

Educator Mortality In-Service in KwaZulu Natal

A Consolidated Study of HIV/AIDS Impact and Trends

Peter Badcock-Walters, Christopher Desmond, Daniel Wilson & Wendy Heard
Mobile Task Team (MTT¹) on the Impact of HIV/AIDS on Education
HEARD, University of Natal

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¹ The Mobile Task Team (MTT) is a network of Southern African professionals in complementary disciplines, currently working in 12 African countries, to assist MoEs to manage and mitigate the impact of HIV/AIDS through the strategic planning and implementation of sustainable and systemic interventions. It operates from the Health Economics & HIV/AIDS Research Division (HEARD) of the University of Natal and is funded by USAID.

1. Study Purpose and Objective

This study constitutes the second step in analysis of educator data in KwaZulu Natal, as part of an on-going research agenda, following the development of an educator demand model (described below) and linked to the development of a monthly data collection system (DEMMIS). The purpose of the study is to attempt to answer several important questions in the context of education planning in a high prevalence environment in the HIV/AIDS era, specifically:

- How important is educator mortality and attrition in the face of declining enrolment?
- What is the current rate of educator mortality in-service in the KwaZulu Natal (KZN) education system, by gender and age?
- What trends can be observed in the data?
- How much will the projected rate of attrition increase the demand for new educators?
- What implications will this have for teaching and learning?

The objective of the study therefore was to attempt to benchmark the mortality rate amongst educators *in-service* in KZN in order to inform future educator demand and supply planning and modelling.

2. The Education Context and Importance of Educator Attrition

It is important to provide a brief context to this study: The Provincial education system of KwaZulu Natal is in fact an amalgam of what were 5 separate, racially-divided and inequable education departments. Not all these departments were able to enter this union equally empowered with complete data and records. Thus, we begin with an incomplete history of system operations, enrolment and staffing in a large part of what is now the KwaZulu Natal Department of Education & Culture (KZNDEC).

This may help to explain why the threads of the education 'data puzzle' only begin to knit into comprehensible form in the mid to late-1990s. Consequently, any time series of complete education data is comparatively short, and exploration of it is both a voyage of discovery and source of deep confusion. Analysis of educator mortality is a case in point and presents us with countless contradictions, which are examined in detail below.

The KZNDEC is responsible for South Africa's largest provincial education system, with 2,6 million learners and 76 000 educators in over 6 000 schools. Put in context, it has been claimed that the KZNDEC is the nation's largest single public sector employer, after the SA National Defence Force. The recurrent cost of these educators accounts for over 90% of the Province's recurrent annual education budget. *Fluctuations in educator demand and supply, driven by issues of attrition, training and replacement, therefore have profound implications and demand careful monitoring and measurement.*

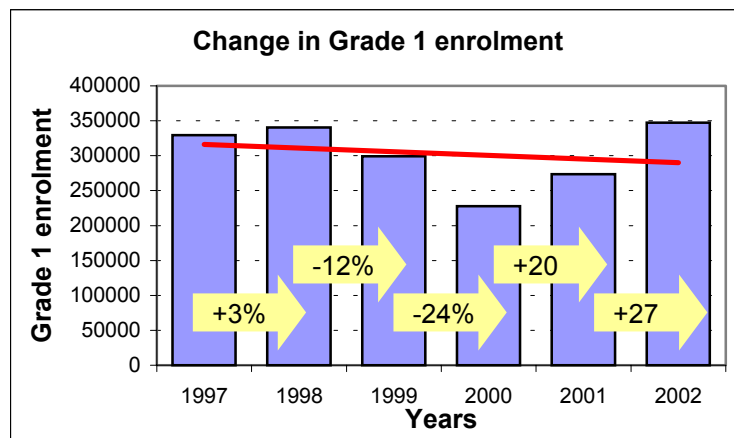
Antenatal Prevalence in KZN:

With an antenatal HIV prevalence rate above 35% for several years, KZN is also South Africa's worst HIV-affected province, a situation compounding the vulnerability of the

system and its professional staff. A 1999 educator demand and supply model² suggested that AIDS will *add* to existing high levels of educator attrition, and that the cumulative attrition rate may require the replacement of as many as 60 000 educators by 2010. In 1999 for example, around 7% of educators left the KZN system, but less than 1% were estimated to have died of AIDS, suggesting that over 6% could be considered 'normal' attrition.

Demand:

In terms of demand, it should be noted that enrolment into Grade One of the KZNDEC system has become extremely unstable over the last five years (Graph 1 & Table 1). While enrolment into this first grade grew annually by between 3% and 5% in the preceding decade, it went from a 3% increase in 1998 to an unexplained 12% decline in 1999, and then to a 24% decline in 2000 – clearly exacerbated by the policy change of that year, which precluded the entry of children under age 7. Enrolment grew again in 2001 by 20%, but fell some 10% short of the level required to absorb the previous year's (policy-driven) backlog. In 2002, the age policy was *reversed*, and entry into Grade One grew by 27%. On the face of it, this suggests a recovery but trends are now so distorted by policy change that any firm conclusion is difficult to reach; what *is* certain however is that over the *five-year period* 1998 to 2002, enrolment into Grade One has only grown by 1,9%. Put differently, Grade One enrolment was 16% smaller in 2002 than it would have been if the annual rate of growth had continued at 3% after 1999.



Graph 1: Change in Grade 1 Enrolment
(Source: KZNDEC Snap Survey Data)

Year	No of Schools	Grade 1 Enrolment	% Enrolment Change
1998	3790	340 379	3.34%
1999	3878	299 357	-12.05%
2000	3914	227 728	-23.93%
2001	3940	273 633	20.16%
2002	3907	347 128	26.86%

Table 1: Grade 1 Enrolment 1998 - 2002
(Source: KZNDEC Snap Survey Data)

This reduction in demand might appear to signal a reduction in demand for educators, assuming learner/educator ratios were held constant, but in fact rate of educator attrition

² Developed by HEARD & the MTT, based on a national model developed by Dr Luis Crouch, SA DoE & RTI

appears to be greater than the rate of decline in demand, and the net effect – according to the 1999 projection model mentioned above – is to require the KZNDEC to find, train and appoint a cumulative total of around 60 000 new educators before 2010. This equates to the introduction of between 5 500 and 6 000 new educators annually over this decade.

Impact of HIV/AIDS on Education:

The primary impact of HIV and AIDS is to explode the scale of existing systemic and management problems in education. Educator attrition is a good example of this, with existing fairly high levels of loss now accelerated by AIDS mortality. However, this is a simplistic representation of impact and requires an understanding of at least three additional dimensions:

- First, the rate of direct educator AIDS mortality is likely to grow over time, before reaching a plateau and declining. Thus, while AIDS mortality amongst educators was estimated to be about 0,64% in 1999, it is expected to rise to around 5% by 2010³. If the 'normal' (or net) attrition rate of 6%, evidenced in 1999, was to hold constant over time, then it is hypothetically possible that gross (including HIV/AIDS) attrition rate could climb significantly by the end of the decade.
- Second, it has long been traditional for the private sector (and other parts of the Public Service) to recruit skilled human resources from the education sector. As AIDS erodes the workforce outside education, this demand is certain to rise and may be seen as an increasing 'indirect' AIDS impact. Thus, the levels of 'normal' attrition may not hold as constant as may be assumed and may increase the gross rate significantly.
- Third, it is important to note that educator mortality usually signals the end of a long and debilitating period of illness, depression and trauma, usually in-service. The cumulative loss of teaching contact time, quality, continuity and experience may have equally important implications for teaching and learning, and is certainly harder to monitor and measure. There is also the associated cost of replacement educators, and in KZN this impact is already clearly evident.

3. Study Method

In response to the urgent need to benchmark the level of educator mortality and underpin projection modelling, research commenced in late 2002. The study reviewed all available data and attempted to compare and/or consolidate these in order to establish a dependable benchmark on which future estimates of educator demand could be based. The method involved analysis of KZNDEC Annual School Survey data; the commissioning and analysis of a 100-school random sample survey to investigate non-reporting of educator mortality by 90% of schools in this Annual Survey; and analysis of PERSAL (Personnel Salary System) educator mortality records.

The study then attempted to reconcile or at least explain the observed contradictions, consider the implications for the Provincial education system, the trends and the likely impacts on educator demand, teaching and learning.

³ AIDS mortality in the model was estimated by downloading demographic characteristics from PERSAL and then assigning the same levels for the general population with the same characteristics.

4. Outcomes: Educator Mortality in KwaZulu Natal

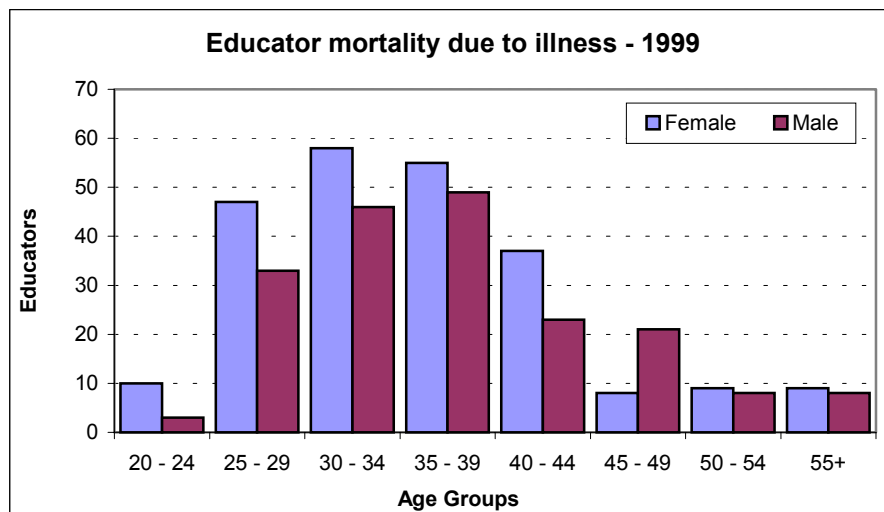
4.1 Analysis of Annual Survey Data:

Each year the KZNDEC conducts two surveys or statistical audits of the 6000 schools in the Provincial system. The first is a 10th-School Day Snap Survey to establish guidelines for provisioning while the second, the 95-page Annual Survey, is a more detailed statistical census, which normally takes place in March and is sent to every public ordinary school in the province. In 1999, for the first time, the Annual Survey asked questions about educator and learner mortality.

Rate of Response 1999:

Only 8% of all school returns for the Annual Survey (Graph 2 and Table 2 below) captured in 1999, and reported in 2000 (first year of such data capture) indicated mortality. This shows 509 deaths, of which 424 were due to illness. Based on the reported total of 68 615 publicly paid educators in-service in that year, this translates to a gross annual mortality rate of 0,74%, of which a net 83% (0,61%) was due to illness. It should be noted that while the gross number of deaths amongst female educators was somewhat higher than that for males, the much lower number of males in service (32% of the total) meant that their gross mortality rate was much higher (1,12% versus 0,56% for females).

Total deaths captured in these data are significantly lower (34%) than those shown by the PERSAL data for the same year (681), which appears to confirm the 100-School Sample Survey indication that the Annual Survey is indeed undercounting educator mortality. Also important to note is that illness as a reported cause of death was somewhat higher for female educators (88,6%) than for males (77,6%).



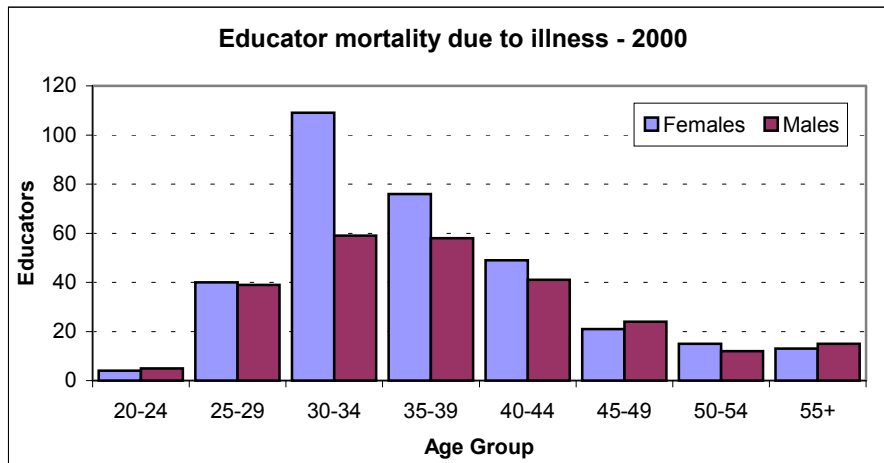
Graph 2: Educator mortality due to Illness by Age Group and Gender, School Year 1999
(Source: KZNDEC Annual Survey, 2000)

Age Group	Due to Illness		Educator Mortality		Illness as a % of mortality	
	Female	Male	Female	Male	Female	Male
20 – 24	10	3	10	8	100.0%	37.5%
25 – 29	47	33	50	46	94.0%	71.7%
30 – 34	58	46	66	52	87.9%	88.5%
35 – 39	55	49	63	66	87.3%	74.2%
40 – 44	37	23	41	33	90.2%	69.7%
45 – 49	8	21	11	23	72.7%	91.3%
50 – 54	9	8	11	10	81.8%	80.0%
55+	9	8	11	8	81.8%	100.0%
Total	233	191	263	246	88.6%	77.6%
	424		509		83.3%	

Table 2: Death of Educators due to Illness by Age Group and Gender, School Year 1999
(Source: KZNDEC Annual Survey, 2000)

Rate of Response 2000:

The number of schools responding to the question on educator mortality, rose to 11% for the school year 2000, reported in 2001. This shows 654 deaths, of which 580 were due to illness. Based on the reported total of 67 958 publicly paid educators in-service in that year, this translates to a gross annual mortality rate of 0,96%, of which a net 89% (0,85%) was due to illness. As will be seen in Graph 3 and Table 3 below, the gross number of female deaths (54% of the total) again exceeds that for males; and again the lower number of males in service (32% of the total) meant that their gross mortality rate remained much higher (1,4% versus 0,76% for females). Total deaths captured on these data are more in line with those shown by the PERSAL data for the same year (609) although it is possible that the lag time in PERSAL reporting has reduced this latter number.



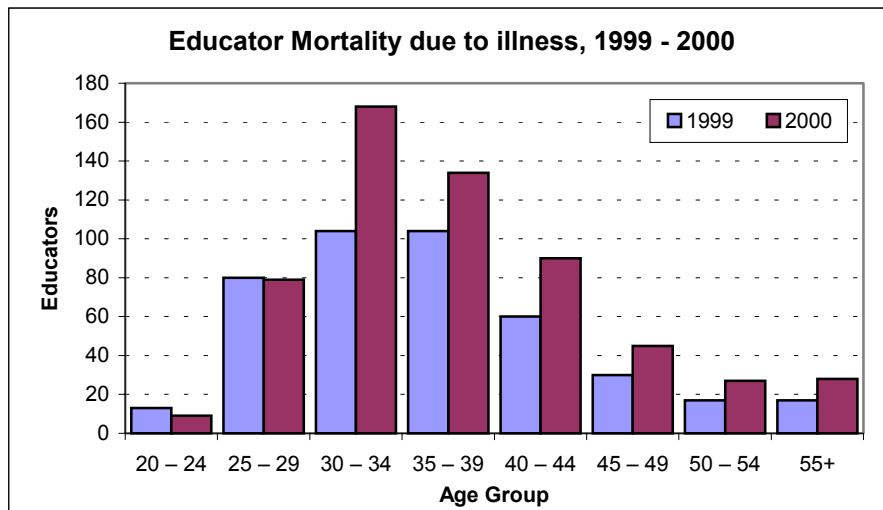
Graph 3: Educator mortality due to Illness by Age Group and Gender, School Year 2000
(Source: KwaZulu Natal Annual Survey, 2001)

Age Group	Due to Illness		Educator Mortality		Illness as a % of mortality	
	Female	Male	Female	Male	Female	Male
20 – 24	4	5	6	10	66.7%	50.0%
25 – 29	40	39	47	53	85.1%	73.6%
30 – 34	109	59	112	71	97.3%	83.1%
35 – 39	76	58	82	65	92.7%	89.2%
40 – 44	49	41	51	44	96.1%	93.2%
45 – 49	21	24	23	29	91.3%	82.8%
50 – 54	15	12	18	13	83.3%	92.3%
55+	13	15	15	15	86.7%	100.0%
Total	327	253	354	300	92.4%	84.3%
	580		654		88.7%	

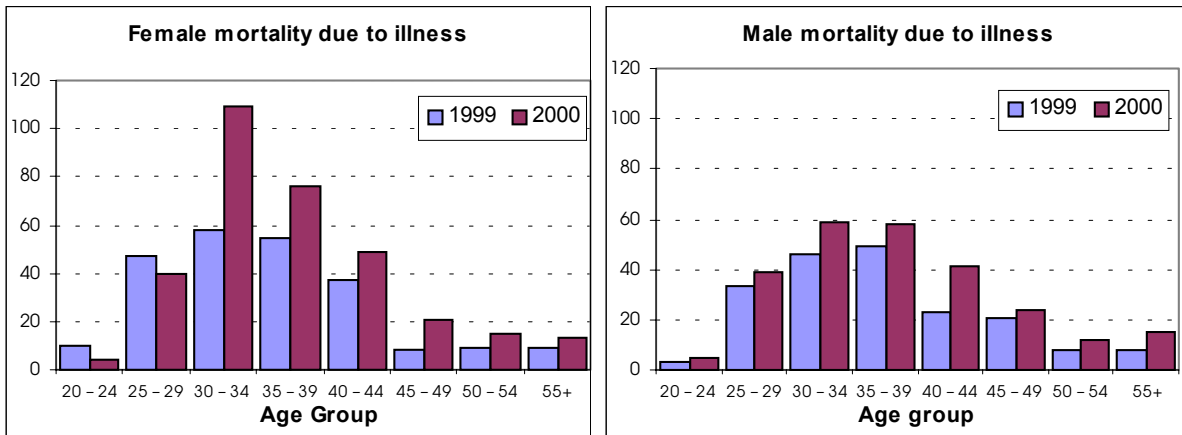
Table 3: Educator mortality figures, School Year 2000
(Source: KwaZulu Natal Annual Survey, 2001)

Again, illness as a reported cause of death was somewhat higher in 2000 for female educators (92,4%) than for males (84,3%), but significantly was higher for both sexes than in 1999. Graph 4 below shows this trend by age group, and confirms that there was a substantial increase in educator mortality due to illness from one year to the next. The most important aspect of this was the increase in the age bands 30 to 34, 35 to 39 and 40 to 49. Given that we would not normally expect to see significant mortality in the age bands under 50, this growth should be of particular concern to the education sector and evokes the likely association of opportunistic AIDS-linked infections and disease.

Finally, Graphs 5 and 6 below show comparative mortality due to illness of male and female educators. What is immediately clear is that while male mortality has risen to an extent in every five-year age band 20 to 55+, female mortality in the age band 30 to 34 rose by 70% and by 30% in the age band 35 to 40. Thus, while mortality rates for female educators are substantially lower than those for males, females constitute some 68% of the workforce, making the implications of this very initial trend somewhat alarming.



Graph 4: Educator Mortality due to Illness by Age Group; School Years 1999 and 2000
(Source: KwaZulu Natal Annual Survey, 2000 and 2001)



Graph 5: Female Mortality due to illness, 1999/2000 Graph 6: Male Mortality due to illness, 1999/2000
(Source: KwaZulu Natal Annual Survey, 2000/2001)

4.2 Analysis of 100-School Random Sample Survey Data:

Given that only 8% of schools in 1999 (reported in 2000) and 11% in 2000 (reported in 2001) recorded educator mortality, the KZNDEC requested the MTT to undertake a random sample survey of 100 schools in KZN, in September 2002, to gather further data and information on this issue. The objective was to determine what had happened in those (90%) schools not reporting and review the reliability of school record keeping – and its implications for general education system management. A random sample was drawn using available EMIS data and school location/GIS data and field research immediately initiated. (Method for drawing the 100-school Random Sample is briefly discussed in Annexure A and the survey instrument is available on request, together with a sample school distribution map). In the event, the Survey was scientifically designed and conducted, but encountered exceptional difficulties and complications in its implementation.

School Record Keeping:

First, the research team established that only some 24% (24 of 100) of the sample schools kept anything approaching comprehensive and accessible records. The balance (76 of 100) relied on the principals concerned consulting other staff, picking through apparently random notes and papers or simply recalling events as best they could. Thus, the key outcome of this experience was to call into question the reliability of data capture generally, given the patent failure of school-level record keeping in many schools. This said, it should be noted that the Annual Survey involves a much longer period of engagement with the survey instrument, more interaction with educators and staff and the opportunity to review the preceding year's returns; for these reasons, it is possible that levels of internal organisation compensate and result in reasonably accurate returns.

Educator Mortality 1999:

Second, the data obtained through this sampling exercise was often confusing and contradictory: In 1999, the Annual Survey reported 8 deaths in the 100 sample schools, while PERSAL reported 9; of these 5 were apparent duplications

while 7 were reported by one or other source but not both. This suggests a total of 12 unduplicated deaths. The Sample Survey reported 5 deaths, of which only 1 was duplicated in the other data sources. This suggests total unduplicated deaths for the 100 sample schools of 16 in 1999. However, of this total of 16 educator deaths in the sample schools, *12 were not recorded or could not be recalled by the principals concerned*. Equally, school principals in the sample were reporting four additional deaths that had not been captured by the other two data sets. With an educator workforce of 1843 in the sample, this provides us with at least three possible mortality rates: If we take the sample school survey figure of five deaths, this equates to a mortality rate of only 0,27%. If however we take the unduplicated Annual Survey and PERSAL figure of 12, this equates to a rate of 0,65%; and if we take the consolidated/unduplicated figure of 16, this equates to a mortality rates of 0,87%.

Educator Mortality 2000:

In 2000, the Annual Survey reported 11 deaths in the 100 sample schools, while PERSAL reported 13; of these 9 were duplicated in these two data sets while 6 were reported by one or other source but not both. This suggests a total of 15 unduplicated deaths. The Sample Survey reported 12 deaths, of which only 3 were not duplicated in the other data sources. This suggests an unduplicated total of 18 educator deaths in the sample schools, of which only 6 were not recorded or could not be recalled in the sample survey. Equally, school principals in the sample schools only reported 3 additional deaths that had not been captured by the other two data sets, suggesting much greater consistency of reporting. The educator workforce grew to 1903 in 2000 in the sample schools, and again provides us with a choice of mortality rates: If we take the sample survey figure of 12 deaths, this equates to a mortality rate of 0,63%. If however we take the unduplicated Annual Survey and PERSAL figure of 15, this equates to a rate of 0,79%; and if we take the consolidated/unduplicated figure of 18, this equates to a mortality rates of 0,94%.

But third, even given the reservations expressed regarding reporting in schools, we are left with the sense that no one willingly or frivolously reports a death that has not occurred. Thus, allowing for some measure of subjective judgement to filter out duplicatory records, we conclude that the mortality rates derived from the cumulative totals are supportable. The implication of this is that we are looking at gross mortality rates of 0,87% in 1999 and 0,94% in 2000, in the 100-school sample. As will be seen below, these compare with PERSAL rates of 0,7% and 1,0% for 1999 and 2000 respectively, the former suggesting an undercount of 0,17% in the PERSAL data in 1999 versus an undercount of 0,06% in the sample data for 2000.

Annual Survey Undercount:

However, in the context of the original question of possible undercount in the Annual Survey, the 100-school sample data shows a mortality rate of 0,87% in 1999 as against the 0,74% of the equivalent year for the Annual Survey, suggesting an undercount of 0,13%. But what is extremely interesting is that in 2000, the Annual Survey mortality rate of 0,96% closely parallels the 100-school sample data rate of 0,94%, confirming a significant confluence of trends.

Finally, it may be that the primary value of this Sample Survey has been to highlight the evident deficiencies in school level record keeping. While this is certainly known to the KZNDEC, the advent of the AIDS era, with all its implications for planning and delivery, may have the effect of motivating major reforms and even the regulation of a monthly data collection process to empower district-level management.

4.3 Analysis of PERSAL Data:

The Personnel Salary System is jointly maintained by the Department of Finance and the KZNDEC. Each provincial Education Department has a PERSAL Section, where appointed officers are responsible for provincial administration of the system. Information for each educator stored on the system includes surname and initials, PERSAL number, Paypoint number, ID number, gender, date of birth, qualifications, experience, leave taken etc - and the school at which they are registered/appointed. (See Annexure B for PERSAL data 1998 - 2001).

Death Certificates:

Deaths are recorded on PERSAL in order to terminate/ finalise salary and other records but only comparatively recently began to require a Death Certificate; PERSAL is now going back on its files and entering this data where necessary. The average 'lag time' between the dates of death and the 'transactions' being enacted on the PERSAL database is currently 4.33 months. In 16.5% of cases, PERSAL registered the death in the same month as the death took place; 58% of all deaths were on the database within 3 months of occurring, while 80% were registered within 6 months. 7% took a year or more to be entered onto the database, the worst case being 61 months – a death in 1997 was only registered on the database in 2002.

Educator Deaths under Age 40:

While PERSAL emerges as the most reliable of the three sources of data, this lag time significantly reduces its reliability for 2002 and even 2001. None the less, and even allowing for delayed mortality records for 2001 and 2002, the time series of PERSAL data clearly confirms the trends evidenced in the other two data sources – and points to a growing level of AIDS impact. For example, they clearly demonstrate the preponderance of deaths among educators under the age of 40, and attribute around 80% of all deaths under this age to illness.

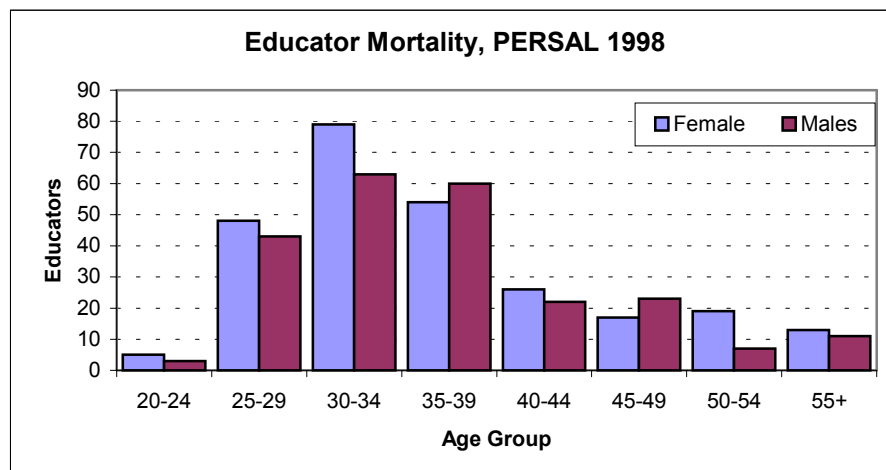
Illness and Natural Causes:

Data for the period 1996 to 2002 in Table 4 demonstrates this and also confirms the level of 'unknown' causes up to 1998, by which point most of the Apartheid-era 'independent' systems were fully incorporated onto the national PERSAL system. This data also suggests the impact of the lag times discussed earlier for the most recent year or two, particularly illustrated by the low total for 2002. What is noteworthy, in the years 1999 through 2001 (following the stabilisation of the 'Unknown' category), is the fact that between 84% and 87% of all deaths were ascribed to illness or natural causes; while the uncertainty surrounding 'Natural Causes' is an issue, the trend mirrors that of the data reported by the Annual Survey.

Year	Accidental	Illness	Natural Causes	Suicide	Unknown	Unnatural Causes	Violence	Total
1996					309			309
1997	1	21	8		367	9		406
1998		180	82		172	57	2	493
1999	1	178	269		5	75	2	530
2000		115	473		3	89	1	681
2001	4	164	368	1	5	64	3	609
2002	2	99	268	1	3	55	2	430
Total	8	757	1 468	2	864	349	10	3 458

Table 4: Cause of Educator Death, by Year
(Source: PERSAL)

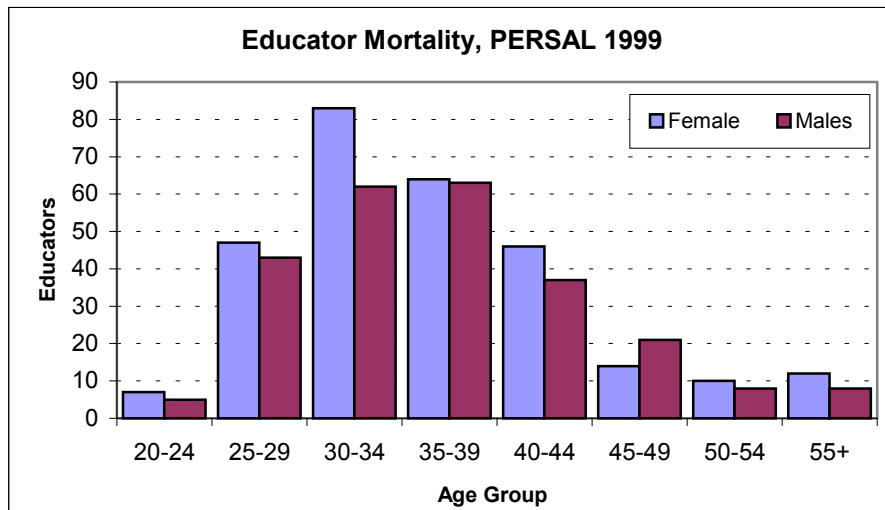
In 1998, the estimated number of 76 584 publicly paid educators in-service was significantly higher than that of the following years; the lower numbers reported following this are explained in part by the large number of educators who exited the system around 1998, in return for severance packages designed to reduce the proportion of expensive, experienced educators and improve employment equity. The mortality data for 1998 show rates for male educators peaking at 1,2% in the group 35 to 39, before dipping and peaking again at 1,1% for those 55 and over. The average rate for males 20 to 55+ was 0,9%. Mortality rates peaked amongst female educators in the age group 30 to 34, at 0,8%, with an average for females 20 to 55+ of 0,5%. Graph 7, below, will show these rates by age and gender, for 1998. Of the 493 deaths recorded in 1998, 70% occurred in the age group 25 to 39, with an average mortality rate for all educators of 0,6%. The average age of (all) educators in 1998 was 36,4, while the average age at death was 36,6.



Graph 7: Educator Mortality by Age Group and Gender, 1998
(Source: PERSAL)

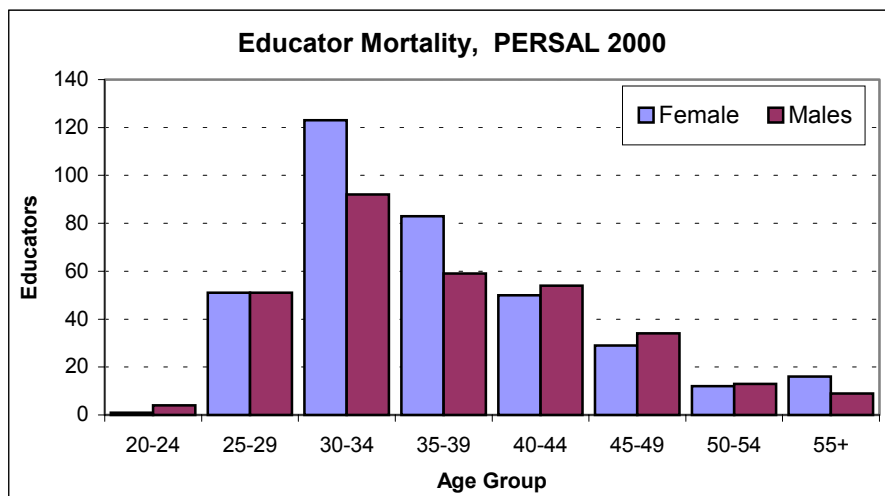
In 1999, with 71 084 publicly paid educators estimated to be in-service, the data show mortality rates for male educators peaking at 1,3% in the group 35 to 39, and averaging at 1,1% for all those 20 to 55+. Mortality rates peaked amongst female educators at 0,7% in the age group 30 to 34, with an average for females 20 to 55+ of 0,6%. Graph 8, below, will show these rates by age and gender for 1999. Of the 530 deaths recorded in 1999, 68% occurred in the age group

25 to 39, with an average mortality rate for all educators rising to 0,7%. The average age of (all) educators in-service in 1999 was 36,5, while coincidentally the average age at death in that year was also 36,5.



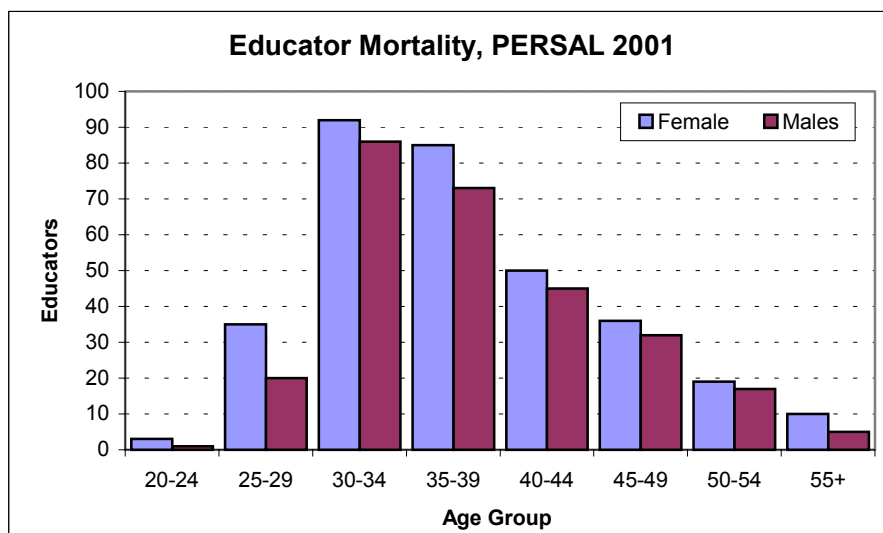
Graph 8: Educator Mortality by Age Group and Gender, 1999
(Source: PERSAL)

The estimated number of publicly paid educators in-service declined to 68 615 in 2000, when the data show mortality rates for male educators peaking at 1,6% in the age bands 30 to 34 and 40 to 44, before climbing again to 1,9% in the 45 to 49 group and those over 55. The average rate for male educators, 20 to 55+, rose to 1,5%. Female mortality rates rose to 0,8% in the age group 25 to 29, and then peaked at 1,1% for the 30 to 34 age band and again at 1,0% for the over 55 group. The average mortality rate for females 20 to 55+ climbed to 0,8%. Graph 9, below, will show these rates by age and gender for 1999. Of the 681 deaths recorded in 2000, 67% occurred in the age group 25 to 39, with an average mortality rate for all educators of 1,0%. The average age of (all) educators in 2000 was 37,1, while the average age at death was 36,9.



Graph 9: Educator Mortality by Age Group and Gender, 1999
(Source: PERSAL)

In 2001, with 67 958 publicly paid educators estimated to be in-service, the data show mortality rates for male educators climbing fractionally to 1,5% for the bands 30 to 39, before climbing again to 1,7% in the group 45 to 49 and peaking at 1,8% for the 50 to 54s. The mortality rate averaged 1,3% for all those males 20 to 55+. Mortality rates peaked amongst female educators at 0,8% in the age bands 30 to 39, and 50 to 54, with an average for females 20 to 55+ of 0,7%. Graph 10, below, will show these rates by age and gender for 1999. Of the 609 deaths recorded in 2001, 64% occurred in the age group 25 to 39, with an average mortality rate for all educators declining slightly to 0,9%. The average age of (all) educators in-service in 2001 was 37,6, while the average age at death in that year was 37,8.



Graph 10: Educator Mortality by Age Group and Gender, 1999
(Source: PERSAL)

'Aging' Educators:

Interestingly, perhaps illustrating how AIDS is impacting younger educators and signalling the limited numbers of these professionals now entering the service, these data also confirm that educators are 'getting older'. The average age of educators has moved from 36,4 in 1998 to 37,6 in 2001, while the average age at death has also moved out from 36,6 to 37,8. These dynamics may seem minor in the scheme of things, but should be flagged carefully in terms of planning and projection.

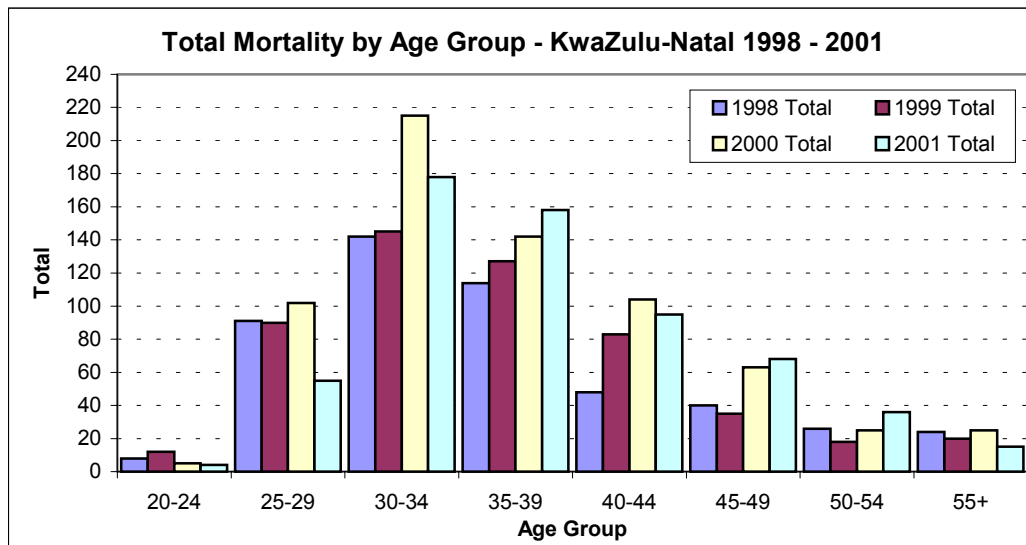
4.4 Mortality Trends by Age and Gender:

These data confirm that mortality – overwhelmingly due to illness, according to the Annual Survey data and reinforced by the combination of Illness and Natural Causes in the PERSAL data – is peaking at ages well below anticipated life expectancy without AIDS. Indeed, in 1998, 90% (443 of 493) of all educators dying were 49 or under; this percentage rises to 93% in 1999 (492 of 530) and 2000 (631 of 681), before declining slightly to 92% (558 of 609) in 2001. This equates to 2 124 of the total of 2 313 educators dying over this four-year period being 49 years of age or under. To establish some order of the possible magnitude of the AIDS impact in this equation, we note that around 80% (or

1700) of the group 49 or under appear to have died from illness or natural causes. Put another way, this mortality rate is around three-times higher than we might expect in these age bands, without AIDS.

Trends:

As noted earlier, there is little data available to establish or benchmark the position before 1998, but from this point on it is fair to reflect that the position shown in Graph 11 below is disturbing indeed. The impact illustrated by the graph is clear and the only positive note is that fact that the data for 2001 show some measurable decline in the age bands 25 to 34; whether this is attributable to lag times in PERSAL reporting or to an improvement, or even early plateau in AIDS impact, remains to be seen.



Graph 11: Mortality by Age Group 1998 to 2001
(Source: PERSAL)

Mortality Rates by Gender:

In terms of gender impact, the data shown in Annexure B confirm that mortality rates are significantly higher for male educators, and tend to peak later than those for females. However, while rates for female educators are twice as high (0,6%) in the age band 20 to 24, than for males (0,3%) in the same band, these flatten out and range between 0,6% and 0,8% over all five-year age bands from 25 to 55+, averaging 0,7%. By contrast, rates for males increase to 0,6% in the band 25 to 29 and then range between 1,5% and 1,8% over the age bands from 30 to 54, before declining again to 1,0% for the 55+ group, and average 1,3%.

Since female educators constituted around 68% of the entire educator workforce over the period, it may be argued that their lower mortality rates reduced impact on the sector to some degree. Conversely though, males dominated senior posts and the positions of principals and deputy principals, exposing system management at the local or institutional level to greater risk through their comparatively higher mortality rates.

An important question arising is whether or not educators are at greater risk than the general population in equivalent age bands. However comparing mortality

amongst educators to the levels experienced by the general population is difficult: The mortality rates discussed in this paper are for educators *in-service*; in other words, an analysis of deaths which have occurred amongst educators currently employed.

This means we have no sense of what happens to educators who have left the profession through resignation, illness or other voluntary or even involuntary causes. It is in fact quite likely that a very significant percentage of these educators have died *after* leaving the profession, from AIDS-related and other illness. Studies of a number of large private sector organisations in South Africa show that up to 50% of employee deaths due to illness occur soon after they have left employment. While it is clear that further analysis is required to determine what proportion of educator deaths occur in-service versus the number that occur post-service, it is however reasonable – based on this private sector experience – to assume that in-service deaths represent only a portion of total mortality.

Thus, without knowing what proportion of educator deaths occur in-service, it is not possible to determine whether or not educators are more or less affected by HIV/AIDS – or even to what degree they are *really* affected. It is however possible to confirm through this analysis that educators are indeed seriously affected. The in-service mortality rates shown in this study are three-times higher than the normal ('without AIDS') mortality rate for South Africa in equivalent age bands. Given the assumption, described above, that these in-service educator rates only represent a portion of the real rate, further analysis will now be undertaken to assess the magnitude of educator mortality.

4.5 Impact on Demand Projections

As discussed above, the current study is limited to mortality data on in-service educators. The KZN Teacher Demand model, also discussed briefly above, used an estimate of educator attrition based on an assumed AIDS mortality rate amongst these educators of 0.64% in 1999. In fact, the Annual Survey data for that year shows a *gross* mortality rate of 0.66% while the Sample Survey data suggests a rate of 0.87% in 1999, and the arguably more reliable PERSAL data for the same year shows a rate of 0.88%. By 2000, the rate suggested by these three data sets had converged somewhat, with the Annual Survey at 0.96%, the Sample Survey at 0.94% and PERSAL at 1.0%.

For the purpose of the model however it was irrelevant whether the educator had resigned and then died, or had died in-service; the real point of the projection was that a given number of educators had to be replaced. It is therefore difficult to compare the in-service mortality rates calculated here with those used in the model. In practice though, and while further analysis is required, the results of this study are by no means inconsistent with what was expected and projected: Estimates suggest that in 1999 a little less than half of all adult deaths in KZN were a result of AIDS. The estimate of 0.64% of educators dying of AIDS-related causes would therefore equate to a total mortality rate around 1.3%. Given the evidence of the private sector studies, regarding post-service deaths versus in-service deaths, the gross rates for in-service deaths in 1999 noted in the Annual Survey (0.66%), Sample Survey (0.87%) and PERSAL

(0,88%) data are by no means inconsistent, since they may only represent half the total number of educators *actually* dying. This hypothesis will be pursued through further study and analysis, and will constitute the next step in this line of inquiry.

4.6 HIV/AIDS Impact on Teaching and Learning

This paper is focused on the permanent loss of educators from the system, but it is important to repeat that educator mortality due to AIDS may signal the end of a long and debilitating period of illness, depression and trauma in-service (or outside it). In addition to the significance of permanent loss therefore, issues of declining capacity to teach effectively and the loss of contact time, experience and institutional memory are all features of associated impact. These are all issues of quality and affect the process of learning, transition and the quantity and quality of the system's output, in the form of its matriculants and potential entrants to the tertiary sector and the world of work. Temporary educator absenteeism (for reasons including personal illness, trauma, family care or bereavement) as well as permanent loss (through resignation, retirement or death) are therefore a dual assault on the system, and may be equally 'expensive' in the long-term.

Impact in an Average Primary School:

This system perspective does not take account of the level of personal tragedy inherent in this cycle of illness and death, nor does it account for the impact of these dynamics in and around the classroom. The KZN teacher demand and supply model suggests for example that in an average primary school in this Province, with an enrolment declining from around 1310 in 2001 to around 1075 in 2010, only about 11% of the teaching staff in-service in 2001 will still be in that school in 2010. This equates to about 4 educators out of an original cohort of 38 remaining in service in this 'model' school, the result primarily of the 'normal' attrition described above, exacerbated by growing AIDS mortality. Reducing the level of impact to this more tangible and local setting makes the point: Beyond the loss of trained and expensive human resources, teaching and learning will become an increasingly stressed process, located in a more and more traumatised social environment.

The cost in educational attainment may be profound, and must certainly point to the decreasing ability of the basic education system to feed the tertiary sector and world of work with the preparatory skills they require. The socio-economic impact of this dynamic would be difficult to quantify, and it may be simpler to consider the hard cost of training replacement educators and the policy options that now confront the authorities in terms of balancing supply and demand.

Policy Implications:

Simple arithmetic tells us that we cannot produce sufficient new educators, in time, to replace those likely to be lost to the system, if we continue to train students for a full four years. Thus, a reduction in the period of pre-service training suggests itself, as does some review of retirement age policy and incentives to lure back those many educators no longer in-service, for example. The issue of the strategic use of ARVs to prolong the productive careers of educators also presents itself, and will sooner or later have to be discussed.

Whatever decisions are made, it is clear that for the process of teaching and learning, it is no longer business as usual.

Cost of Educator Replacement:

As far as the cost of loss and replacement is concerned, it is evident that in addition to writing off some percentage of the cost of training the lost educator, there are temporary replacement costs in the period leading to the permanent loss *and* the cost of training a permanent replacement. Thus, each AIDS-related death may have at least three levels of direct cost to the education system. It is not the purpose of this paper to attempt to calculate this cost, but it is useful to reflect that in the year 2000, the cost of putting a trained educator in front of a class in South Africa was estimated to be at least R100 000. If we only take the cost of training a new educator and apply it to the replacement of the just those 1700 educators of 49 and under, who died of illness in the last four years, we arrive at a figure of R170 million in year-2000 Rands. If the additional costs of writing off the original training and providing temporary replacements are added, this cost may escalate considerably.

5 Lessons and Conclusions

The sheer length and complexity of this paper may provide the first lesson: Establishing the extent of educator mortality and analysing it to produce any discernable management information should *not* require anything like the volume of research and energy invested here. The fact that this is the case suggests that this sort of data and management information is not routinely extracted, and that the education system has yet to come to terms with the need for an 'early warning' system more consistent with the needs of the HIV/AIDS era. This also speaks to the fact that decisions are not yet routinely evidence-based, and that the capture of data, its analysis and value-adding to provide decision support to management, is not yet a key systemic function.

Mortality Post-Service:

The second lesson is that it is extremely difficult to calculate educator mortality in a comprehensive way, which may indeed help explain the paucity of data in this field of enquiry. The fact that this study confines itself to educators *in-service* speaks to the fact that there is almost no way of determining the extent of mortality rates amongst those very many educators who leave the system and die outside it. Thus the impact measured by a study confined to in-service educators may miss very significant additional losses 'post-service'. The example quoted earlier, of major South African employer organisations estimating that more than half the staff that leave, later die of illness, is case in point. If we were to apply these estimates to the mortality rates shown here, for example, the rates would be deeply alarming and might well confirm the rates of loss predicted by the educator demand and supply models in use.

Coincidental Trends:

Third, while comment has already been made about the comparative reliability of certain of the data, it is clear that the trends coincide and confirm a pattern that can no longer be denied or wished away. These data confirm that mortality – overwhelmingly (80%+) due to illness, according to the Annual Survey data and reinforced by the combination of Illness and Natural Causes in the PERSAL data – is peaking at ages well below anticipated life expectancy without AIDS.

The hard evidence of certified mortality by age and gender also tells us that educators are dying at three-times the rate of the equivalently aged general population without AIDS. Thus it fair to say that in contrast to some claims that there is little evidence of AIDS impact on educators in Southern African countries, these data confirm that this system at least shows very substantial and measurable impact.

Continuing Research:

The fourth lesson is that however ambitious any study may be, its outcomes will be constrained by the environmental realities: This study is no exception and early hopes for a conclusive outcome have been tempered by an acceptance that this remains work in progress. It is now clear that we require some insight into the rate of mortality amongst those educators who have left the profession – for whatever reason – and also need more data on general attrition rates, ideally with some analysis of the reasons for exiting the system. It is for these reasons that this study is styled as one step in a continuing research agenda, and that we will continue to narrow the margin of error around this critical issue.

Conclusions:

The density of the data analysed in this study should not detract from the key issues that arise; first, as already noted, work of this kind should and must be a routine feature of system management and monitoring, if teaching and learning is to be sustained. This study does not however describe a ‘Doomsday’ scenario, but rather signals that AIDS-linked mortality is incrementally eroding the capacity of the system and will inevitably have dramatic repercussions for educator recruitment and training. More to the point, it alerts us to the fact that AIDS is adding to existing levels of attrition and will inexorably ‘target’ any latent dysfunction in the system. In flagging the fact that the system is losing educators at the peak of their professional skills – and therefore also losing experience and institutional memory – it alerts us to the fact that is *really* no longer business as usual.

This points to the fact that losses on this rising scale will require serious consideration of policy issues around recruitment into (what should be) an attractive employment option, length of pre-service training, curricula, and retention in the system for a viable period, for example. Failing resolution of issues like these, as we have already discussed, this raises the spectre of extraordinary measures being required; for example, enticing educators no longer in-service back, extending retirement age or using ARVs to prolong productive life in the classroom. We make no comment on these issues, but merely note that the need to engage this level of debate already confirms the extent of the crisis.

The next phase of research will commence immediately in order – it is hoped – to bring some further clarity to this process. We hope these data, analyses and comments will serve to provide some insight into the complexity of the problem, but more importantly, highlight the level of impact now evident in the most valuable of the Province’s education resources.

**Procedure for drawing a weighted random sample
of schools in KwaZulu-Natal**

Sample Survey Research Team: Jill Tomlinson (Manager), Luisa Roscani, Nkosinathi Ngcobo & Sarah Pye

The KwaZulu-Natal Annual Schools Survey database for 2001 was used as the basis for drawing the schools sample used in the survey. This database includes information on a total of 5942 schools and 76 887 educators in the province.

A random equal probability sample that does not take school size into consideration would tend to disproportionately favour small schools and by implication sample a smaller percentage of the teaching force. School size was therefore taken into account by using the educators as a weighting factor, so that larger schools (with more educators) were given a proportionately higher probability of being included in the sample. No other weighting factors were used. The sample of 120 schools (later reduced to 100 for logistical and other reasons discussed below) represents 2% of the total number of schools in the province.

The breakdown of schools selected by region and size is shown below:

Region	No. of schools selected
Durban South	18
Empangeni	12
Ladysmith	14
North Durban	16
Pietermaritzburg	17
Port Shepstone	17
Ulundi	18
Vryheid	8
Total	120

Table showing number of schools selected in the sample study by Education Region.

School Size	No. of schools selected
Schools with less than 5 educators	5
Schools with between 5 and 10 educators	16
Schools with between 10 and 20 educators	53
Schools with between 20 and 30 educators	30
Schools with more than 30 educators	16
Total	120

Table showing number of schools selected in the sample study by size of school, determined by number of educators appointed.

The 100 schools surveyed were appropriately distributed over the Province's 8 Education Regions and included 27 secondary, 2 intermediate and 71 primary (including 6 junior primary) schools. The survey sought to establish the quality and reliability of school record keeping in general and educator mortality in particular, and deliberately did *not* highlight issues of HIV/AIDS mortality or impact. The survey data was linked to Annual School Survey and PERSAL data via unique EMIS school numbers for purposes of comparative analysis. Finally, the educator age and gender profile of the sample very closely approximates that of the Provincial educator workforce, shown in Annexure C.

PERSAL Data: Mortality Rates by Gender and Age Group 1998 - 2001

1998**PERSAL Deaths**

Year	Gender	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	Age not stated	Total
1998	Female	5	48	79	54	26	17	19	13		261
1998	Male	3	43	63	60	22	23	7	11		232
1998	Total	8	91	142	114	48	40	26	24		493

Annual Survey State paid Educators

Year	Gender	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	Age not stated	Total
1998	Female	2081	9731	12401	10715	7148	4018	2551	2243	616	51504
1998	Male	1199	5428	5907	4892	3095	1953	1199	970	437	25080
1998	Total	3280	15159	18308	15607	10243	5971	3750	3213	1053	76584

Note: 2670 educators either had no gender information or no information on whether they were state or SGB paid and were excluded

Mortality Rates

Year	Gender	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	Age Not Stated	Total
1998	Female	0.2%	0.5%	0.6%	0.5%	0.4%	0.4%	0.7%	0.6%	0.0%	0.5%
1998	Male	0.3%	0.8%	1.1%	1.2%	0.7%	1.2%	0.6%	1.1%	0.0%	0.9%
1998	Total	0.2%	0.6%	0.8%	0.7%	0.5%	0.7%	0.7%	0.7%	0.0%	0.6%

1999**PERSAL Deaths**

Year	Gender	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	Age Not Stated	Total
1999	Female	7	47	83	64	46	14	10	12		283
1999	Male	5	43	62	63	37	21	8	8		247
1999	Total	12	90	145	127	83	35	18	20	0	530

Annual Survey State paid Educators

Year	Gender	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	Age not stated	Total
1999	Female	911	8302	12276	11197	7574	4162	2284	1588	336	48630
1999	Male	588	4517	5986	4966	3190	1728	798	489	192	22454
2000	Total	1499	12819	18262	16163	10764	5890	3082	2077	528	71084

Note: 840 educators either had no gender information or no information on whether they were state or SGB paid and were excluded

Mortality Rates

Year	Gender	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	Age not stated	Total
1999	Female	0.8%	0.6%	0.7%	0.6%	0.6%	0.3%	0.4%	0.8%	0.0%	0.6%
1999	Male	0.9%	1.0%	1.0%	1.3%	1.2%	1.2%	1.0%	1.6%	0.0%	1.1%
1999	Total	0.8%	0.7%	0.8%	0.8%	0.8%	0.6%	0.6%	1.0%	0.0%	0.7%

2000

PERSAL Deaths

Year	Gender	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	Age not stated	Total
2000	Female	1	51	123	83	50	29	12	16		365
2000	Male	4	51	92	59	54	34	13	9		316
2000	Total	5	102	215	142	104	63	25	25		681

Annual Survey State paid Educators

Year	Gender	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	Age not stated	Total
2000	Female	511	6568	11553	11263	7998	4553	2405	1590	551	46992
2000	Male	357	3738	5699	4907	3391	1782	908	486	355	21623
2000	Total	868	10306	17252	16170	11389	6335	3313	2076	906	68615

Note: 2378 educators either had no gender information or no information on whether they were state or SGB paid and were excluded

Mortality Rates

Year	Gender	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	Age not stated	Total
2000	Female	0.2%	0.8%	1.1%	0.7%	0.6%	0.6%	0.5%	1.0%	0.0%	0.8%
2000	Male	1.1%	1.4%	1.6%	1.2%	1.6%	1.9%	1.4%	1.9%	0.0%	1.5%
2000	Total	0.6%	1.0%	1.2%	0.9%	0.9%	1.0%	0.8%	1.2%	0.0%	1.0%

2001

PERSAL Deaths

Year	Gender	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	Age not stated	Total
2001	Female	3	35	92	85	50	36	19	10		330
2001	Male	1	20	86	73	45	32	17	5		279
2001	Total	4	55	178	158	95	68	36	15		609

Annual Survey State paid Educators

Year	Gender	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	Age not stated	Total
2001	Female	463	5373	11087	11143	8452	4877	2521	1591	931	46438
2001	Male	298	3289	5634	4826	3579	1881	968	494	551	21520
2001	Total	761	8662	16721	15969	12031	6758	3489	2085	1482	67958

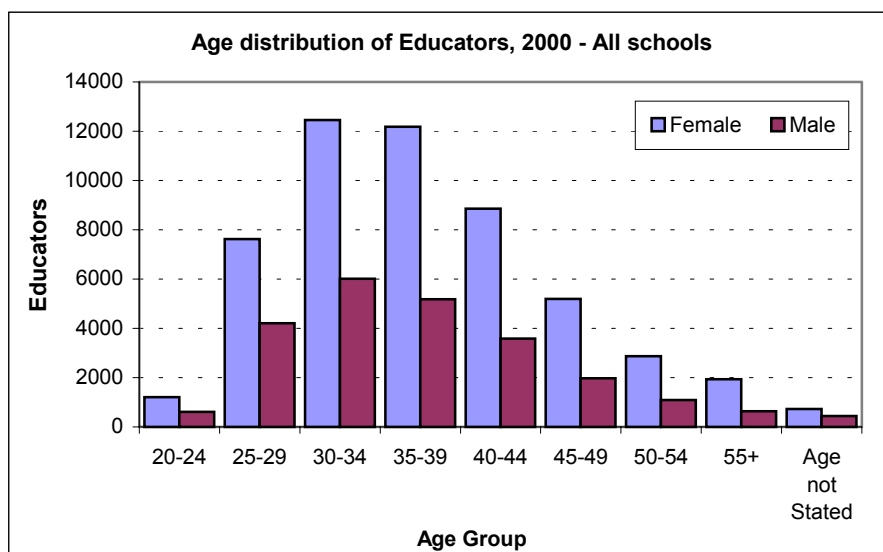
Note: 2462 educators either had no gender information or no information on whether they were state or SGB paid and were excluded

Mortality Rates

Year	Gender	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	Age not stated	Total
2001	Female	0.6%	0.7%	0.8%	0.8%	0.6%	0.7%	0.8%	0.6%	0.0%	0.7%
2001	Male	0.3%	0.6%	1.5%	1.5%	1.3%	1.7%	1.8%	1.0%	0.0%	1.3%
2001	Total	0.5%	0.6%	1.1%	1.0%	0.8%	1.0%	1.0%	0.7%	0.0%	0.9%

Age Distribution of Educators, All Schools in KZN, 2000

Educator data in this study is based on the Annual Survey's Educators Table, which records details of all educators in the Province; however it should be noted that these data are subject to considerable definition and interpretation since they include very fluid ratios of public versus privately paid educators, permanent versus various categories of temporary educators, all of which vary from *month to month*. Nevertheless, the age distribution data for 2000 adequately reflect the average position for the period of analysis in which the ratio of female to male educators was 2.23 and on average, female educators (37,4) were older than males (36,4).



*Graph 2: Distribution of Educators by Age: all schools, year 2000
(Source: KZNDEC Annual Survey, 2000)*

Age Group	Female	Male	Female & Male
20-24	2%	3%	2%
25-29	14%	18%	15%
30-34	23%	25%	24%
35-39	23%	22%	23%
40-44	17%	15%	16%
45-49	10%	8%	9%
50-54	5%	5%	5%
55+	4%	3%	3%
Age not stated	1%	2%	2%
Total	100%	100%	100%

*Table 2: Percentage educators by Age Group and Gender, all schools, year 2000
(Source: KZNDEC Annual Survey, 2000)*