**Actuarial Society of South Africa**

# EXAMINATION

6 October 2009 (pm)

## Subject SA1RSA — Health and Care Specialist Applications

EXAMINER'S REPORT

**Question 1**

*Candidates performed relatively well in this question. However, several candidates failed to demonstrate a thorough appreciation of the long-term nature of a PRMA liability and the impact that the scheme's expected financial performance should have on the employer's PRMA valuation basis.*

- Average family size decreases from 2.4 to 2.1 (13% decrease)

- Number of families on HighPlan changes from 5625 to 2184 (61% decrease)

- Number of families on MidPlan changes from 13125 to 936 (93% decrease)

(Credit also given for changes in beneficiary calculations but not both)

- Average contribution per family changes from R2,015 to R2,635 (31% increase)

- Total annualized contributions change from R453,375,000 to R98,654,400 (78% decrease)

- Solvency ratio (based on annualized contributions) changes from 35% to 162% (360% increase)

- Both the decrease in size and increase in age and related indicators represent and increase in the risk profile of the scheme. These risks include volatility and higher expected claims due to the demographic and chronic profile of the scheme.

- This is partly mitigated by the increase in the solvency ratio.

- The loss ratio of the scheme will dramatically worsen

- Assuming no midyear contribution increase is implemented

- If not at midyear 2009, it is likely that contributions will be increased at some future point to reflect the altered risk nature of the scheme.

- The scheme may need to add a contingency margin to its contributions to reflect the higher uncertainty associated with its smaller risk pool, adding further pressure to increase contributions.

- Higher contributions on the HighPlan may lead to anti-selective movements from the HighPlan to the MidPlan, adding further pressure to increase contributions on the HighPlan and possibly also the MidPlan.

- Per capita non-health expenditure will increase, depending on the extent of the scheme's fixed expenses.

 

- A regional analysis would also have to be done to see if region is a meaningful risk factor, and whether there has also been a change in the regional distribution of employees due to the merger. The specific industry of each of the subsidiaries could also be modeled as a risk factor, and factored in as part of the analysis of the net effect of the movements.

- MidPlan in particular becomes a very small option, exposed to volatility which could threaten the sustainability of the option.

- The scheme may need to consider merging its two options, since it is most likely to small to sustain two self-sustaining risk pools

- The change in age profile and chronicity will improve the scheme's net Risk Equalisation fund position once the REF is implemented

- The portion of the PRMA liability attributable to active employees will decrease significantly as a result of the loss of active employees due to the unbundling

- The number of pensioners remains the same, as their liability would not be transferred to the unbundled companies (as shown by increased average age)

- Also, the average contribution has increased immediately by 31%, leading to a significant increase in the PRMA liability for those that remain

- It would also be reasonable to assume that future medical inflation in TradeMed would be higher than before, and hence that the assumptions should change, leading to a further increase in the PRMA liability. Even though the solvency ratio is higher, the Scheme should not price for a continuous underwriting loss, and hence an increase in the inflation assumption is most likely required

- Hence the PRMA liability is likely to increase overall despite the loss of membership

ii)

*This question is based on bookwork and was generally well answered.*

- An application must be made to the registrar, along with an exposition of the proposed transaction and submitted along with all actuarial or other reports produced for consideration in the merger

- The merger cannot be detrimental to the interests of the members of any one of the medical schemes

 

- An independent report must be sought from a suitably qualified professional evaluating the merger

- If member voting is required, the voting results need to be submitted to the registrar.

- The schemes may be required to publish the proposed transaction in the Gazette and/or newspapers as directed by the registrar

- All interested parties are allowed 21 days to inspect and comment on the transaction

- After this time period the registrar will approve or decline the exposition, or suggest modifications to the transaction

- Both Boards of Trustees must agree with the merger

- Communication of the merger to members should be made, especially TradeMed members

- Assuming the schemes are administered by a different administrator, there should be discussions about data transfers for member and claim related information, including information on chronic conditions and medication

- There should be consideration as to the suitability of MedicAll; evaluating the extent of cover, and if there are significant differences in the benefit design – in particular as the benefits of TradeMed would not be available in the new scheme.

- Upon conclusion of the transaction, the assets and liabilities of both schemes shall vest in the amalgamated scheme.

iii)

*Few candidates performed well in this question. Many candidates failed to grasp that the additional amount reflected the present value of future cashflows for a number of years into the future. Too much focus was given to providing lists of data required and/or detailed methodology of generic short term (e.g. single-year) projections.*

- First, the open scheme's risk profile should be considered in relation to TradeMed's. If MedicAll's profile is worse than TradeMed's (reflected in demographics and expected claims) then no additional payment should be necessary. But this is unlikely given the average age of TradeMed after the unbundling.

- The underlying risk of the residual TradeMed members should be modelled, possibly with a Generalized linear model

 

- The GLM must be fitted on the basis of MedicAll's claims data, to ensure that it reflects the benefit structure that the new members would have in practice. The underlying assumption is that there are no fundamental differences in the underlying risk of a particular member transferring into MedicAll, and the existing members of MedicAll

- This may of course not be correct, so it is worthwhile to check that, where benefits are the same between any of the TradeMed options, and any MedicAll options (e.g. on hospitalisation or chronic medication where cover is likely to be similar), the claims costs of similar members are similar in the two schemes

- But if it is different, this could also be attributable to differences in managed care approaches between the two schemes, rather than fundamental differences in underlying risk profiles.

- On the other hand, TradeMed members may well have a different underlying risk profile, as MultiTrade operates in a single industry, whereas MedicAll is likely to have more diverse membership

- Care should be taken to consider relevant risk factors and cross terms, while also bearing in mind any limitations of the data

- The data used should be the most recent, but should go far enough back to ensure a full year's worth of data for seasonality adjustments (particularly if benefit designs are significantly different). Using data from further back will improve credibility and care should be taken to appropriately adjust values to the current period.

- The members of TradeMed should be mapped to which option they are expected to join and appropriate benefit design changes made. Option mapping can be done in a variety of ways – either by most similar premium or most similar benefits, the latter being done most frequently. In particular since hospitalisation benefits are expected to be more homogeneous, consideration of chronic and out of hospital benefits is key

- The subsidy policy (subsequent to the merger) may also have an impact on option choice

- Another choice regarding options is that the options could just be adopted by the open scheme, however such an alternative is not likely here given the sizes of membership. This alternative brings complications of open scheme members being able to join these options.

- The projection model should simulate the ageing of the TradeMed members over time, if it is unlikely that MultiTrade would continue to attract young and active employees. Alternatively, the MultiTrade population can be assumed to age slowly, or to remain at a similar or younger age, depending on the outlook for the unbundled company.

 

- The projection model may need to incorporate mortality, especially if the projection time period is long.

- The projection should take into account the accumulated funds to be invested in the scheme from TradeMed

- And a suitable investment return rate incorporated

- Note that the investment return will also be earned on the cash injection from MultiTrade

- The family make up of the remaining members should be used to determine the premiums for use in the projection

- An assumption needs to be made as to MedicAll's future contribution increases. This assumption is likely to be based on MedicAll's projected long-term financial performance in the absence of an amalgamation.

- Adjustments may need to be made for differences in provider tariffs being paid by the two schemes.

- Adjustments may need to be made for the behavioural (*i.e.* indirect) impact that changes in benefit design is expected to have beneficiaries' utilisation patterns

- The admin fees and other expenses of the open scheme should be incorporated

- Appropriate provision for brokerage in MedicAll would need to be made

- A suitable period should be chosen for the projection. This may be a difficult and controversial decision as, depending on the outlook for the company and the ageing of the MultiTrade members, the projection period may have a major impact on the required cash injection.

- And a suitable discount rate and annual increases for claims and other expenses should be set. The gap between the discount and inflation rates is more important than the absolute values of the rates

- The net result of projecting income less expenses (claims, administration fees, managed care fees, brokerage, other fees) taking into account the opening reserves should be discounted to the current period

- Given that the premiums of the open scheme would most likely not be sufficient to cover the expected costs of the TradeMed members under the open scheme's benefit design, the projection model will show the period of run down of the opening reserves.

 

- The additional amount for injection by the employer should be calculated as the amount necessary, at the current period, to make the discounted present value of the cash flows zero over the projection period

- Sensitivity testing should be done on the key assumptions, as well as some worst case scenario outputs generated to illustrate the potential impacts of the model's central assumptions are not borne out in practice.

iv)

*Candidates generally did not perform well in this question. Too much focus was given to insurance products which, although worth mentioning, are not a realistic option for MultiTrade. Several candidates failed to demonstrate an appreciation of the fact that MultiTrade as en employer is not effectively in control of the scheme and that it would need to revert to indirect measures (such as its subsidy policy) to encourage certain changes.*

- Members would have to find another medical scheme suitable to their needs and may be subject to underwriting depending on how long they have belonged to a medical scheme before

- Pensioners may be particularly worried about whether they will continue to enjoy the same level of cover as in TradeMed, and there may be significant legal challenges to the liquidation on labour law grounds and appeals to the Registrar

- Chronic Members will likely have to reapply authorization for their chronic conditions and medicines. Chronic medicine benefits could be different to the TradeMed scheme

- It is likely that a liquidation would not be approved by the Registrar unless alternatives are in place for members

- MultiTrade could change the subsidy policy to incentivise membership of an open scheme. This change could be that employees should belong to a particular open scheme (e.g. MedicAll) , or that employees could choose which fund to belong to from a restricted list of schemes, or MultiTrade could move to a structure where employees could choose to belong to any scheme

- Underwriting will depend on periods of eligible members, and whether there were any breaks in cover. Waiting periods and late joiner penalties may be carried over, but waiting periods would not be allowed in respect of PMBs

 

- Such subsidy policy changes are only possible if there are no labour law issues, or if the change does not lead to a severe impact on the post retirement medical liability

- If MultiTrade changes the subsidy policy such that the employees may belong to only one open medical scheme, such as MedicAll, and that this change is effective on 1 January of any particular year, then MedicAll is not in a position to impose any underwriting conditions on the members transferring in, which means that it is likely to be acceptable to employees, especially after the high contribution increase

- Also, this would mean that TradeMed could more easily be liquidated, which would lead to the payment of reserves to its members, which in turn makes the proposition attractive to members

- MultiTrade could allow TradeMed to continue as is, with premiums as is. It will operate at a deficit and run down reserves, which is a short term strategy. Loss making business plans would have to be granted dispensation from the Council for Medical Schemes

- MultiTrade could encourage TradeMed to pursue a merger with another scheme

- However, if the MedicAll merger did not succeed because of the risk profile of TradeMed members, it is unlikely that another merger would succeed

- MultiTrade could offer to buy out the post retirement liability. This involves consultation with employees as to the nature and extent of the liability, and also involves a transfer of risk to the employees, and may not be successful, although given the trouble in which TradeMed finds itself, employees may be willing to accept a buy out

- In particular employees who would have remained until retirement could lose out on individualized calculations if a withdrawal decrement assumption is included in the calculation, but the opposite is true for those that would have withdrawn early in any event.

- The reserves of TradeMed will be used in part to pay for outstanding liabilities (eg IBNR)

- Reserves remaining should be paid out to members upon liquidation, but this may be subject to tax

- Brokers can be consulted to advise the employees on which medical schemes to choose if choice is allowed.

 

**Solution to Question 2**

i)

*Candidates generally struggled with this question, although most recommended the transaction not to go ahead. None of the candidates picked up on the notion that the valuation proposed by the hospital would be overstated.*

- The hospital group's rationale for the transaction assumes that a medical scheme can effectively channel members from one hospital to another. This is not correct for the majority of members, as the decision on which hospital to go to depends on the specialist that the member visits.

- However, it is possible that the Scheme may be able to channel members to this hospital group, particularly in the context of a tightly controlled lower cost option, but only if at the same time it establishes a specialist network of doctors operating in this hospital group to service lower income members. It is probably also necessary to use deductibles for members who voluntarily go outside the hospital and specialist network to make the channelling effective

- The Scheme's management may not have the necessary expertise to reduce the profit margins of the hospital without impacting adversely on its operations or the quality of care provided. The margin may simply not reduce or there may be unintended consequences.

- The R2bn valuation of the hospital group is based on the existing profit margins of the hospital group. If the main rationale for the transaction is to reduce future profit margins, it would mean that the Scheme has overpaid for its investment, as the value would have been significantly lower than R2bn if, in the calculation of value, future profit margins were assumed to reduce significantly.

- The average occupancy level is fairly low. Perhaps the hospital group should first work on increasing the occupancy in its existing hospitals before trying to expand by purchasing or building more hospitals.

- Also, due to the Certificate of Need, the hospital group may not be allowed to build more hospitals

- Or may be prevented by the Competition Commission from purchasing more hospitals from other groups

- However, a good use of capital would be to improve facilities, thereby attracting the best specialists and their patients to the hospital

 

- Other disadvantages include the fact that the medical scheme would use a third of its accumulated funds in purchasing the hospital, and, because this would be a single non-listed entity in which the Scheme would be invested, it would not meet the requirements of Annexure B of the Act, and hence the asset would not be admissible in the solvency calculation. Further, the value of the hospital in the medical scheme's books would be lower due to the reduction in future profit margins, and hence solvency would immediately decrease to well below 25%.

- The existing management of the hospital may not work well together with the Board of Trustees of the Scheme, particularly if one of their main aims would be cost control.

- Hence, there is a fundamental conflict of interest between the hospital management's focus on revenue and profit and the scheme management's focus on cost controls, and this is likely to lead to problems.

- It is not clear how competitors of the Scheme would react to this hospital group belonging to the Scheme – they may enter into risk sharing agreements with other hospital groups, and potentially take lower income patients away from this hospital group, or accuse the Scheme of applying differential tariffs or offering poorer quality services to their members, which may lead to bad publicity.

- The Scheme's management will now be taking responsibility for the quality of care provided in the hospital group, which may be a burden to the scheme. It also removes a layer of corporate governance currently built into the system where schemes act in members' interests to monitor the quality of care provided

- On balance, the recommendation is against this transaction.

ii)

*Most candidates failed to see that the question required an assessment the components of the relative increases in costs experienced. Several candidates merely outlined different ways in which hospital costs can be categorised or analysed (pointing out several arbitrary issues such as demographics or provider abuse or high-cost cases), without exploring how one would go about quantifying and interpreting the contribution of each of these to the total cost increases.*

- First determine the per life per month (PLPM) claims cost for hospitals, specialists, GPs and medication in both years to be evaluated, thereby removing the impact of membership growth over the period. The evaluation should explain the change in PLPM.

 

- To do this, one would have to consider the incurred-but-not-reported claims in each claim category for the latest months. Given the size of the Scheme, it is best to do this separately for each claims category because of the different run-off patterns for these types of claims

- Any necessary adjustments for seasonal effects would then have to be made, particularly if we do not have two complete calendar years in the period of evaluation

- Adjustments would also have to be made for any benefit changes, although this is unlikely to be relevant for hospital cover

- One needs to determine the proportion of cost increases generally attributable to changes in demographics

- Generalised linear modelling (GLM) is one good way to do this

- GLMs should be fitted for all four categories of claims using last year's data. Once this has been done, the impact of the change in demographics from last year to this year can be quantified.

- The average tariff increases for specialists, GPs and increases in the price of SEP and dispensing fee should then be adjusted for

- Relative to the weighted average increase in tariffs amongst the four hospital groups from last year to this year

- But part of the consideration should also be whether there has been any change in the proportion of members going to different hospital groups, and whether this has had an impact on the overall hospital increase between the two years

- Having adjusted for tariff / price increases and demographic changes, the rest of the increase in hospital costs can be attributed to changes in utilisation

- One explanation for a change in utilisation could be changes in casemix of the patients who were admitted to hospital

- Based on the clinical data provided, and a diagnostic grouper, it would be possible to determine the extent to which the casemix has changed from last year to this year.

- Part of the casemix change may be attributable to demographic changes. For instance, if casemix changed by 6%, and the impact of demographic changes was 4%, it means that casemix change contributed a further 1.9% to the cost increase, over and above the impact of demographic changes.

 

- If there is an increase over and above what can be explained by changes in casemix, demographic and tariff changes, such an increase could be attributable to changes in technology or in treatment protocols (this should be apparent from the casemix analysis by evaluating the diagnosis related groups with the highest increases),

- or the presence of other inflationary drivers, such as increased use of consumables, prostheses or in-hospital drugs.

- Changes in the admission rate could also explain some of the cost increase. However, if the change in admission rate is inconsistent with the change in the casemix, some analysis of the diagnostic groups of admission could indicate areas where managed care interventions may be effective.

iii)

*Several candidates focused predominantly on generic pricing and projection techniques, without applying these techniques within the context of hospitalisation.*

- Assumptions would have to be made on the relevant hospital tariff increases in each of the hospital groups.

- This has not yet been agreed with each hospital group, and hence you would have to take a view of the likely outcome of the negotiations with each hospital group. This in turn depends on how each group compares against the others on a casemix-adjusted cost per event basis, for instance, and the relative market power of each group.

- The relative market power depends, in turn, on such matters as the geographic spread and size of each group, and the mix of services offered in each group.

- You also need to estimate how the mix in patients between the different hospital groups will change next year, i.e. the most expensive group may attract more patients

- And how the casemix within each hospital group may change next year, e.g. the most expensive group may attract more complex and expensive cases

- Based on estimates of the full calendar year experience given the current year's experience to date. This may be difficult to estimate during the year, as casemix follows a different seasonality pattern and one may not be able to construct a reliable IBNR for casemix.

- Having taken a view on the above, and using the full year PLPM estimated above, the next step is to evaluate the membership growth prospects for the scheme next year, taking into account:

 

- the scheme's market position relative to competitors,
- the general economic outlook,
- the likely mix of options that new members would join,
- the likely membership movements between options

- Having estimated membership movements, you can use the GLM results from part (ii) to model the impact on the *current* year's claims

- And then apply the assumed tariffs, casemix and market share of different hospital groups assumed above, to these results

- Taking into account that all of these factors interact with each other, and that results may well be different expected

- It is also a good idea to project various scenarios in terms of membership growth and casemix etc. to get a feel for the sensitivity of results to various factors

- Finally, a central estimate would have to be derived based on the sensitivity analysis, and this should be included in the pricing.

iv)

*This question is based on bookwork and was generally well answered.*

- Medical schemes can ration care by:
  - price
  - benefit design
  - pre-authorisation
  - benefit complexity
  - ex-gratia payments
  - sharing risk with service providers
- Service providers could ration care by:
  - age
  - scarcity

 

- prognosis
- ability to pay
- scheme membership
- protocols and formularies

v)

*Generally, candidates made very few valid points in this question. Although several candidates identified various applicable risk elements, few proceeded to explain the practical difficulties associated with isolating these risks in a risk-sharing agreement, or to identify the risk elements that may be appropriate to be transferred to a hospital.*

- The hospital group's immediate financial interests are directly opposed to those of the medical scheme, although it is in the interests of both parties in the longer term to ensure that cover remains affordable

- The main challenge is to isolate the impact of casemix and / or demographic changes over the period of the agreement

- To ensure that the hospital buys into the agreement – hospitals do not like to take demographic or burden of disease risk

- The hospital and the scheme therefore has to agree on the methodology to isolate the impact of demographic risks, and this is complex, involves some degree of subjectivity, and therefore hard to agree between the parties

- Also, a hospital run on a fee-for-service basis requires an entirely different management approach from one run on the basis of risk sharing, and the hospital may struggle to make the transition, particularly if not all of its clients are interested in entering into a risk sharing arrangement

- The hospital group may have to register with the Council for Medical Schemes as a managed care provider in order to take on risk

- The hospital group would not accept any risk in respect of the admission rate, as this is under the specialists' control rather than the hospital's control (although there are situations in which this is not the case).

 

- So the only remaining risk to share with the hospital is on a casemix adjusted cost per event basis

vi)

*Candidates offered several generic points on the difficulties of introducing low-cost options. Although limited credit was awarded to these generic points, few candidates gave sufficient consideration to the hospitalisation and risk sharing considerations that formed the central thrust of the question.*

- To the extent that a risk sharing arrangement controls hospital inflation costs, due to the incentive for the hospital not to maximise income via fee-for-service, it makes private hospital cover more affordable for lower income employees

- Ideally, the scheme should also obtain discounts from one or more hospital groups and set up a network of hospitals meeting certain criteria, such as affordability (on a casemix adjusted basis) and quality of care

- Given that this is the low income market, the concept of a hospital network and less choice may well be acceptable to members

- However, if the hospitals in question are already at close to full capacity, or if it is the only hospital in a particular region, it may not be possible to obtain a discount

- However, it may still be too expensive, given that the cost of cover for a family will be a substantial percentage of household income

- There is also evidence, e.g. from the LIMS study, that low income members may actually prefer other forms of cover, rather than hospitalisation

- However, under prescribed minimum benefit legislation, the scheme would have no choice but to offer full hospital cover – for the diagnosis treatment pairs in the PMB list

- And since it is almost impossible to cover only PMBs and not other admissions, the scheme would effectively have to provide full cover for hospitalisation

- And for PMBs, the tariff has to be paid at cost, thereby also increasing the cost of cover

- There are also challenges with distribution: brokers may not be willing to service this market given the likely low levels of commission, and unless the option is sponsored by employers, it is

 

unlikely that it would be marketed to individuals, and the cost of distribution in any event has to be kept to a minimum

- But employers are unlikely to sponsor relatively expensive cover for employees with such low salaries in full, and employees may not be willing or able to pay their portion of the contribution, which also means that take-up will be low

- The administration and managed care fees would also have to be lower to increase affordability, but the cost of administration is not necessarily lower

- In addition, the Scheme has to take great care to manage option downgrading to ensure medium to long term sustainability, and this is difficult to achieve given that even a low cost option has to offer PMB cover in full

- If, in addition, the Scheme has to price in a solvency building margin (e.g. if they are currently below 25%), it is unlikely that the cost of cover would be affordable for lower income individuals