spectrum model, which calculates to 67,000 deaths based on StatsSA live births for that year. In their 2008 report 'Every death counts' Bradshaw et al at the MRC estimated 75,000 under 5 deaths in 2005 based on an estimate by a UN Interagency group as presented in a UNICEF report of 2008. In their latest child mortality report the World Bank estimated a rate for South Africa of 53 in 2010 and a report by a Parliament Research Unit presented to the NCOP Social Services Committee in Mar 2013 estimated the under 5 rate at 56 in 2009. Based on StatsSA recorded deaths these rates translate to a registration rate ranging from 86% in 2004, 83% in 2005, 93% in 2009 and 91% in 2010. StatsSA under 5 deaths reached a total of 57,500 in 2004, 62,100 in 2005, peaking at 64,400 in 2006 before decreasing to 61,900 in 2007 and 61,300 in 2008.

The UN Population Division estimated that the under 5 mortality rate was on average 76 per 1000 live births for the period 2000 to 2005 and support for this is provided by the more recent April 2012 MRC report by Bradshaw, Dorrington et al, on under 5 mortality statistics from 1997 to 2007.

In their conclusion on page 74 they state that South Africa has seen vast improvements in the registration of child deaths over the period 1997 to 2007. On page 55 they estimate the U5MR remaining effectively constant from 73.4 in 1998 to 75 in 2006 and 71.8 in 2007. Based on birth occurrences updated to June 2013 of 944,000 in 1998 and 1,083,000 in 2006, total under 5 deaths were 69,300 in 1998 and 81,300 in 2006, reflecting the increase expected from the increase in births ($69 \times 1083/944 = 79$).

This estimate of 81,300 under 5 deaths for 2006 calculates to a registration completion rate of 79% ($64.4/81.3$) which is confirmed by the registration completion estimates from the 2007 Community Survey, quoted by the MRC authors on page 73, of 88% for infants under 1 year and 60% for children aged from 1 to 4 years, which also calculates to total under 5 registration completion of 79% based on 48,333 deaths under 1 and 16,097 deaths from 1 to 4 registered by StatsSA in 2006.

5) Analysis of Child Under 5 Mortality Increase From 1997 to 2006

Based on the MRC estimates in their April 2012 report under 5 real deaths increased from 69,300 in 1998 to 81,300 in 2006, which is mostly explained by the increase in live births over the period ($69.3 \times 1083/944 = 79.5$). This represents an increase in registration completion from 54.7% in 1998 to 79% in 2006. The MRC report a U5MR of 63.9 for 1997, which is inconsistent with the stable rate from 1998 and the sudden significant increase from 1997 to 1998 is not explained, but the error very likely results from the significant increase in registered deaths which followed the government vital registration campaigns that began in February 1998. Confirmation that the 1997 estimate was an error comes from the 2007 Community Survey estimate of under 5 registration completion of less than 50% in 1997, quoted by the MRC report on page 73, because 63.9 calculates to a registration completion of 53% in 1997 ($32490/63.9 \times 960$). Estimating the 1997 U5MR at 72% in line with the succeeding years calculates to real deaths of 69,100 (960×72) or 47% ($32490/69100$) registration completion, consistent with the MRC estimate of less than 50%.

As before, the increase in real under 5 deaths from 1997 to 2006 is mostly explained by the increase in births ($69.1 \times 1083/960 = 78$) and the increase in StatsSA registered deaths is explained by the vast improvement in registration completion as acknowledged by the MRC in April 2012, in addition to the increase in live births, and not by any new cause of child mortality allegedly rapidly escalating over the period.

6) Calculation of Total Death Registration Completeness for 1997 from StatsSA Reports

StatsSA first issued full reports on recorded deaths for the census year 1996. In Dec 2001 they released their second report for deaths from 1997 to 2000, which included an analysis of the 1996 data comparing their registration deaths with those on the population register. During 1996, 327,253 deaths were registered, of which 33,119 or 10% were late registrations occurring in 1995 or earlier, leaving a total of 294,134 current registrations. They reported that only 72% of registrations appeared on the population register or 88,641 fewer. They stated that it would be expected that with regular updating of late registrations, deaths on the population register should be higher than 294,134. This expectation is confirmed by the higher percentage ratio of StatsSA deaths compared to the population register from 1997 when 82% were registered or 57,000 fewer, 31,641 less than in 1996. The several government campaigns to improve ID and vital registration only began in February 1998 so an improvement in registration completeness would not be expected in 1997.

In the census year of 1996 StatsSA demographer Dr Sulaiman Bah estimated that death registration completion was 37.4% in the rural areas, comprising 46% of the population, and 85.5% in the 54% urban areas, which calculates to an overall rate of 63.4%, assuming equal crude death rates in rural and urban areas, which applied to the 317,412 deaths StatsSA reported in 1997 gives a total of

500,000 real deaths in that year. In the mid-year estimates they released in November 2000 they reported that 76% of the 1996 deaths occurred in urban areas and 24% in rural. Applying these percentages of completion and area calculates to a total of 486,000 real deaths in 1997. They then proceed to calculate crude death rates, based on the census and death registration data, of 11.4 per 1,000 in the urban areas and 4.1 in the rural areas, stating the conclusion that deaths in the rural areas were significantly under-reported. To illustrate their point they apply the death rate in the urban areas to the 77,330 rural deaths recorded in 1996 giving an expected 248,313 deaths in rural areas. As 10% of the recorded deaths were late registrations, expected rural deaths in 1997 were 223,481, which added to the urban deaths in 1997 of 283,000 (242,000/85.5) gives a total of real deaths for 1997 of 506,481. On the basis of these several calculations the best estimate of total real deaths in 1997 is 500,000 or 63.4% registration completeness.

7) Analysis of Over 5 Mortality Increase from 1997 to 2006

Based on the StatsSA estimate of 93% registration completion for over 15 deaths in 2006, real over 5 deaths were 590,600 in 2006 (613,700-64,400)/93. As 5 to 14 deaths represent only 1.8% of total over 5 registered deaths they have no impact on this calculation especially as their registration completion is likely closer to 93% than 60%. Applying the average population growth rate of 1.9%, which includes net immigration, to the total over 5 real deaths in 1997 of 431,000 (500,000-69,000) calculates to an expected total of 510,600 in 2006 or 80,000 less than the actual real deaths, assuming no change in the over 5 crude death rate during the period, the number of deaths per 1,000 population. However, as described below, there are two substantial explanations why the crude death rate would be expected to increase in the years after 1997.

8) Poverty Explanation of Marginal Increase in Adult Mortality Rate

In reality there are clear alternative explanations why adult mortality in SA marginally increased up to 2006. Firstly, the replacement of 0.5 million largely wealthy, healthy emigrants by 4.0 million largely impoverished, deprived immigrants was certain to have increased the national crude death rate. Secondly, as recorded in the archives of the Institute of Race Relations and Black Sash, hundreds of thousands of South Africans barely survived to adulthood with stunted organs during the apartheid years, when an estimated 50,000 children under 5 died annually in the rural areas from malnutrition diseases like kwashiorkor. Faced with a variety of assaults on their immune system, which most healthy well-nourished persons would survive, the weakest and most vulnerable of those born in the 1960s and 1970s would succumb to premature mortality but eventually these unhealthy victims of oppression would be weeded out.

Similarly, a spike in mortality among the first wave of immigrants after democracy would begin to decline as the unhealthiest are eliminated and the remainder begin to establish roots and have better access to healthcare, clean water, etc. Recent studies by StatsSA show there were 23 million people in the country living below the poverty line in 2006, which has since reduced to 16 million in 2011, partly because of a dramatic increase in social grants, which rose from 3 million in 2000 to 15 million in 2011. This decrease in poverty precisely coincides with the decrease in StatsSA registered mortality since 2006. StatsSA report that 61.3% of the poor are under the age of 25.

9) Failure of Hypothesis Predictions

In his book 'Aids: The challenge for South Africa' published in 2000, Prof. Alan Whiteside, who has recently been awarded an OBE for his services to hiv, presented the model projections of Peter Doyle from Metropolitan Life, which were commissioned in 1998 for a paper for the UN Development Programme. This predicted 60,000 child and 433,000 adult aids deaths for 2006. StatsSA in Table 6 of their latest mid-year population estimates for 2014, report 343,000 aids

related deaths in 2006 or 49.4% of their total deaths estimate. In their latest 2008 model ASSA estimate 262,000 aids deaths in 2006 or 40% of total deaths, which they estimate at 656,000. In their National and Provincial Indicators for 2006 Dorrington and Bradshaw reported 346,000 aids deaths and in the Burden of Disease Unit report updated on 10 February 2007 they showed aids deaths of 360,000 for 2006.

These ludicrous figures from cloud cuckoo land are conservative in relation to other predictions that have fuelled the hiv hysteria epidemic since the beginning. In the Mercury newspaper of 24 January 2002 headline publicity was given to a prediction by a professional insurance body that total deaths in SA would reach 6 million by 2006. In other areas of science when later data do not substantiate predictions of a hypothesis it is rejected in favour of an alternative hypothesis but in the case of hiv anything goes and science gives way to a superior morality. In the words of Bradshaw and 27 other hiv experts in a letter to the press in November 2009, 'we know the suffering and feel the pain', this as hiv 'experts' like Peter Doyle, past president of ASSA, take early retirement to travel the world on the profits of their income generating hypothesis. It is clear that the increase in adult mortality from 1997 to the peak year of 2006 cannot remotely be reconciled with the various predictions and current estimates of deaths from a new cause of death called hiv.

10) HSRC Prevalence Surveys, ASSA Modelling and StatsSA Mortality Reports

Regardless of the precise accuracy of the above calculations of the actual mortality increase, a closer examination of the irreconcilable contradictions in the statistics produced by our official research bodies reveals the logical incoherence and mathematical impossibility of the hiv hypothesis. The HSRC have published comprehensive prevalence surveys in 2002, 2005, 2008 and 2012 based on scientific sampling and testing in which they give percentage estimates for the population for each 5 year age group. Similarly, the ASSA models estimate prevalence for both sexes in 5-year age groups as well as a host of other indicators and StatsSA report annual mortality in 5-year age groups although the single age totals are readily available. It is thus possible to make calculations based on a 5-year cohort such that an age cohort of 5 to 9 in 2002 becomes 10 to 14 in 2007. ASSA publish exact numbers whereas the HSRC show percentages, which are easily converted to numbers using StatsSA estimates of population.

11) Irreconcilable Contradictions between HSRC and ASSA Child Prevalence Estimates

A comparison of the HSRC and ASSA prevalence totals for children from age 2 to 14 with StatsSA mortality exposes the huge contradictions at the root of the false hypothesis. The HSRC report 2 to 14 prevalence consistently decreasing from 5.6% or 710,000 in 2002 to 2.4% or 330,000 in 2012 whereas ASSA diametrically opposes this scientific fieldwork calculation by showing 2 to 14 prevalence consistently rising over the same period. The Doyle model also shows 0 to 14 prevalence consistently rising from 226,000 in 2002 to 365,000 in 2010. In 2002 the HSRC report their prevalence estimates, based on scientific sampling and testing, of 307,000 hiv in 5 to 9 and 233,000 in 10 to 14 whereas ASSA show 32,000 in 5 to 9 and 1,000 in 10 to 14, ten and two hundred times lower respectively. By 2005, ASSA increase 5 to 9 to 85,000 and 10 to 14 to 8,000 whereas the HSRC show a huge decrease in 5 to 9 to 214,000 and 10 to 14 to 86,000.

12) Diametrically Opposed Prevalence Estimates from HSRC and ASSA

In a comparative study between the HSRC 2005 study and ASSA2003 the aids committee of ASSA observed in January 2006 that the trend of falling prevalence in children was quite implausible. Despite this polar opposite trend the HSRC continued to show a further sharp decrease in 2008 to 2.5% or 340,000 whereas ASSA continued to show in ASSA2008, 5 to 14 sharply rising with 0 to 4 remaining stable. The two leading South African hiv research bodies continued to hold their

diametrically opposed positions in a further debate in the SA Medical Journal of September 2009. Shisana and Rehle argued that the decline they found from 2002 to 2008 reached statistical significance and was epidemiologically plausible, as evidenced by the increasing coverage of prevention of mother to child transmission programmes with fewer hiv infants moving each year into the 2 to 14 age cohort. They reminded Dorrington of the famous quote by the great statistician George Pelham Box that essentially all models are wrong but some are useful. Dorrington responded by asking them for any quantitative evidence to explain how a programme preventing infection in infants and with low coverage between 2002 and 2005, might explain in an epidemiologically plausible way that the bulk of the drop in prevalence among children aged 2 to 14 occurred between 2002 and 2005. By 2012 the HSRC showed yet a further decrease in 5 to 9 whereas ASSA2008 continued to show the age group rising from 2008.

13) Comparison between HSRC and ASSA Child Prevalence and StatsSA Mortality

Aside from such irreconcilable contradictions it is a comparison of the ASSA and HSRC child prevalence estimates with StatsSA registered mortality that puts the final nail in the coffin of the hiv causes death hypothesis. As can be seen from Table 1 of the response to the Harvard study posted near the bottom of the page on tig.org.za, StatsSA registered deaths between age 2 and 19 have always been small in absolute terms and show zero increase from 1997 to 2013 after registration completeness and population growth are accounted for. The MRC state that all models of child death registration completion confirm the higher levels of registration completeness for infants under 1 compared with the older children of 1 to 4 years, 88% to 60% in 2006. Assuming the same ratio in 1997 under 1 is 52% and 1 to 4 is 36%. Over 5 is 66% (285/431). It is already calculated that the under 5 StatsSA death increase from 1997 to 2006 is all accounted for by registration improvement and birth increase. Real 2 to 4 deaths increased from 9,519 (3427/36) in 1997 to 10,890 (6,534/60) in 2006 in line with the birth increase from 960,000 to 1,083,000.

Given that 1 to 4 registration completion in 1997 was only 36% it is likely that 5 to 9 was less than the over 5 66%. Assuming 55% then age 5 to 9 increased from 5,407 (2,974/55) in 1997 to 6,004 (5,584/93) in 2006. In their detailed study of child mortality for the year 2000 the MRC calculated zero hiv deaths from age 10 to 14 and assuming 66% registration completion in 1997 real deaths increased from 4,172 (2,754/66) in 1997 to 4,635 (4,311/93) in 2006. Age 15 to 19 increased from 9,506 (6,274/66) in 1997 to 10,179 (9,467/93) in 2006. It is possible these very small increases are related to a higher mortality rate among the children of impoverished immigrants.

StatsSA death increases from age 0 to 19 from 1997 to 2006 are accounted for by registration completion improvement and increased births and not by any new cause of death. The absolute death totals from 2 to 19 are too small to make any impact on the huge estimates of hiv prevalence from age 2 to 14 by the HSRC and ASSA and there is no evidence that the 710,000 reported by the HSRC in 2002 or the 650,000 hiv mother to child transmissions alleged by ASSA up to 2006 have died. Deaths registered by StatsSA from age 0 to 19 have steadily decreased since the peak year of 2006. In total contradiction, the HSRC estimates huge reductions in age 2 to 14 prevalence from 710,000 in 2002 to 340,000 in 2008, despite conducting fieldwork studies using highly scientific sampling and testing. There is no relationship whatsoever between the hiv measurement and mortality among children in South Africa.

14) Annual Incidence and HSRC reported decrease in Child Prevalence

The successive cohort prevalence irreconcilable contradictions are even more pronounced when the alleged annual incidence totals are included. From 2005 the HSRC began calculating the annual incidence of so called new infections. In that year they estimated an annual incidence of 75,000 (1.5%) in 5 to 9, or 375,000 over 5 years, which if added to the 5 to 9 cohort prevalence of 307,000

in 2002, projects to 682,000 in 10 to 14 by 2007, yet in 2008 they report only 68,000 (1.3%) in 10 to 14. In total they estimate an annual incidence increase of 118,000 from 2 to 14 in 2005 or 354,000 over 3 years, yet they show 2 to 14 total prevalence decreasing by 280,000 between 2002 and 2005, with no evidence of any increase in 2 to 19 mortality from StatsSA.

15) HSRC and ASSA Cohort Gender differences

By 2012 the HSRC have reduced their estimate of annual incidence from 2 to 14 to just 29,000, which was all female and zero male. Closer examination of the gender differences reveals yet further absurd contradictions. In 2002 they estimated male prevalence from 5 to 9 as 162,000 (6.5%) yet the same male cohort ten years later in 2012 they show at only 18,000 (0.7%) from 15 to 19 with no explanation as to where the missing 144,000 have gone. Whereas ASSA show the huge gender imbalance from 15 to 19, estimating only 8,000 male prevalence in 2002, virtually unchanged through to 2012, the HSRC begin by showing an almost equal ratio in 2002, 4.7% male against 5.3% female prevalence, successively widening to 0.7% against 5.6% in 2012.

16) MRC and ASSA Predictions of Maternal Transmission and Child Deaths

Yet further irreconcilable contradictions arise from a comparison of ASSA2008 and the Department of Health antenatal clinic prevalence estimates with StatsSA mortality. In an article in the August 2007 SAMJ entitled 'Child Mortality in South Africa-we have lost touch', Bradshaw and Dorrington state that in the absence of a prevention of mother to child transmission programme, close to a third of the babies of hiv positive mothers might be expected to become infected, and data on survival of infected children suggests that around 60% of these children can be expected to die before reaching age 5, which should, all other things being equal, lead to an increase of around 60 per 1,000 in the under 5 mortality rates. In fact, the early ASSA models were calibrated on the assumption that all the so-called infected children would die before age 5 but when they realised that the models were overestimating child deaths, the ASSA2003 model was recalibrated by distinguishing between those infants acquiring hiv through the birth process and those through breast feeding. The 60% perinatal transmissions were estimated to have a median survival of only 1 year whereas 40% breast milk transmissions were predicted to have a median survival of 9 years. No evidence was provided for this assumption. In the later User Guide to the ASSA2008 model published in July 2010 the assumptions were changed yet again, stating that in 2010 the median survival is roughly 7.29 years for children infected perinatally and 14.65 years for children infected through breast milk. Again, no evidence was provided for these new assumptions.

ASSA2008 shows perinatal hiv increasing from 25,499 in 1997 to 47,828 in 2002 and then steadily decreasing despite the antenatal rate continuing to rise from 23% in 2000 to 30.2% in 2005. Despite ASSA showing 402,552 perinatal hiv from 1997 to 2006, StatsSA show no real increase in the historically small death totals from 5 to 14, as would be expected by the median death age of 7.29 years. Similarly, ASSA show 247,306 breast milk hiv from 1997 to 2006 with StatsSA showing no increase in real deaths in the historically small totals from 10 to 19, as would be expected by the median death age of 14.65 years. Mortality of 5 to 9 peaks at 6,177 in 2004 in those children born from 1996, when the antenatal rate was only 14.2%, and 10 to 14 mortality peaks at 4,311 in 2006 in those children born from 1991, when the antenatal rate was a mere 1.4%.

There is no evidence whatsoever that the total of 649,858 alleged mother to child transmissions have died, as there is no evidence from StatsSA that the 710,000 from 2 to 14 in 2002, reported by the HSRC, have died. In the same article of August 2007 in the SAMJ Bradshaw and Dorrington refer to the increase in under 5 deaths reported by StatsSA from 1997 to 2005, stating that 'this increase is difficult to interpret because it is impossible to decide to what extent it represents an increase in child mortality, as opposed to simply an increase in the completeness of registration'.

Thus, 4 years after they published a detailed analysis of child mortality in 2000, alleging with certainty that 40% of 106,000 under 5 deaths were a result of a new cause called hiv, they acknowledged that they had lost touch and were unable to make any judgement as to the cause of the increase. Five years later in April 2012 they acknowledged that there had been vast improvement in the registration completeness of child deaths.

17) Ratio Analysis of Child Mortality Predictions

There are numerous other major contradictions within and between the child mortality data produced by our publicly funded research bodies but finally the method of ratio analysis 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 various research studies. If you have two variables divided in a certain ratio before an additional sum is added to both, then the existing ratio of the two variables 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. If the claims of the hiv experts regarding the impact on child mortality of mother to child transmission are examined it is very clear that their various hypotheses are unsupported.

In their article 'Estimating the lost benefits of antiretroviral drug use in South Africa', published in the Journal of aids in December 2008, a Harvard group made the claim, based on a pooled analysis of babies born to hiv women, that one third (35%) of babies born hiv die before the age of 1 year and one half (52%) before the age of 2 years. This is a ratio of 2 in age 0 (under 1) to 1 in age 1. They stated that they used 3 years as a conservative estimate of the mean survival of hiv babies. Adding ASSA2008 increase of 12,000 in perinatal hiv from 1997 to 2006 to the StatsSA death totals in 1997 of 4,324 in age 1 and 24,734 in age 0, in the ratio proposed by Harvard, results in a new ratio of 25.7. This is significantly greater than the StatsSA death registration ratio of 1 to 0 over the same period, which is constant between 17.5 and 20.4.

Applying Harvard's estimate of 52% hiv babies dying from 0 to 1 and 48% dying from age 2 to 4, according to their estimate of a mean survival of 3 years and adding 12,000 to the StatsSA death totals in 1997 of 3,427 in 2 to 4 and 29,058 in 0 to 1 results in a new ratio of 26. This is way above the actual ratio over the same period, which is constant between 11.3 and 15.2. 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.

An alternative scenario was presented by Bradshaw and Dorrington in their SAMJ article of August 2007, namely that around 60% of hiv babies can be expected to die before age 5. This prediction conformed to that of ASSA2003, which calibrated that 60% transmitting perinatally would have a median survival of 1 year. If the median survival is interpreted as all dying before age 2 then adding 12,000 to the StatsSA total of 29,058 in 0 to 1 in 1997 results in a new ratio of 2 to 4 over 0 to 1 of 8.3%, significantly below the actual ratio which is constant between 11.3 and 15.2. If 12,000 deaths are added to StatsSA 1997 totals of 5,728 in 5 to 14 and 32,485 deaths in 0 to 4 in the ratio of 40% to 60% the new ratio becomes 26.5. Again, this is significantly higher than StatsSA ratio from 1997 to 2006, which is constant between 15.4 and 17.6.

A further scenario is that published in the MRC Policy Brief of December 2003, analysing the leading causes of child mortality in the year 2000. They estimated 42,749 hiv deaths or 40% of their total of 106,000, attributing 58% to under 1 and 42% to age 1 to 4. ASSA2008 later revised their estimate of under 14 hiv deaths in 2000 to 27,701. Adding 12,000 deaths to StatsSA 1997 totals of 7,751 in 1 to 4 and 24,734 in 0, in the ratio of 42 to 58, results in a new ratio of 40.3, which again is significantly above StatsSA ratio of 1 to 4 against 0 from 1997 to 2012, constant from 31.3 to 38.5.

Finally, consider the fantasy scenario from the ASSA2008 User Guidelines, which calibrated that the 60% perinatal hiv babies would survive a median 7.29 years and the 40% breast milk hiv babies would survive a median 14.65 years. Why the breast milk babies survive so much longer than the projected period of 10 years for adults is not explained. Adding 12,000 to the StatsSA 1997 totals of 9,028 for age 10 to 19 and 38,213 for age 0 to 14 in the ratio of 40 to 60 results in a new ratio of 30.4, significantly higher than the StatsSA ratio of 10 to 19 against 0 to 14 from 1997 to 2010, which is constant between 18.5 and 24.2.

The detailed ratios can be seen in the response to Harvard posted on tig.org.za which has since been updated to 2013, including the ratios based on the estimated real deaths, and both the registered and real death ratios are remarkably consistent over the whole period from 1997 to 2013. It is mathematically impossible for a new cause of under 14 deaths to have been introduced, unless in the existing ratio of approximately 65% under 1, 20% in 1 to 4 and 15% in 5 to 14, which has never been proposed by any research body.

18) Analysis of HSRC & ASSA Prevalence, Incidence, Death estimates with StatsSA Mortality

Based on their cohort prevalence estimates applied to StatsSA estimates of population, the HSRC have reported age 2 plus prevalence increasing from 4.9 million in 2002 and 2005 to 5.1 in 2008 and 6.3 in 2012. They report overall prevalence rising from 5.2 million in 2008 to 6.4 in 2012. In stark contrast, ASSA estimates total prevalence rising from 3.9 million in 2002 to 4.8 in 2005, 5.2 in 2008 and 5.7 in 2012. Starting from 1 million less in 2002, ASSA converge with HSRC in 2008 before estimating 0.7 m less by 2012.

Based on their highly scientific assay technique the HSRC began estimating annual incidence in 2005. In that year they reported 2 plus incidence as 2.7% which equates to 1.15 million annually. By 2012 they reduced their estimate to 1.07% or 469,000. In stark contrast ASSA estimate overall incidence at 1.06% or 460,000 in 2005, decreasing to 0.71% or 322,000 in 2012.

These totals cannot be reconciled within or between the research bodies. The HSRC report an average annual prevalence increase from 2008 to 2012 of 300,000 (1.2m/4) while stating in their 2012 report that there was no evidence that incidence among adults aged 15 to 49 had changed between 2008 and 2012. As their reported incidence was 2.5 times higher in 2005, their annual prevalence estimate could not be less than 300,000 from 2002 to 2008 without a total of annual deaths far in excess of the estimates of ASSA, the MRC or Metropolitan Life. The latter estimated an average prevalence increase of 260,000 and ASSA 220,000 (5.2-3.9) from 2002 to 2008. Using the lowest estimate calculates to an average annual prevalence increase from 2002 to 2012 of 250,000 or 2.5 million, which is far in excess of the HSRC's reported increase of 1.5 m (6.4- 4.9).

Expressed in a different way the HSRC's incidence estimate of 2.7% or 1.15 m in 2005 calculates to an incidence increase of 3.45 m from 2005 to 2008, which cannot remotely be reconciled with the HSRC's prevalence increase of 0.3m and ASSA's of 0.4 m, whatever estimate of annual deaths is used. ASSA estimated an annual average of 246,000 or 740,000 total hiv deaths from 2002 to 2005. The Metropolitan Life Model shows an average annual new incidence of 672,000 and ASSA2008 500,000 from 2003 to 2005 yet the HSRC report zero prevalence increase from 2002 to 2005. Metropolitan Life show annual incidence constant at an average of 650,000 from 2001 to 2010, ASSA show it steadily decreasing from a peak of 646,000 in 1999 to 322,000 in 2012 whereas the HSRC show it increasing from less than 300,000 between 2002 and 2005 to 469,000 in 2012, three completely different versions of an alleged epidemic. Metropolitan Life show an annual average of 440,000 deaths from 2003 to 2010 while their total prevalence steadily increases, as does the total prevalence of ASSA's model that calibrates for the dramatic increase in the administration of drugs labelled antiretroviral. In diametric opposition the HSRC show total prevalence decreasing before

2005 if their survey totals are reduced by the extra deaths estimated saved by the drugs.

These irreconcilable contradictions become even more visible when the male to female estimates are examined. The HSRC estimate of 2 plus female incidence of 3.6% or 820,000 in 2005 is a prevalence increase over 3 years of 2.46 m (820x3), far in excess of their reported increase of 0.3 m from 2005 to 2008, after deducting the highest estimate of average annual female hiv deaths by the MRC of 180,000 in 2006, at the peak of StatsSA registered deaths.

The HSRC report male prevalence of 41.9% of the total in 2002, 40.7% in 2005, 38.2% in 2008 and 39.5% in 2012, a remarkable consistency over the 10 year period despite reporting male incidence of 28.7% (330/1150) in 2005 and 32.2% (151/469) in 2012. Based on ASSA's lowest estimate of annual deaths of 225,000 from 2003 to 2012 and using the male average prevalence of 40%, rather than the even lower incidence proportion, female hiv deaths are predicted to exceed male by 450,000 (60%-40% of 2.25) over the decade as against the actual excess of total male deaths of 135,000 registered by StatsSA, who estimated registration completeness for adults of 93% to 94%.

Narrowing the comparison to the 20 to 49 age group, the percentage of female deaths registered by StatsSA increases significantly from 37.3% in 1997, in line with the evidence provided by US biochemist Rodney Richards in his 22-page unacknowledged paper presented to the MRC in August 2004. He demonstrated the significant under registration of younger females, especially in the rural areas before the vital registration campaigns began in 1998. By 2002 the female percentage had reached 47.7% rising to 49.8% in 2004 before decreasing again to 47.0% in 2010. Based on the HSRC prevalence totals for 2002 and 2005 of 60% female and before any significant use of the drugs, StatsSA were expected to show a significant excess of female deaths from 2002 to 2005 as against the actual 49% female deaths. ASSA estimate a female excess on the drugs of only 8,000 in 2004. Based on the extensive administration of the drugs after 2005, reaching over a million by 2010 according to ASSA, StatsSA were expected to show a significant decrease in the female percentage of deaths as a result of the two thirds female on the drugs, whereas they actually report 47% female in 2010, almost exactly the same as in 2002. A significant excess of female prevalence is not matched by any excess of female deaths before the administration of drugs and a significant excess of female drug exposure is not matched by any decrease in female deaths relative to male.

If you add an amount to two variables in a ratio significantly different from the existing ratio then the new ratio between the two variables will be significantly different from the previous ratio. If the ASSA annual average of 400,000 new incidence, less than the HSRC estimate for 2012 of 469,000, is added to the HSRC prevalence in 2002 of 41.9% male, 58.1% female, in the ratio of one third male to two thirds female, before an equal deduction is made for deaths of 1.1 million each over the decade, as estimated by ASSA, the new ratio becomes 34% male as against the actual 39.5% male estimated by the HSRC in 2012. It is mathematically impossible to reconcile the HSRC prevalence and incidence estimates with the proposition that males and females have died in equal numbers. There is no relationship whatsoever between the HSRC's estimates of incidence and prevalence and StatsSA registered mortality.

19) Comparison of HSRC & ASSA antiretroviral estimates with StatsSA death decreases

On page 57 of their 2012 survey the HSRC report the numbers of people living with hiv exposed to the drugs, analysed by age, sex and other variables. By calculating the percentage decrease in StatsSA deaths from 2006 to 2012 and the percentage of the population on the drugs for each age group in 2012, the correlation between drug exposure and mortality can be calculated. From age 15 to 24 the HSRC estimate 14% of hiv on the drugs or 1% of the 15 to 24 population as against 31% and 8% for age group 25 to 49. Despite 25 to 49 having more than twice as many hiv on drugs and 8 times more of the age group population than 15 to 24, StatsSA report an identical percentage

death decrease of 34% from 2006 to 2012. Despite the HSRC estimating 42% of hiv and 5% of total 50 to 59 age group population on drugs, 3 and 5 times more than 15 to 24, StatsSA report a death decrease for 50 to 59 from 2006 to 2012 of only 9% or 4 times less than age 15 to 24.

Each year from 2003 ASSA estimate the total currently taking the drugs as less than the cumulative total to date who had started with the drugs, which increases to their estimate of 542,000 by 2012 or 25% of the total (542/2122). ASSA show an increase of 225,000 taking the drugs in 2012 while they estimate that there were 359,000 newly taking the drugs. This excess of 134,000 represents 70% of ASSA's estimated deaths of 191,000 in 2012.

20) Summary of Conclusions from Research Statistics Analysis

1) Applying the best estimates of death registration completion based on international and MRC estimates of infant and child mortality it is calculated that real under 5 deaths increased from 69,300 in 1997 to 81,300 in 2006.

2) Applying the best estimates of infant and child mortality from 1997 to 2006 the increase in real under 5 deaths was 3,300 in excess of that expected from the improvement in registration completion and increase in births.

3) Applying the best estimates of registration completion and population growth from 1997 to 2006, the increase in over 5 deaths was 80,000 in excess of that expected.

4) The residual impact of widespread malnutrition and stunted organic growth during the apartheid years, especially in the rural areas, and of deprived impoverished immigrants after democracy, has resulted in an increase in the crude death rate among children and adults until 2006 after which StatsSA report a significant reduction in the number of people living below the poverty line.

5) Every prediction of future mortality from a new disease by the international and South African professional and research bodies has failed to be confirmed by the later data published by StatsSA.

6) There are irreconcilable, diametrically opposed findings on child mortality between the fieldwork studies of the HSRC and the sophisticated modelling estimates of Metropolitan Life & ASSA.

7) There is zero correlation between the huge estimates of child prevalence by the HSRC, ASSA and other research bodies and the child mortality reported by StatsSA.

8) There is zero correlation between the MRC and ASSA predictions and estimates of maternal transmission and StatsSA child mortality totals.

9) There is zero correlation between the various predictions and estimates of a new cause of child mortality and the ratio analysis of StatsSA child mortality over the period from 1997 to 2012.

10) There is a complete lack of coherent consistency in the published estimates and conclusions of the research bodies relating to child mortality.

11) It is impossible to reconcile the estimates of incidence, prevalence and mortality by the HSRC, ASSA and Metropolitan Life, either within or between the various professional bodies.

12) It is mathematically impossible to reconcile the gender ratios of the incidence and prevalence estimates of the HSRC and ASSA or with the gender ratios of StatsSA registered mortality.

13) There is no statistical evidence of any positive correlation between the drug exposure estimated by the HSRC and ASSA and the decrease in deaths since 2006 registered by StatsSA.

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