

Actuarial Society of South Africa

EXAMINATION

13 May 2010 (am)

Subject F201 — Health and Care

Specialist Applications

EXAMINER'S REPORT

QUESTION 1

(i)

This question was straightforward and well-answered. Some candidates described balance sheet items even though these did not form part of the question.

Net contributions

- Remaining members are generally on the higher options which will have higher average contribution rates pmpm
- Impact of the change in average family size could be in either direction

Claims incurred

- The impact will be negative
 - from the average claim profile worsening (loss of textile sector members)
- from the greater proportion of the remaining members being on the higher options
- Again, the impact of the change in average family size could be in either direction

Expenses

- The scheme is likely to have some fixed expenses, so expenses are likely to increase on a pmpm basis
- Variable expenses may also be required to increase - suppliers of outsourced services such as administration or managed care may insist on increases in their fees due to their loss of economies of scale
- Commission may increase on a pmpm basis since these members predominantly belonged to lower-cost options which may have paid less commission than the more expensive options.

Investment income

- As long as the accumulated funds have not have been affected in the short term, this will increase on a pmpm basis.

(ii)

This question was bookwork. Some candidates neglected to consider the rationale behind various underwriting elements, which was an important part of the question.

- In general, underwriting measures are used to protect the scheme from anti-selection,
- which is possible in a guaranteed acceptance and community rating environment.
- Legislation provides the maximum level of underwriting that may be used by schemes
- Schemes can waive or use less strict underwriting if desired
- 3 month general waiting period
- No benefits payable during the first 3 months of membership on a scheme
- Rationale is that this measure is there to prevent members hopping from one scheme to another

- 12 month condition-specific waiting period
 - No benefits payable for a condition for which advice, diagnosis, care or treatment was received in the past 12 months
 - Rationale is that this should discourage members to only join when they’re in need of benefits.

- For this reason, it can only be applied once in a beneficiary’s lifetime (unless there is a gap in cover of more than 90 days)
- Waiting periods may apply to PMBs unless the applicant had been a member of a scheme with a gap in cover of less than 90 days upon application for cover
- If the applicant has a gap in cover of longer than 90 days, then all waiting periods may be re-applied (incl. for PMBs)
- No waiting period may apply if the reason for moving scheme was due to:
 - Change of employment and membership of that scheme is compulsory/a condition of employment, or
 - Employer changing or terminating the scheme of its employees at the end of a financial year (1 Jan), with sufficient notice given to the scheme.
- Late joiner penalties
- Penalties apply to members who join a medical scheme after age 35
- Penalty can move with individual from one scheme to another
- Formula provided to calculate penalty that may be applied
- Credit for any past medical scheme cover from age 21 is taken into account
- Applies independently to the different beneficiaries within a family (i.e. does not necessarily apply to the whole contribution payable)
- Rationale is that there is a disincentive to join a scheme when one is older (i.e. to encourage age cross-subsidies)
- No underwriting may be applied to option changes within a scheme.
- No waiting periods may be applied to a child born during the period of membership.

(iii)

This question required some application of knowledge. Better candidates were able to distinguish themselves in this question.

- Possible factors include:
 - Size of group
 - Larger the better as this minimizes the risk of anti-selection
 - Will probably have a minimum no. (e.g. 30 members) before considering waiving
 - Average age of group
 - Will want to consider the demographic risk profile of the group and will not want to waive underwriting for a “high risk” group which will impact the scheme negatively financially
 - Likely that age will be the most easily available measure that could be used
 - For example, could waive underwriting for groups with average beneficiary age under 35
 - Chronic prevalence of the group (in addition to age)
 - A higher chronic ratio is likely to have a negative impact on the scheme
 - Other factors (e.g. location or industry) might be possible, but may be difficult to include generically within a policy
 - Could look at other members from that geographic area or industry already on the scheme to assess the risk level.
 - Options that the group wants to join

- If the group wants to join an option that is inappropriate given its risk profile, then one wouldn’t want to waive the underwriting.
- Past claims experience on previous scheme (if available)
- Will indicate the possible claims ratio for these members on the scheme
- Whether compulsory for all employees to move to your scheme
- If not compulsory, then scheme is exposed to anti-selection
- Could also provide for an interaction of the above factors.
- For example, the scheme could require a lower historic claims ratio for smaller groups than for larger groups to ensure that that scheme is not unduly exposed to random variation.
 - The presence of members with specific very expensive diseases e.g. Gauchers, haemophilia etc
 - These diseases could cost so much, especially where the group is not very large that the scheme is likely to make predictable losses on the group.

(iv)

This question presented a common scenario for a consulting healthcare actuary. Most candidates performed well in (a), demonstrating a keen appreciation for the risks associated with the relaxation of underwriting. However, candidates struggled to come forward with useful ideas in (b) and (c) and reverted to bookwork such as the regulatory processes pertaining to amalgamations or new options. It was disappointing to see that few candidates picked up on the possibility that an amalgamation or new option might not necessarily attract the kind of risk profile the scheme would be looking for. In (d), most candidates appeared to confine their suggestions to the textile industry in which the scheme presently operates, rather than offering ideas on wider growth.

a. Relax underwriting

- Rationale
- Currently underwriting is used to prevent anti-selection and would be a barrier for members wanting to join the scheme, especially those with a pre-existing condition.
- Relaxing underwriting means the scheme might gain favour with brokers, who then will be able to place business more easily and will hopefully bring all their business to the scheme.
- It is likely that there will be a significant increase in new members joining the scheme.
- Especially individual members (rather than groups)
- Which typically exposes the scheme to greater anti-selection
- Individuals that could not get cover for the first 12 months elsewhere due to their pre-existing conditions would take the opportunity to join the scheme to get immediate cover
- Same applies to those members that would have late joiner penalties applied if they went elsewhere.
- Problems for the scheme:
- Very likely to attract poor risks that need long term cover that will remain on the scheme and negatively impact the scheme financially
- Although the scheme does grow, the claims ratio would probably deteriorate as a result of the growth
- Some of the new members may leave soon after joining having incurred significant expenses for the scheme

- For example, some members who are need a particular procedure performed, or are about to give birth, will join the scheme, have the procedure and then leave the scheme.
- This may be exacerbated by elective procedures, which are under the beneficiary’s control
- The cost to the scheme of the procedure would cost far in excess of any contributions received
- The “growth” the scheme experiences as a result of these members will only be temporary
- It is probably unlikely that the brokers will bring “good” business together with the “bad” business, as it will be as easy for them to place these better risks at larger or more prominent medical schemes (i.e. with a better brand) and the prospective members will be more easily convinced to join these schemes. The “bad” risks will take any cover they can get.
- In essence, if the scheme has lower underwriting than its competitors, it is likely to suffer from anti-selection.
- Would advise strongly against it.

b. Find another scheme to transfer its business into HealthMed

- Rationale
- Provides immediate growth for the scheme
- Whether the growth is sufficient to meet the scheme’s desires will depend on the size of the merger partner
- The likely success of the strategy is entirely dependent on the potential merger partner that can be found
- HealthMed is likely to have a high solvency ratio, if only because of the rapid drop in membership, which may make it an attractive merger partner for others seeking the same strategy
- It is common that schemes looking for merger partners are in some sort of distress
- For example, their demographic risk profile has deteriorated, they’re making underwriting losses and reserves are being reduced (i.e. they’re in the “actuarial death spiral”)
- Therefore, it is very possible that any merger partner may worsen the risk profile of HealthMed
- “Healthy” schemes are less likely to be willing to consider this merger, unless HealthMed becomes the party that is “absorbed” into the other scheme
- This will probably not be accepted by the trustees of HealthMed given their concerns about improving the relevance of their own scheme
- External service providers to HealthMed might also put pressure on the scheme not to merge into another scheme as they have vested financial interests.
- If a merger partner is found, there might not be a good fit between the two schemes in terms of their option structures, managed care protocols etc.
- If the fit is poor, then there might be a loss of members due to unhappiness with the new product provided which reduces the membership “growth” that was being targeted
- If the merger is successful, then there is a chance that the scheme’s profile in the market might be improved, and further independent members may start joining, fulfilling the scheme’s aim.
- Would advise to consider the possibility of a merger, but to do a thorough analysis on the impact of any potential merger before going ahead

c. Create a new option to attract young and healthy members

- Rationale
- A scheme needs to have a steady inflow of younger & healthier members to keep the demographic risk profile stable (or improve a worsening profile). By creating a new option that is specifically designed around the needs of this market, you will both grow the scheme and improve the risk profile.
- The option will have to be well priced to attract this market.

- Identifying the needs of this market is not straightforward, and the benefit design implemented may not attract sufficient new members from the intended target market.
- Having to cover all PMBs, the resultant contributions may not be low enough to attract this market
- Also, as it will cover all PMBs, it is likely that sufficient cover will be available to not discourage worse risks from joining.
- Given the current affordability issues in the medical scheme market, this new option is likely to attract the attention of older members on the other options (who may then buy-down).
 - If this happens, then the option would need a large contribution increase in future years to be self-sustainable which would start the “death spiral” for the option.
- For it to be successful, the option will have to be very carefully marketed.
- In any event, the growth in membership is likely to be slow.
- Would advise that it is unlikely to succeed in meeting the needs of the scheme, but that an analysis of the current option structure might be appropriate to assess whether there is capacity for another option.

d. Steady organic growth

- Rationale
- If risk management (incl. pricing, underwriting policy etc) is done properly, it may be possible to grow the membership steadily while protecting the scheme’s risk profile and financial position.
- Scheme has traditionally marketed itself to one industry. Thus it probably does not have a strong brand in the open market.
- The brokers it has historically used or has relationships with may not be well suited to moving into the general open market.
- It may have to spend a fair amount on a marketing campaign to increase their brand awareness in the desired market.
- The scheme is at risk of the remaining textile sector members leaving it
 - The organic growth may be too slow for it to counteract any further membership losses, further reducing the scheme’s prominence in the market.
 - The risk profile may deteriorate to a position where the scheme is not able to both have contributions rates that are financially sustainable while being attractive to the open market.
- In the absence of a suitable merger partner, it may become the default option for the scheme. Increasing the level of awareness of the scheme in the intended market will be crucial.

(v)

Performance on this question was poor. Most candidates did not consider the systemic impact on the remainder of the scheme should the option be closed. Given that the question revolved around a phenomenon that is rather common in multi-option medical schemes throughout South Africa, this result was disappointing.

- The legislation requires all options to be self-sustainable, which implies that this possibility must be considered.
- However, if the option were closed, then the members on the option would have to be moved to another one of the scheme’s options.
- Although the scheme could suggest which option these members should move to, they may move to any of the other options.
- As these members would be, on average, poorer risks, this would negatively impact on these options’ financial position.
- Thus deficits may well be experienced on these options too.
- At the very least, there will be pressure on contribution rate increases.
- Might start the “actuarial death spiral” and make the other options unsustainable too
- Otherwise, closing the option might encourage the members on the top option to leave the scheme
- This would reduce the negative impact that the remaining members would have
- Although unlikely, as these members would most likely be underwritten elsewhere if they were to move
- The better profile members would be the ones most likely to leave
- Would advise the scheme not to do so, but to consider whatever options might be available first

QUESTION 2

(i)

Although on the surface this could appear to be a tough question, those candidates that applied their generic modelling knowledge from first principles were able to distinguish themselves in this question. Notwithstanding this, it was disappointing that many candidates missed the suggestions in the question that the profiling should consider “downstream” costs and not limit itself to direct costs and measures. Some candidates completely disregarded the implications of the fact that beneficiaries are linked to general practitioners.

Cost measure(s) to be used

- Must consider whether to profile direct GP costs and/or downstream costs
- The PO has suggested downstream costs is her primary focus so it would make sense to consider “average cost per patient/beneficiary per annum”
- Downstream costs are also more appropriate for the “co-ordinator of care” role that the PO wants to encourage
- One can also profile the various components of healthcare expenditure separately (e.g. ave hospital costs per patient per annum, GP out-of-hospital costs per patient per annum etc)
- If one does look at separate components, then one would need to consider how to establish an aggregate score (e.g. by attaching different weights to each component)

Data required for the exercise

- Will need data on a beneficiary level
- If data is on a member/family level, then need to make an adjustment for family size
- But this has issues with heterogeneity in the data as it doesn’t take into account the specific details of the family
- Need full claims paid data (i.e. both direct and downstream claim) for each beneficiary,
- With details on, for example:
 - Practice type
 - Date of claim
 - Amount paid/claimed
 - Coding information
 - Hospital admission details
- Data needs to be from the specific period required for the analysis
- Needs to have a lag (e.g. 2 or 3 months) to allow for claim runoff
 - GPs are likely to happiest with the use of actual cost data as opposed to projected cost data (if projections on that level are even possible)

Methodology

- In order to identify how cost-effective a GP is, one needs to be able to compare their “actual” cost score against a risk-adjusted “expected” measure.
- Each GP’s actual performance relative to their expected value can be used to position them in relation to their peers.
- Might be more appropriate to place GPs into particular bands of performance rather than ranking every GP individually

- Depending on the methodology, one might want to adjust for the no. of beneficiaries linked to the practice when assessing their relative performance (i.e. a credibility weighting), or by using statistical significance.
- Analysis must be performed at a beneficiary level.
- Each beneficiary’s results will then be linked to the GP that they have nominated.
 - These results will then be aggregated for that GP.
- Need to choose an appropriate period for the analysis
 - One year?
- Allows for likely impact of the benefit cycle
- Should also provide sufficient data for the analysis to be credible (given the size of OPENAID)
- A longer period?
 - One wants the “profile” of the GP to respond as soon as is reasonable to a change in behaviour – the longer the period, the longer it takes for the impact to be seen
- A shorter period?
 - May not have enough data to make the profiling credible
 - But will respond to a change in GP behaviour the quickest
- In considering the hospital related portion of the costs, one might want to make some adjustments where the GP will have the least influence
 - For example, might want to exclude the severity risk by capping/limiting the impact of large claims so that they don’t overwhelm the “average”
 - Might also want to entirely exclude the costs of those hospital admissions not able to be influenced by the GP (e.g. trauma events)
- Other adjustments are possible
- For example, all dental and optical costs can be excluded too
- With this data, can calculate the actual average cost per beneficiary for the chosen time period
- Now need to calculate a risk-adjusted cost benchmark/estimate for comparison to the actual cost score
- Expected claims costs may vary according to many factors, and these factors will need to be considered in the regression/modelling exercise
- Likely factors include:
 - Age
 - Gender
 - Chronic disease
 - incl. multiple co-morbidities
 - Option
 - Geographic location
 - Income level/occupation/industry (if available)

[plus other appropriate factors at ½ each, max 3 in total]
- Build a model (e.g. a linear regression model) based on these factors to calculate the risk adjusted expected cost for the measure for each beneficiary
- If the components of total cost are being analysed separately, would need to do this for every measure being used
- One would need to check whether the model used is appropriate for the exercise as risk adjustment will not capture all aspects of the risk profile heterogeneity (i.e. if a linear regression model, one could assess the goodness-of-fit)

(ii)

This question was partly bookwork and partly higher order, challenging candidates to come up with useful and relevant ideas. Credit was given to any appropriate measures, and candidates performed reasonably well.

- Some possible process related quality measures
 - Adherence to chronic medication
 - Proportion of chronic patients actually enrolled on the chronic programme
 - Whether a particular pathology test has been done that is part of a recommended protocol for a particular chronic disease (e.g. HbA1c tests for diabetics)
 - Whether particular screening tests have been performed (e.g. pap smears for women within a specified age band)
- Some possible outcomes related quality measures
 - Hospital admission rates for particular admission categories
 - For example, the admission rate for short term diabetic complications
 - Specialist referral rates
 - Whether the patient's clinical indicators are being well managed (e.g. whether a diabetic's sugar levels are being well controlled)

(iii)

This question required some insight but was relatively straightforward and most candidates performed reasonably well.

- Beneficiaries
 - Would need to see the GP first before being allowed to go to a specialist
 - Depending on the benefits available, the increase in utilisation might mean that members deplete the available GP benefits sooner than before
 - Likely to be some unhappiness, especially for those members who are used to going directly to specialists
 - This may be exacerbated if the GP refuses to refer the beneficiary to a specialist as they were hoping
 - There will be an additional cost as a result of having to visit a GP
 - In addition to any amount that the beneficiary has to cover that the scheme doesn't, there will be the cost associated with the time taken to visit the GP and the travel expenses.
 - Going to a specialist without a referral, will result in the beneficiary having to fund the specialist consult costs themselves.
 - However, the GP will now be in a better position to co-ordinate the care for their patients which might lower overall costs
- GPs
 - Are encouraging this as it allows them a greater ability to co-ordinate the care for their patients
 - Will result in their beneficiaries visiting them more often which will increase their income

- Trend has been for patients to go directly to specialists, often for less “specialized” needs (e.g. basic acne visits to a dermatologist) – these patients could now be treated more cost-effectively by the GP
- Some GPs may decide, depending on the circumstances, to provide a referral without actually having a consultation with the beneficiary
- They will have to get used to process of generating a referral

- Medical specialists
 - Are likely to be unhappy as it will most likely reduce their number of consultations which will impact on their income
 - Some speciality types will be more affected than others
 - E.g. dermatologists, gynaecologists, paediatricians
 - It will result in some claims being declined by the scheme where there was no referral, which will mean the specialist needs to get payment from the beneficiary directly
 - This might increase the level of bad debts experienced by the specialists
 - With the scarcity of specialists in South Africa, this may however free up some capacity allowing for greater access to specialists

- Medical scheme
 - Out-of-hospital GP costs should increase as the beneficiaries make more visits to their GPs
 - Out-of-hospital specialist costs should decrease as not all beneficiaries who might have visited specialists will do so if the GP is able to treat the beneficiary
 - There is the potential that hospital costs would decrease too, depending on the extent that specialists were admitting patients into hospital unnecessarily
 - Might have to consider redesigning the benefits as a result of the change in utilisation patterns of GP and specialist consult benefits
 - Depending on the level of unhappiness with this move, the scheme may lose some members
 - As this has a direct impact on the livelihood of both the GPs and specialists, the scheme will have to manage the relationships with them very carefully. Without their support, public sentiment may turn against the scheme.

(iv)

This question was straightforward bookwork. As expected, candidates either performed very well (if prepared) or very poorly (if unprepared).

- Window period (Primary Stage)
 - No defining symptoms, and will not test positive for HIV
 - May develop swollen glands, sore throat, headache, muscle aches and rash
- Asymptomatic stage (Stage 1)
 - Individual will be well for long periods
 - Only indication will be a positive HIV test
 - CD4 count greater than 500 mm³
- Early symptomatic stage (Stage 2)
 - Immune system will continue to weaken
 - Individuals will show mild symptoms of the disease, including shingles, fungal skin, weight loss and mild skin irritations (the majority of which can be cured)

- CD4 count between 350 and 500 mm³
- Medium symptomatic stage (Stage 3)
 - More frequent and serious occurrences of opportunistic infections
 - These include TB, oral/vaginal thrush, persistent diarrhea and significant weight loss
 - CD4 count between 200 and 350 mm³
- Late stage HIV disease (Stage 4), or AIDS stage
 - Severe opportunistic infections, often with many being experienced at any given time.
 - These include brain infections, severe pneumonia, pain and specific cancers
 - CD4 count lower than 200 mm³

(v)

Although this was not a very tough question, candidates performed poorly. This could possibly be attributable to some candidates running out of time. The marking schedule allowed liberally for a wide range of ideas to be recognised but most candidates failed to come forward with a sufficient number of features (such as potential data sources or adjustments or limitations) that are applicable to a medical scheme environment.

- Crude initial prevalence estimates can be derived from local and international statistics
- Such as output from
 - UNAIDS
 - ASSA2003
 - Antenatal Clinic Surveys
 - National Household Survey
- It is unlikely that any of these would be appropriate for the scheme’s purpose as the demographic profile of the population covered would be different to that of OPENAID’s.
- Although given OPENAID’s relatively large size, it is possible that the scheme’s demographics could be representative of the population
- It might be possible to adjust these estimates to allow for the scheme’s specific population demographics,
- Although it would be better to use a select, or sub-population, model such as ASSA Select or PGN105
- When using the model, one would need to take into account the specific population demographics of the scheme, such as:
 - Age, gender, location, income (if available), industry (if available), risk group
- Then the model would need to be calibrated with reference to whatever further information is available, for example:
 - Any data available from major employer groups on the scheme, such as:
 - Results of any VCT and/or HIV testing programme performed
 - Any data available from any group life insurance provided
- Any public prevalence data available for any industries that the scheme has a significant exposure to
- Numbers of beneficiaries registered on the HIV disease management programme
- Mortality details of those registered on the HIV disease management programme (if available)
- The treatment provided (both currently and historically) for HIV by the scheme’s disease management programme

- Any claims analysis/modeling done that could identify potential HIV+ beneficiaries that haven’t registered on the programme, such as usage of relevant medication or pathology tests
- *(give credit to any additional valid suggestions on data sources that could be used for calibration, up to a maximum of six ideas (3 points))*

- There are limitations with data utilised in the calibration of the model, which would need to be understood

- Large employer groups may not form a large enough component of the OPENAID’s membership for VCT results to give a meaningful indication of prevalence.

- VCT results may be limited in their reliability given the impact of selective testing
- Many schemes don’t collect accurate exit data. Mortality data may therefore be limited.
- The historically low uptake of HIV treatment programmes may skew estimates of prevalence. Observed increases in registration on HIV treatment programmes may for instance be as a result of improved marketing or confidence in the programmes rather than due to increased prevalence.
- *(give credit to any additional valid suggestions on data limitations, up to a maximum of four ideas (2 points))*
- Some adjustments to the standard select model may be required in order for it to be applicable to the medical scheme environment
- E.g. a standard model may not allow for the fact that HIV infection rates within a family unit will be linked to that of the main member.