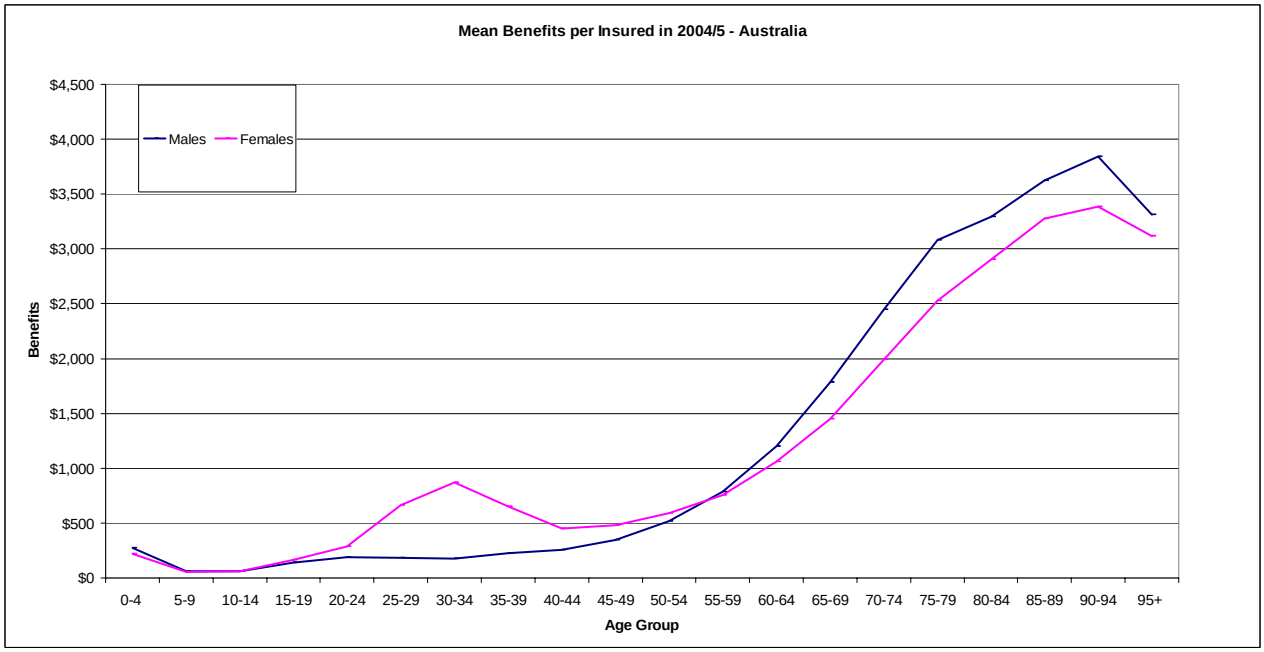
Hospital/Medical Risks &Reinsurance

This paper is designed to assist readers understand advanced concepts of hospital and medical benefit reinsurance.

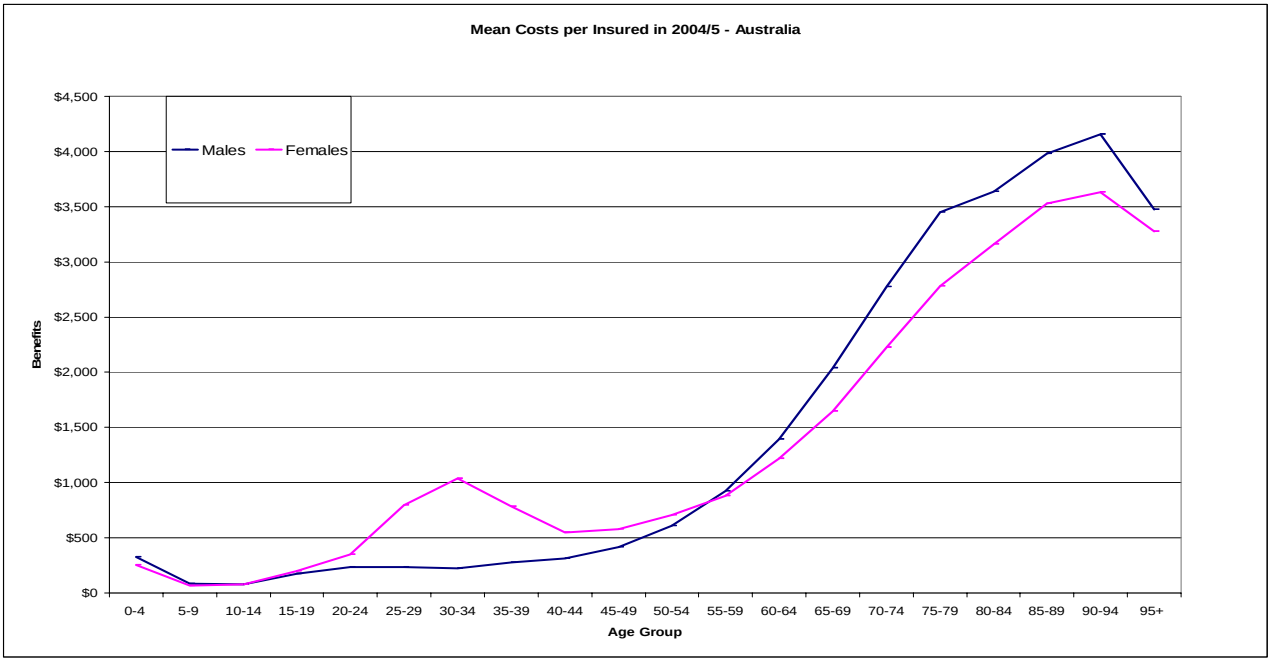
When looking at PHIAC hospital and medical benefit utilisation data by age we usually start with the mean benefits paid per person covered in a 12 month period. Graph 1 (below) shows this for all Australian insureds for the 2004/5 financial year.

GRAPH 1



The next graph shows similar distributions but this time the graphs are the average total hospital and Medical costs per Australian Insured in 2004/5.

GRAPH 2



These two graphs look very similar but when one examines the differences one sees that the elderly have much lower out-of-pocket costs than the young as Table 1 shows. This table details the excess mean cost over the mean benefit paid as a percentage of the mean benefit paid according to the PHIAC data for 2004/5.

TABLE 1

	Excess Costs	
	Males	Females
0-4	18.32%	15.41%
5-9	28.56%	27.13%
10-14	25.36%	23.00%
15-19	24.28%	21.72%
20-24	24.94%	21.39%
25-29	27.13%	19.48%
30-34	26.91%	18.94%
35-39	22.42%	20.21%
40-44	23.19%	21.29%
45-49	20.24%	19.80%
50-54	18.17%	19.05%
55-59	17.54%	17.39%
60-64	16.00%	14.78%
65-69	14.24%	13.45%
70-74	13.18%	11.84%
75-79	11.89%	10.10%
80-84	10.35%	8.91%
85-89	9.82%	7.81%
90-94	8.05%	7.29%
95+	4.98%	5.11%
Total	16.14%	15.36%

Before going any further let's put some reasonability checks on the data so far used in this report. There is no reason to suspect that the industry data for benefits is inaccurate because there are a number of checks and balances to validate the hospital and medical benefit data (not the least being that total benefits submitted on PHIAC 1 by an insurer equals those in the accounts submitted in PHIAC 2). Unfortunately there is not the same level of scrutiny given to cost data and analysis of the 2004/5 financial year's data submitted by insurers showed an extra-ordinarily wide range in the percentage of average excess costs for each insurer. Two insurers had an average excess cost for the 2004/5 financial year of 0.0% - in other words their members had zero or insignificant out-of-pocket expenses. Six other insurers had an average of less than 1.0% and 20 insurers were in the range of 1.1% to 5.0%. Six insurers were in the range 5.1% to 10%, one insurer was in the range of 10.1% to 15%, one was in the 25.1% to 30.0% range and four other insurers provided data to PHIAC that indicated that their members had excess costs averaging above 30% of benefits paid with the data of one of Australia's largest insurers indicating that its members had average out of pocket costs of 37.7% of hospital and medical benefits paid. It therefore seems highly likely that at least five and possibly six insurers are not submitting correct cost data to PHIAC because if their cost data had been correct then the Health Insurance Ombudsman would have had to have been extraordinarily busy. The insurers that appear to have provided incorrect data cover some 20% of the total hospital insured population of Australia!

Let us now analyse what we mean by the term "mean benefits paid per person covered in a 12 month period". This is simply the total amount of benefits paid divided by the total number of persons exposed to risk during the 12 month period. For any age/sex grouping the exposed to risk is determined as the average over the 4 quarters of the 12 month period of the average persons covered in that age/sex group for each quarter. The average persons covered in an age/sex group in a quarter is the half of the sum of the persons (in that age/sex group) recorded at the beginning and at the end of that quarter. Now the "persons covered" for a period is made up of two groups of persons – those who have had a benefit or benefits paid in respect of their hospitalisation(s) and those who haven't. In a 12 month period the former group is approximately about 10% of the total exposed to risk but this percentage whom have had a benefit paid in respect of their hospitalisation is generally much higher in the older age groups than the younger age groups. Also, since virtually all children born to insured's in Australia generate a "hospital" benefit and because of the complications and issues resulting from pregnancy and women's reproductive organs, there are also fairly high proportions of females in the 20-40 age groups who obtain hospital benefits in any 12 month period.

To understand the hospital and medical claims distribution we need to look more deeply into hospital and medical benefits paid to persons who receive a benefit in say a 12 month period. Firstly, a period of hospitalisation of a person generally generates several benefit payments and these benefit payments are made sometime after the hospitalisation event. Usually the first and highest benefit payment is to the hospital for its services and if the hospitalisation is prolonged then the hospital will make several claims on the insurer – often every week. If a prosthesis is provided then the claim for the prosthesis will usually be submitted with the hospital claim and processed as a separate claim line. The hospital claim is then followed by claims from the attending medical practitioners. In a few cases these medical claims may not arrive at the insurer for some months or even a year or two after the hospitalisation event and due to the complexities of the assessment and benefit payment procedures may not be settled until some months later again. Also to add to this complexity some persons will, because of the nature of their medical condition, undergo many hospitalisations over a

long period of time. So when we look at the benefits paid to an individual in respect of a particular period of time we discover that some of the benefits paid are incurred by that insured in the time period and some of the benefits paid were for services provided in prior insured periods. Furthermore, when examining the total benefits paid to each insured in say a 12 month period of time we find that some insureds have obtained very substantial amounts of benefits in respect of their hospitalisations but there are also a large number of individuals for which relatively small amounts of only medical benefits have been paid. This latter group's benefits relate to prior periods of insurance. Even in the former group there are persons whose benefits were for services incurred in a prior period of insurance and when the next 12 months claims payments are analysed there will be persons in that group whose benefit payments were for services incurred in the previous 12 month period of insurance (and some in even earlier years).

Examination of the claims records of an insurer indicated that around 10.4% of the hospital services and 20.8% of medical services paid in a year were incurred in a previous year. Nearly all of the hospital services that related to the previous year were paid in the first quarter of the year as only 1% paid in the second quarter related to the previous year and virtually none paid in the last 2 quarters were incurred in a prior year. However 66% of the medical services paid in the first quarter of the year were incurred in a previous year. Also, 12% paid in the second quarter, 3.5% in the third quarter and 1.7% in the fourth quarter were incurred in a previous year. During the year around 1.7% of the medical services processed were incurred more than 1 year previous to settlement with a small number being paid more than 2 years after the date of occurrence.

Insurers have to be interested in benefits that are accrued during any period of time because of the need to report, as accurately as possible, the accrued financial position of the insurer. From July 1, 2005 in Australia the health insurance industry has adopted international financial reporting requirements which recognise the uncertainty of the estimates of benefits incurred during the reporting period for which claims are either received but not paid or not even received by the end of that financial period. Furthermore insurers should be interested in their risk exposure to benefit payments particularly large benefit payments and should be interested in reducing their risk exposure to such large benefit payments. This is becomes particularly important when determining the pricing of individual products.

In 1976 the initial reinsurance system was designed to reduce insurers' product risk exposures to large claims as the threshold to debit a claim to reinsurance was the requirement that the insurer meet the first 35 day's hospital benefits to a membership in any incurred period of 12 consecutive months. The criteria of 35 days seems inappropriate now but back in 1975 the average hospital stays were almost 14 days and health insurers only paid per diem benefits. So, as insurers' products were defined by the daily benefit rate that the product provided, the reinsurance system theoretically provided proportional cover to all products. However even in those days health insurers' products with the highest benefit rates also had the highest daily hospital utilisation rates so, in practice, the high benefit products debited proportionately more benefits to reinsurance than low benefit products. Much of this phenomenon was due to older people taking the highest levels of cover.

We are now going to change the perspective of the analysis of hospital and medical claims of a financial year from being expressed in terms of the mean benefit paid per exposed to risk to statistics related to the actual claimants. However, unless an attempt is made to adjust for the myriads of small medical benefits paid that relate to past periods, the statistics calculated from this distribution of claims will be quite false. Each of three years hospital and medical data of one medium sized insurer was analysed. All persons who were paid medical benefits but who did not receive hospital benefits in a financial year were excluded from the calculations as was any person who had received total hospital benefits that were less than $100 (on the grounds that the hospital benefits paid to these few claimants were probably supplementary to a claim paid in a previous financial year). These adjustments excluded an average of 11.2% of the total persons for which a benefit was paid in each financial year analysed. However these adjustments only excluded 1.5% of the benefits paid. These discrepancies seemed tolerable for the purpose of this exercise. The alternative would have been to ask the insurer to undertake the significantly more difficult exercise of producing files of claimants by year of incurred claims and then making allowances for the benefits (particularly medical

benefits) yet to be paid in respect of those hospitalisations.

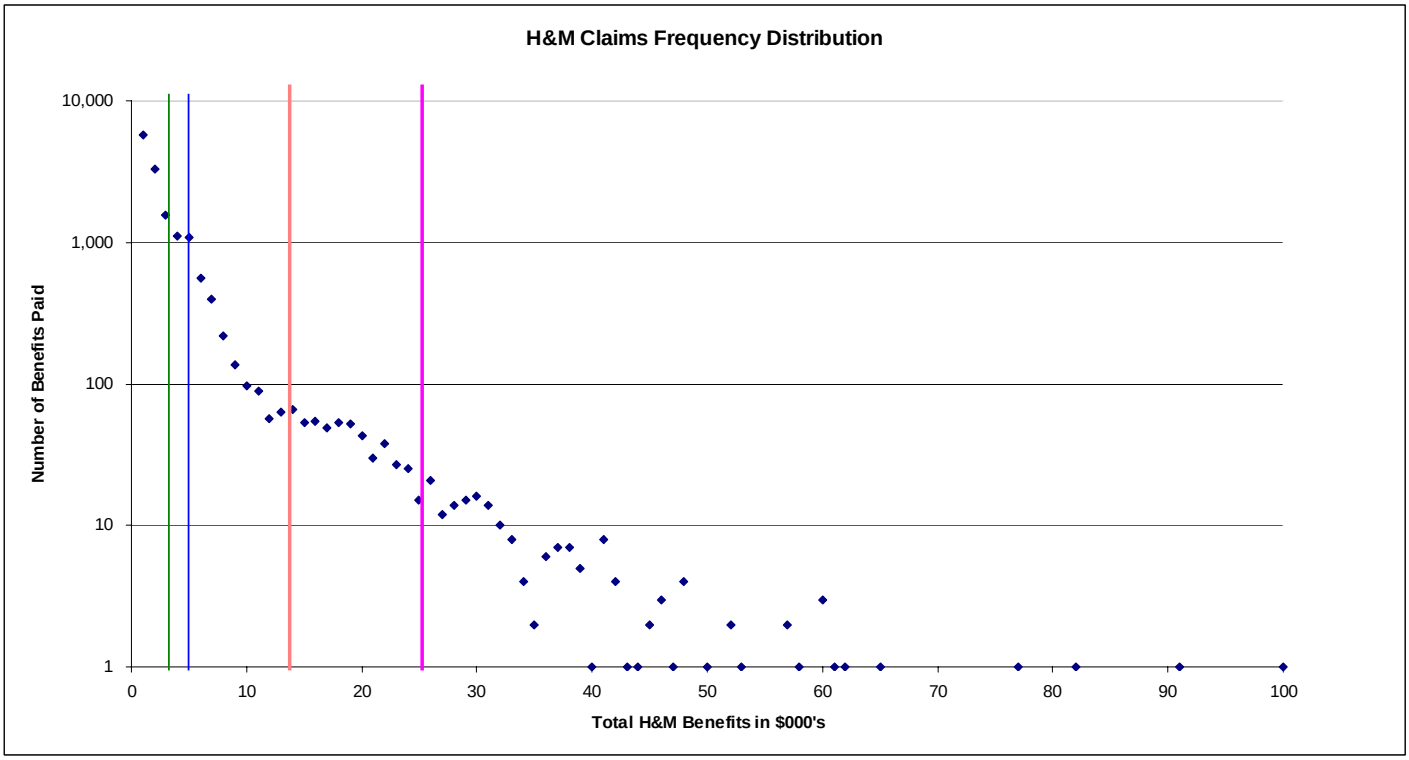
TABLE 2

	Percent Claiming		Percent Not Claiming	
Age Group	Males	Females	Males	Females
0-4	13.3%	9.5%	86.7%	90.5%
5-9	5.9%	4.2%	94.1%	95.8%
10-14	4.1%	3.7%	95.9%	96.3%
15-19	7.1%	8.3%	92.9%	91.7%
20-24	8.6%	14.0%	91.4%	86.0%
25-29	8.4%	20.9%	91.6%	79.1%
30-34	8.2%	23.7%	91.8%	76.3%
35-39	9.2%	17.8%	90.8%	82.2%
40-44	10.6%	14.4%	89.4%	85.6%
45-49	11.6%	15.5%	88.4%	84.5%
50-54	16.0%	18.1%	84.0%	81.9%
55-59	18.8%	21.6%	81.2%	78.4%
60-64	24.7%	23.9%	75.3%	76.1%
65-69	29.1%	27.1%	70.9%	72.9%
70-74	36.3%	29.4%	63.7%	70.6%
75-79	31.2%	32.2%	68.8%	67.8%
80-84	20.4%	33.1%	79.6%	66.9%
85-89	22.6%	34.8%	77.4%	65.2%
90-94	38.3%	37.4%	61.7%	62.6%
95+	65.6%	38.2%	34.4%	61.8%
Total	7.7%	10.3%	92.3%	89.7%

Let us now look at the relationship between the claimants and the exposed to risk. The data in Table 2 shows, as percentages, the sum of the claimants (adjusted as indicated above) for three years divided by the sum of the exposed to risk for the three years. In this table if a claimant has claimed in each of the three years then that claimant is counted 3 times. The table shows that on average a little less than 10% of the persons covered claim in any one year. Male claiming rates are well below 10% until age group 40-44 but females in the child producing ages tend to have approximately twice the male claim rates in the same age groups. This insurer also has a fairly high proportion of young families.

We will now look at the claims frequency distribution function for 2003/4 for the hospital and medical claimants. Graph 3 plots the number of persons for which hospital and medical benefits have been paid in each $1000 range. The highest total benefit paid to a claimant was $126,000 but is shown as just $100,000 in this graph. The next highest claimant received benefits of $91,000 and is correctly shown. So that readers can view the data a logarithmic scale has been used for the number of persons who have received a benefit and a linear scale for the total benefits paid. (This also, fortuitously, enabled the elimination of the zero values which were very prominent in the higher $1000 groups).

GRAPH 3

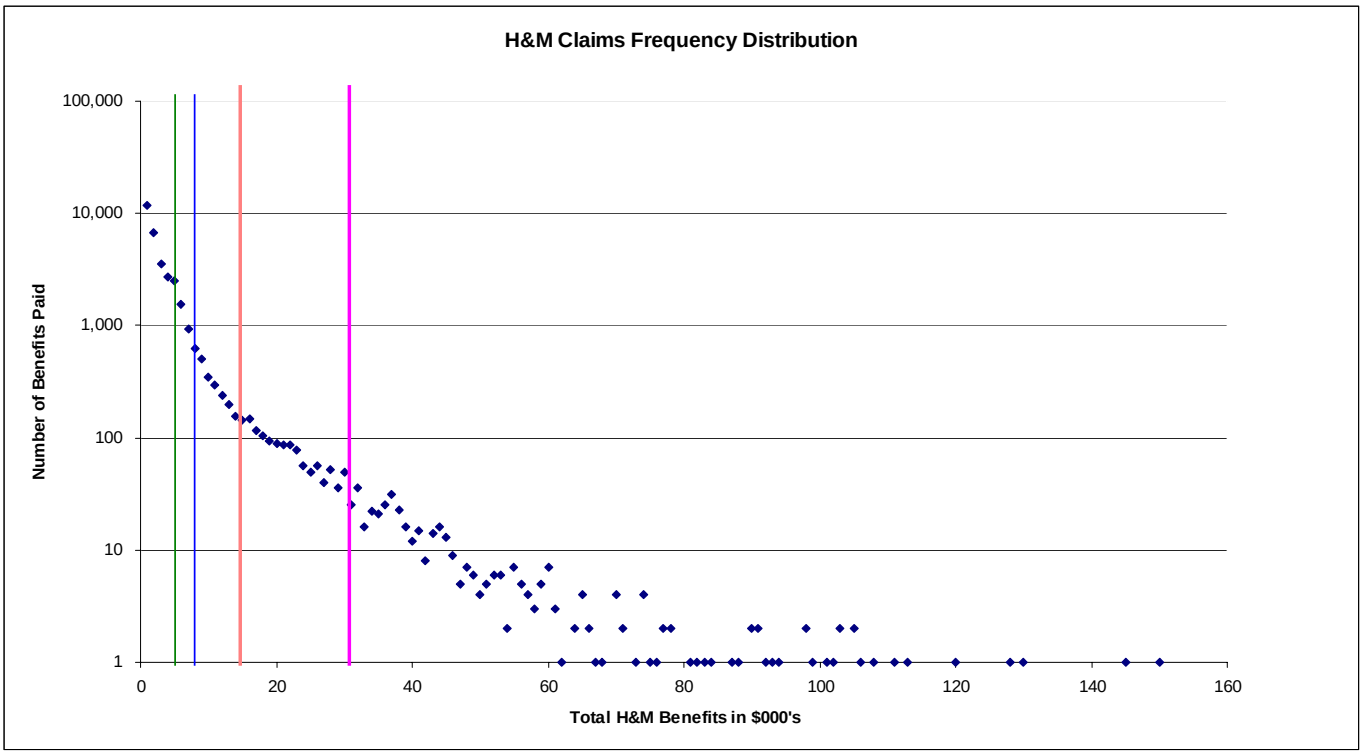


The first point to note that the mean total benefit (green line) paid in respect of a person is very low at $3,173. The standard deviation (blue line) is greater than the mean at $5,235. This indicates great volatility. The mean plus 2 standard deviations (orange line) is $13,644 and the crimson line represents the mean plus 4 standard deviations and is $24,114. As can be seen there are still small numbers of claimants above the pink and

crimson lines but the progression of numbers claiming the higher amounts is not smooth. If we weren't using a logarithmic scale then these claims would be difficult – if not impossible to see. This graph shows that claim numbers that are over 2 standard deviations above the mean claim (pink line) tend to be more volatile than claims up to the pink line and that claim numbers above the mean plus 4 standard deviations (crimson line) are exceptionally volatile. If one was to similarly graph a very large insurer's claims then the progression of the numbers claiming across $1000 claim band would be much smoother. An important point to note is that the medium sized insurer whose data is used in this exercise is larger than around two thirds of the insurers in the Australian health insurance industry. But there is an even more important implication that should be noted. This is that there would not be very many state based products in the Australian health insurance industry that have more persons covered than total persons covered by this insurer so the volatility of the higher benefit claims exhibited in this graph will be tend to be less than for most products! This volatility makes the pricing of hospital insurance products very difficult and this causes actuaries to include higher margins than they would otherwise require if a reinsurance system was used to smooth out this volatility.

Graph 4 looks at the claims over the 3 financial years 2001/2, 2002/3 and 2003/4 for the same insurer.

GRAPH 4



No allowance has been made for inflation and claims for individual persons covered have been aggregated. This aggregation reduced the number of claimants by a little over 20% (compared to the sum of the claimants for each of the 3 years). The most worrying aspect of the aggregation is that it was much more common for higher claiming individuals to have made claims in two or even three consecutive years. There was only 1 claimant who received more than $100,000 in 2003/4 none in 2002/3 and just one in 2001/2. However when claims are aggregated for each individual over the 3 financial years there were 15 persons who received more than $100,000 in benefits with the one person receiving $197,000. It is worth noting that only 1 of these 15 high claimants was over the age of 65 and this was very close to the proportion of members over 65! So many high claimants are younger than age 65! The $197,000 claim is conveniently shown as $150,000 here. Because some persons have claimed benefits in 2 or more financial years the mean claim (green line) has increased to $3,815, the standard deviation (blue line) to $6,857 so the mean plus 2 standard deviations is $17,529 (orange line) and the crimson line, which is the mean plus 4 standard deviations is $31, 243. This indicates that high claiming members tend to remain high claimers for quite long periods of time!

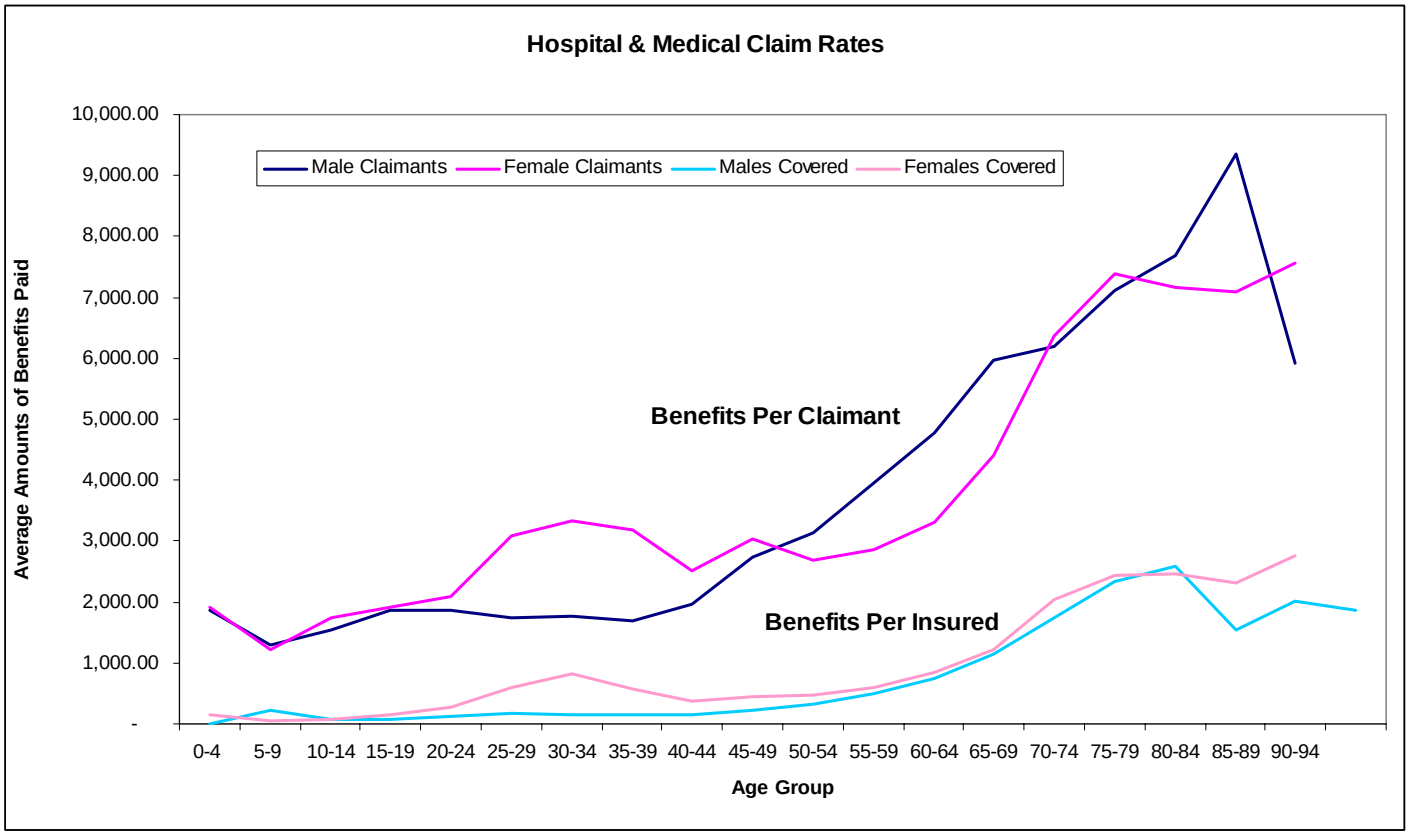
Table 3 provides some additional statistics about these two claims distributions. The excess benefits are those benefits paid above the three thresholds (mean, mean plus 2 standard deviations and the mean plus 4 standard deviations) and would be the amounts that the reinsurance would be based on if it cut in at the threshold. In terms of the percentages the distributions are fairly similar because the mean and standard deviations have been increased for the distribution of claims in the 3 financial years due to the aggregation of claims in respect of the individuals who claimed in 2 or 3 of those financial years.

TABLE 3

FY 03/04	Claimants	Benefits	Excess Benefits
Total	15,056	$47,758,472	$47,758,472
Over Mean	4,255	$34,978,775	$21,476,470
%	28.3%	73.2%	45.0%
> Mean+2SD	650	$14,981,551	$6,113,228
	4.3%	31.4%	12.8%
>Mean+4SD	197	$6,803,141	$2,052,708
	1.3%	14.2%	4.3%
3 Fin Years	Claimants	Benefits	Excess Benefits
Total	33,796	$128,979,060	$128,979,060
Over Mean	9,493	$95,807,138	$59,595,785
%	28.1%	74.3%	46.2%
> Mean+2SD	1,252	$38,756,758	$16,810,601
	3.7%	30.0%	13.0%
>Mean+4SD	402	$19,169,565	$6,609,788
	1.2%	14.9%	5.1%

Graph 5 plots for financial year 2003/4 the insurer's mean claims per person covered and the mean claims per person insured by age/sex groups. The benefits paid that are used in these calculations are the same it is just that for the lower graph lines the benefits are divided by the average exposed to risk in each age/sex group in 2003/4 and the upper lines are the benefits paid divided by the number of claimants in each age and sex group in 2003/4. Age group 95+ has not been included because this insurer has very few persons covered in this age group. The mean benefit paid per person covered is $423 and the mean benefit paid per claimant is $3,173.

GRAPH 5



So there is nothing particularly magical about looking at benefit data on a claimant basis it is just that when we do this we can more easily understand the underlying risks. We can also divide the risks up into those claims frequency distribution risks which can be better ameliorated by claims equalisation or reinsurance measures and those which are primarily related to age and sex differentials. The product (or insurer)

differences in risk that are primarily related to the distribution of the age and sex of persons should also be addressed to ensure that community rating works fairly. Both the age/sex distribution and the claims frequency distribution risks can be addressed by a relatively simple claims pooling (or reinsurance) arrangement – but such arrangements can lead to significant inefficiencies in both the delivery of care and the financing of it. With hospital/medical insurance systems there are added complexities because the claim rates are not random, the 90% or so of insured individuals who do not claim in any one year include a very significant proportion of persons who are very unlikely to claim in 10 or even 20 years – and many of them know it! Also intrinsic knowledge of the mean claim rates is generally known to the community and particularly to the medical profession. So insurers who are too well equalised could get lazy but if sections of the age/sex distribution risk are not appropriately equalised then insurers may well attempt to ignore that market in an effort to gain a competitive advantage. For example health insurers in Australia by and large do not aggressively market to couples and families in the child producing age groups because pregnancy costs are high and there is no reinsurance offset. This appears to be causing the overall percentage of the population that is insured to gradually fall. It is also likely that this gradual fall in percentage insured will continue unless this risk distribution problem is appropriately addressed.

The current reinsurance system is quite inappropriate for the current health insurance arrangements because it doesn't manage the age/sex distribution risk across the whole system and also it often fails to provide amelioration of the claims frequency distribution risk. (Remember that 14 out of 15 of the highest hospital/medical claimants over three years for the insurer used in this analysis were under 65!). Making the proposed incremental changes to the current arrangements would be an improvement but major improvements can be made by taking a more scientific approach.

It is far more efficient to manage age/sex distribution risks through a risk equalisation process than through a claims equalisation process. This is because the risk equalisation costs or benefits are predictable and relatively stable from one risk period to the next. Also such a system creates incentives to enrol all people and manage their claims effectively and not leave out high risk groups (such as family forming age groups) to reduce insurers' claims exposures. At the same time claims equalisation is most appropriate for the claims distribution risk. Claims equalisation becomes most appropriate for high cost claimants because usually there is usually no <u>easily</u> identifiable risk variable that can readily identify these people in advance of them becoming a claimant and hence enable a "before the event" risk adjustment for these people. (I might add that a lot of very serious work is being done by actuaries around the world on risk adjustment mechanisms that will help identify some high risk segments of the population but use of these will mean much more personal information about insureds will have to be recorded and used to make the risk predictions.)

The claim rates at each age sex group can be viewed as being composed of several components. For the purpose of this exercise I am identifying 4 such components. These are as follows;

1. The portion of the claim rate up to the "mean"
2. The portion of the claim rate from the "mean" to the "mean" plus 2 standard deviations from the "mean"
3. The proportion of the claim rate from the "mean" plus 2 standard deviations from the "mean" to the mean plus 4 standard deviations from the "mean".
4. The proportion of the claim rate above the "mean" plus 4 standard deviations from the "mean"

The word "mean" has quotation marks because it could have two interpretations. Firstly, it could have the interpretation of being the average claim for that age/sex group – in other words the average claim rate for that age sex group. Secondly it could have the interpretation of being the average claim for the whole population of the 40 age/sex groups – in other words the insured population. When risk adjusting for community rating purposes we should use the second interpretation because we are trying to adjust to the insured population risk, so the table on the next page splits the claim rates into the four components using the second interpretation of "mean". Also are we talking about the population mean claim per claimant or the population mean claim per exposed to risk? Well if we take the population mean claim per claimant, which is where we can obtain the above 4 components we can turn it into the population mean claim per exposed to risk by

multiplying it by the population proportion of claimants – number of claimants/divided the population exposed to risk. So we can use the proportions derived from the claimant data on the exposed to risk claim rates! In the following table claims information for the 3 years has been averaged. For each financial year the population mean total claims per claimant and the standard deviation has been determined. Then for each financial year the proportions of claims in each age group have been calculated for that part of the claims distribution above the population mean, the population mean plus 2 standard deviations and the population mean plus 4 standard deviations. The results for the 3 years have been averaged and the percentages are detailed in Table 4.

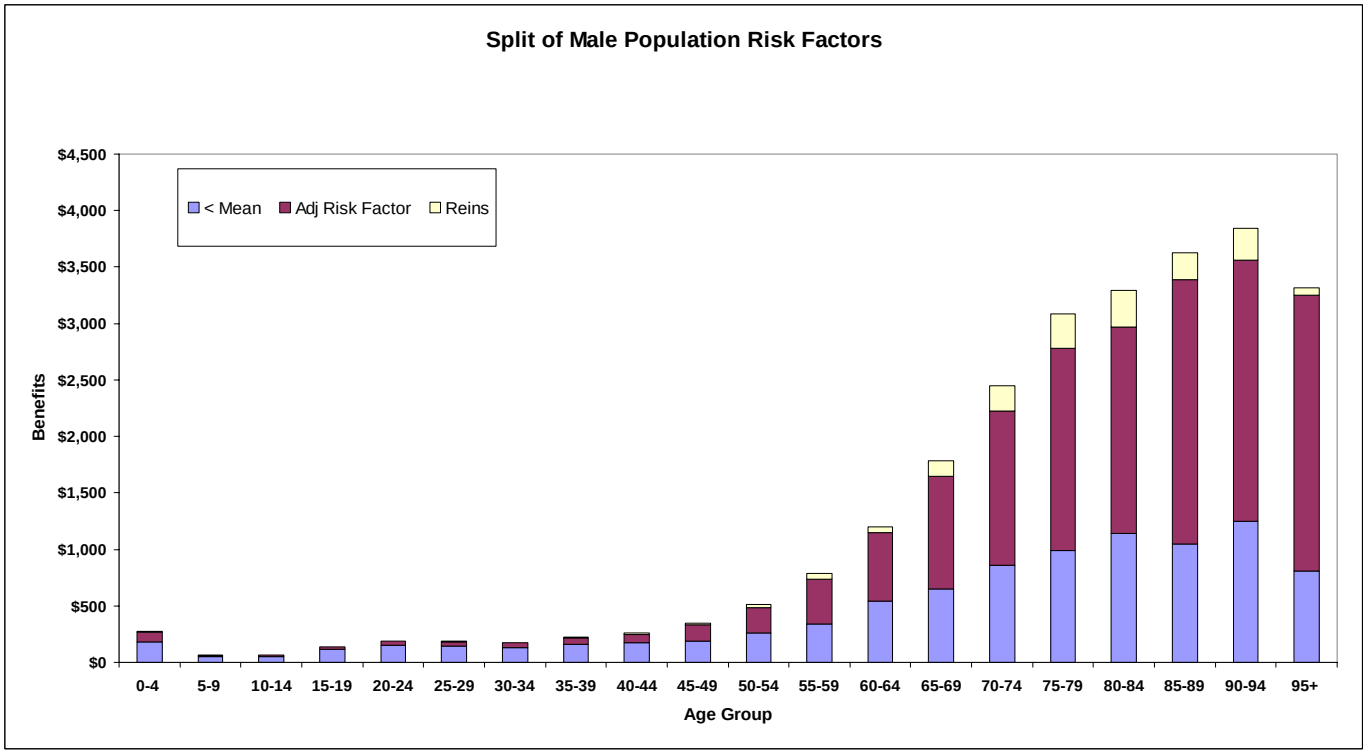
TABLE 4

	% Claim under Mean		% Claim over Mean to 2 SDs above Mean		% Claim Between Mean + 2SD & Mean + 4SD		% Claim over Mean + 4SD	
Age Group	Males	Females	Males	Females	Males	Females	Males	Females
0-4	66.2%	65.9%	25.2%	27.8%	6.2%	4.8%	2.4%	1.5%
5-9	79.7%	87.2%	10.2%	6.8%	4.1%	2.7%	6.0%	3.3%
10-14	84.3%	77.9%	11.7%	17.0%	3.0%	3.6%	1.0%	1.5%
15-19	83.1%	64.0%	13.5%	23.6%	1.7%	7.2%	1.7%	5.2%
20-24	78.1%	72.7%	16.2%	21.4%	2.6%	2.9%	3.1%	3.0%
25-29	78.4%	66.6%	19.4%	30.8%	1.9%	1.5%	0.3%	1.1%
30-34	75.7%	65.9%	19.7%	31.4%	3.0%	1.7%	1.6%	1.0%
35-39	70.5%	63.0%	21.4%	31.0%	4.1%	3.4%	4.0%	2.6%
40-44	68.4%	63.0%	23.7%	28.7%	4.6%	4.9%	3.3%	3.3%
45-49	54.2%	59.6%	30.7%	31.2%	9.3%	6.9%	5.7%	2.4%
50-54	50.9%	59.7%	32.8%	31.5%	9.7%	6.7%	6.5%	2.1%
55-59	43.0%	56.4%	36.9%	32.4%	13.2%	8.0%	6.9%	3.2%
60-64	45.0%	45.0%	37.6%	33.5%	12.4%	12.7%	5.0%	8.8%
65-69	36.3%	42.6%	39.7%	38.7%	15.7%	11.9%	8.4%	6.7%
70-74	34.9%	36.8%	39.0%	41.5%	15.7%	15.3%	10.3%	6.4%
75-79	32.2%	34.6%	40.1%	40.6%	16.9%	16.3%	10.8%	8.5%
80-84	34.6%	30.0%	37.5%	38.0%	17.0%	16.8%	10.9%	15.3%
85-89	28.9%	32.8%	45.5%	45.5%	18.2%	13.2%	7.3%	8.5%
90-94	32.5%	34.6%	45.3%	52.4%	14.0%	11.1%	8.2%	1.9%
95+	24.5%	28.4%	51.3%	45.8%	22.1%	21.0%	2.0%	4.8%
Total	51.9%	57.1%	31.4%	32.5%	10.4%	6.7%	6.3%	3.7%

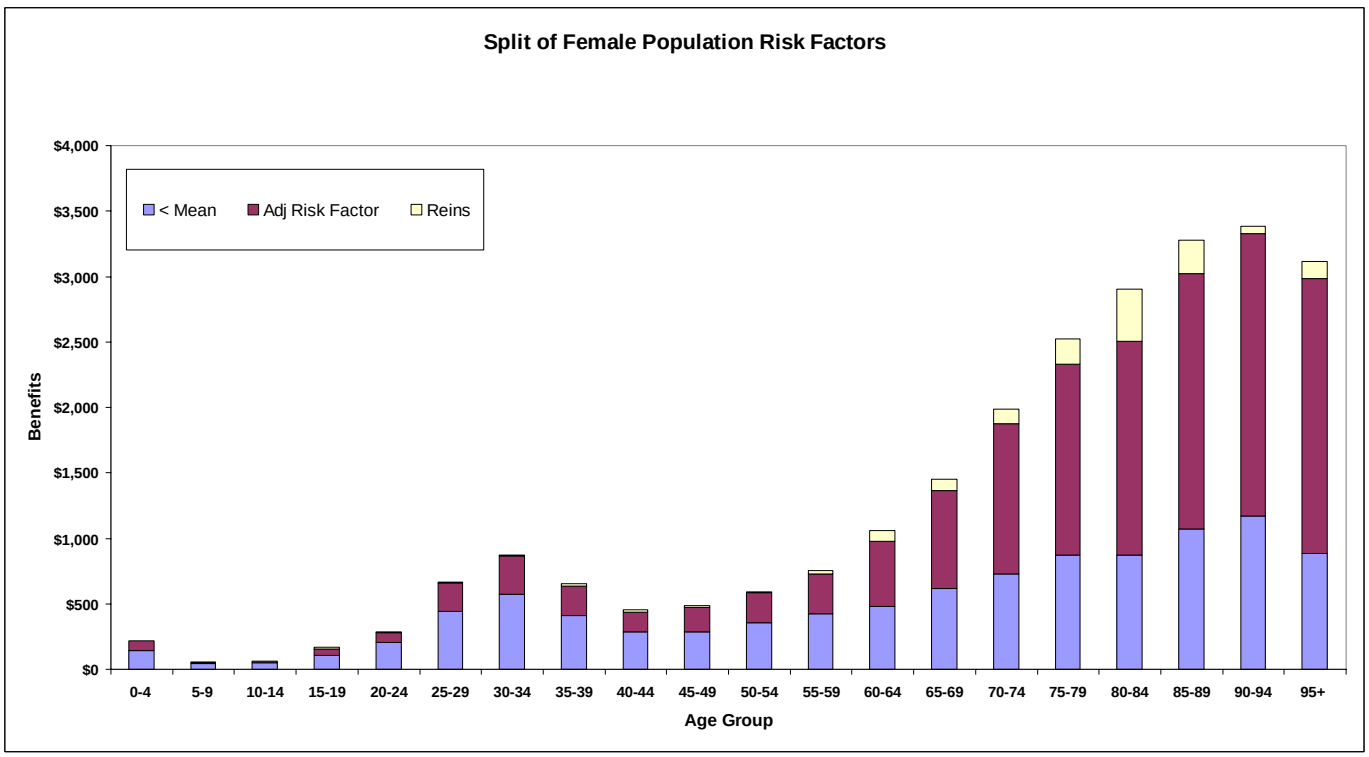
Note that the 4 components in each age/sex group do add to 100%.

The next step is to look at how we might use this data. If we accept that true reinsurance of the claims above 4 standard deviations from the population mean is appropriate and that this reinsurance should be 90% of the excess claims, then in any risk adjustment system it would be fair to remove that portion of the risk that is going to be reinsured (through the claims equalisation mechanism). Hence we would adjust the risk equalisation factors which are based on the population mean claim at each age/sex group by the proportion that is expected to be reinsured at each age/sex group (i.e. 90% of the factors shown in the blue print above). However we could consider a more sophisticated arrangement. The data on Graph 1 of this report is now going to be reproduced in Graphs 6 and 7 on the next page. The mean benefit data has been split into 3 components. The first (blue component) is part of the claims distribution that is represented by the claims up to the population mean claim. The middle (red component) is the part of the claims distribution function that is represented by the claims above the population mean that are not expected to be reinsured and the top (yellow component) is the part of the claims distribution function that is expected to be reinsured.

GRAPH 6



GRAPH 7



At least the middle (red component) of the age/sex claims distribution function should be risk adjusted and the top (yellow component) should be claims equalised. This leaves insurers to manage the bottom (blue component) risk without either risk or claims adjustment giving insurers a relatively strong incentive to recruit in the younger market segments. This method still leaves part of the so-called pregnancy hump to be managed without risk adjustment. However the remaining blue component of the pregnancy hump could be adjusted out if Government considered this to be a desired objective. Having a relatively flat progression of female claim rates from age 20-24 to age 40-44 would encourage funds to design new products and recruit members

in those age groups.

The method gives relatively more weight to the costs of older age groups than a risk equalisation system that is based on the combined blue and red components. Therefore it produces outcomes by insurer that tend to be closer to that produced by the current reinsurance system than certainly a straight risk equalisation scheme. The main advantage of this proposed dual risk equalisation and claims equalisation system is that it is derived from a statistical understanding of the underlying risks of hospital and medical insurance and is designed to, within reason, reduce both the age/sex distribution and claims frequency distribution risks of insurers. A secondary advantage is that with this scientific approach to risk reduction the capital requirements of the health insurance industry should be reduced and this will enable the value of health insurance to be improved. The main disadvantage of the above approach is that the data used to obtain the figures in Table 4 is a little scanty particularly in the older age groups but as the Commonwealth is collecting vast quantities of relatively good HCP data, it will be able to determine these factors independently of this analysis.

Conclusions

Costs should not be used in a risk equalisation arrangement until the cost data can be verified as being substantially accurate.

A risk equalisation system that is scientifically designed to reasonably minimise substantial age/sex distribution risks is preferable to that of an all inclusive risk equalisation system. But the very volatile risks should be minimised by a claims equalisation system. These risks are after say 4 standard deviations from the population mean of the claims frequency distribution function and seem to be not concentrated in the over 65 age groups as commonly assumed.

A mixed system of risk equalisation of that part of the claims frequency distribution function represented by the claims above the mean and below 4 standard deviations from the mean and a claims equalisation system for those claims above 4 standard deviations from the mean could provide a fairer system than any simple system based on either risk or claims equalisation. The equalisation factor for the claims equalisation component should be high (90% say) and the equalisation factor for the risk equalisation system should be chosen to ensure that an appropriate level of cross industry subsidy occurs – possibly similar to the current arrangements.

The factors applied to the risk factors in the risk equalisation component of the recent HIRMAA report that Brent Walker Actuarial Services provided were obtained from summing the 3 right hand columns of table 4 separately for males and females. The factors applied to the risk factors in the risk equalisation component of the recent Westfund report by Brent Walker Actuarial Services were obtained from summing the 2 middle columns of table 4 separately for males and females. The Westfund approach was superior because there was no implied overlap between the risk equalisation and claims equalisation components of the proposal. The fresh analysis done for this report is slightly modified from that done for the previous reports so there will be very slight differences in these factors.

Because the analysis for this report has been obtained from medium sized insurer that has limited numbers of persons covered particularly in the older age groups the analysis should be repeated for a much larger sample of the health insured population. It is understood that it will be possible to obtain the risk factors corresponding to the red components of the bars in Graphs 6 and 7 directly from HCP data each year. If HCP data is seen to be not as accurate as PHIAC data then the HCP data can be used to get the proportions of the claim rates represented by the red bars (equivalent to the sum of the two middle columns of table 4 separately for males and females) and these proportions can then be applied to the PHIAC benefit risk data. When PHIAC cost data is demonstrably accurate then a switch could be made from using PHIAC benefit data to using PHIAC cost data to determine the risk factors.

It is hoped that this relatively short paper will lead to a better understanding of the hospital and medical age/sex distribution and claims frequency distribution risks of the health insurance industry and the underlying principles for any reinsurance system to ameliorate these risks across the system. Please contact Brent Walker (bwas@bigpond.com) 02 9498 1496 if you wish further information or have a contribution to make to any discussion of this paper.