

**HEALTH INSURANCE
CLAIMS AND RISK
EQUALISATION IN
AUSTRALIA**

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Historical Perspective

The hospital insurance reinsurance arrangements originated with the commencement of Medibank Mark II on October 1, 1976. The reinsurance arrangements were designed to replace the previous fully government subsidised hospital benefits special account which had operated for most of the period from the commencement of the Earl Page national health insurance scheme in 1953. The design of the initial reinsurance arrangements was simple. The special account model was chosen with a 35 hospital bed day threshold instead of the 30 day (single) 60 day (family) threshold that existed under the special account arrangements.

Once a membership was included in the reinsurance account it stayed there for one year from the date of the first threshold day. Contributions received for any membership's period in the reinsurance account were to be credited to the reinsurance account and insurers were able to claim a fixed percentage of debited claims for expenses in administering these claims.

The principal feature of the reinsurance arrangements was that the Commonwealth Government agreed that it would support the principal of Community Rating by allocating, in each budget, a subsidy of 50% of the expected reinsurance net debits for the following year. Unfortunately the Commonwealth reneged on this agreement in its 1977 budget and, after that, never again produced a budget allocation to reinsurance that was even close to the initially promised 50% of expected net debits.

The original reinsurance arrangements created a national pool that was managed by trustees appointed by the Minister. Because of the 50% percent Commonwealth subsidy only a small number of insurers were initially required to contribute amounts to the pool as a result of each quarter's trust fund calculations. Even then the amounts to be contributed were very small in relation to their total hospital claims paid. Also the basic table daily benefit was standard for all insurers in all States and only basic table benefits could be debited to reinsurance. This ensured that any subsidies being transferred across state boundaries could only be in respect of different hospital utilisation rates in each state due to, for example, differing age profiles of the insured population in each state. This form of cross border subsidy was, at that time, thought to be quite reasonable especially since the intended level of Commonwealth subsidy would ensure that insurers with good risk profiles in lower risk profile states would not be confronted with large quarterly bills from the reinsurance trustees.

The design of the scheme was also dictated by the ability of the health insurance industry's management information systems. In 1976 the majority of the insurers did not have computers and, in fact, were little more than claims processing organisations that, until then, had recorded very little information about their members and, when they did, it was usually only in paper files. The initial reinsurance system was, therefore, designed as a hospital claims equalisation system with a claims threshold that was approximately five times the then average length of hospital stay, which was seven days. At that stage hospital benefits consisted of a flat rate basic table benefit per day and supplementary

tables provided a flat rate daily benefit for single room accommodation. Some insurers paid something extra in their supplementary table for telephones and televisions provided to the patient while in hospital but supplementary table benefits were initially not permitted to be debited to reinsurance.

The initial arrangements lasted more than seven years even though the Commonwealth subsidy was decreased to a small fraction of the net debits to the reinsurance account and health insurers' supplementary tables became the source of benefits for a much larger proportion of private hospital services to insured patients with the development of benefits for private hospital theatre fees, labour ward charges, intensive care services and even some case payments. By 1980 there was also some considerable disquiet expressed by insurers, in Western Australia in particular, over the amount of subsidy they were providing to insurers operating in the eastern states through the, what was becoming the relatively unsubsidised, reinsurance arrangements. This subsidy was due largely to the lower risk profile (lower average age) of the insured population in Western Australia.

The first major changes to reinsurance occurred in 1984, upon the introduction of Medicare, when it was decided to create state reinsurance pools with the development of stratified basic table benefits and Commonwealth subsidies for private hospitals. The aforementioned disquiet over interstate subsidies due to the lack of Commonwealth subsidies also contributed to this decision. A further change abolished the requirement to credit contributions and debit management expenses to the reinsurance account. This latter change was made on the grounds that these amounts roughly cancelled each other out in aggregate and insurers were having immense difficulty in getting their reinsurance contribution income credits correct so an inordinate amount of Commonwealth audit time was spent on correcting these accounting entries.

Commonwealth support for community rating via the budget allocated subsidy to reinsurance had dwindled substantially to this time but was revived briefly with the introduction of Medicare when the Commonwealth also introduced private hospital subsidies that were related to the Commonwealth "classification" of each private hospital. Average lengths of stay in hospital had also trended downwards quite significantly in the seven years prior to the introduction of Medicare. These two factors had created a case for substantial change to the reinsurance arrangements although it was a further five years before the required substantial change was made.

In the period leading up to the substantial changes to reinsurance that occurred in June 1989 the Commonwealth introduced two new basic table benefits; medical gap insurance and benefits for prostheses. It also scrapped its private hospital categorisation scheme and the attendant subsidies to private hospitals and replaced those subsidies with much higher private hospital insurance benefits based on patient classification. The Commonwealth subsidy to reinsurance by 1987/88 was just a token \$1million and the total net debit to the reinsurance account was \$215 million (i.e. only 0.93% of the initial intended subsidy on which the reinsurance design was based on).

The June 1989 changes to reinsurance were motivated by two political objectives. Firstly, waiting lists in public hospitals were becoming a substantial problem for state

governments. This problem had the potential to destroy the political appeal of Medicare. The Commonwealth Government was also concerned that private hospitals were under-utilised and this was believed to result from insurers providing less than 100% cover for private hospital treatment. If private hospital insurance benefits could be raised to virtually 100% of fees then doctors who admitted to both public and private hospitals would be able to more easily refer additional insured patients to private hospitals because their “out of pockets” would become nil like they were when privately insured patients were treated in the public hospital system. There were no “out of pocket” costs for insured public hospital services because the Commonwealth prescribed the benefits for public hospital treatment and state governments were virtually forced to only charge these highly subsidised amounts. (Highly subsidised by the state by virtue of the fact that it cost the state, on average 2 to 3 times more to provide services to insured patients than it received in insured benefits for that treatment).

The second objective was to overcome the threat to the whole private health insurance system, and therefore Medicare, posed by the apparent impending insolvency of two sizeable insurers. The financial difficulties of these insurers was partly due to the fact that supplementary table benefits had grown to over 30% of the total private hospital benefits paid by Australian insurers. Much of these benefits were paid to long stay patients but the benefits could not be debited to reinsurance. The two funds in question had very high proportions of elderly members. The federal election due in early 1990 also motivated the Commonwealth to make changes with minimal consultation with the industry (except with the insurers whose solvency was in doubt).

The result was a reinsurance system that put strong incentives onto the health insurance industry to substantially increase private hospital supplementary benefits (which could also now be debited to the reinsurance account under the same rules as basic table benefits) and provided for the debit to the reinsurance account of all hospital benefits paid in respect of hospitalisation provided to persons over the age of 65. The 35 day threshold rule for insured patients under the age of 65 remained unchanged. These changes were implemented from June 1, 1989 and were controversial right from the start, as they enormously increased the total debits to reinsurance. In the last full year of the previous arrangements (1987/88) total debits to reinsurance were \$215.3 million. In the first full year of operation of the new arrangements (1989/90) total debits to reinsurance were \$743.9 million. The Commonwealth subsidy in that year was a token \$15.1 million and was completely phased out mid way through the following year.

To get some idea of the scope of inter-insurer transfers initiated by the changed arrangements, the following shows the largest receiver and payer of reinsurance benefits in those two years.

Insurer	Received or (paid) to reinsurance	
	1987/88	1989/90
	\$000	\$000
MBF	7,756	32,483
Medibank Private.	(8,232)	(29,786)

For some insurers the changed arrangements were even more traumatic. The health insurer known as Government Employees paid \$1.339 million to the reinsurance trustees in 1987/88 and \$7.510 million in 1989/90. For the Geelong insurer these figures were \$0.249 million and \$1.462 million.

By 1991/92 total benefits debited to reinsurance had grown by around 36% on 1989/90 to \$1.015 billion and the health insurance industry was in turmoil as the incentives built into the reinsurance arrangements were having enormous, and most thought, unbeneficial effects on the health insurance industry. An inquiry was called, but a further 2.5 years went by before the reinsurance arrangements were changed to what is still the current form and by then total reinsurance debits had increased by a further 25%. The current form of reinsurance commenced in January 1995 and this form retained the essential features of the previous structure except that only 79% of claims paid to persons over 65 or for hospitalisation in excess of 35 days in one year were able to be debited to the reinsurance arrangements.

The Commonwealth Minister's announcement in September 1996 of the new community rating principles that came into effect on October 1, 1996 threw a new dimension into the underlying philosophy of the reinsurance arrangements, particularly as health insurers also became allowed to exclude certain hospital services or diseases for which hospital treatment is provided from October 1, 1995. The new community rating principles provided for separate non-linked contribution rates for singles, couples, single parent families and two parent families with children. This replaced the community rating principle of single rates being half family rates for the same product that had been in existence since the commencement of the national health insurance arrangements in 1953. The new community rating principles together with the allowance of benefit exclusion tables meant that insurers could, from October 1, 1996 provide hospital benefit plans "targeted" to population groups and could effectively isolate poorer risk groups and make them pay a contribution rate more commensurate with their likely experience. It was thought that the maintenance of the existing benefit equalisation (reinsurance) arrangements would frustrate the Government's apparent intention for insurers to produce products for risk groups which were rated more closely to that risk group's actual experience.

The Government's ultimate objective was for more attractive products to become available to the better risk groups and thus a higher proportion of the population to become insured. (Even though this may have meant that the proportion of hospital services that are provided to privately insured persons would reduce, because the cost of hospital insurance would have eventually risen significantly for the higher risk groups who may, as a result, not have been able to afford to remain insured.) But the Government had a "bet each way" because the Minister for Health also issued a press release to the effect that he has a "concern that these changes do not result in increased premiums for families with children" and therefore there was a threat that the previous single/family community rating principle would be restored if this occurred. Since families with children, especially those that are claiming benefits for the birth of their children (the most common reason for taking out hospital insurance in Australia), are

being subsidised by the very insured population groups that the Minister wished to have cheaper premiums the Minister's concern would, sooner or later, have been realised.

These issues were raised with an enquiry into the Private Health Insurance system conducted by Australia's Productivity Commission and a risk adjustment system was proposed.

The Initially Proposed Risk Adjustment System

The following is the details of the original risk adjustment system proposed to the Productivity Commission in late 1996. It contains much of the arguments used to support the risk equalisation proposition.

The history of reinsurance is outlined above. It was designed as a benefit equalisation scheme because insurers could not have provided sufficient data to build even a crude risk equalisation scheme at that time. The 35 day threshold was also chosen somewhat arbitrarily to be equal to a number of weeks (5) and a week was the approximate average hospital length of stay at that time. Also, the 35 day threshold approximated the financial effect of the previous Government funded “special account” thresholds of 30 days (single) and 60 days (family).

By 1996, how long a patient stayed in hospital was far less relevant to the cost to the insurer of the benefits paid in respect of that hospitalisation. What was relevant was the treatment provided to the hospital patient as benefits are basically paid according to the treatment provided under Casemix benefit systems including the versions used by the private health insurers. A reinsurance threshold measured in days was therefore no longer technologically appropriate.

Benefit equalisation schemes also suffer from the problem of equalisation after the event which effectively reduces the incentive for the insurer to minimise the benefits to be paid in relation to the episode of service. On top of this, benefit equalisation schemes require all sorts of rules and definitions which do have a distorting effect on the efficiency of the services to be provided. For example there may be two ways of treating a particular chronic condition of a child. One could involve a lengthy hospital stay and low intensity (low cost) treatment and the other a much shorter, even minimal length of stay in hospital but very high intensive, high cost treatment. The then current reinsurance arrangements would tend to cause insurers to provide better benefits for the low intensity treatment because some of the cost may be picked up by others through the reinsurance arrangements. This may be true even if the high intensity treatment is significantly cheaper. In other words, benefit equalisation reinsurance enable cost shifting opportunities to be available to insurers and this can interfere in the development of efficient health care delivery systems.

An even more practical example of the way the current reinsurance design breeds inefficiency occurs when there are two ways of treating a particular condition of say a 70 year old insured patient, one involves hospital treatment with high risk surgery but minimal non medical after care, the other one doesn't require hospital treatment but does involve continuing ambulatory, services for some weeks yet will cost two thirds as much as the first option. Seventy nine percent of the benefits for the hospital treatment option will immediately be debited to reinsurance whereas the benefits for the ambulatory

treatment will be the full responsibility of the insurer. The insurer will naturally tend to slant any benefit incentives and advice towards the higher risk, higher cost option because that is the insurer's lowest cost option.

The fact that insurers were not on risk for the full cost of in hospital and out of hospital medical services also can severely distort the choice of the most efficient health care service. Throughout the industrialised world hospital services involving overnight stays are being replaced by non-hospital inpatient services where the patient is treated and sent home on the same day. Furthermore, a range of illnesses that previously would have been treated in hospital could then be treated in doctors' surgeries or in 24 hour medical clinics (as operated in Australia). The fact that the reinsurance arrangements were based on the requirement to be hospitalised and use an obsolete concept of a bed day as the parameter of its primary threshold inhibit maximum efficiency benefits from being gained from the technological developments that are giving rise to this long term change in the medical paradigm.

Clearly a risk equalisation scheme is more appropriate in the current and expected Australian health care environment because a risk equalisation scheme can not distort incentives to maximise the efficiency to provide the most appropriate care. How would a risk equalisation scheme be designed? One way would be to use the general method already in use in the Medicare hospital financing agreements of standardised age/sex weighted hospital utilisation patterns. The weights used in the Medicare hospital financing agreements in 1996 were as follows:-

Hospital Cost Weights In the Medicare Hospital Financing Agreements

Age	Male Weight	Female Weight
0-14	.334554	.349741
15-34	.364114	.902878
35-49	.489935	.710966
50-64	1.286132	1.139774
65-74	3.122513	2.379293
75+	6.164183	5.422562

Insurers would be required to submit quarterly data on the total persons covered for hospital services at the end of a quarter in each of the above age/sex groups and this would be averaged with the previous quarter's data before weighting by the cost weights above and summing to obtain the total cost weighted (n_w^i) average membership (persons covered) for that insurer (i) for that quarter and the standardised weight ($\overline{n_w^i}$) per person covered for that insurer being its $\overline{n_w^i}$ divided by its average number of persons covered

(n^i). The total cost weighted average membership (persons covered) for all insurers in that state for that quarter would be obtained by simply summing the n_w^i figures for each insurer and the average cost weight per person covered for the state obtained by dividing this figure by the total number of average persons covered for each insurer in that state (S^n). This figure would be known as the average standardised weight per person (S_w^n) for that state. The total hospital contributions received in the state would then be divided by S^n to obtain the total Hospital Contributions per total average Persons covered (C^n) for that state.

To determine the risk adjustment for each insurer its n_w^i would be subtracted from the S_w^n to obtain the absolute difference by which its average membership for that quarter had a higher risk or lower risk than the state average for that quarter. This would then be multiplied by both the C^n for the state and the n^i for that insurer to determine (if positive) the amount to be paid to the reinsurance pool for the state, or (if negative) the amount to be received from the reinsurance pool for the state. Finally a constant (k) is multiplied by the amounts obtained. This constant is the “level of equalisation” constant because the proposed risk equalisation reinsurance arrangements would not be intended to equalise the total risks borne by insurers. (The current benefits equalisation arrangements only effectively equalise about 46% of the hospital benefits paid). The formulae for the proposed arrangement are set out in Appendix 1.

Although there could be an argument for 100% equalisation of risks between insurers, it would be difficult to get agreement from insurers when the present environment provides for only partial equalisation of hospital benefits through the current reinsurance arrangements. At present only 79% of hospital benefits qualifying for reinsurance are actually equalised through the reinsurance arrangements. In 1995/96 58.9% of total hospital benefits paid in Australia were debited to reinsurance. Effectively only 79% of the 58.9% (i.e. 46.5%) of hospital benefits were therefore equalised. This proportion is gradually growing over time as age profiles of insurers’ memberships gradually get older due to the selectively increasingly exhibited by the population due to the requirement that insurers community rate in a voluntary hospital insurance environment.

The proposed basis enables a very simple adjustment to be made for the level of equalisation. All that is required is to multiply each insurer’s contribution or benefits to be paid or received at the 100% equalisation level by the equalisation adjustment factor.

Calculations were then done for a sample group of 10 insurers on both the current claims equalisation basis and the proposed risk equalisation basis and the results showed that the proposed reinsurance arrangements would produce similar overall results to the current arrangements at about the 70% equalisation level. The proposed risk equalisation arrangements did, however, produce differing results between insurers because it was

equalising all risk groups. Therefore, for example, the higher expected utilisation of hospital services by women in the child bearing ages was equalised between insurers in the same way as the higher expected utilisation of hospital services by the aged.

This proposed arrangement should be measured by what should be the objectives for reinsurance design:

- **Simplicity** - the cost weights are determined independently by the Australian Institute of Health and Welfare (AIHW) and are changed only when the Medicare hospital Financing Agreements are renewed. Even if Medicare hospital financing agreements were scrapped the methodology for their calculation is well developed. Refinements to the methodology would be determined by AIHW in conjunction with the Commonwealth and the states. The determination of the amount payable by, or to be paid to, an insurer is quite a simple calculation and principally relies on the total hospital contributions received by insurers in each state for the previous quarter.
- **Stability** - the proposed arrangements would be very stable since they would be based on cost weights that are changed only when the Medicare hospital financing agreements are reviewed and would be known well in advance. Thus, there will be considerably more stability in these arrangements than in the current reinsurance arrangements. Variations in insurer contributions to or receipts from the reinsurance pool each quarter will be largely due to changes in membership composition of that insurer and so will be entirely predictable.
- **Fairness** - the reinsurance arrangements would be seen to be fair because they would compensate insurers for all higher risk memberships and not just higher risks due to age. For example, insurers with high levels of females in the child bearing age groups would have this risk element equalised in the same way as the risks of older aged members are equalised. Therefore, the proposed arrangement would be considerably fairer than the current arrangement. It would also be perceived to be fair because the underlying cost basis is the same as the one agreed to between the Commonwealth and the states for the Medicare hospital financing agreements.
- **Self Financing** - the arrangements would still be totally self financing.
- **Compulsory** - the arrangements would still be compulsory.
- **Sufficiency** - the arrangements would provide significantly more cover against the insurance risk than the present arrangements. Therefore, the proposed arrangement is more sufficient than the current arrangement. At the same time there is not over compensation as there is only currently six cost weights for each sex. There is plenty of scope within the proposed arrangement to develop innovative health insurance products. However, the cost weights do appropriately allow for obstetrics so will assist the insurers to

meet the Minister's request that contribution rates not rise unduly for families with children.

- Appropriateness - the current arrangements were appropriate for an environment of paper based health insurers that did not know their membership profile. The current arrangements are not appropriate in the current technological environment nor are they appropriate in the Minister's new community rating environment which is much more focussed towards persons covered.
- Correct Incentives - the proposed reinsurance arrangement also equalises risk and not claims and thus provides the appropriate incentives to maximise efficiency in the delivery and financing of health care.

Other issues that should be considered for the proposed arrangement are as follows:

- Audit of Persons Covered - persons covered information on health fund databases will be the primary data for the risk equalisation process. This data may still not be 100% accurate in all insurers. Although a previous consultant to the Government on reinsurance stated in its report that it believed that persons covered data held by insurers was then sufficiently accurate to enable an equalisation scheme to be based on this data. Several insurers were able to provide persons covered data on the Medicare cost weight basis within a few hours of the request to do so for the development of the model. This suggests that the data is readily available. Appropriate audit procedures could be developed to improve the accuracy of this data. One method would be to, at least once a year, get all insurers to provide persons covered age specific data and a full reconciliation on an age by age basis of this data with the previous year's age specific data. This would not be a difficult task for health insurer's computers but it would ensure that the auditors would pick up any errors in the previous year's membership returns to Private Health Insurance Administration Council (regulator). Adjustments to earlier reinsurance pool calculations could then be made on the basis of the corrected data.
- Audit of Hospital Contribution Income - the audit of the contribution income should be able to be accomplished by each insurer's own auditor. The important component of this audit is to get the split between hospital and ancillary insurance correct. Most insurers' computer systems already appear to do this adequately. Because the total hospital income for the state is used in the calculation insurers should not be able to obtain any significant advantage by over or under stating their hospital contribution income.
- Transparency of Effect - the proposed scheme is inherently transparent in its effect. This is because its purpose is clearly defined and coincides with the basis used in the national Medicare hospital financing arrangements. To the extent that insurers can do better than the standard reinsurance cost weights they can reduce their own contribution rates relative to the market. Also only

partial equalisation is proposed so this will also enable insurers to compete to obtain better risk profiles.. The scheme also will tend to enhance the Minister's new community rating system rather than frustrate it as the current scheme does.

- Transparency of Application - the proposed reinsurance arrangement is inherently simple in application and the calculations are designed to work in much the same way as the current reinsurance arrangement. Even the application of the constant "level of equalisation" factor is a very simple process.

Hospital insurance risk equalisation schemes are in use around the world in environments where community rating is practiced. Most of these environments use various forms of community rating by class where the insured's age is the most important factor in determining which class the insured is included for that insured's community rate.

The most important general principle used by actuaries in the design of risk equalisation arrangements is the requirement for transparency in the method of calculating the risk adjustment factors. We are fortunate in Australia to already have in use a well accepted set of hospital risk adjustment factors in the Medicare hospital financing agreements. It is more important to have well accepted risk adjustment factors than to have their veracity validated. In the end the insurer that gets the greatest market advantage is the insurer that is able to consistently reduce its claims rate further below the adjustment factors than its competitors have done. So, it is not so important that the adjustment factors be correct as to be seen to be the appropriate adjustment factors by all parties. The adjustment factors chosen for this exercise would appear to satisfy that criteria.

Finally it should be pointed out that one effect of this reinsurance proposal will be to make it more attractive for insurers to provide cover to families who are having children. This will accord with the Minister's wish in this regard. However, there will still be a requirement for a longer waiting period for obstetrics because this proposed reinsurance system does not assist insurers that are unduly selected by families who take out hospital insurance for the express purpose of an imminent pregnancy.

Improvements to the Risk Adjustment Scheme

In late 1998, the Commonwealth Dept of Health appointed a firm of consultant actuaries to advise it on health insurance risk adjustment schemes. The firm suggested a modification of the proposed arrangements but their recommendations were further modified after their initial report had been released. The principal modification to the proposed arrangements was to use more up-to-date data to calculate the risk adjustment factors for five year age groups, which were applied to persons covered. Instead of equalising on persons covered the consultants argued that it should be equalised on adults covered but in the end it was decided to equalise on the same basis as the existing reinsurance arrangements which was single equivalent units (SEUs) of membership. One single member is an SEU and for the remaining classes of memberships being family memberships, couples and single parent family memberships, these are all counted as 2 SEUs. The risk equalisation factor was effectively disguised by the way the consultants determined the risk adjustment factors but it effectively ended up at 69.6%. The formula for the revised suggested risk adjustment arrangements is set out in appendix 2.

In the meantime the Commonwealth Government had decided to implement another of the Productivity Commission's recommendations, which was the concept of what became known as Lifetime Healthcover. Lifetime Healthcover was a significant modification to community rating. Instead of the same contribution rate being charged to all members of each class of contributors, the standard rate would only be charged to all members of that class prior to the implementation date and all future member who joined before age 31. Thereafter an entry age loading of 2% of the standard rate would apply for each entry age above 30 with a maximum entry age loading of 70% (at ages 65 and above). The entry age loadings on the standard rates apply for life.

The controversies surrounding the consultant's initial report and the subsequent delays caused by its revisions caused the Minister to eventually decide not to implement the change to a risk equalisation system until well after the introduction of Lifetime Healthcover. He initially promised to reactivate the process to change the reinsurance system after the following Federal election, which was held last November. However this Minister has since resigned from Parliament and the new Minister and her new Dept Head have yet to come fully to grips with the portfolio let alone tackle the difficult and controversial issue of risk adjustment for private health insurance.

Finally, the introduction of Lifetime Healthcover in Australia has created a further equalisation issue. New insurers (and existing insurers) that grow strongly with products targeted to new entrants who are over 30 will eventually have a significant advantage over existing insurers who don't grow strongly or don't target older new entrants because the majority of the new insurers' membership will be paying a loading on their standard rates. This will eventually lead to some instability in the industry and in any event is counter to the fundamental structure of the proposed risk adjustment mechanism, which has an implied underlying assumption that the community rate is applied uniformly to a

class of members and not with age at entry loadings. Therefore an adjustment is needed to overcome this potential problem. The age at entry loadings will eventually need to be respread across insurers in some way. The arguments for this and the appropriate formulae to accomplish this are detailed in Appendix 3.

Appendix 1

Let the number of members in age group n , sex s in insurer i be $x_{n,s}^i$

Let the cost weight for age group n , sex s be $w_{n,s}$

The total members for insurer i (n^i) is therefore $\sum_i x_{n,s}^i$

The total weighted membership for insurer i (n_w^i) is $\sum_i x_{n,s}^i \cdot w_{n,s}$

The total membership for the state (S^n) is $\sum_i \sum x_{n,s}^i$

The total weighted membership for the state (S_w^n) is $\sum_i \sum x_{n,s}^i \cdot w_{n,s}$

Let the hospital contributions for an insurer i be c^i

The total hospital contributions for the state is therefore $\sum c^i$

Therefore average contributions per member of the state ($\overline{c^n}$) is $\frac{\sum c^i}{S^n}$

The average weighted membership for the insurer i ($\overline{n_w^i}$) is $\frac{n_w^i}{n^i}$

The average weighted membership for the state ($\overline{S_w^n}$) is $\frac{S_w^n}{S^n}$

The contribution to be made to the reinsurance pool by insurer i is therefore

$$k \cdot (\overline{S_w^n} - \overline{n_w^i}) \cdot \overline{c^n} \cdot n^i \text{ or } k \cdot \left\{ \frac{\sum_i \sum x_{n,s}^i \cdot w_{n,s}}{\sum_i \sum x_{n,s}^i} - \frac{\sum_i x_{n,s}^i \cdot w_{n,s}}{\sum_i x_{n,s}^i} \right\} \cdot \frac{\sum c^i}{\sum_i \sum x_{n,s}^i} \cdot \sum_i x_{n,s}^i$$

Where k is the level of equalisation to be carried out and is a constant multiplier. If k is 1 it is 100%, if k is .79 it is 79%, etc.

The result will be negative if the insurer's average weighted membership is greater than the average weighted membership for the state. Then this negative result is the amount receivable by the insurer.

Appendix 2

In Appendix 1 the contribution set out to be made to the reinsurance pool by insurer i is

$$k \cdot (\overline{S_w^n} - \overline{n_w^i}) \cdot \overline{C^n} \cdot n^i \quad \text{or} \quad k \cdot \left\{ \frac{\sum_i \sum x_{n,s}^i \cdot w_{n,s}}{\sum_i \sum x_{n,s}^i} - \frac{\sum_i x_{n,s}^i \cdot w_{n,s}}{\sum_i x_{n,s}^i} \right\} \cdot \frac{\sum c^i}{\sum_i \sum x_{n,s}^i} \cdot \sum_i x_{n,s}^i$$

Where k is the level of equalisation to be carried out and is a constant multiplier. If k is 1 it is 100%, if k is .79 it is 79%, etc.

The result will be negative if the insurer's average weighted membership is greater than the average weighted membership for the state. Then this negative result is the amount receivable by the insurer.

What is required is a new parameter, which is denoted $u_{n,s}^i$.

u is the equivalent single unit (or family unit if you prefer) and replaces $x_{n,s}^i$ in the equation as follows.

$$k \cdot \left\{ \frac{\sum_i \sum x_{n,s}^i \cdot w_{n,s}}{\sum_i \sum u_{n,s}^i} - \frac{\sum_i x_{n,s}^i \cdot w_{n,s}}{\sum_i u_{n,s}^i} \right\} \cdot \frac{\sum b^i}{\sum_i \sum x_{n,s}^i} \cdot \sum_i u_{n,s}^i$$

You will notice that c^i has also been replaced with b^i and the reason for this will be discussed below.

The above formula now enables all risk groups to be included in the equalisation process but equalises on units (equivalent single units) instead of persons covered.

The reason for substituting b^i with c^i , is that the rationale for using c^i , the total contributions for the state, is no longer valid. That rationale was that the total contributions for a state could be estimated reasonably accurately into the future because this figure tended to change fairly slowly and fairly predicably. The time when the health insurer would most want to project its likely risk equalisation cost is when it is doing its new contribution rate calculations.

However the Government also now requires all insurers to change their contribution rates at the same time. This makes it extremely difficult to predict future levels of contributions particularly at the time when you need to. Therefore, it would be more sensible to use total benefits (b^i) rather than total contributions (c^i). To smooth out fluctuations one could use a rolling 4 or 5 quarter average, but quite likely that this would not be necessary. One consequence of using b^i rather than c^i is that the level of k needs to change. Possibly k can be set at about 80% to achieve an appropriate result.

Appendix 3

The health insurance risk equalisation “reinsurance” system that was under consideration by the Australian Government was designed, when the level of equalisation is 100%, to fully spread the risk of the whole insured population, across all contributors of all tables (and health insurers) in a state. This is the prime object of community rating, which requires that each member of a class of membership within a table of membership pay the same contribution rate. The risk equalisation system to be eventually adopted will have a level of equalisation less than 100% to ensure that individual health insurers have an incentive to market their insurance products to “better risk”, usually younger persons. This is to ensure that there is a continuing supply of “better risk” new entrants into the system to keep the overall contribution rates at a lower level than they would otherwise be. The concept of Lifetime Healthcover also has this objective, through the imposition of penalty contributions to new entrants who first obtain membership after age 30.

The test of adherence and hence “fairness” of any reinsurance proposal is whether, with a reinsurance equalisation of 100%, a table will still require the same contribution rate when a new entrant with a different risk characteristic than the average is admitted to membership. For the purposes of this fairness test the table is assumed to have zero expenses and zero investment income. Furthermore to simplify the mathematics the table and the rest of industry in that state is assumed to only have single memberships and a very large number of them such that one can use the usual approximations associated with very large numbers. The expansion into the four classes of membership is dealt with at the end of the test.

Let the contribution rate for the table be C and let this also be the average contribution rate for the whole state.

Assume that the number of members of the table before the addition of the new entrant is n and that the number of members in the whole state is a very large number N .

Assume that the expense rate of the fund with the table is zero. Also assume that the investment income of that fund is zero and that it has no requirement to increase or decrease its solvency margin by an appropriate component in the contribution rate of the table.

Assume the average relative risk factor for the table is 1 and also that the average relative risk factor for the state is 1. Furthermore, assume the risk factor for each person (member) is the actual expected claims cost of that person.

Assume that the risk factor for the new entrant is r . Assume that the reinsurance equalisation factor is k .

The reinsurance contribution payable by the existing membership of the table is given by:

$$\left(\frac{N.1}{N} - \frac{n.1}{n}\right).n.k.C = 0$$

With the new entrant the reinsurance contribution of the members of the table changes to:

$$\left(\frac{N+r}{N+1} - \frac{n.1+r}{n+1}\right).(n+1).k.C = (1-r).k.C$$

This transformation occurs because N is a very large number and hence

$$\frac{N+r}{N+1} \cong 1$$

If C=1 then the breakeven contribution rate before the new entrant joined was 1 and after the new entrant has joined it becomes:

$$\frac{n+r+(1-r).k.1}{n+1}$$

In other words the n+1 members of the fund now have to share the experience of the new member plus the contribution made to reinsurance in respect of that new member. If r was greater than 1 then there would be a contribution from reinsurance that would reduce the contribution rate for all the members. If k=1, that is, there was full equalisation then the breakeven contribution rate becomes:

$$\frac{n+r+1-r}{n+1} = 1$$

In other words with full equalisation the breakeven contribution rate for the table remains unchanged and this is because the different experience of the new entrant is fully spread among all members of all funds in the state. This demonstrates that the reinsurance system under these ideal conditions and assumptions is designed to be unequivocally fair.

Now consider what happens when the same new entrant joins after July 1, 2000 and the fund is required to charge a premium loading of x to this member so that the member pays (1+x) while everyone else in the state pays only 1. The breakeven contribution rate for the members of the table with the new entrant (when k=1) is smaller.

$$\frac{n+r+(1-r).k}{n+1+x} = \frac{n+1}{n+1+x}$$

In other words the members of the table benefit because they get to share the extra loading imposed on the new member by Lifetime Healthcover. This is not in accordance with the wider context of the community rating principal given the intention of the proposed reinsurance system. Clearly, all contributors to all funds should share the extra loading imposed on the new entrant by Lifetime Healthcover. If that was not the case then health funds could profit from Lifetime Healthcover in respect of loadings imposed by new entrants over age 30. A new fund or a new table within a fund that was set up to commence on July 1, 2000 or any date thereafter would gain significant advantages literally from the first day of operation if it concentrated on getting new members to health insurance that were over age 30. This would not have been an intended consequence of the new reinsurance system or Lifetime Healthcover.

Therefore the reinsurance formula should be changed to provide for Lifetime Healthcover. As it happens the required change is quite subtle.

The reinsurance contribution for the table for the new entrant from July 1, 2000 should be as follows.

$$\left(\frac{N.1+r}{N+1+x} - \frac{n.1+r}{n+1+x}\right).(n+1+x).k.C = (1-r+x).k.C$$

This formula is achieved when the sum of the contribution rate loadings payable by members of a fund is added to its number of contributors in the reinsurance formula. When this new reinsurance result is applied to the breakeven premium rate for the table then the new premium rate for the table with a contribution rate $C = 1$ becomes (when $k=1$):

$$\frac{n+r+(1-r+x).k}{n+1+x} = \frac{n+1+x}{n+1+x} = 1$$

In other words the loading payable by the new member is no longer used to reduce the contribution rates of the members of that table (or increase the profits of the fund) but is spread among all members of all funds in the state. This would satisfy the criteria of equity under the community rating principal.

In practice, what is required is that each fund will also have to advise Private Health Insurance Administration Council (regulator) of the numbers of memberships by class of membership at the end of each quarter for whom a Lifetime Healthcover loading is payable subdivided by each Lifetime Healthcover loading. (Or they could provide the

sum of the Lifetime Healthcover loadings for their total membership, but this figure would need periodic audit.)

What would happen if the risk equalisation system were not modified as indicated above? Existing insurers would have a strong incentive to develop new hospital insurance products to specifically cater for older Australians, because the Lifetime Healthcover entry age loadings would make these products competitive vis-à-vis existing products. Also new entrants to the market would quickly be able to undercut existing health insurers.