

REPORT
of the
CONTINUOUS STATISTICAL INVESTIGATIONS COMMITTEE

ASSURED LIVES FUNERAL MORTALITY INVESTIGATION
2001-2002

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1. Introduction

1.1 Description of Investigation

This is the first individual life funeral policy investigation undertaken in South Africa.

“Funeral policies” refers to policies that are sold with the intention of covering the funeral costs incurred, offering a speedy payout for that purpose. Policies are often sold on a family basis, incorporating additional cover for the policyholder’s spouse, children or parents. In this report, “main member” refers to the principal policyholder.

1.2 Data

This investigation covers individual funeral business in South Africa over the period 2001-2002. The participating companies were African Life, Capital Alliance, Charter Life, Hollard Life, Metropolitan Life, Old Mutual and Sanlam.

It is intended that in future data will be captured and reported on annually.

In general, data was submitted on time but in some cases lack of validation was apparent. Errors included invalid dates of birth, entry and exit, invalid sexes, invalid deaths and dates of birth after the policy entry date. This resulted in the need for some data to be resubmitted. Ultimately, about 10% of data was excluded due to validity checks that failed.

All children older than age 25 were excluded due to unreasonable ages and negligible exposure. Also, a minimum age of 40 was used for parents of the main life.

Data was requested for the years 2000, 2001 and 2002. However, 2000 was excluded since two companies with substantial exposure were unable to provide data for that year.

A three year select period was used as one company was unable to provide non-aggregated data for longer durations.

Although various checks were done on the data to determine general soundness, the results provided are highly dependent on the accuracy of the underlying data provided by each company. It is recommended that in future investigations participants carry out their own data checks and be requested to have the data signed off.

One company was unable to provide data in the requested format due to system constraints. This company provided grouped data for each combination of analysis factors (sex, life, age etc.) together with the number of exits and the exposure. The exposure was adjusted to create consistency with other participants by assuming all decrements other than death occurred in the middle of the year.

1.3 Exposed-to-Risk Calculation

The exposure for this investigation is based on number of lives. The age definition used is age next birthday. For each date, the year and month was requested. Therefore, to calculate exposure the first day of the month was used for entry and the last day of the month for exit.

1.4 Analyses

The data was analysed by the following factors:

- Age
- Sex
- Smoking Status
- Province
- Life on policy (e.g. main life or spouse)
- Duration
- Policy type (stand alone or rider)
- Calendar year

Although various types of decrement were requested, it was difficult to calculate lapse, surrender and other withdrawal rates as all lives covered by a policy were counted as the decrement. This was overcome by only examining these decrements for the main lives, but the exposure became very small in some instances.

Comparisons have been made with the SA85-90 ultimate table, as well as the SA85-90 (heavy) table. These are the most recently published assured lives mortality tables where AIDS deaths can be assumed to be negligible.

There are no standard published mortality tables for females in South Africa. Therefore, in this report the female experience is compared to an adjusted version of SA85-90, referred to as SA85-90 F. The adjustment used is 40% of the table for durations zero and one and 50% for durations two and higher. Caution is therefore advised when referring to the female experience.

All the rates in this report are per mille and the y-axis of most graphs is on a logarithmic scale.

2. Analyses of Data

2.1 Exposure and Deaths

Exposure is examined below by sex, class of life and province.

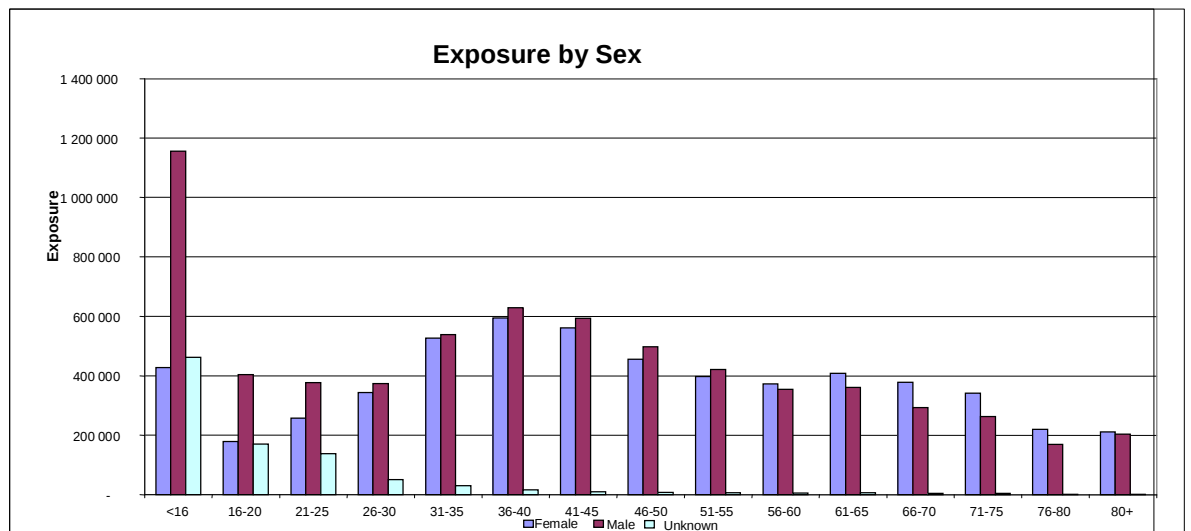


Figure 1

The distribution of exposure of all lives is broadly in line with expectation. The small hump around age 65 is due to the large number of parents covered at older ages.

Male and female exposure is similar at most ages but below age 26 it differs significantly. This is possibly a coding error where sex defaults to “male” for children. The number of lives where the sex is unknown is very high for children and decreases with age.

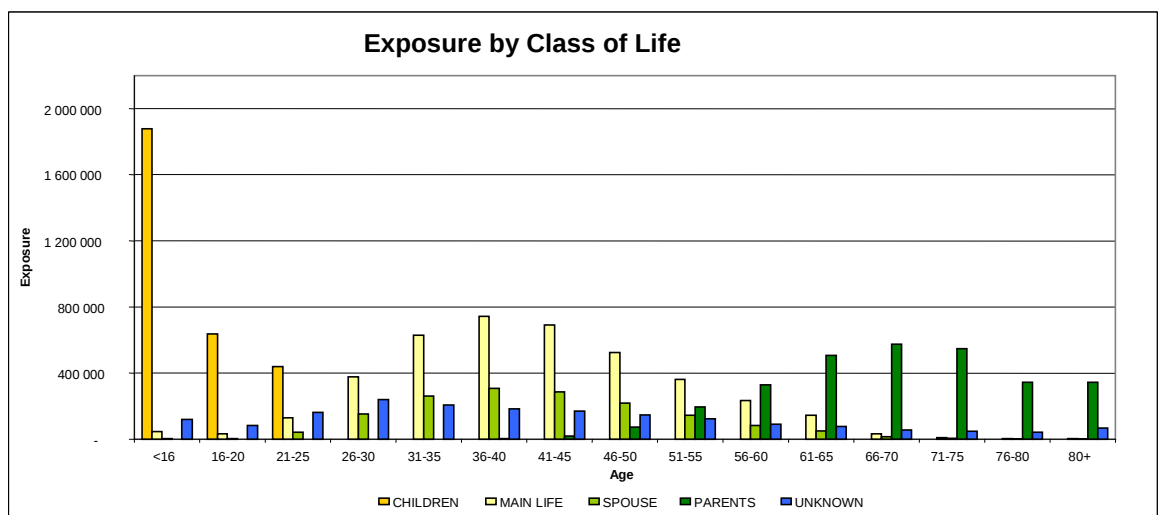


Figure 2

Even though some lives have been excluded due to age restrictions, the spread of exposure by age and class of life looks reasonable

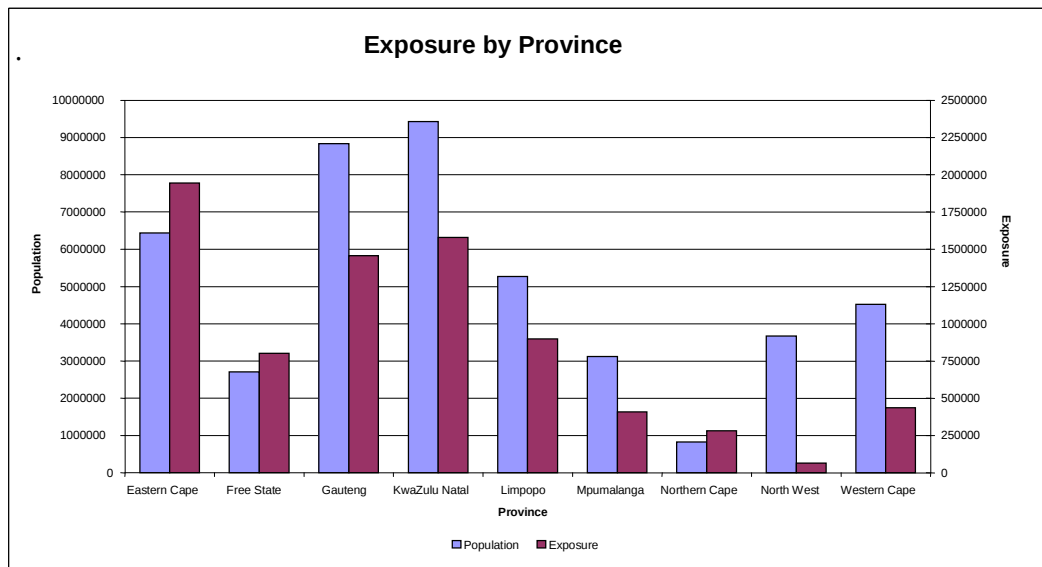


Figure 3

Figure 3 compares the exposure from both years of this investigation by province with that of the general South African population as indicated in the 2001 Census. North West is the only province not showing a reasonable relationship, but this is due to this province being excluded from the initial data request. This may have resulted in companies reassigning North West business to other provinces or listing it as Unknown.

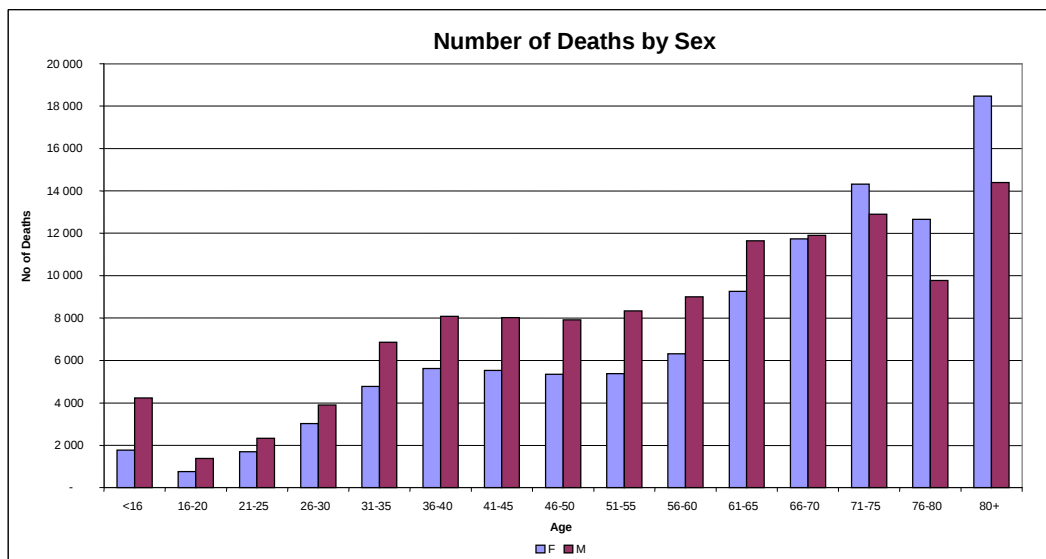


Figure 4

The number of deaths for males is higher than that of females up to age 70, but lower above age 70. Lives where the sex was unknown have been excluded from this comparison.

2.2 Cause of Death

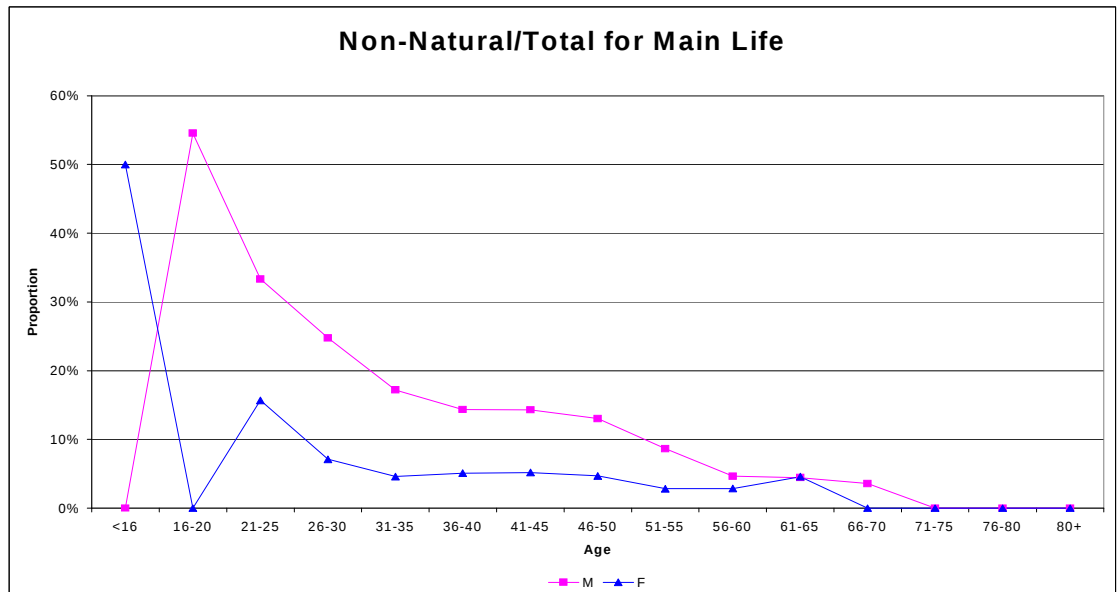


Figure 5

Only two companies provided data by natural or non-natural cause of death. The ratio of non-natural to overall mortality rates for males and females for these companies is illustrated above. The results above age 56 are unreliable due to the lack of data. A distinctive increase for males can be seen at ages 16-20, providing some evidence of an accident hump.

When all categories of lives are included the accident hump appears unrealistically low compared to other South African assured life mortality investigations. For lives other than the main life, a very low proportion of accidental deaths are recorded. It is likely that this may not be a realistic reflection of underlying experience.

When only the Main Life is examined, the proportion in excess of 50% is seen for males in the 16-20 age-group as may be expected. However, above age 20 the proportion of non-natural claims drops very quickly and could be due to the cause of death defaulting to natural if unknown.

2.3 Comparison with Standard Tables

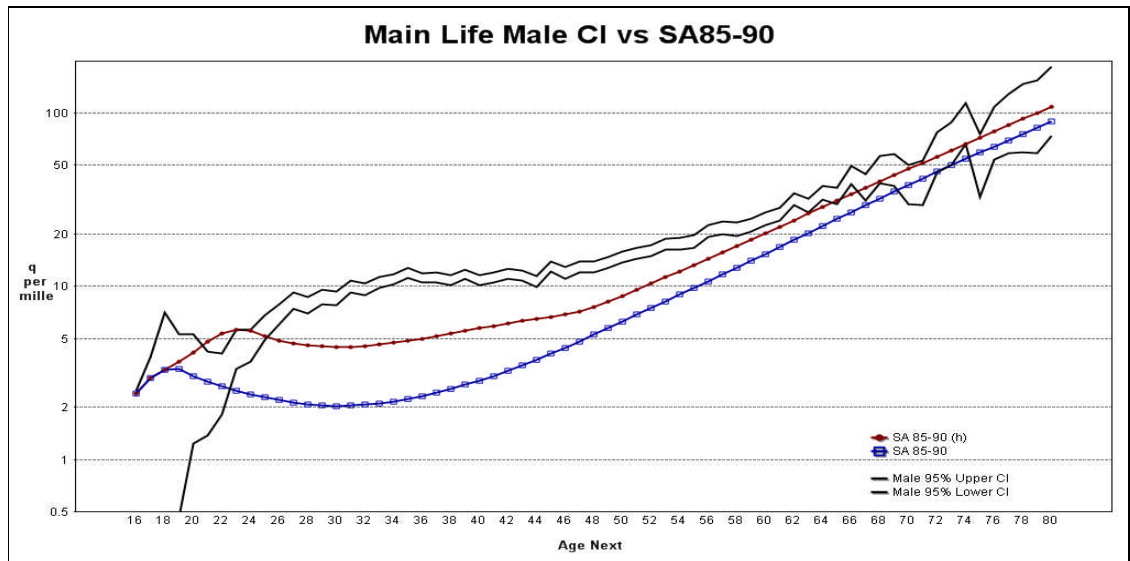


Figure 6

The above graph shows a comparison of the main life male upper and lower 95% confidence intervals with SA85-90 and SA85-90 (heavy). The male mortality is much higher for most ages, but starts to follow the heavy table more closely from age 65. This illustrates the impact of AIDS.

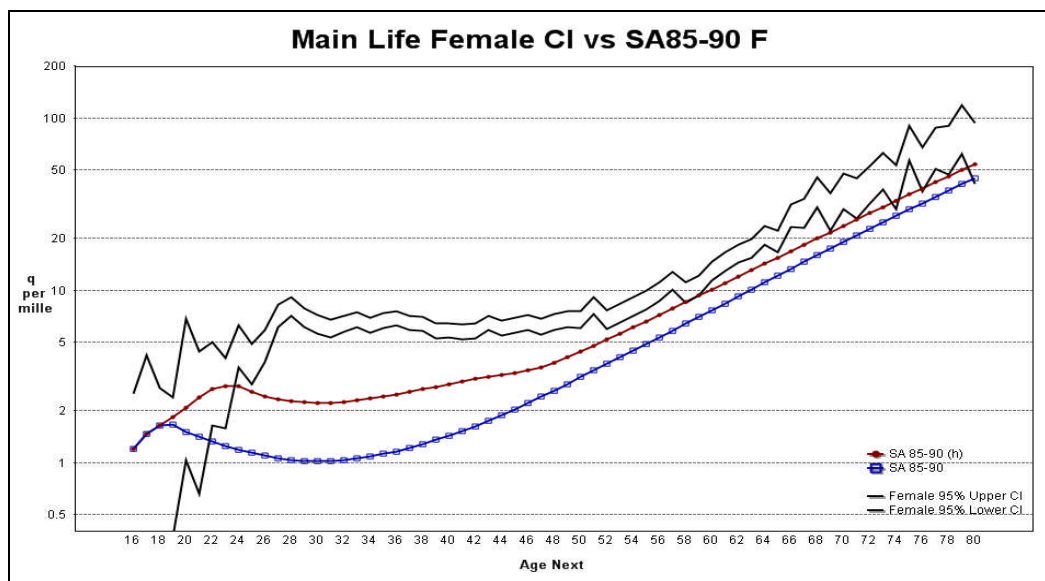


Figure 7

The mortality for females is significantly higher than the derived SA85-90 F heavy table from ages 25 to 55 while the experience is only slightly heavier than the table above age 60. There appears to be an even larger impact of AIDS mortality for females than males.

The confidence intervals for both males and females are very wide below age 25 and above age 70 because of the low exposure at those ages.

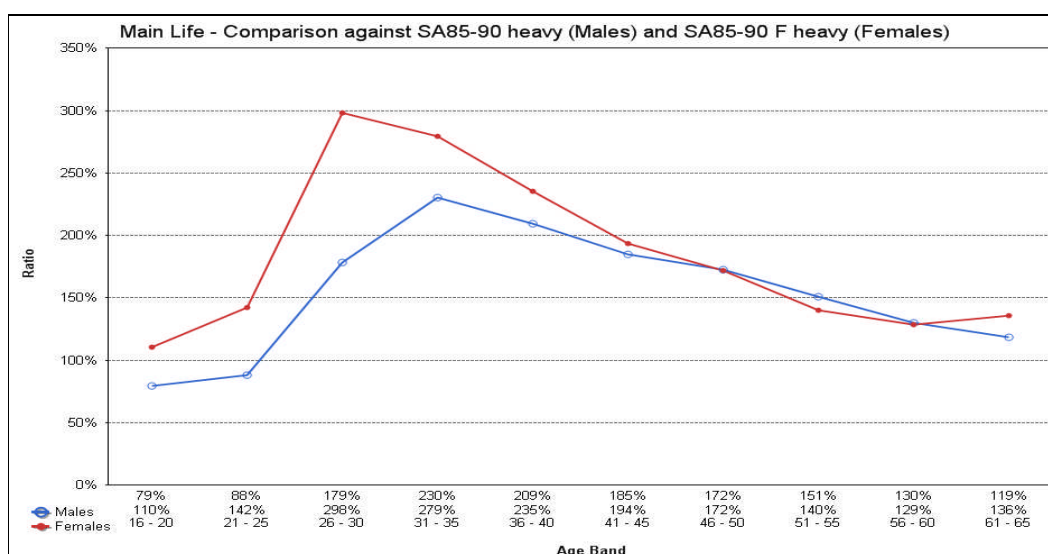


Figure 8

The ratios of main life male and female mortality rates to SA85-90 (heavy) rates are illustrated above. The significance of the AIDS hump is shown by the experienced mortality increasing to more than 200% of the standard table in the age-range 31 to 35 for males and to more than 300% in the age-range 26 to 30 for females.

2.4 Analysis by Province

The details of the exposure by province, age, sex and class of life are given in Appendix A.

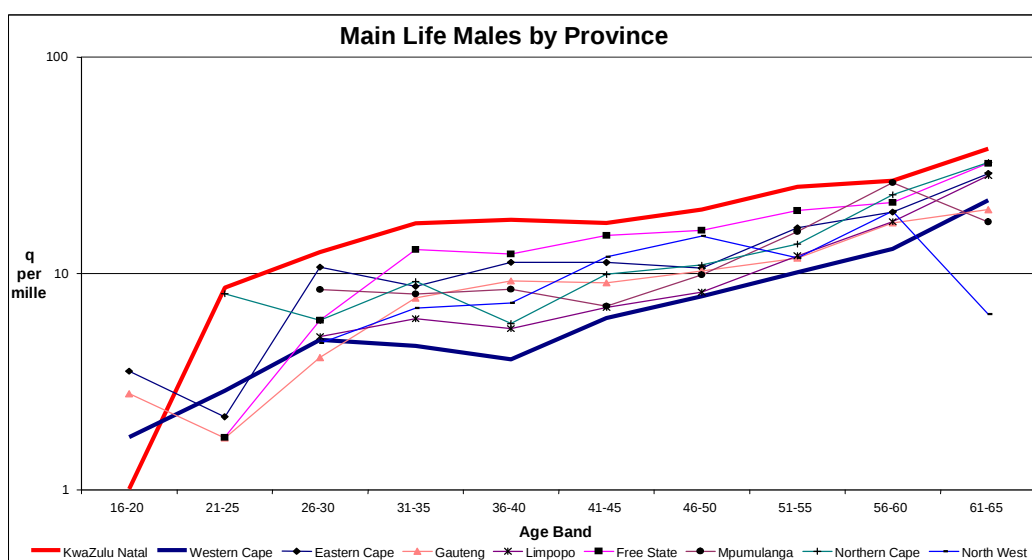


Figure 9

Mortality in KwaZulu Natal is clearly higher than all the other provinces, while Western Cape has the lowest mortality for most age bands. An AIDS hump is also evident for most provinces.

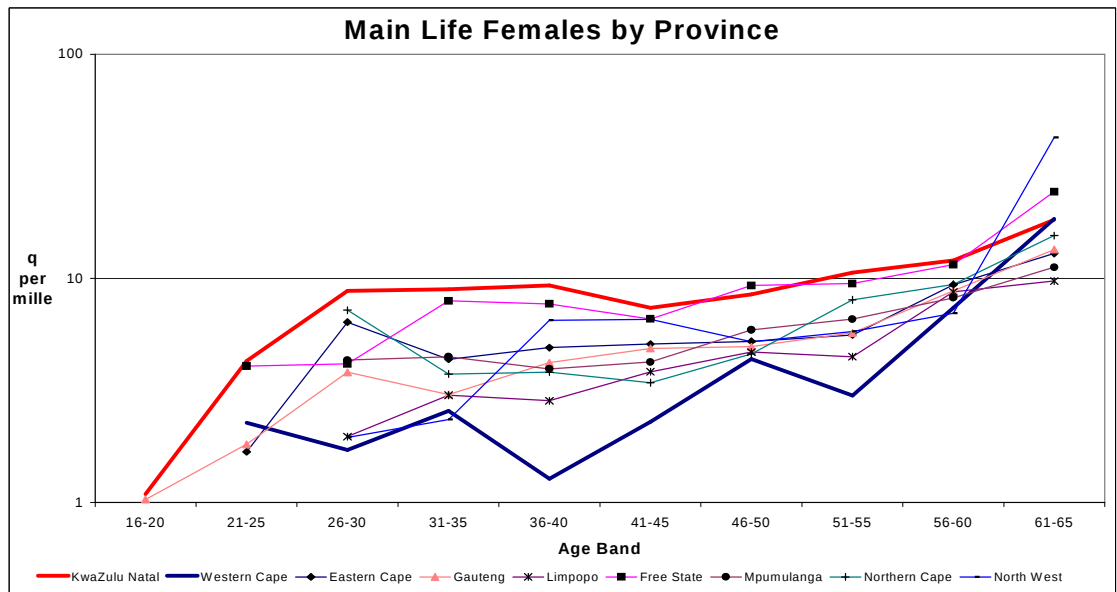


Figure 10

As with males, KwaZulu Natal has the heaviest mortality and Western Cape the lightest. The AIDS hump is very pronounced for KwaZulu Natal, as well as the Free State.

Mortality Rates by Province in Descending Order

Province	Male Mortality Rate per Mille	Female Mortality Rate per Mille	Weighted Average Rate per Mille
KwaZulu Natal	19.7	9.7	13.8
Free State	15.3	8.6	12.0
Eastern Cape	13.0	5.9	8.6
Northern Cape	11.1	5.4	8.4
Mpumalanga	10.4	5.0	7.5
North West	9.3	5.4	7.4
Gauteng	9.7	5.1	7.3
Limpopo	9.2	4.4	7.0
Western Cape	6.7	3.2	4.9

It is apparent from the table above that Northern Cape, Mpumalanga, North West and Gauteng experience similar results overall, although there are some age bands where the differences are significant.

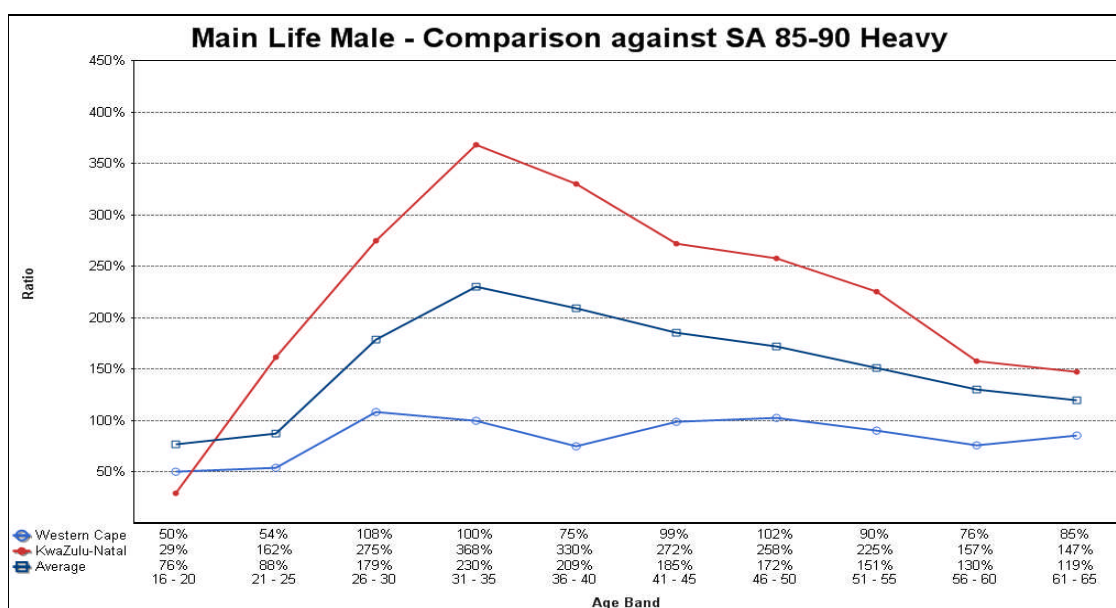


Figure 11

Males in KwaZulu Natal experience mortality of 368% of SA85-90 (heavy) at ages 31-35, with the average male ratio to SA85-90 (heavy) for all provinces also peaking in this age band.

The male mortality in Western Cape is similar to that of the SA85-90 (heavy) from age 26 to 55 and materially lighter at older and younger ages, showing the generally lower level of mortality as well as the lower level of AIDS mortality in Western Cape.

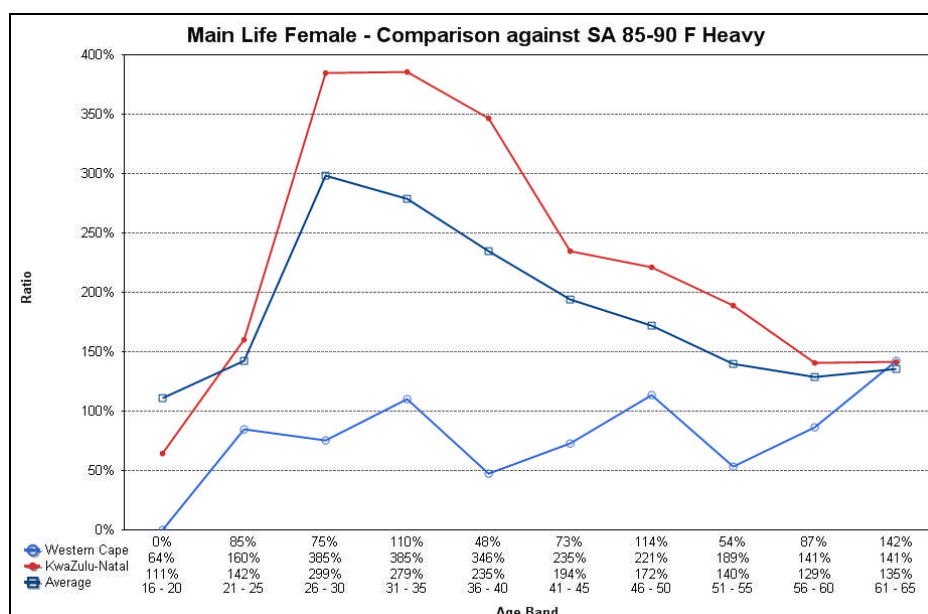


Figure 12

The ratio of female experience to SA85-90 F (heavy), peaks above 400% for KwaZulu Natal while the Western Cape remains close to or below 100%.

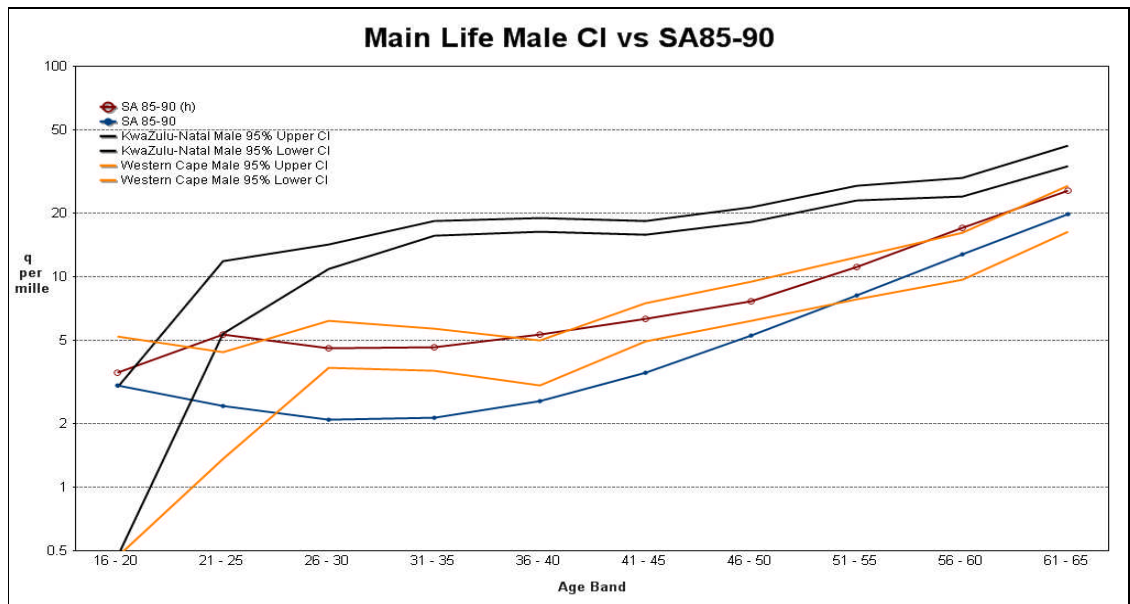


Figure 13

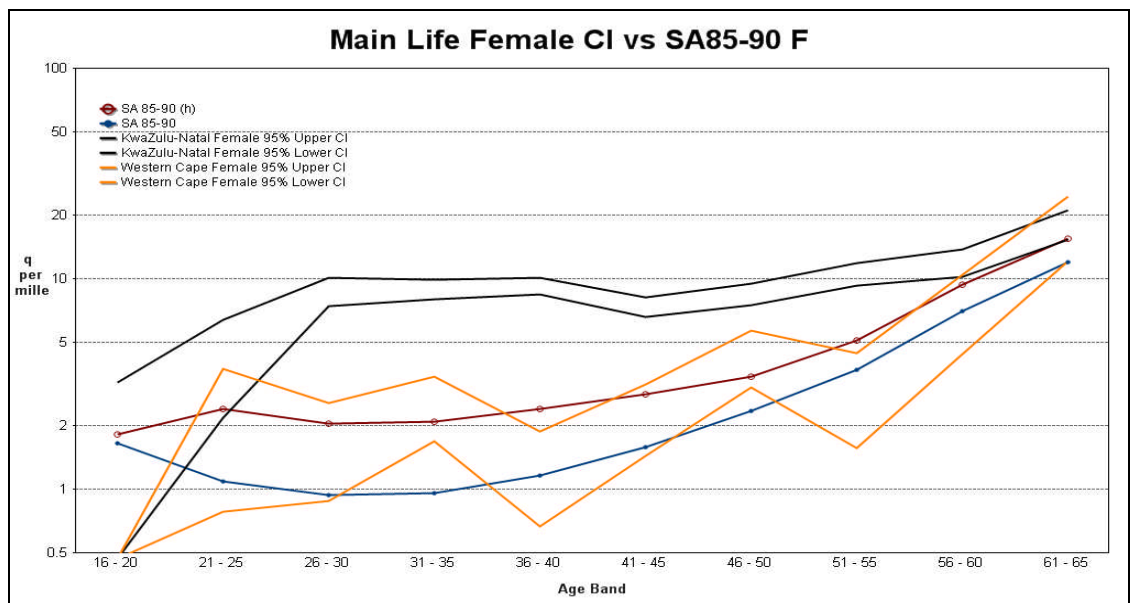


Figure 14

The above graphs show confidence intervals for main life males and females from the investigation together with standard tables. KwaZulu Natal has a small confidence interval due to the large exposure, with Western Cape (WC) producing wide confidence intervals (especially for females) due to the relatively small exposure.

2.5 Analysis by Duration

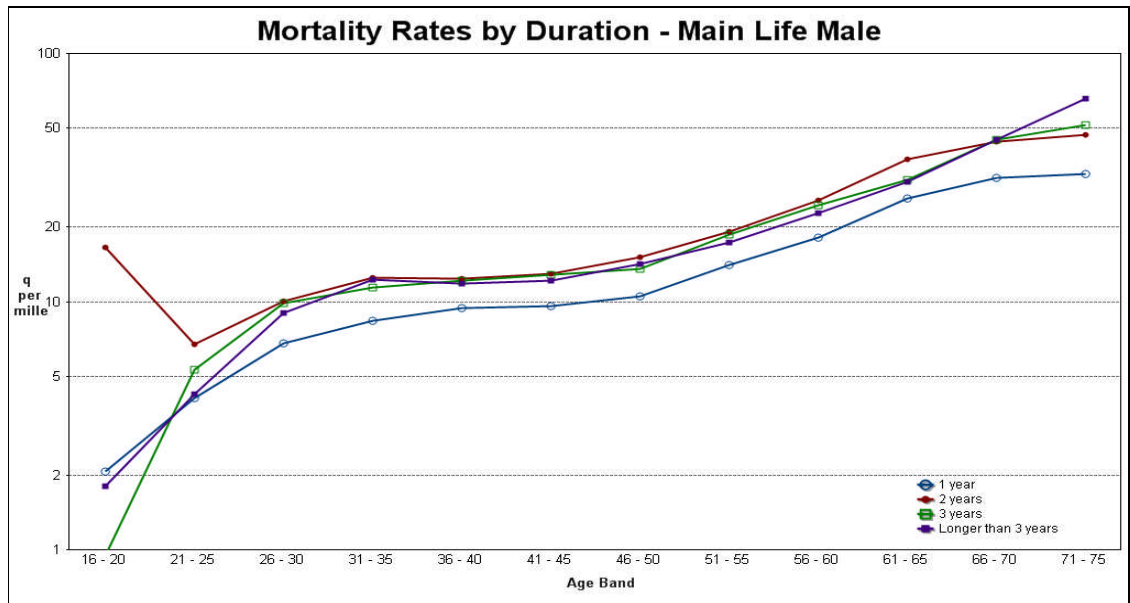


Figure 15

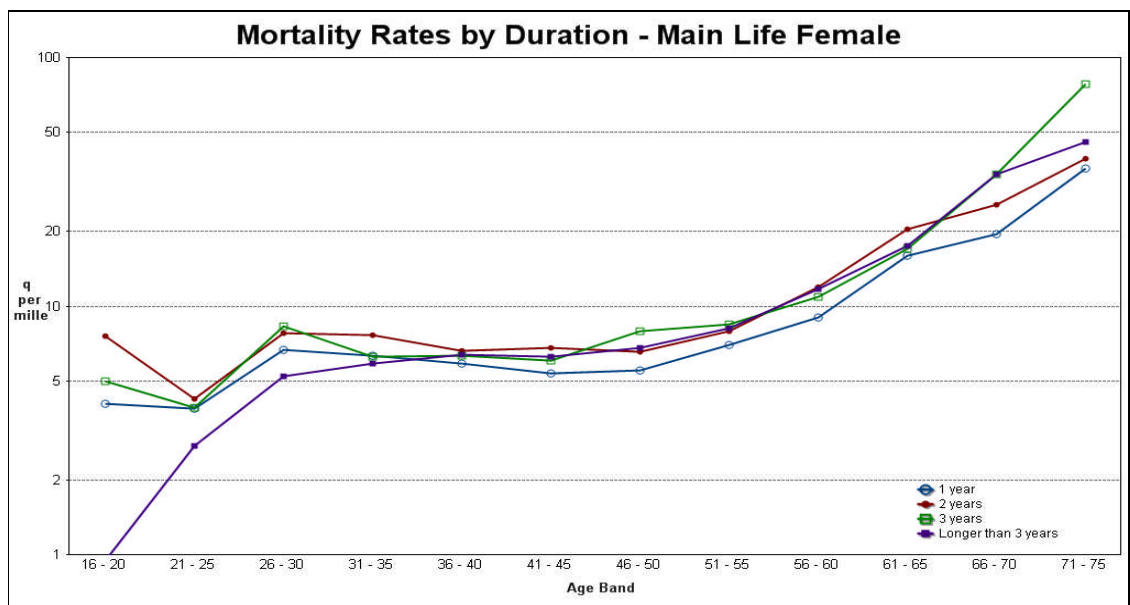


Figure 16

For both male and female main lives, the mortality experience in the first year is the lowest, after which it increases significantly to the second year. Thereafter the rates decrease slightly further to the third year and for longer durations.

The mortality rates in the first year are likely to be affected by waiting periods, whereby claims in the first year, 6 months or 3 months are only paid where the cause of claim is accidental. Waiting periods are a common feature in funeral business as a means of protecting against anti-selection, given the lack of initial underwriting.

Deaths for the later durations may also be understated where beneficiaries forget older policies. It was requested that paid up policies be removed from the exposure, but one company was unable to do this. This is unlikely to have a material impact on the overall results.

2.6 Analysis by Calendar Year



Figure 17

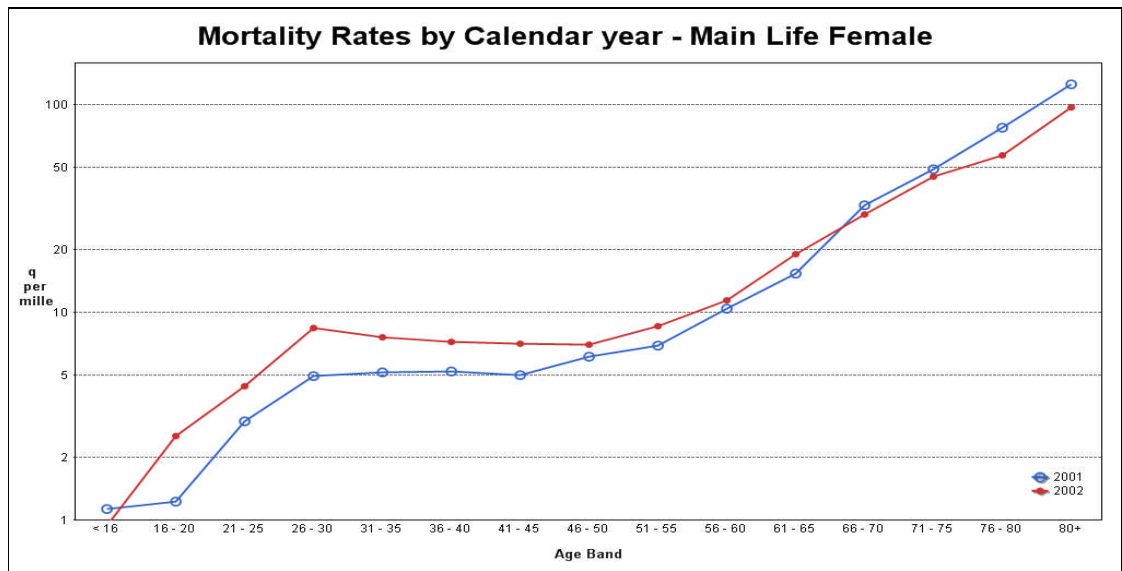


Figure 18

The above graphs show how rates have progressed for main life males and females over the years 2001 to 2002. The average increase over the time period was about 15% for males and a significant 29% for females. The ratio of the 2002 to 2001 rates by age for males and females are shown in detail below.

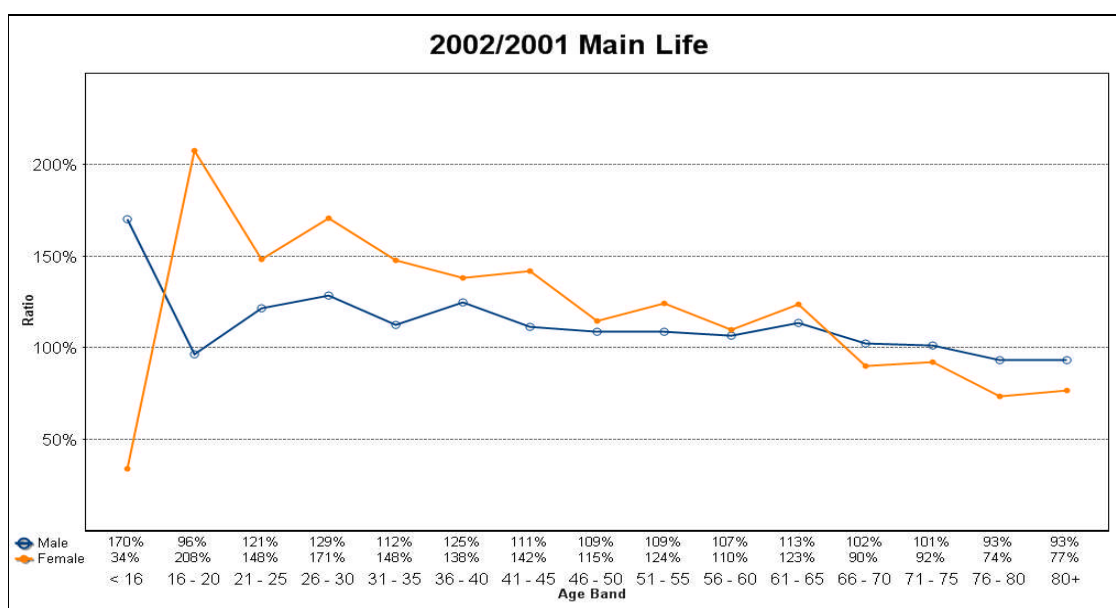


Figure 19

The average increase for males over ages 16 to 45 is 18% and over ages 16 to 65 it is 15%. Similar increases have been seen in male population mortality over the ages 21 to 45, indicating that this change is likely attributable to the HIV/AIDS epidemic.

The increase experienced for females is far more significant and less easily explained. The largest increase, amounting to 71%, is seen in the 26 to 30 age-band. Over ages 16 to 45 the increase is 46%, and it is 34% over ages 16 to 65.

The explanation of this increase is not at all clear, since for the population as a whole it is thought that mortality has only increased in the age range associated with AIDS deaths and then not to this extent over a single year. Readers are cautioned not to read too much into data for only two years.

The decreasing mortality rates for both males and females above age 65 are noteworthy.

2.7 Analysis of Spouses, Parents and Children

A summary of exposures and deaths per class of life is included in Appendix B.

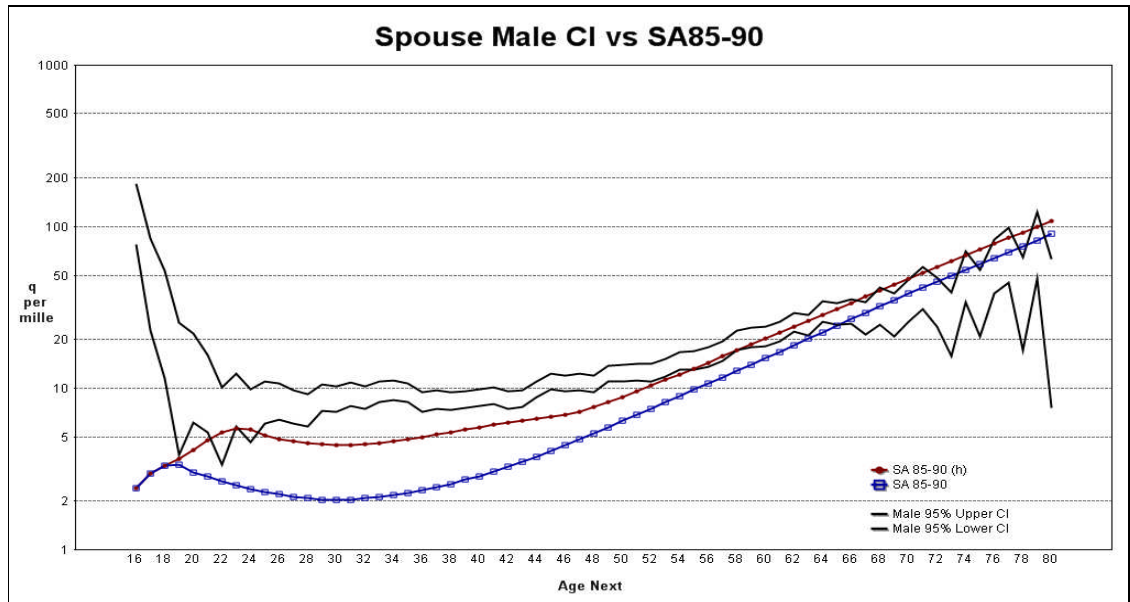


Figure 20

The upper and lower 95% confidence intervals for male spouses are plotted with SA85-90 and SA85-90 (heavy). The mortality experience of male spouses is closer to SA85-90 (heavy) than the aggregate table, but the rates are still considerably higher between ages 27 and 50.

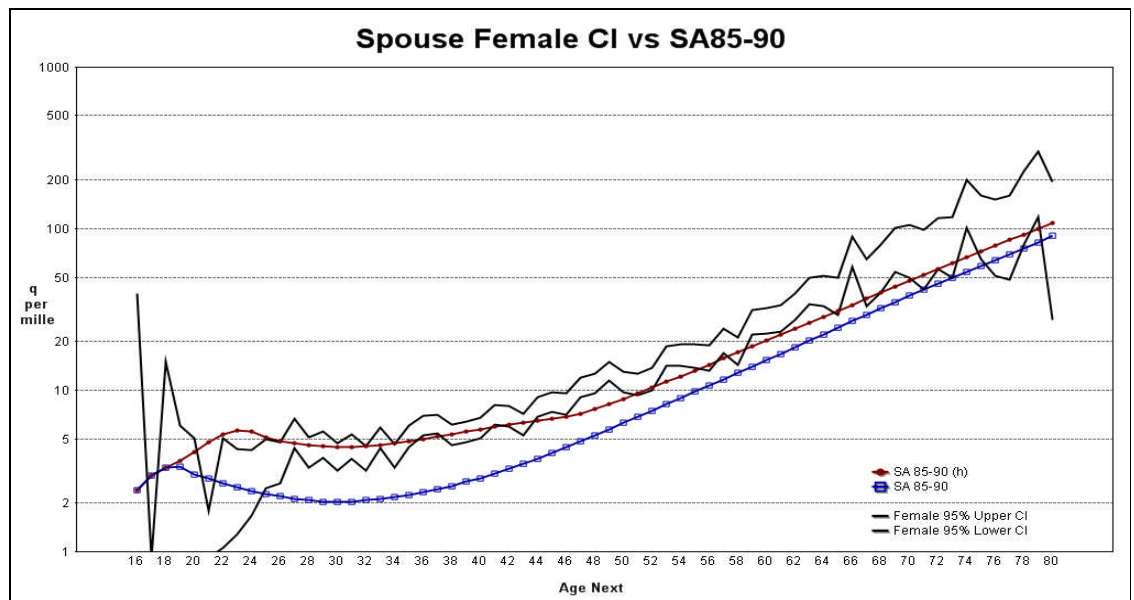


Figure 21

The female spouses' mortality is similar to that of SA85-90 (h) and in comparison shows no significant AIDS hump

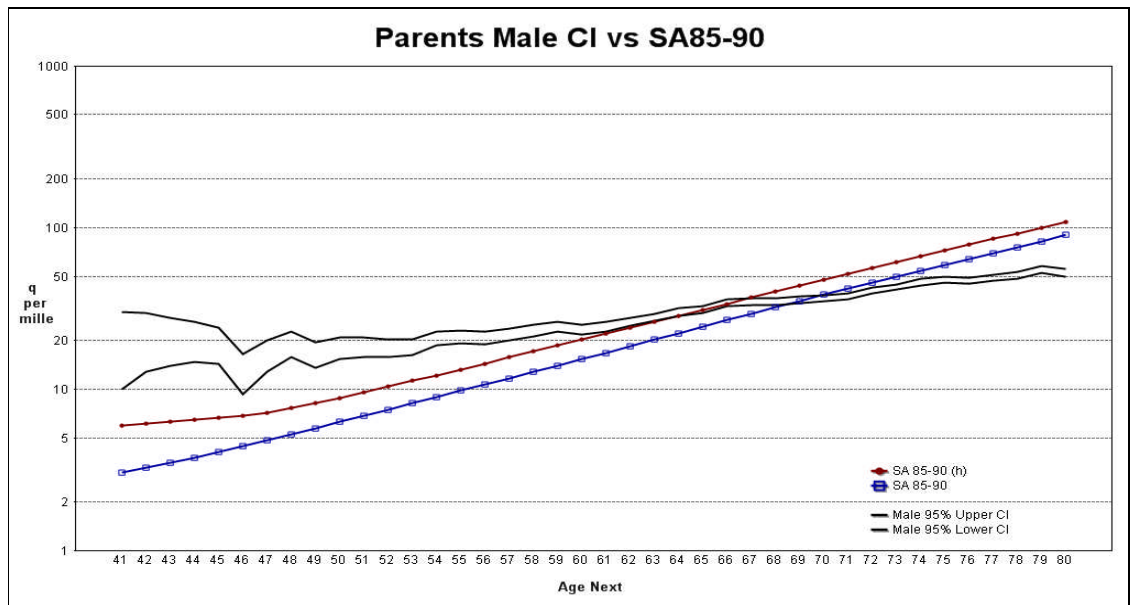


Figure 22

The narrow confidence intervals for male spouses above age 50 illustrate the high exposure. The experience does not closely resemble the standard tables which could be due to the underreporting of claims at the older ages.

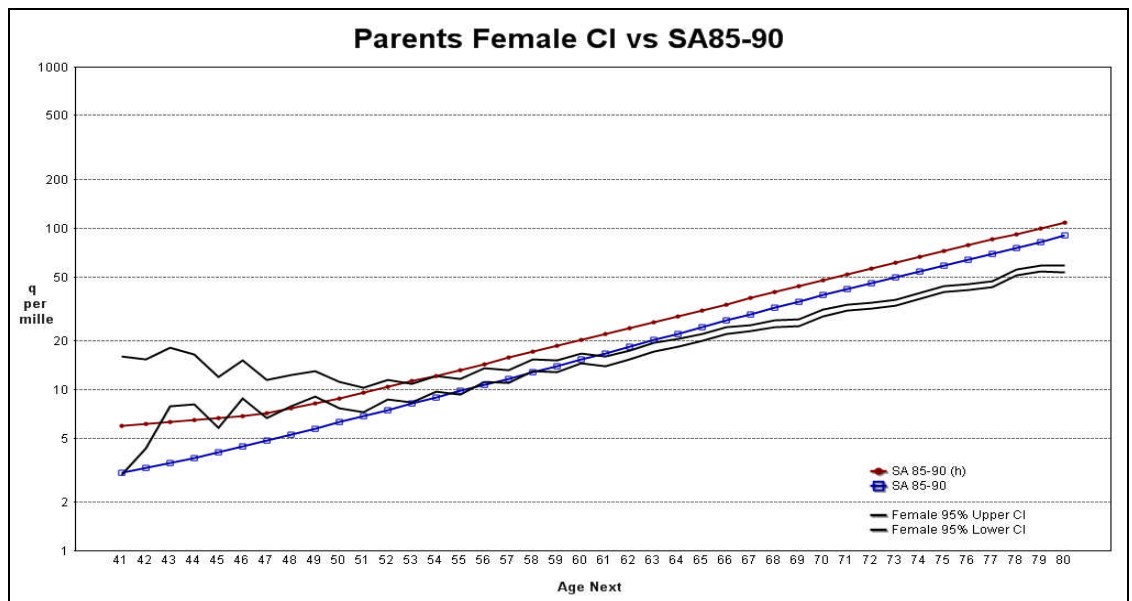


Figure 23

The female mortality is lower than the standard tables, but the curve is steeper than the male mortality.

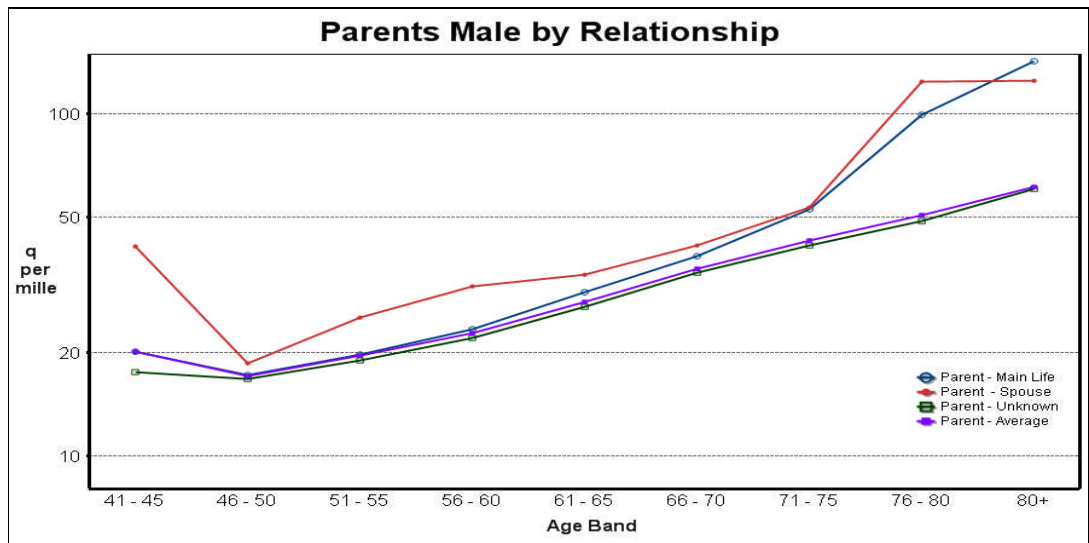


Figure 24

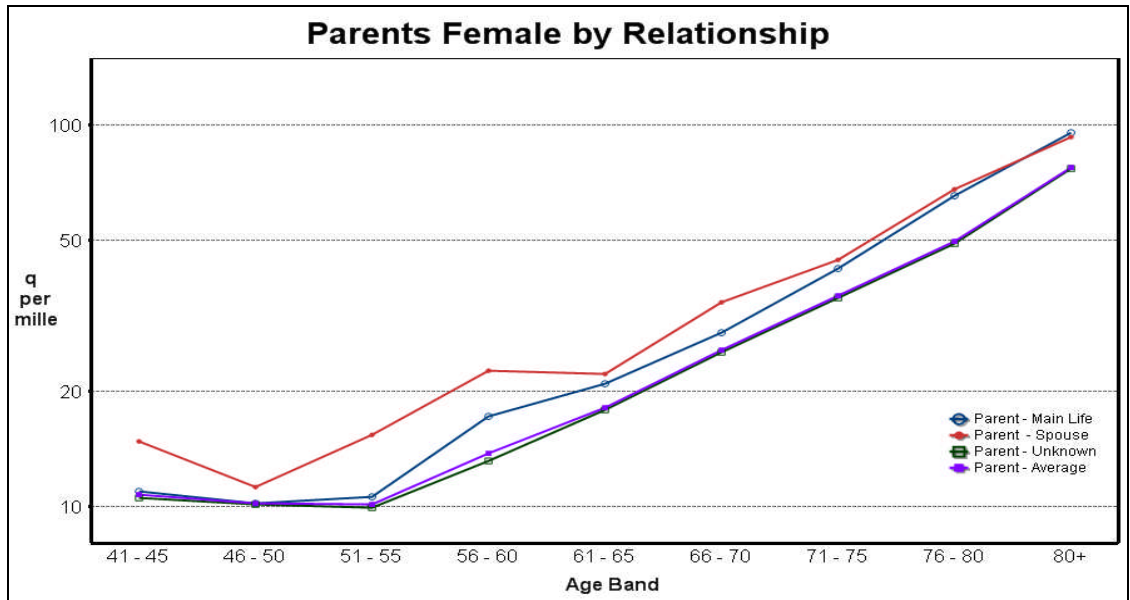


Figure 25

The above graphs examine any differences depending on whether the parents covered by the policy were parents of the main life or parents of the spouse of the main life.

For males, below age 66, the mortality rates of parents of the spouse differ considerably to the other rates. The females show a similar pattern, but with smaller differences.

However, the usefulness of this comparison is limited by the fact that only one participant provided details on the relationship of the parents. This company had higher overall mortality rates than the other participants, contributing to the pattern in the graph above.

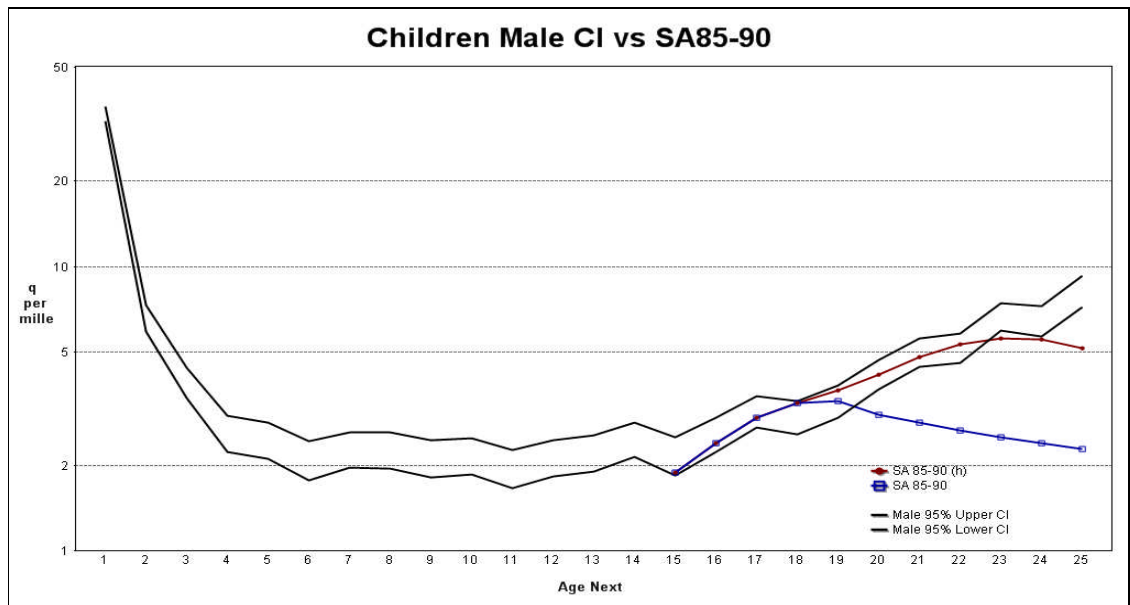


Figure 26

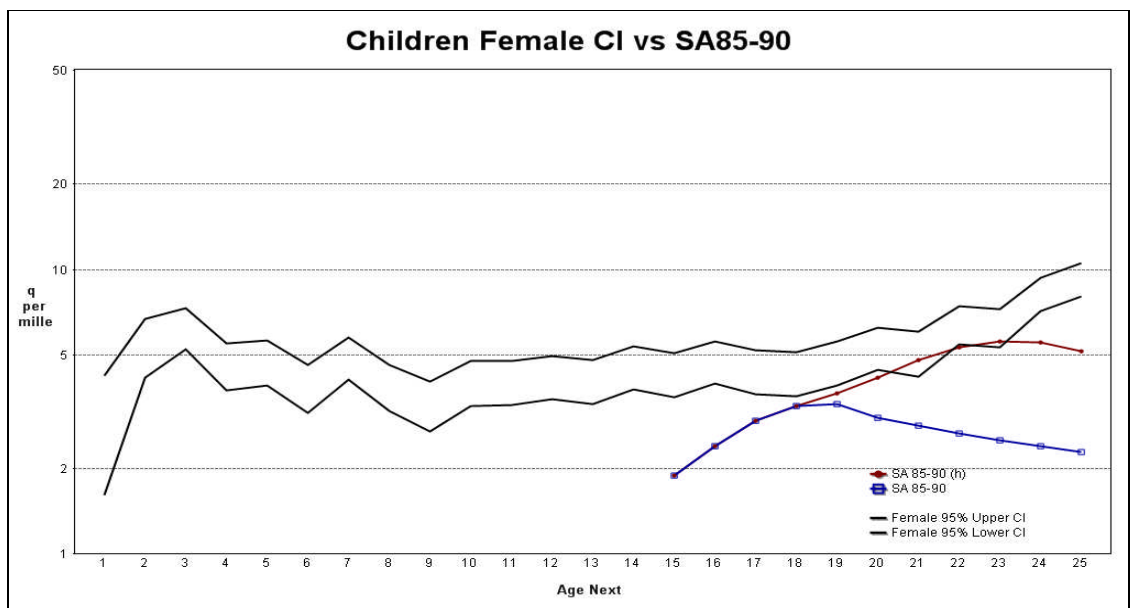


Figure 27

The SA85-90 tables begin at age 15 therefore these tables are not plotted above for the younger ages. From ages 15 to 22 the experience of the male children has a good fit to SA85-90 (heavy).

Girls have a higher mortality rate than boys, except for infant mortality, where the female mortality is probably significantly understated due to the sex defaulting to male. Only one company had infant mortality rates that appeared reasonable but the mortality rates for the girls were still higher than the mortality rates of the boys.

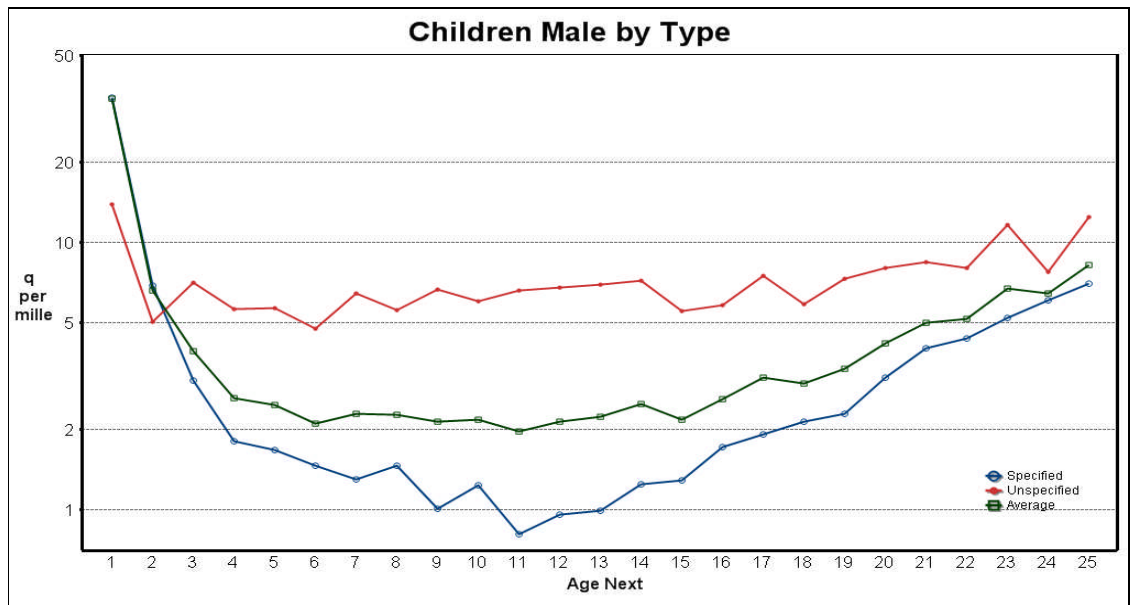


Figure 28

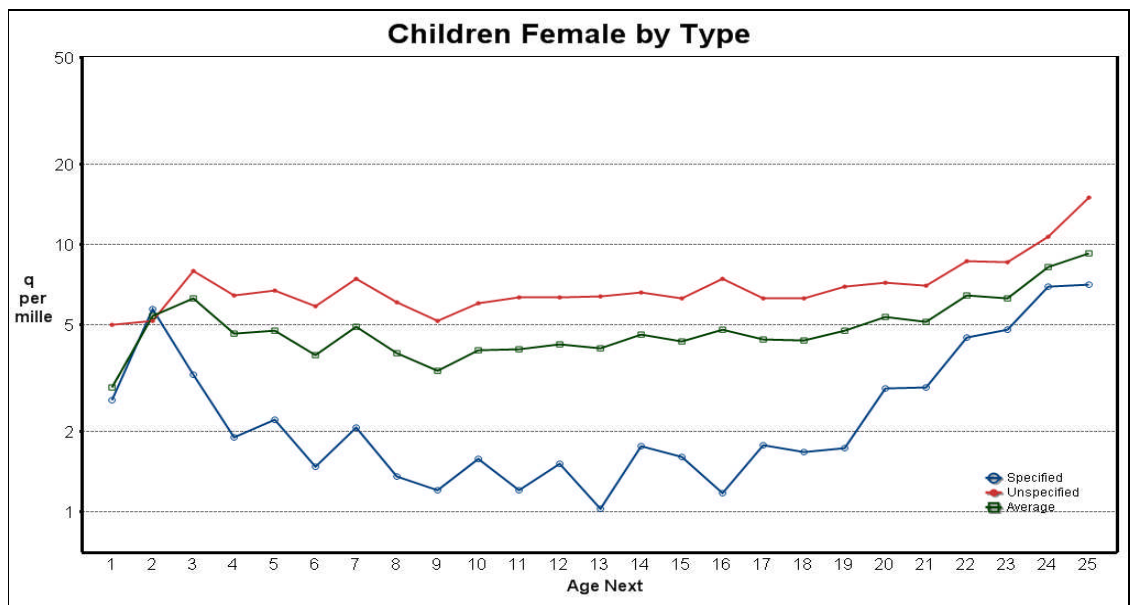


Figure 29

The above graphs compare mortality rates for policies where the children covered need to be specified with policies that do not require children to be specified. “Unspecified” refers to policies where neither the details of the children nor the number of children need to be provided. The exposure for the “unspecified” lives may be understated leading to the high mortality rates. In addition, the experience for “unspecified” children was provided by a single company, which also experienced higher overall mortality.

2.8 Comparison of Spouses, Parents and Children with Main Lives

This section compares the mortality of main members with the mortality of other lives covered by the policy.

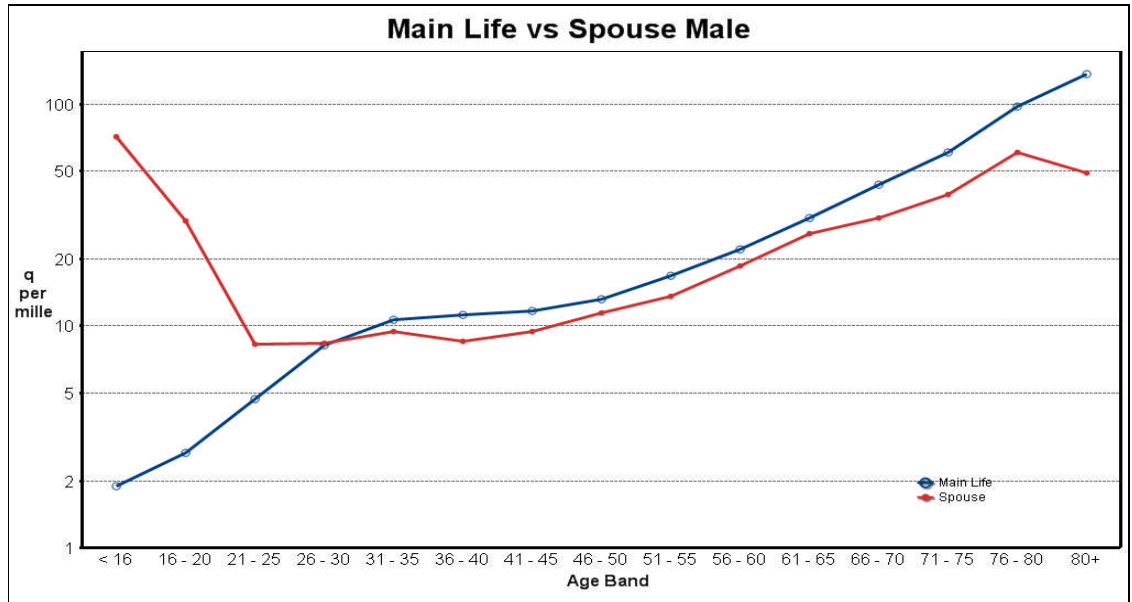


Figure 30

With the exception of younger ages where there is limited data, male spouses experience lighter mortality than male main members.

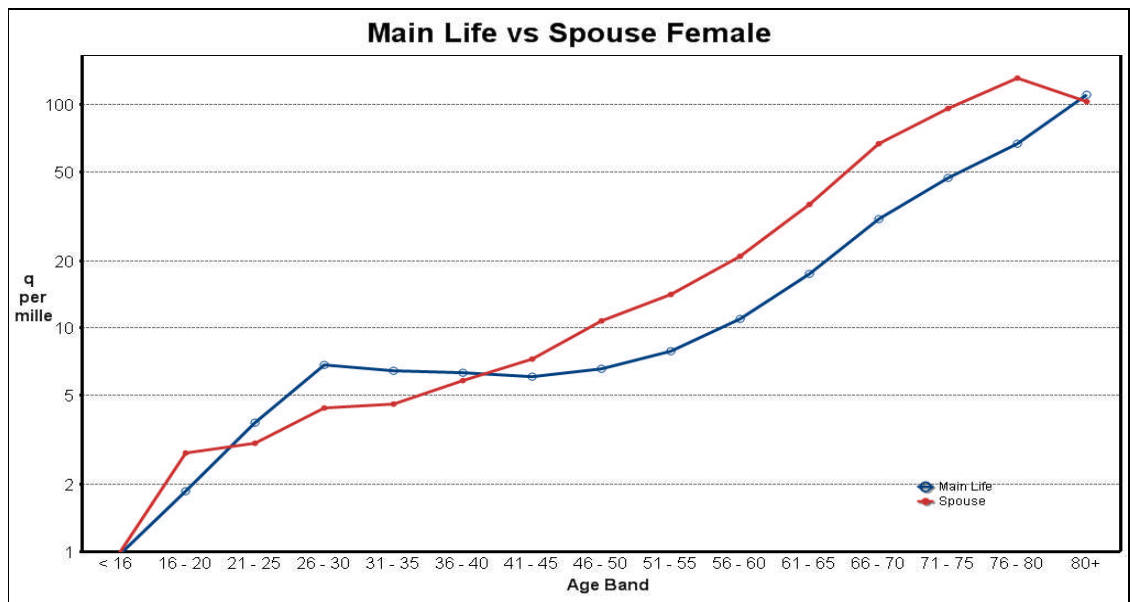


Figure 31

Female spouses show lighter mortality than female main members below age 40 and heavier mortality thereafter.

The lighter mortality below age 40 may be attributable to the lighter HIV prevalence amongst married assured lives. However, as an analysis of main members by marital status is not included, this cannot be verified.

The significantly higher mortality for female spouses at the older ages may be due to a lack of correspondence between deaths and exposure.

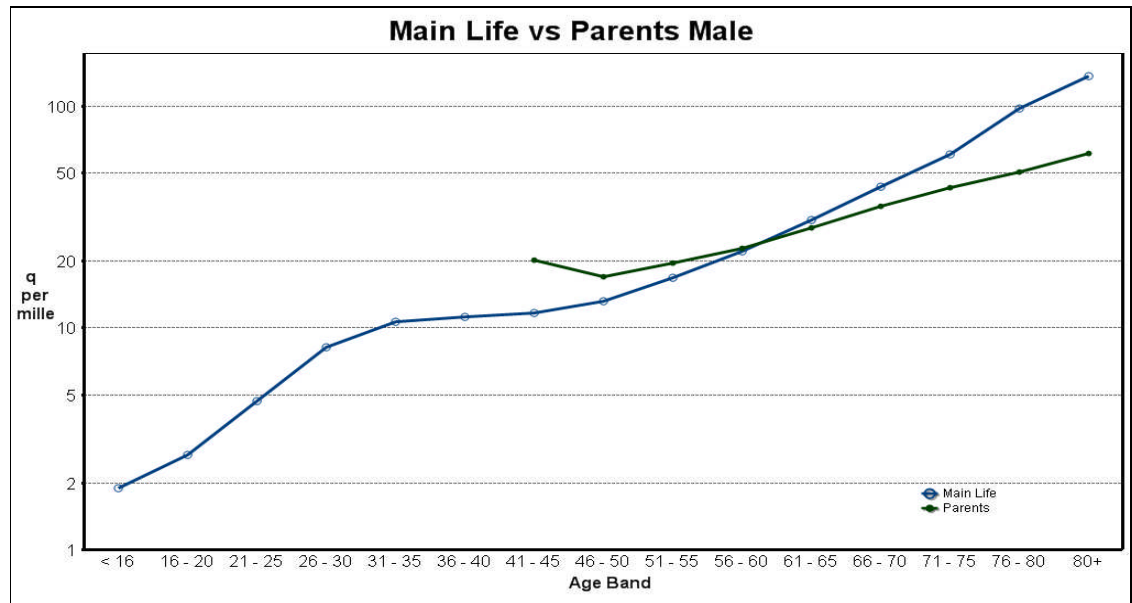


Figure 32

The exposure for male parents below age 46 is very low and therefore the results are not credible. However, it can be noted that the mortality of parents is high compared to main lives below age 56.

Between ages 46 and 65 the exposure for both main life males and male parents is significant. The lower rates for older (above age 65) parents may be due to an under-reporting of deaths of parents.

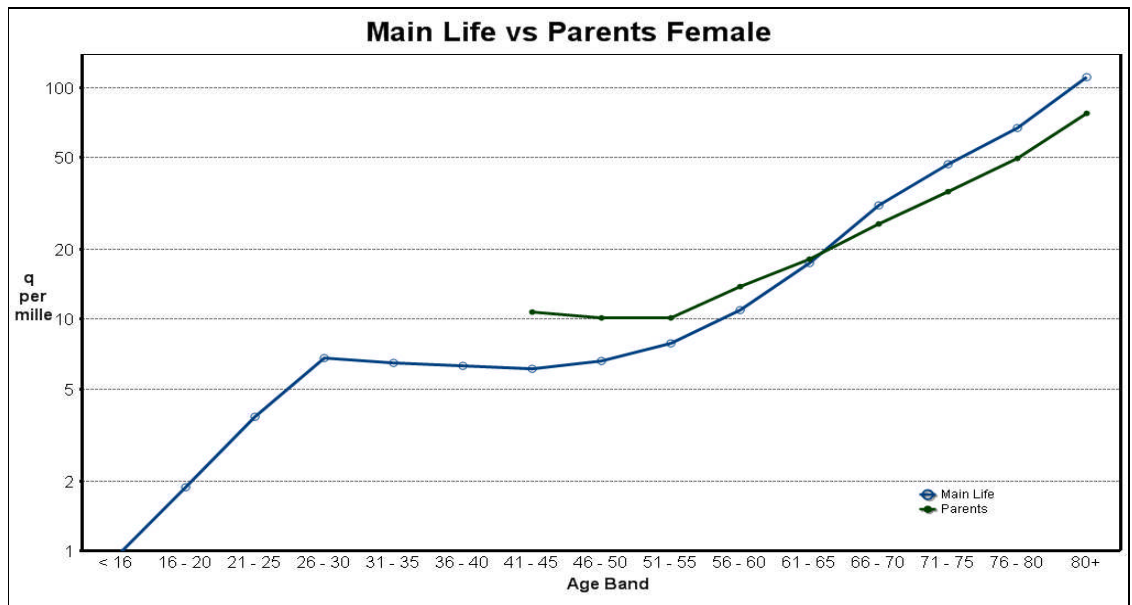


Figure 33

The comparison of female spouses with female main lives is fairly similar to the comparison for males, except that the curves cross at a higher age.

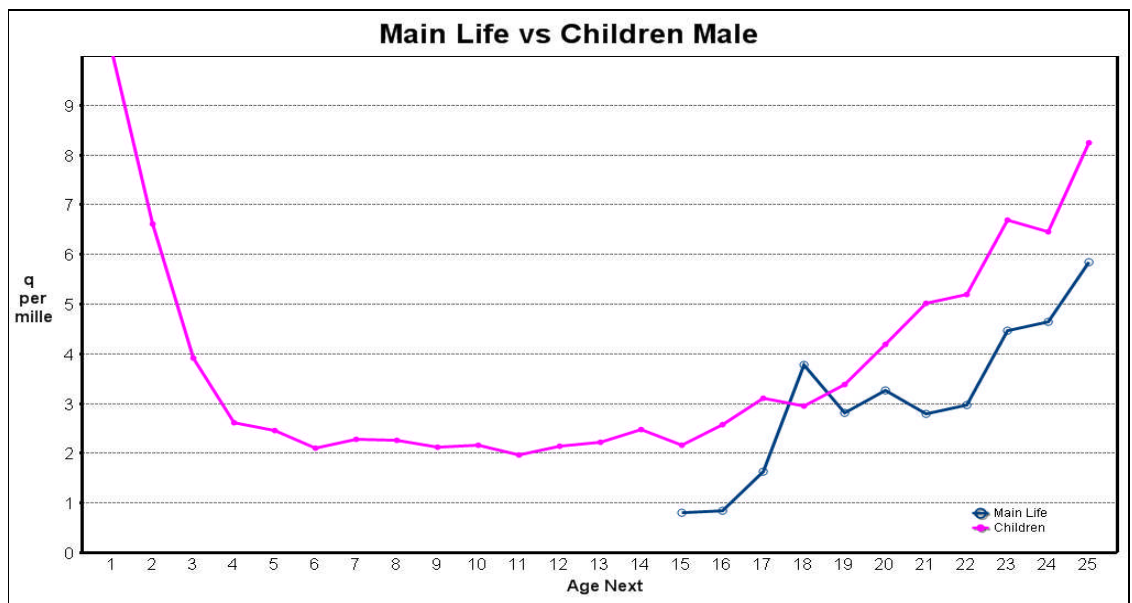


Figure 34

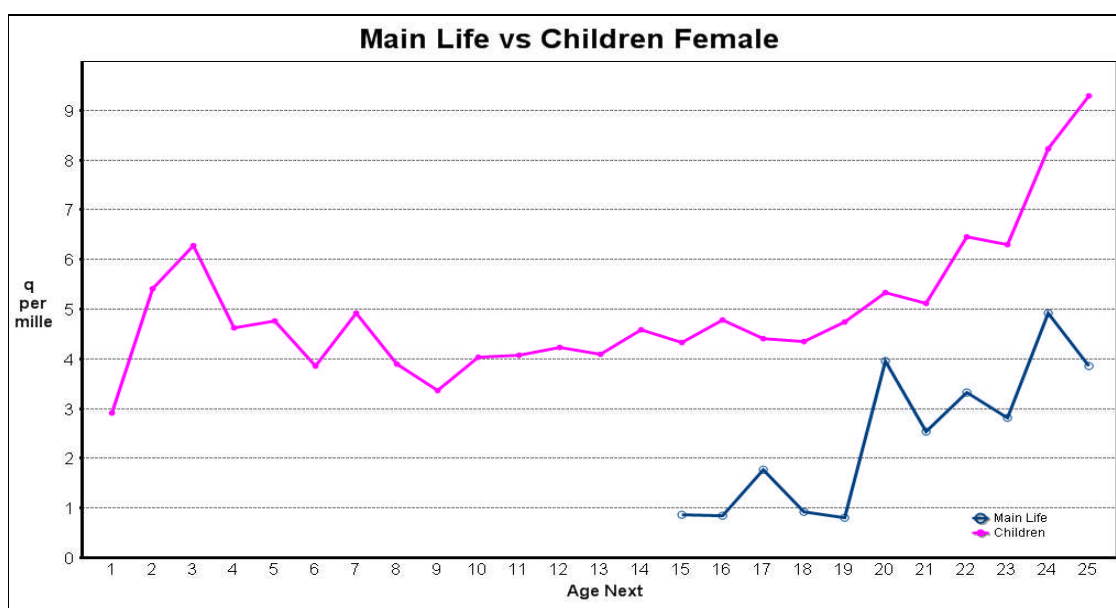


Figure 35

Although the exposure for main life remains very low below age 22 before increasing steadily, the shape of the rates for main lives and children is similar for both males and females. However, the mortality for main lives is generally lighter than that of children. This may be due to under-reporting on the death of the main life or the laxity of controls or broad definition on children's death claims.

It should be noted that the two above figures are not plotted on a logarithmic scale.

2.9 Comparison with National Mortality

This section compares the mortality experience from the funeral investigation with mortality of the general South African population. Estimates of national population mortality are based on the work of Dorrington, Moultrie and Timaeus (2004) updated for latest data released by Stats SA (at the time of writing this report).

Essentially the estimates were produced as follows:

1. National rates of adult mortality were derived from vital registration data after adjusting for estimates of completeness of registration (approx 83-84% of adult deaths reported – estimated from census population and migration)
2. Rates for individual years 1996-2001 were estimated by assuming that mortality of those aged over 60¹ was unchanging and hence that differences by year are due to changing completeness.
3. Provincial rates were derived using deaths reported by household in census 2001 adjusted so that at the national level they summed to the number of deaths by population group, sex and age expected on the basis of the estimated mortality rates.

¹ Comparison of m_{60+} estimated for the period 1996-2001 with those estimated for 1984-86 suggest that in no population group is the difference more than 5%.

The resulting rates show virtually no change over the 1996-2001 period with the exception of a rising ‘AIDS’ hump which is consistent with that produce by the ASSA AIDS and Demographic model.

Comparison of the mortality of the main life with that is presented in Figures 36 and 37, with the ratios in Figure 38. These suggest that mortality of funeral policy holders is lighter than that of the population up until age 70 for males and 60 for females. Undoubtedly this is due to socio-economic selection. Apart from that, the mortality curves have broadly similar shapes with the mortality of funeral policyholders being 65-80% of that of the population as a whole for ages up to 64.

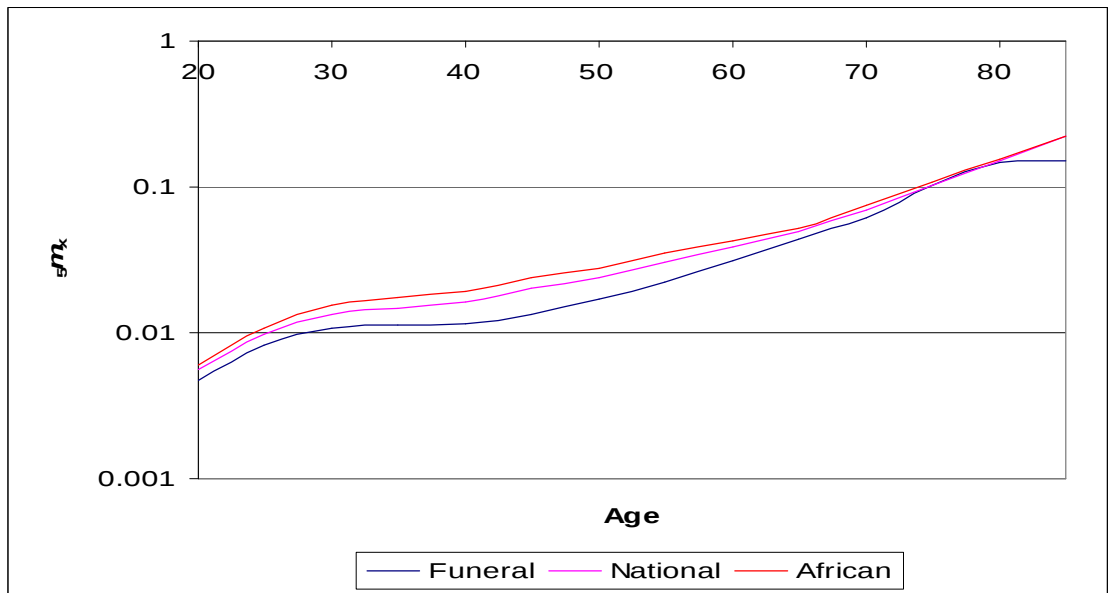


Figure 36: Comparison of main life mortality with national mortality (log scale) - males

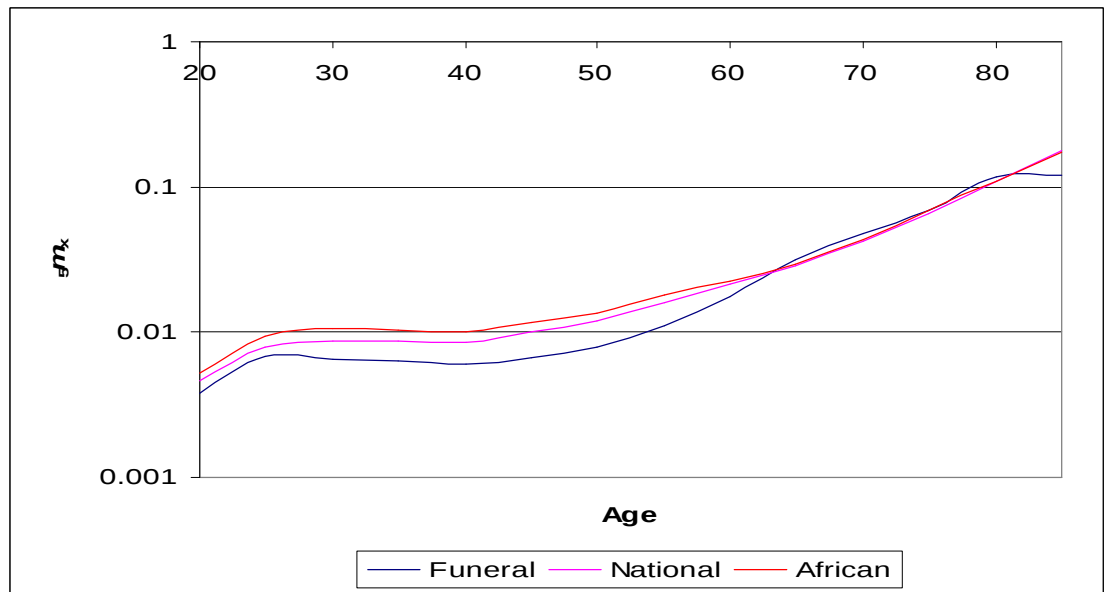


Figure 37: Comparison of main life mortality with national mortality (log scale) - females

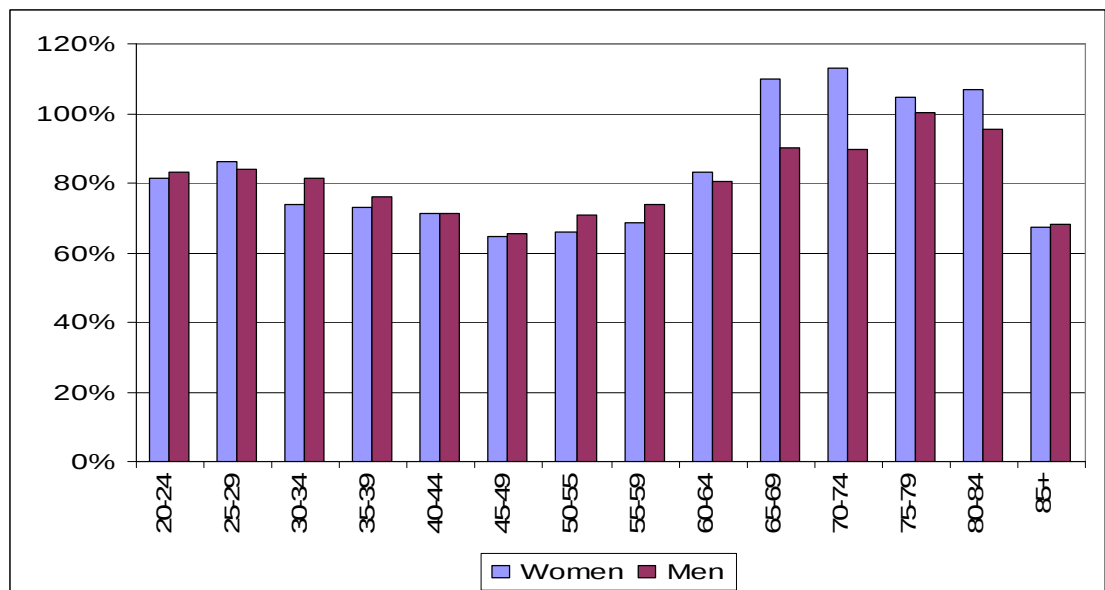


Figure 38: Ratio of main life mortality to 2001 national population mortality

In terms of cause of death it appears that whereas for men the proportion of deaths that was due to natural causes was about half of that in the population as a whole, for women the proportions, although much lower, were approximately the same.

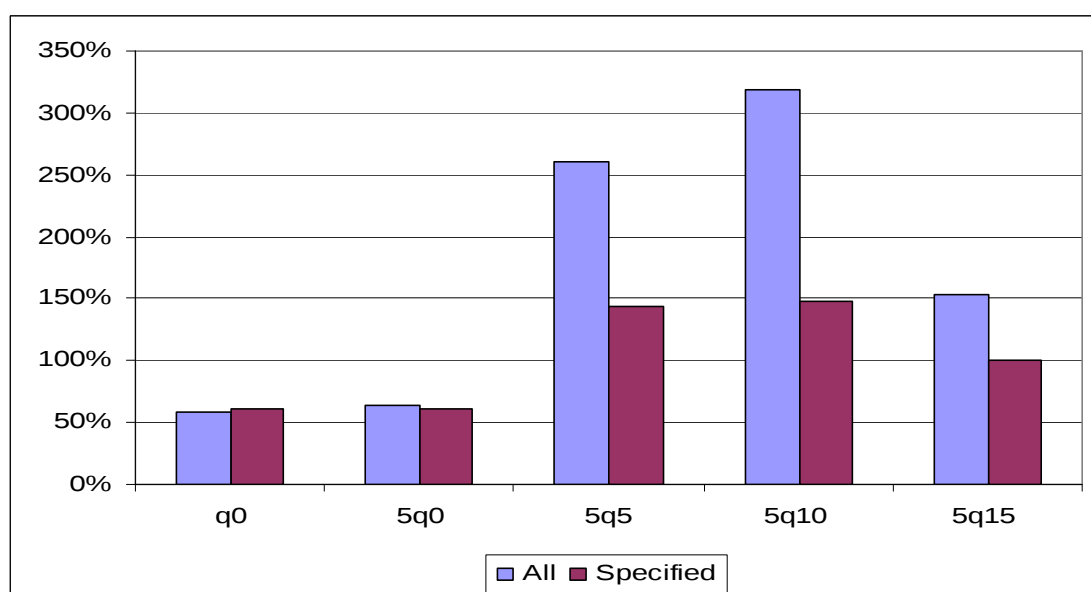


Figure 39: Ratio of mortality of children covered by funeral policies to that of the population as a whole

Figure 39 shows the ratio of the mortality of children covered by funeral policies to that of the population as a whole, both for all children and separately for children specified in the policy. Interestingly the mortality of children covered by funeral policies is about half that of the population as a whole in the first five years of life. While in part this is due to socio-economic selection, some of it might be due to the fact that young sick children are often not covered in time, which is not the case at the older ages. However, caution must be exercised when comparing rates for children above age five, since the national estimates are not very reliable for this age group.

Finally, Figures 40 and 41 compare the mortality rates by province. Regression of the rates of funeral policyholders to those in the population by province suggest around 70% of the variation in the mortality of funeral policyholders can be explained by the variations in the population mortality by province. The correlation is slightly stronger for men than women.

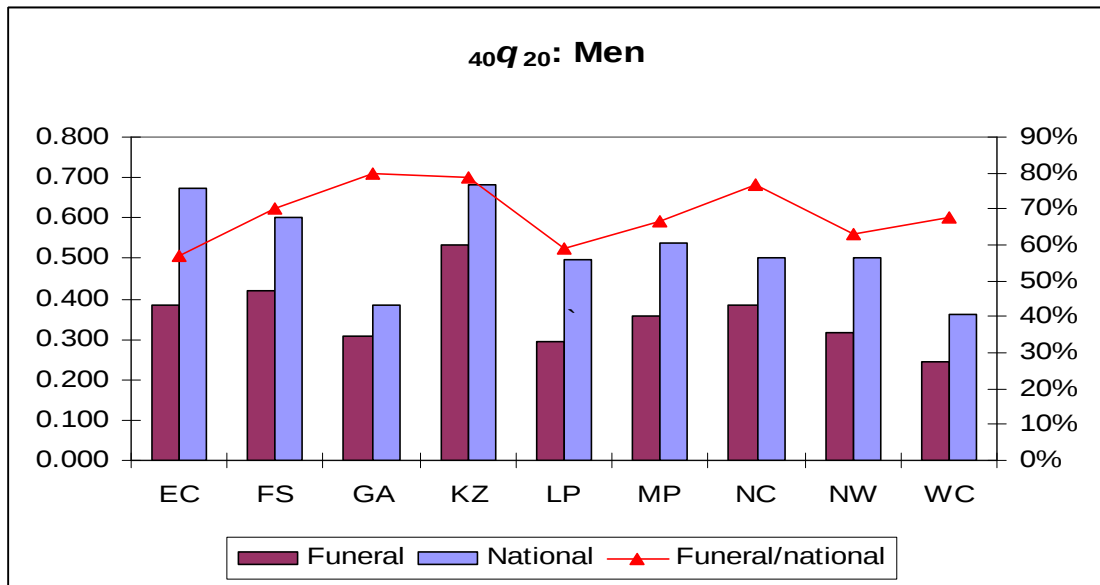


Figure 40: Mortality rate ($_{40}q_{20}$) by province – males

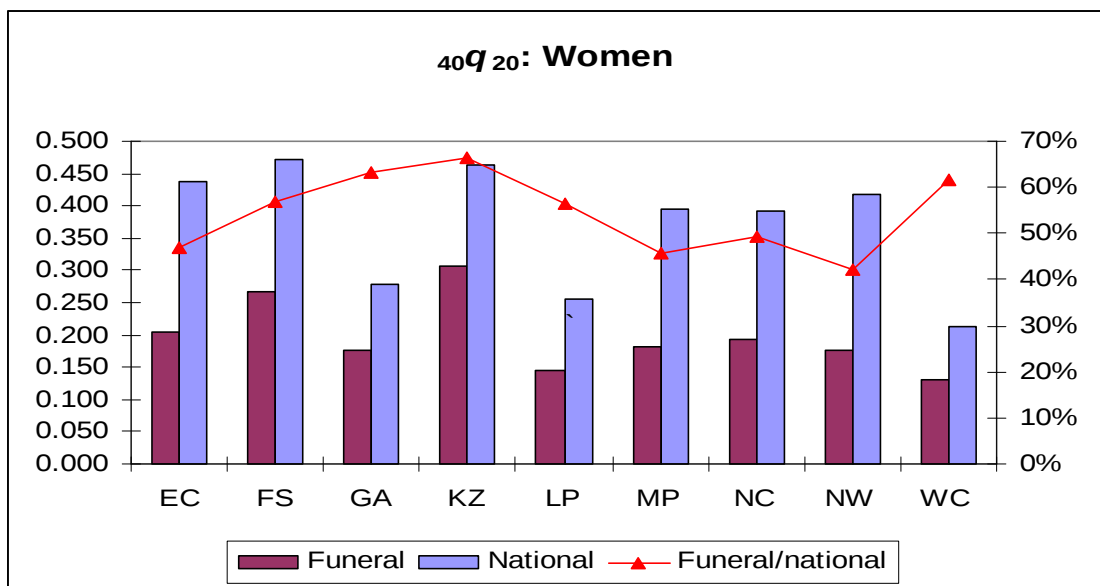


Figure 41: Mortality rate ($_{40}q_{20}$) by province – females

Dorrington, R. E., Moultrie, T. A. and Timæus, I. M. 2004. *Estimation of mortality using the South African 2001 census data*. Monograph 11. Centre for Actuarial Research, University of Cape Town. Available: <http://www.commerce.uct.ac.za/care/Monographs/Monographs/Mono11.pdf>

3. Summary and Conclusions

1. Any interpretation of the results of the investigation should bear in mind that the results are dependent on the accuracy of the data provided by each company. It remains a concern that checking and validation of the data was not done in all cases.
2. One company contributed significantly to the exposure and thus results are weighted towards it.
3. Two companies experienced much lower mortality than the other participants over most ages. These companies also have the lowest exposure, though their exposure is not insignificant.
4. A distinctive AIDS and accidental mortality “hump” can be seen compared to SA85-90 (heavy), with actual mortality rates for the male main lives being 230% of expected between ages 31 and 35.
5. At older ages, mortality rates for main life males are close to those of standard tables.
6. Duration 2 and 3 mortality rates are higher than the ultimate rates, which could indicate anti-selection. However this pattern of mortality by duration was not experienced for all classes of lives.
7. Mortality rates increased by 6.7% between 2001 and 2002 on average across all ages.
8. There is a significant difference in mortality between provinces with KwaZulu Natal having the highest mortality and Western Cape the lowest for both sexes when looking at the main life. KwaZulu Natal shows a distinct AIDS hump, which is not as pronounced in the other provinces. Limpopo is very similar to SA85-90 (heavy) up to age 60.
9. For main lives, males have higher mortality than females across all ages. For spouses, female mortality increases significantly above that of males from about age 55. Parents experience a very low mortality rate compared to main lives above age 60, with male parent mortality being higher than that of females.
10. The mortality experience for parents is very different to the SA85-90 tables. Below age 66, the mortality rates are higher than SA85-90(heavy), while from age 66 the experience rates are lower. This is questionable and it is likely that this could be as a result of underreporting at older ages.

The CSI Committee wishes to acknowledge the work done by Charles Fourie in analysing the data and producing this report, as well as the efforts of those responsible for collating and submitting the data for the participating companies.

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July 2007

APPENDIX A: EXPOSURE BY PROVINCE

	PROV	EC		FS		GA		KZ		LP		MA		NC		NW		UN		WC
	SEX	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
LIFE	AGE BAND																			
Main Life	< 16	107	66	73	66	729	666	730	646	73	51	50	35	58	28	15	12	5 278	4 339	242
	16 - 20	282	245	125	145	1 076	968	988	918	117	110	55	60	68	91	45	65	5 239	3 290	570
	21 - 25	1 836	1 781	1 145	985	5 173	5 497	3 135	3 744	479	540	555	600	990	758	324	239	51 668	20 405	4 876
	26 - 30	11 479	15 060	6 246	4 330	22 002	18 100	17 317	18 435	2 935	3 045	3 083	2 777	4 444	2 635	1 679	1 024	136 699	70 618	12 149
	31 - 35	36 938	47 297	18 689	11 348	39 395	28 339	34 663	39 024	14 216	11 628	9 577	8 293	7 722	4 539	3 315	2 129	171 136	105 385	16 420
	36 - 40	48 342	62 545	24 439	18 470	51 108	38 532	41 563	49 132	28 966	21 444	13 941	13 939	8 361	5 235	3 151	2 311	167 336	111 577	16 669
	41 - 45	45 453	70 952	22 337	21 090	46 049	41 254	37 917	45 339	26 832	23 228	11 594	12 762	7 463	5 555	2 510	2 136	140 331	98 628	13 983
	46 - 50	35 769	54 774	17 103	16 478	35 182	32 683	29 803	33 404	20 233	17 508	8 410	9 180	6 131	4 339	1 607	1 344	105 078	72 467	10 572
	51 - 55	24 644	35 607	12 520	10 554	24 435	19 245	22 946	22 640	14 480	11 403	5 820	4 862	4 752	2 865	929	864	76 938	51 964	7 417
	56 - 60	17 635	25 223	7 793	6 513	13 919	11 488	14 163	14 834	9 210	6 780	3 189	2 568	3 285	1 704	514	430	48 267	36 335	4 628
	61 - 65	11 315	12 861	3 615	2 957	7 394	6 168	7 700	8 000	5 566	3 804	1 615	1 160	1 472	774	308	165	32 867	31 233	2 846
	66 - 70	1 550	1 660	525	395	2 673	2 298	2 230	2 649	387	213	286	155	176	146	76	32	5 932	7 983	1 013
	71 - 75	376	547	99	87	413	436	446	730	41	29	42	26	38	22	6	6	2 006	4 143	162
	76 - 80	138	174	22	34	35	52	69	170	2	2	5	3	3	17	5	1	842	2 364	12
	80+	3	6	-	-	6	2	2	2	1	-	-	-	-	2	-	-	377	1 442	-
Spouse	< 16	94	90	30	48	102	155	69	72	64	62	19	34	8	38	-	-	1 155	211	30
	16 - 20	49	126	35	86	79	303	45	151	29	92	25	91	11	63	-	7	1 671	726	32
	21 - 25	203	1 981	136	1 453	529	4 040	201	2 305	190	1 827	151	1 283	106	805	1	140	14 386	9 998	351
	26 - 30	1 311	10 982	789	7 156	2 779	15 797	1 379	9 005	835	9 698	693	4 978	442	2 561	10	888	41 453	33 100	1 533
	31 - 35	5 741	19 671	2 809	13 101	7 502	25 609	5 695	15 309	3 413	18 835	2 189	8 104	1 108	3 786	182	1 440	64 092	46 592	3 471
	36 - 40	12 906	20 878	5 964	13 693	12 558	27 235	12 161	18 288	8 201	18 735	5 034	7 288	1 658	4 188	397	1 413	78 094	44 211	4 379
	41 - 45	17 129	18 390	8 008	11 134	15 304	21 653	14 895	15 731	10 982	13 949	5 865	5 121	1 862	3 899	518	1 073	72 724	34 709	4 024
	46 - 50	16 072	12 899	7 459	7 834	13 595	13 922	12 243	10 958	10 038	8 119	4 922	3 331	1 674	3 052	460	572	57 123	24 908	3 315
	51 - 55	11 750	7 967	5 020	4 838	9 077	7 180	8 571	7 218	7 315	4 699	3 267	1 951	1 143	1 959	280	230	39 521	18 021	2 177
	56 - 60	7 151	3 837	3 015	2 113	5 061	2 835	5 062	3 232	4 238	1 727	1 684	717	703	914	205	117	25 788	11 717	1 146
	61 - 65	5 274	1 519	1 760	784	2 829	952	2 933	1 188	3 080	749	1 025	310	427	340	118	24	17 913	6 425	722
	66 - 70	2 484	410	676	168	1 056	210	1 176	273	1 174	251	330	68	176	74	29	7	3 618	1 603	265
	71 - 75	981	155	192	56	390	104	509	116	676	128	149	44	64	11	1	-	660	633	113
	76 - 80	374	66	94	17	159	43	174	39	240	33	44	13	26	17	-	-	303	234	40
	80+	214	42	46	18	64	33	104	34	284	50	37	19	9	5	-	-	117	53	29
Parents	41 - 45	515	1 143	444	674	759	1 765	634	1 831	411	556	254	469	321	369	4	47	5 161	2 542	449
	46 - 50	2 118	5 035	1 908	2 922	3 139	6 935	2 749	6 677	1 734	2 851	1 005	1 836	1 059	1 518	26	175	16 190	10 352	1 487
	51 - 55	7 464	17 675	6 143	9 278	9 007	16 847	7 947	17 304	4 990	11 156	2 969	5 475	2 894	3 692	140	421	34 144	26 019	3 531
	56 - 60	16 308	35 266	11 725	16 475	15 933	27 656	14 954	27 914	10 495	21 637	5 571	9 976	4 768	6 096	258	594	48 061	38 574	5 551
	61 - 65	33 621	61 685	18 020	24 713	25 575	40 801	24 419	42 722	21 773	37 840	9 236	14 187	6 959	8 487	323	541	64 606	48 316	8 035
	66 - 70	42 841	75 744	21 476	29 101	29 633	45 211	27 702	48 935	27 303	45 094	9 713	15 384	7 792	8 988	292	539	67 838	47 560	8 703
	71 - 75	48 834	73 700	19 513	24 226	30 271	39 372	29 301	46 687	37 039	51 276	10 994	14 504	7 093	7 491	220	372	46 826	38 972	7 586
	76 - 80	37 798	50 557	13 782	16 333	21 545	25 254	19 731	28 201	25 999	28 883	7 344	8 399	4 878	5 177	156	308	15 608	22 152	5 360
	80+	45 356	44 731	16 493	16 874	23 620	21 484	19 503	20 639	36 145	30 779	9 158	8 028	5 571	5 344	122	233	15 353	16 204	4 857
Children	< 16	1 206	6 726	1 920	3 968	1 012	3 307	1 755	8 146	1 750	4 751	768	2 815	1 062	1 021	-	2	1 090 039	347 744	794
	16 - 20	474	2 053	586	1 002	354	922	652	2 367	573	916	304	715	220	286	-	-	352 697	125 988	228
	21 - 25	2 495	8 809	2 240	4 042	2 486	7 355	2 779	9 642	2 899	6 005	1 404	3 121	1 385	1 388	-	-	204 336	80 056	1 211

APPENDIX B: SUMMARY OF EXPOSURES AND DEATHS PER CLASS OF LIFE

B1. All Lives

	Male	Female	Total
Deaths	120,683	106,659	227,342
Exposed	6,640,013	5,678,492	12,318,505
Mortality Rate per mille	18.18	18.78	18.46

The aggregate rates for all lives combined are higher for females than for males. This is a result of the different mix of males and females by age and class of life. In particular, there are a greater proportion of female parents than male parents.

B2. Main Life

	Male	Female	Total
Deaths	27,452	13,556	41,008
Exposed	2,096,617	1,758,782	3,855,399
Mortality Rate per mille	13.09	7.71	10.64

The main life's aggregate rate is significantly higher for males than for females.

B3. Spouse

	Male	Female	Total
Deaths	9,497	6,431	15,928
Exposed	782,121	779,022	1,561,143
Mortality Rate per mille	12.14	8.26	10.20

Females also have lower rates than males for spouses. The spouse rate is slightly higher than the main life for females, while the male rate is lower.

B4. Parents

	Male	Female	Total
Deaths	48,533	51,572	100,105
Exposed	1,276,455	1,641,394	2,917,848
Mortality Rate per mille	38.02	31.42	34.31

Parents have very high rates, as expected, given that the exposure covers lives from age 40 onwards. Again females experience a lower rate than males.

B5. Children

	Male	Female	Total
Deaths	6,377	3,152	9,529
Exposed	1,677,630	637,219	2,314,849
Mortality Rate per mille	3.80	4.95	4.12

The results for children are surprising, with females having a higher rate than males. However, this is influenced by the fact that one company with unspecified children had a very large number of females and a high overall mortality rate compared to the other companies.

Also, as suggested earlier companies are not particularly interested in recording the sex of children covered under these policies and thus it is probable that it was not recorded accurately, which would explain the anomalous results.

B6. Unknown

	Male	Female	Total
Deaths	28,824	31,948	60,772
Exposed	807,191	862,076	1,669,266
Mortality Rate per mille	35.71	37.06	36.41

The 'unknown' lives are included to indicate how the figures tie up to the total. Interestingly the rates for females are higher than males (as is the case for children) but are even higher than the parents' rate.

One would expect other relatives, such as uncles and aunts to have higher mortality.