

HEALTHCARE EXPENDITURE IN THE LAST YEAR OF LIFE: THE EXPERIENCE OF SOUTH AFRICAN MEDICAL SCHEMES

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ABSTRACT

The aim of this paper is to investigate the costs incurred by medical schemes arising from the provision of benefits during the 12 months preceding a beneficiary's death. There are two main areas of investigation. First, costs in the last year of life are compared to costs in earlier years prior to death. Second, decedent and survivor costs are compared. The relationship between last-year-of-life costs and age is analysed. Healthcare costs in the last year of life were found to 3.51 times higher than in the second last year of life. In addition, during the four-year study period per-beneficiary decedent costs were found to be between 15.26 and 25.31 times higher than survivor costs. The proportion of decedent claims relating to the provision of Prescribed Minimum Benefits increased over to the period to 80.10% in 2011.

KEYWORDS

Medical schemes; last year of life; decedent costs; prescribed minimum benefits

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1. INTRODUCTION

There exists a substantial international body of studies that examine the healthcare expenditures incurred by health insurance beneficiaries in their last year of life. Timmer and Kovar (1971) published one of the earliest studies on healthcare costs in the last year of life in the US. More than four decades later this topic is still of great interest to members of the global healthcare industry.

These studies have been driven by concerns over the effect of ageing (leading to the postponement of death) on healthcare expenditure (Breyer & Felder, 2006), as well as the need to predict future expenditure in light of technological advancements and the increase in demand for medical care (Stearns & Norton, 2004). Much of the international research indicates a general concern over medical resources being directed towards health insurance beneficiaries in their last years of life (Scitovsky, 1994).

The aim of this paper is to update the work done by McLeod and Moodley (2001) using a sample group of beneficiaries covered by medical schemes in South Africa, and to compare the results obtained with international findings.

Two main areas surrounding healthcare costs in the last year of life are examined here. The first involves the determination of average healthcare costs in the last year of life. The average last-year-of-life costs are compared with the average costs in preceding years before death with the aim of investigating the relationships that exist between them. This part of the investigation also makes similar comparisons according to category of healthcare expenditure and age at death. In addition, the effectiveness of a disease grouper system, in this analysis the Adjusted Clinical Groups (ACGs) system, is considered for the prediction of medical scheme resource utilisation in the last year of life.

The second area investigated examines the relationship between the healthcare costs of those beneficiaries dying (decendent costs) and those surviving (survivor costs) in a particular calendar year. The aim of this part of the investigation is to determine the extent to which decendent costs vary from survivor costs within a particular calendar year. The investigation also compares decendent and survivor costs by age and category of expenditure. This part of the investigation concludes by examining the proportion of survivor and decendent costs that are incurred by medical schemes in the treatment of Prescribed Minimum Benefits (PMBs).

It should be noted that this investigation will be a retrospective analysis of costs in the last year of life. The reader should not infer that healthcare has been provided in anticipation of death (Hogan et al., 2001). Such an inference may only be made in investigations pertaining exclusively to terminally-ill patients. This investigation considers varying causes of death and, therefore, does not deal with 'the high cost of dying' but rather with healthcare expenditure at the end of life (Scitovsky, 2005).

This research is of interest to those working on medical scheme benefit design and managed care, and should also be of interest to regulators considering potential benefit packages and the costs thereof under National Health Insurance.

In section 2 we provide a brief overview of medical schemes in South Africa,

and highlight the key features of the environment that differentiate this study from studies done elsewhere. Section 3 contains a description of the data used in the study. The methodology that was used is presented and compared to international studies in section 4. Section 5 comprises the main findings of the study. In section 6 we discuss these results.

2. LAST-YEAR-OF-LIFE COSTS IN SOUTH AFRICAN MEDICAL SCHEMES

The largest body of research done on healthcare costs in the last year of life relates to Medicare expenditure. Medicare is public healthcare provided to US citizens over the age of 65. It also provides cover for individuals of any age suffering from End-Stage Renal Disease and certain other disabilities (Centres for Medicare and Medicaid Services, 2012). The need for this research arises from the hypothesis that the results obtained from Medicare studies are not directly applicable to South African medical schemes. There are a number of factors that support this hypothesis. First, a large proportion of medical scheme beneficiaries are under 65. Second, the range of benefits covered by medical schemes differs from those provided by Medicare.

Moodley and McLeod (2001) analysed healthcare costs in the last year of life using data relating to South African medical schemes. It is important to note that legislation concerning medical schemes in South Africa has changed significantly since that research was done.

The Medical Schemes Act No. 131 of 1998 was implemented after the period of investigation in Moodley and McLeod (2001). The first key feature to note comes from Annexure A of the Regulations in Terms of the Medical Schemes Act No. 131, which ensures the mandatory provision of Prescribed Minimum Benefits (PMBs) by all medical schemes. The PMB package covers 270 diagnosis and treatment pairs, a chronic disease list and emergency conditions in full, barring certain terms and conditions.

The second key feature is outlined by the Medical Schemes Act No. 131 (section 29(1)(n)) which prohibits medical schemes from denying cover based on age, sex and past or present state of health. This feature combined with the voluntary nature of medical scheme membership potentially allows for anti-selection against medical schemes by individuals who are old and sick (Doherty & McLeod, 2002). The scope for anti-selection is expected to increase the healthcare expenditure by medical schemes in the last year of life.

Section 1(1) of the Medical Schemes Act No. 131 does help to mitigate this risk by defining the business of medical schemes as one which “undertakes liability in return for a premium or contribution to make provision for the obtaining of any relevant health service”. This definition limits the provision of health insurance by any financial institution other than a medical scheme. In addition, many working age members of medical schemes are required to have medical scheme cover as a condition of employment. This increases the number of younger and healthier beneficiaries

covered by the schemes, thereby improving the risk pool that medical schemes are exposed to. Medical schemes are able to employ cross-subsidisation to mitigate the effect of the influx of old and sick beneficiaries.

3. DATA

The data used in this investigation were provided by Medscheme, South Africa's largest managed care service provider and third largest medical scheme administrator (Medscheme, 2012). The data pertain to 18 medical schemes administrated by Medscheme. The schemes and their beneficiaries are de-identified in order to ensure anonymity. The data provide information on approximately three million beneficiaries during the four-year period spanning from the beginning of January 2008 to the end of December 2011. The number of beneficiaries that are considered in the investigation is substantial, bearing in mind that there are currently a total of approximately eight million individuals covered by medical schemes in South Africa (Council for Medical Schemes, 2011). The large number of beneficiaries ensures that robust conclusions can be drawn from the results obtained (Calfo, Smith & Zezza, 2008).

3.1 Entire Risk Pool Data

Summary exposure data and claims data were provided for the entire risk pool covered by Medscheme-administered medical schemes. Exposure months were provided by treatment year, scheme code, year of birth, gender and province. The amounts claimed by beneficiaries are recorded in groups according to scheme code, treatment year,

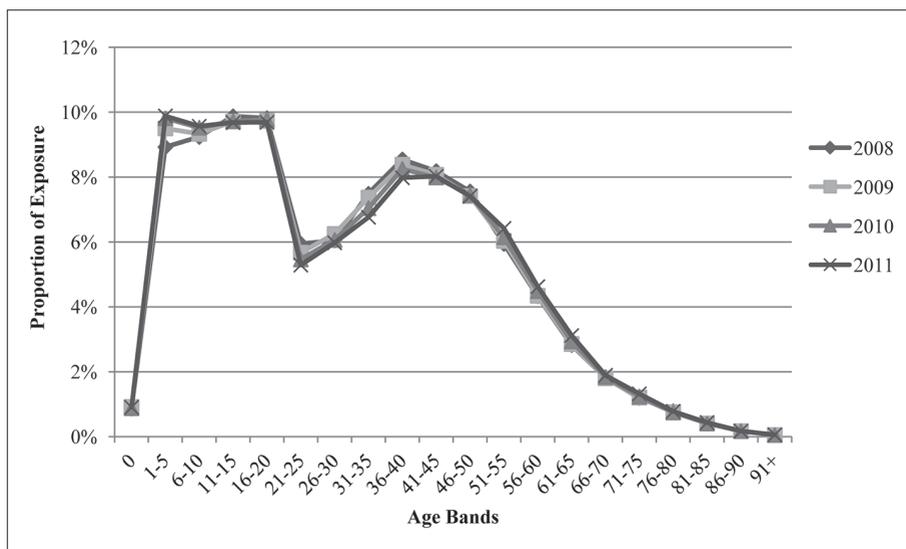


FIGURE 1 Distribution of exposure according to age on 1 January for the entire risk pool of beneficiaries

year of birth, gender, province, category of expenditure, Hospital Account Summary (HAS) indicator and by whether or not the claims are considered PMBs. The HAS indicator records whether or not the beneficiary was treated in a hospital.

Figure 1 illustrates total exposure according to age on 1 January for the calendar year in question. It is observed that the shape of the distribution is the same for each of the four years.

The age distribution displays the key features expected in the South African medical scheme environment: anti-selection in the early adult years, followed by incremental increases by age category reflecting the impact of medical scheme cover as a condition of employment, coverage declining in the later years as people start to retire and discontinue their medical coverage, and the impact of mortality is seen.

3.2 Decedent Data

There were 36 711 beneficiaries who died during the four-year study period (decedents). Unlike the data for the entire risk pool, which were provided in summary format, detailed demographic records were made available for decedents. The demographic data provided included the decedent's birth date, gender, deceased date and province in which they lived. Dates when each decedent joined and left the medical scheme were also provided. Note that if the decedent is covered by a medical scheme until death then the date the decedent left the medical scheme is recorded as the date at the end of the month of death. Claims data were grouped per treatment month, scheme code, category of expenditure, HAS indicator and by whether or not the claims were PMBs.

Due to the monthly nature of the data, the calculated exposure period is subject to possible over or under-estimation, depending on the assumptions made in the calculation method. Figure 2 depicts the exposure in the last year of life for decedents by age group (where age is at 1 January for the year in which the beneficiary died). Exposure figures are for the year of death only. The number of recorded deaths (and the associated exposure) increased in each year. This is likely to represent an increase in the administrative accuracy of the recording of deaths.

It is observed that there is low decedent exposure at younger ages. This is expected considering the low mortality rates at those ages. Decedent exposure increases with age. The high level of exposure under age 65 is due to the large size of the risk pool at these ages. After age 65 the decedent exposure is driven by rising mortality rates. After age 80 the decedent exposure diminishes quickly because, even though mortality rates are very high at those ages, the exposure in the risk pool is very low.

Data representing each decedent's Resource Utilisation Bands (RUBs) were also provided by Medscheme. RUBs are an indication of a beneficiary's expected future healthcare utilisation and cost. RUBs are determined using the Johns Hopkins Adjusted Clinical Groups (ACGs) Case-Mix System. ACGs are a series of mutually exclusive, health status categories defined by morbidity, age, and sex. They are based on the premise that the level of resources necessary for delivering appropriate healthcare

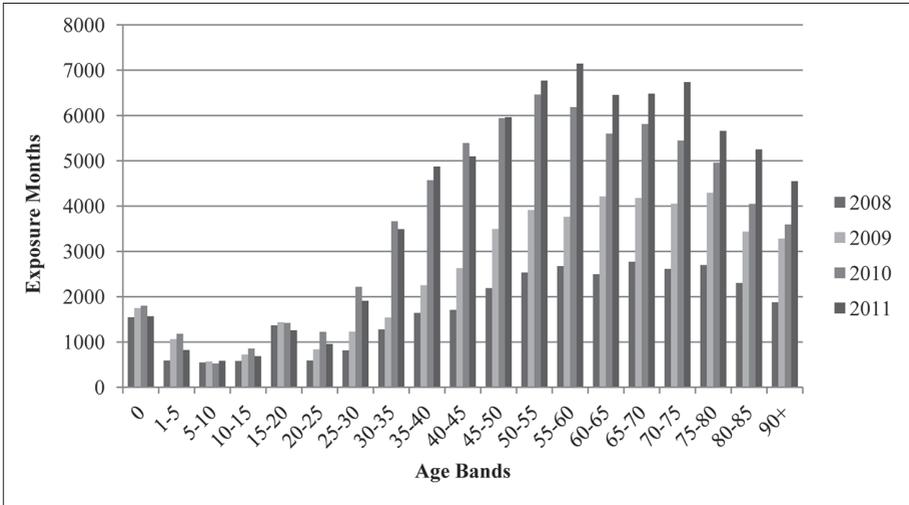


FIGURE 2 Total decedent exposure in the last year of life according to age on 1 January of the year of death

to a population is correlated with the illness burden of that population (Johns Hopkins University Bloomberg School of Public Health, 2009). RUB values range from 1 to 5 and are assigned to various combinations of ACGs. Each combination that has the same RUB value is thought to consume a similar level of healthcare costs. The higher the RUB value, the higher the predicted resource utilisation from that beneficiary. RUBs were provided only for beneficiaries who have exposure greater than six months.

Finally, to obtain data on those beneficiaries that did not die during the study period (survivors), the relevant decedent data were subtracted from the data pertaining to the entire risk pool.

3.3 Additional Notes on Data

Two further comments need to be made concerning the above data. First, the data on beneficiaries' claims histories include, both the amount that beneficiaries submitted to the medical scheme for reimbursement (recorded as the claimed amount by Medscheme) as well as the amount the medical scheme actually reimbursed the beneficiary (recorded as the risk amount by Medscheme). The risk amount is always less than or equal to the claimed amount. For the entire risk pool the total claimed amount during the study period is approximately 10.6% higher than the total risk amount. When considering just the decedents, this figure drops to approximately 4.2%. The difference between the claimed amount and risk amount would have had to be covered by beneficiaries out of pocket. Throughout the investigation the claimed amount was used in calculating the end-of-life costs. The reason for this is that it gives

a better sense of the costs actually experienced by beneficiaries; however, the cost to the medical scheme is less.

Second, all the claims data are adjusted for inflation in order to obtain results in real terms. All claims data are adjusted to 1 January 2011 prices. The challenge presented was which inflation factor to consider. In the USA, Scitovsky (1994) made use of the CPI to inflate medical costs, which was appropriate as national data were being analysed. A possible option for the inflation factor was that of the medical component of the CPI. However it was noted that the basket of medical goods that this index is based upon is considerably different from the basket of medical goods for the average South African beneficiary covered by a medical scheme (Moodley & McLeod, 2001). Inflation factors used in the calculation of the Risk Equalisation Fund were used as a proxy for medical scheme inflation (Council for Medical Schemes, 2010). Data for 2011 were not available, so by analysing the percentage that inflation factors were above CPI for each calendar year 2007 to 2010, a figure for 2011 was calculated.

4. METHODOLOGY

The two different aspects of costs in the last year of life, namely the costs in the last year of life in comparison to earlier years prior to death and the comparison of decedent and survivor costs, are investigated using two different methods. By necessity, the two methods utilise different definitions of age and different methodologies for classifying costs. In order to analyse the first aspect, the average healthcare costs in the final years of life within the study period are required and age is defined as the age at death. Consequently, only beneficiaries dying during the four-year study period were considered in this part of the investigation. The second aspect required the calculation of survivor and decedent costs per calendar year in order to examine the relationships between them. In this analysis, age as at 1 January is used to enable comparison between survivors and decedents.

4.1 Healthcare Costs in the Last Years of Life

This method began with the determination of the exposure period, in months, before death during which each beneficiary held medical scheme cover. The first step in the determination of the exposure period was to ascertain the latest date on which each beneficiary discontinued their medical scheme cover. This required the inspection of the beneficiary deceased date and the date on which the beneficiary left the medical scheme (left date). If the left date proved to fall on an earlier date than the deceased date then the left date was taken as the date on which exposure ceased, otherwise, the deceased date was used. The next step was to determine the date on which exposure began. As mentioned in Section 3 above, the study period of this research extends from the beginning of 2008 to the end of 2011. Therefore, if the date on which the beneficiary joined the medical scheme (join date) is later than 1 January 2008 then the join date was taken as the start date of the exposure period. Otherwise 1 January 2008 was used.

It should be noted that this method of calculating exposure is subject to possible overestimation of the exposure period. This is because the date representing the end of each beneficiary's exposure period was assumed to be the end of the month in which the beneficiary died or left the scheme. This assumption is realistic, since beneficiaries have a full month of medical cover regardless of when during the month they leave the scheme. This is a result of beneficiaries paying their premiums at the start of the month. In addition, the join date was assumed to be the beginning of the month in which the beneficiary joined the medical scheme. The vast majority of join dates fall at the beginning of the month. The assumption merely adjusts the remaining few. These two assumptions are required because the claim amounts are recorded only by treatment month, as discussed above.

The process continued with the division of the exposure period into the respective years prior to death. Anniversaries prior to death, which fall within the exposure period, were determined for each beneficiary. Consistent with the assumptions made above, the anniversaries prior to death were computed from the end of the month of death. Using these anniversary dates, the exposure was calculated for each year prior to death that fell within the four-year study period. For example, a beneficiary who joined the scheme half way through March 2010 and left the scheme, upon death, half way through September 2011 would have contributed exposure from the beginning of March 2010 to the end of September 2011. Therefore, the beneficiary would have had 12 months exposure in their last year of life and 7 months exposure in their second year prior to death. Aggregate exposure was calculated by summing all beneficiaries' exposure months falling within each respective year prior to death.

Once the exposure in each relevant year prior to death had been determined, claimed amounts were allocated among the respective years prior to death. Aggregate healthcare costs in each year prior to death were determined by summing all beneficiaries' claims falling within the respective year prior to death. Finally, average healthcare costs were determined by, first, dividing the aggregate exposure figures by 12 to obtain exposure figures in years. Second, the aggregate healthcare costs for each year prior to death were divided by the respective aggregate exposure in years in order to obtain average healthcare costs per beneficiary per year (Moodley & McLeod, 2001). A similar process was followed to determine average healthcare costs according to age at death, category of expenditure and RUB level. The only difference to the above method was that aggregate healthcare costs and exposure were calculated by summing within, respectively, age at death, category of expenditure or RUB level. Finally, the average healthcare costs for the different years prior to death were compared by taking the ratios between them.

4.2 Survivor and Decedent Costs

This method considered the last year of life for each beneficiary, as calculated in section 4.1. It therefore suffers from a similar possibility of overestimating the true exposure period. The method followed in order to calculate the decedent and survivor

costs is best described by considering how healthcare costs were allocated for the various scenarios that arose in the investigation. There were three possible scenarios: firstly, the beneficiary survived both the calendar year being analysed, as well as the subsequent calendar year; secondly, the beneficiary died during the calendar year under consideration; and finally, the beneficiary died in the calendar year subsequent to the year being analysed. If a beneficiary survived from the calendar year under consideration to the end of the subsequent calendar year, then all the beneficiary's costs in that calendar year were assigned to survivor costs. If a beneficiary died within the calendar year then all the costs relating to that beneficiary were assigned to decedent costs. Finally, if a beneficiary died in the subsequent calendar year to that considered, then a portion of the costs arising in that calendar year were assigned to decedent costs and the rest to survivor costs. The above portion was determined by the number of months within the considered calendar year that the beneficiary is in the last year of life. The exposure period within each calendar year, allocated to either the survivor or decedent category, was determined in the same way (Calfo, Smith & Zezza, 2008; Lubitz & Riley, 1993, 2010). Decedents' costs and exposure periods were then aggregated by summing all decedents' costs and exposures, respectively, within each particular calendar year. Equivalently, aggregate survivor costs and exposure were calculated. Average survivor and decedent costs were then calculated using the same method described in the final paragraph of section 4.1. Ratios were calculated to compare the average survivor and decedent costs within each calendar year.

No data were available for deaths during 2012. As a result, all the costs of beneficiaries who survived to the end of 2011 were considered to be survivor costs. However, a part of the costs for beneficiaries who died in 2012 are last-year-of-life costs. The result is that last-year-of-life costs calculated in the first part of the investigation are underestimated. In addition, the decedent and survivor costs pertaining to 2011 are affected. The 2011 decedent costs are an underestimation of the true value and the survivor costs are an overestimation of the true value. The extent of the inaccuracies is entirely dependent of the 2012 mortality of beneficiaries alive at the end of the study period.

It should be noted that while undertaking the above methods in section 4.1 and 4.2, treatment months of a small number of claims were observed to fall outside the calculated exposure period. Consultation with Medscheme about these inconsistencies indicated that they most likely occurred due to administrative errors. The sum total of these claims amounted to approximately 0.01% of total decedent claims and they were excluded from the investigation.

5. RESULTS

5.1 Analysis of Average Costs in the Last Years of Life

The average cost in the last year of life is substantially higher than in the three earlier years prior to death (Table 1).

TABLE 1 Average claimed amount for each year prior to death, as well as the ratio between the average claimed amounts in the successive years prior to death

Year Prior to Death	1 st	2 nd	3 rd	4 th
Average Cost (in ZAR)	188 276.08	53 682.69	41 738.04	36 762.97
Ratio	3.51	1.29	1.14	

This result is further emphasised by considering the ratio between average costs in successive years prior to death. The average cost in the last year of life is 3.51 times higher than the average cost in the second year prior to death. It is also observed that there is little difference between the average costs in the second, third and fourth years prior to death. These average costs and ratios clearly portray the sudden and substantial jump in healthcare expenditure incurred by medical schemes in the last year of life.

The above analysis is examined in more detail by considering the costs in the last year of life according to age at death, category of expenditure and RUB value.

5.1.1 ANALYSIS OF AVERAGE COSTS IN THE LAST YEAR OF LIFE ACCORDING TO AGE AT DEATH

This analysis considers the distribution of average claim amounts in the last year of life according to age at death (Figure 3).

Average last-year-of-life costs for neonates are significantly higher than other age bands (R744036 as compared to the overall average of R188276). They have been

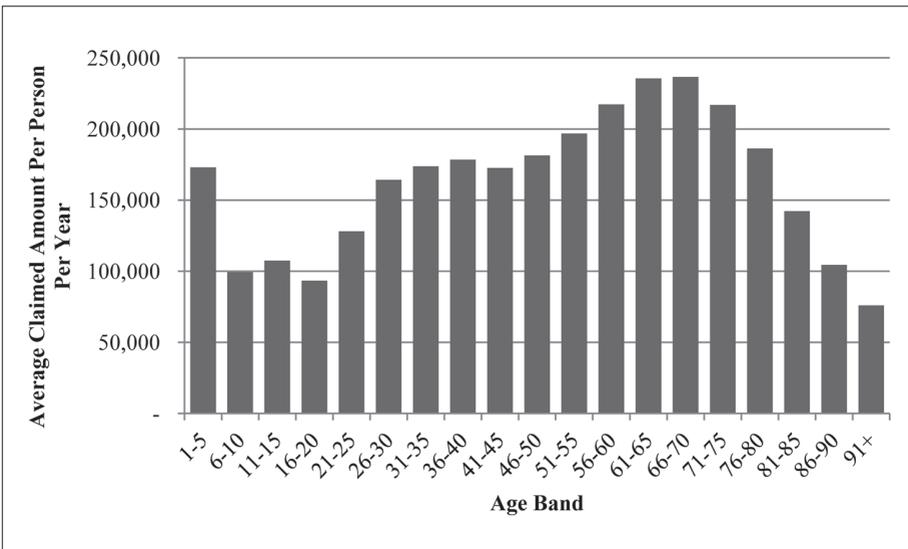


FIGURE 3 Distribution of average last-year-of-life costs according to age at death

omitted from Figure 3 to enable us to observe differences between other age bands. One of the explanations to why average neonatal costs are so high is the complicated ethical issues surrounding neonatal healthcare. Often expensive treatments are performed on unhealthy babies that have extremely low chance of survival (Xiang, 2012). At the same time these new-borns contribute very little exposure as they often may die within a few months of being born. If the study was conducted over the last six months of life, the differences between average costs for neonates and the overall average may be less as this may account better for the very low exposure of neonates.

The key feature visible in the distribution is the relatively low level of the average last-year-of-life costs for beneficiaries in the 6–10 year old age category through to beneficiaries in their mid-20s. This is possibly because more beneficiaries in this age range die from sudden events as opposed to prolonged illness. Therefore, these beneficiaries would not incur substantial additional medical expenditure before their death. The distribution also illustrates that the average costs increase incrementally by age category until around 70 and thereafter rapidly diminish. This is consistent with many Medicare studies (Alemayehu & Warner, 2004; Calfo, Smith & Zezza, 2008; Lubitz & Riley, 1993; Scitovsky, 2005).

Scitovsky (2005) attributed this phenomenon to the exclusion of certain categories of expenditure from studies that the elderly make considerable use of. These expenditures are excluded because either they are not covered by the healthcare provider or insufficient data are available for their investigation. A common example of such expenditure is nursing home costs (Alemayehu & Warner, 2004; Hogan et al., 2001; Hoover et al., 2002; Roos, Montgomery & Roos, 1987; Scitovsky, 2005). Another potential reason is the typical setting of death; elderly patients may chose to go into frail care rather than to a private hospital. Frail care and nursing are included as part of auxiliary benefits. However, the extent to which these expenditures are reimbursed is unknown. Levinsky et al. (2001) attributed the difference in expenditures between the young and old to the decision reached by many elderly patients, together with their families and doctors, to avoid aggressive healthcare procedures that would have otherwise been used on younger patients. Lives surviving to these older ages may also be more likely to be stable on chronic medication than younger lives.

5.1.2 ANALYSIS OF AVERAGE COSTS IN THE LAST YEAR OF LIFE ACCORDING TO CATEGORY OF EXPENDITURE

Last-year-of-life costs are divided according to category of expenditure in order to determine the most expensive categories to medical schemes. Table 2 illustrates the average last-year-of-life costs according to category of expenditure.

The dominant influence that hospital expenditure has on the last-year-of-life costs is unmistakable: almost 60% of the average total claimed amount in the last-year-of-life is for the reimbursement of hospital care. High hospital expenditure is consistent with results obtained in Medicare research (Alemayehu & Warner, 2004; Lubitz & Riley, 2010; McCall, 1984). The other significant expenditures observable

are costs relating to medical specialists, radiation/oncology, pathology and auxiliary. Radiation/oncology accounts for 12.03% of the claimed amount in the second last year of life. Hospital costs, pathology and auxiliary costs held the greatest responsibility for the large jump in average costs between the first and second last years of life.

TABLE 2 Proportion of average claimed amounts in the 1st and 2nd years prior to death according to category of expenditure as well as the ratios between the average claimed amounts

Category of Expenditure	Proportion of Average Claimed Amounts Years Prior to Death		Ratio (1 st /2 nd)
	1st	2nd	
Acute medicines	1.59%	5.00%	1.12
Anti-retroviral therapy	0.27%	0.66%	1.42
Auxiliary	7.84%	6.49%	4.24
Chronic medicines	1.20%	4.78%	0.88
Dental	0.15%	0.67%	0.77
General practitioner	1.33%	2.79%	1.67
Hospital	59.47%	42.28%	4.93
Medical specialist	8.27%	8.97%	3.23
Optical	0.17%	0.82%	0.74
Pathology	5.45%	4.55%	4.20
Radiation/oncology	6.46%	12.03%	1.88
Radiology	4.12%	5.17%	2.80
Special benefits	3.68%	5.79%	2.23
Unknown	0.00%	0.01%	0.71

5.1.3 ANALYSIS OF AVERAGE COSTS IN THE LAST YEAR OF LIFE ACCORDING TO RUB VALUE

This analysis divides the last-year-of-life costs according to beneficiaries' RUB value. The average last-year-of-life cost for each RUB value can be seen in Table 3. An example of a Value 1 RUB is eye and dental treatments, whilst asthma is an example of a Value 2 RUB value (Johns Hopkins Bloomberg School of Public Health, 2009).

It is easily observable that average last-year-of-life costs rise with the RUB value. In particular, Value 5 RUB beneficiaries consume an enormous amount of medical expenditure.

TABLE 3 Average claimed amount in the last year of life according to RUB category

	Resource Utilisation Bands (RUBs)					
	0	1	2	3	4	5
Average claimed amount per person per year (in ZAR)	54,187.34	95,849.66	102,203.58	146,978.96	190,217.91	321,777.14

5.2 Analysis of Survivor and Decedent Costs

The percentages of total costs that decedents consume in each calendar year indicates that decedents' costs form a very small part of the total healthcare expenditure incurred by medical schemes each year (Table 4). It should be noted, however, that the 2011 percentage will be higher once 2012 mortality is taken into account. Table 4 also records the average survivor and decedent costs for each of the study period's four years. It can be seen that average decedent costs in each year far exceed that of average survivor costs. This result is reinforced by considering the ratio between the average survivor and decedent costs for each year. The average decedent costs are 25.13 times higher than average survivor costs in 2011. In addition, the ratio between average survivor and decedent costs is trending upward over the four-year study period. This is because, while the average decedent costs are increasing year-on-year in real terms, the average survivor costs remain relatively stable.

TABLE 4 Percentage of total claim amount occupied by decedent claims, average survivor and decedent claim amounts as well as the ratio between them for each calendar year

Year	2008	2009	2010	2011
Percentage	3.92%	5.23%	6.57%	5.39%
Average decedent claim amount (in ZAR)	149 195.62	174 160.40	177 314.19	258 023.20
Average survivor claim amount (in ZAR)	8 744.51	9 207.84	8 988.95	9 088.75
Ratio	15.26	16.81	17.52	25.31

The above analysis will now be examined in more detail by comparing survivor and decedent costs according to age, category of expenditure and treatment of PMBs.

5.2.1 ANALYSIS OF DECEDENT AND SURVIVOR COSTS BY AGE

The distributions of average survivor and decedent costs are considered according to age on 1 January for each year of the study period.

The sizes of the decedent costs are substantially higher than that of the survivor costs for every age category. At 70 the average decedent costs reach their peak and start to diminish. The average survivor costs, however, continue to rise substantially all the way to around 90 years of age. This indicates that between ages 70 and 85 decedent

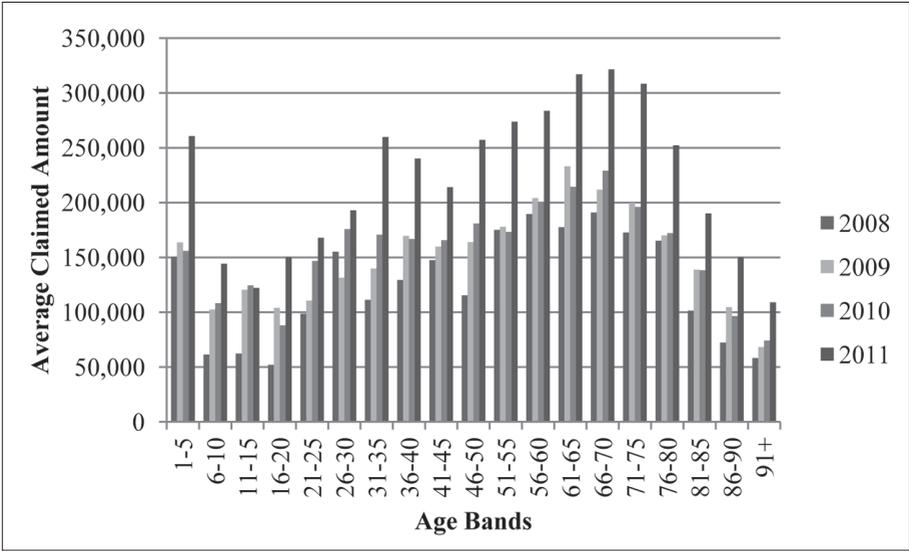


FIGURE 4 Distribution of decedent claim amounts for each calendar year according to age at 1 January

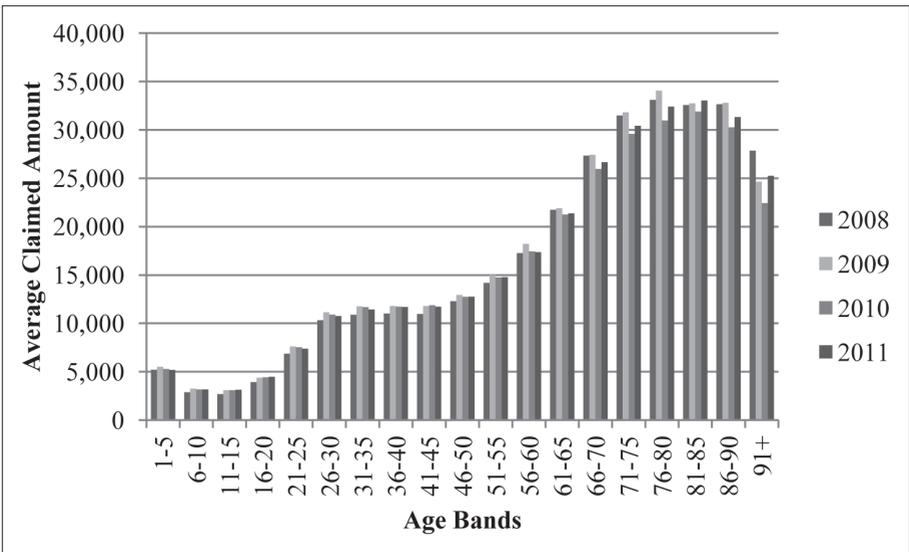


FIGURE 5 Distribution of survivor claim amounts for each calendar year according to age at 1 January

expenditure decreased while survivor expenditure increased. Calfo, Smith and Zezza (2008) established an almost identical result in their Medicare investigation but were unable to definitively explain the reason for this. Note that care needs to be taken when comparing these figures to the distribution in Figure 3 as the age definition is different (Section 4).

5.2.2 ANALYSIS OF DECEDENT AND SURVIVOR COSTS BY CATEGORY OF EXPENDITURE

This analysis attempts to reveal which categories of expenditure contribute the most to the substantial difference between survivor and decedent costs. Ratios between average survivor and decedent costs are calculated in Figure 6 for each category of expenditure and for each calendar year.

It is observed that auxiliary, hospital costs, radiation/oncology, pathology and special benefits are the main causes of the disparity between survivor and decedent costs. These are the same categories that contribute to high claimed amounts in the last year of life, observable in Section 5.1.2. Auxiliary, hospital and pathology are also the main contributors to the large jump in average costs between the first and second last years of life.

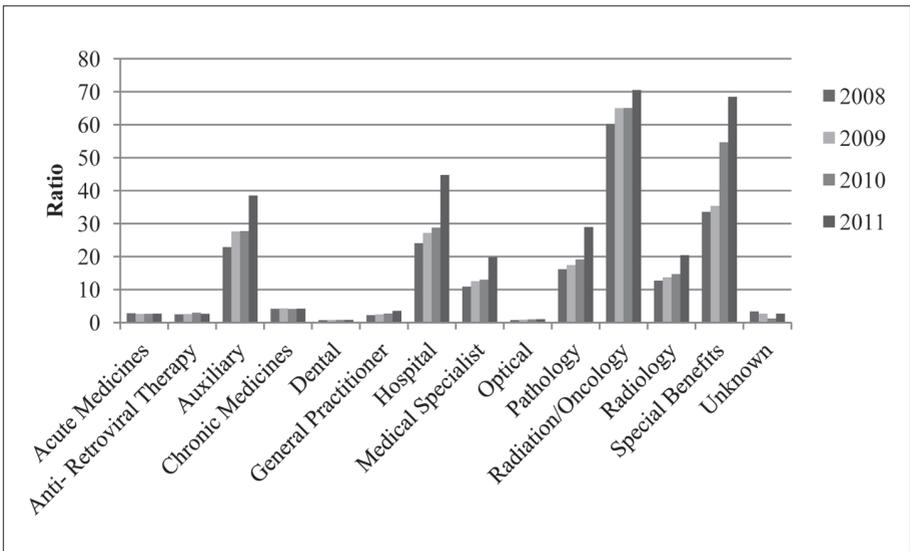


FIGURE 6 Ratios between average survivor and decedent claim amounts by category of expenditure for each year of the study period

5.2.3 ANALYSIS OF PERCENTAGE OF DECEDENT COSTS PROVIDED IN THE TREATMENT OF PMBS

The final analysis is conducted solely on decedent costs. It is revealed that a large majority of decedent costs, within each year, are incurred by medical schemes in the treatment of PMBs (Table 5). It is also evident that the percentage is increasing over the period, from 61.44% in 2008 to a massive 80.10% in 2011.

This may be due to an under-reporting of PMBs in the earlier years; it is likely that both member and provider awareness of PMBs has increased over time. In addition, PMBs are reimbursed at cost and not limited to medical scheme tariffs. It is thus possible that providers charge higher rates for PMBs than for non-PMBs.

TABLE 5 Percentage of total decedent claim amounts utilised on the provision of PMBs

Year	2008	2009	2010	2011
Percentage	61.44%	69.30%	73.70%	80.10%

6. DISCUSSION AND CONCLUSIONS

6.1 High Last-Year-of-Life Costs

The most noteworthy finding in the investigation is the large extent to which average costs in the last year of life exceed average costs in the earlier years prior to death. In addition, it is shown that average decedent costs are at least 15 times greater than average survivor costs. These two findings illustrate the significant medical expenditure that medical schemes incur on beneficiaries in their last year of life. These findings also reveal that the significance of costs in the last year of life has increased since the investigation by Moodley and McLeod (2001). This was expected due to changes in the regulatory environment that encourage anti-selection (namely open enrolment, community rating and voluntary membership).

It needs to be noted, however, that even though costs in the last year of life are shown to have a large impact per year of exposure, significant exposure is still needed to have an impact on a medical scheme as a whole. The fact that costs in the last year of life only constitute between 3.92% and 6.57% of the medical schemes' total yearly expenditure shows that medical schemes currently have limited exposure to the risks imposed by beneficiaries in their last year of life. In addition, between 61.44% and 80.10% of costs in the last year of life are incurred in the treatment of PMBs. This implies that, for example, only 1.7% of total costs would have been affected by attempting to ration last-year-of-life costs in 2010.

The current regulatory environment leaves medical schemes vulnerable to a substantial increase in exposure to beneficiaries in their last year of life as schemes have little protection against anti-selective behaviour. In addition, with PMBs comprising a large percentage of costs in the last year of life, medical schemes are obliged to reimburse the majority of the claims and the scope for rationing is constrained. There

may, however, be scope for schemes to engage more proactively with mechanisms for managing PMB costs such as contracting with designated service providers.

6.2 Key Factors influencing Last-Year-of-Life Costs

Having established the significance of costs in the last year of life, it is important to conclude on the main factors that are responsible for this finding. These factors are important to consider as they provide themes on which to focus further research into healthcare costs in the last year of life. Three main factors are observed to have the most notable impact on last-year-of-life costs. The first, and possibly most influential, factor to consider is the dominance hospital costs hold over the size of total costs in the last year of life. Almost 60% of costs can be attributed to expenditure on hospital care and, as stated previously, this is not a result restricted to the South African healthcare industry. The second factor to consider is the impact that young beneficiaries have on costs in the last year of life. In particular, neonatal average last-year-of-life costs amounted to R744 036.24 and are observed to be at least 23.8 times higher for decedents than for survivors during the study period. Finally, it is observed that it is vital to constantly monitor the number of beneficiaries who have a RUB value of 5. These beneficiaries consume an average of R321 777.14 worth of medical resources in their last year of life. Upon comparison with the average survivor costs in each year, it is calculated that value 5 RUB beneficiaries consume at least 34.9 times more last-year-of-life costs than the average survivor.

6.3 The Effectiveness of Disease Grouper Systems

One of the most interesting findings of the investigation is the effectiveness of a disease grouper system (in this case the ACG system) in revealing those beneficiaries whose treatment incurred the highest average healthcare costs in their last year of life. The finding does not prove that the ACG system will always be successful in revealing beneficiaries with high-resource utilisation. Instead, the finding adds to the credibility of disease grouper systems by providing a retrospective example of the ACG system successfully revealing high-resource beneficiaries who are in their last year of life. Disease grouper systems, such as the ACG system, therefore, provide a potential method of monitoring the high-risk beneficiaries mentioned above in the previous sub-section.

6.4 Recommendations for Further Study

The investigation has revealed many potential areas for further study that should be considered. One area which would be of particular interest to the South African medical scheme industry involves a growth rate projection of the number of beneficiaries in their last year of life. In addition, the conducted investigation largely did not include the substantial out-of-pocket expenses, such as those incurred in frail care and nursing homes, incurred by beneficiaries in South Africa. An augmentation to the investigation to include these additional expenses would be informative. An investigation into the

reasons for the decline in decedent costs after the age of 70 may contain useful insights for managed care companies on the choices made regarding the place of death and implicit age-related rationing that may already be occurring. Collecting data on the cause of death may also yield further insights. There is currently little incentive for administrators to collect this information.

Another investigation that would be very useful to medical schemes is a more detailed investigation into disease grouper systems. This would allow for better monitoring of high-risk beneficiaries. The investigation could involve the consideration of whether certain alterations would improve the system's effectiveness. In addition, the effectiveness of the ACG system could be compared with other similar systems. It may arise that a combination of the ACG system with other similar systems yields more clear and definitive results.

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