

# EXAMINATION MARKING SCHEDULE

31 May 2010 (am)

## Subject F101 — Health and Care Principles

### QUESTION 1

*Question was poorly answered. Students were asked to “describe briefly the main types of reserve” and most students listed types reserves, and didn’t distinguish between their importance.*

- Claims in payment reserve
  - For both group and individual business this would be the present value of future payments on the claims in force ✓ The reserves would allow for recovery as well as mortality and expiry of the claims. ✓ The reserves would take into account the specific circumstances of each claim. ✓ [max 1]
- Incurred but not yet settled claims reserve
  - For both group and individual business this would be calculated as for the claims in payment reserve taking into account the specific circumstances of all claims notified to the insurer. ✓
  - An adjustment could be made to allow for the fact that not all claims would be paid as some of the claimants could recover before the expiry of the deferred period. ✓
- Incurred but not yet reported claims reserve.
  - For both group and individual business a reserve would be held to allow for claims not yet reported ✓. The amount of the reserve could be based on a chain-ladder calculation or other proxy. ✓
- Active Lives reserve
  - For individual business this would be a cashflow reserve taking into account all future premiums and claims. ✓
  - For group business this would be an unexpired premium reserve if premiums are paid in advance and an unexpired risk reserve if future claims are expected to be larger than future premiums. ✓

## QUESTION 2

*Part(ii) of the question was answered better than part(i). Some students assumed that the small size of the insurer implied that they were a new entrant to the market. Students also wasted time by suggesting reasons for the small risk pool and fluctuating results which the question did not ask for.*

(i)

- Challenges driven mainly by greater statistical volatility of claims experience inherent in a small risk pool. ✓
- But contribution and other income is relatively stable. ✓
- Leads to volatile underwriting experience and operating results. ✓
- Volatile operating result will impact on statutory solvency. ✓
- Difficult to forecast financial results. ✓
- Stakeholder perceptions of risk likely to be high – regulator, prospective policyholders, brokers ✓✓
- Investment: need liquidity therefore lower investment returns, less able to diversify. ✓  
Alternatively holding a lot extra by way of margins, thus tying up capital ✓ (point below about “higher probability of ruin” is not valid if this approach is taken)
- Small amounts available to invest, may need to rely on collective investment vehicles ✓
- Limitations on bulk buying capability ✓
- Difficult to estimate future claims experience for pricing purposes. ✓
- Competitive issues – not able to offer a range of products ✓, difficulty of premiums varying from year to year ✓, need higher solvency margin – this would come through in the price. ✓
- Own experience worth very little in the pricing process – reliant on industry data/competitor increases. ✓ [or reinsurer data]
- Higher probability of ruin ✓
- Fixed expenses higher as a proportion (no economies of scale). ✓

(ii) **Strategies for managing the risk:**

- Would probably implement a combination of the following: ✓
- Hold higher reserves so that volatility can be absorbed ✓ (helps in terms of liquidity and solvency). ✓
- Growth in reserves would have to come through positive operating results. ✓
- If results not already positive scheme will have to increase revenue (contributions or investment income) ✓ or reduce expenses (claims or non-health expenses). ✓
- Place appropriate limits on benefits – e.g. overall annual limit. ✓
  - affects competitiveness negatively
- Transfer of risk to managed care organisations. ✓
  - Capitation arrangements. ✓
  - Providers to have sufficient capital to back any guarantees that they are providing. ✓
- Transfer of risk to reinsurers. ✓
  - Catastrophe. ✓
  - Aggregate excess of loss. ✓
  - Individual excess of loss. ✓
- Grow the risk pool. ✓
  - Organic growth. ✓
  - Consider amalgamation(s) ✓

### QUESTION 3

*This question was generally well answered with part(i) answered better than part(ii).*

(i) Policyholder perspective

- Advantages
  - The lump-sum benefit can be used to pay for lifestyle changes or to repay an outstanding debt ✓ should someone become permanently disabled and unable to earn an income ✓
- Disadvantages
  - If the insured is not permanently disabled, the claim will not be paid ✓. They would then not have any income replacement for the period during which they could not work. ✓
- Healthcare insurer's perspective
  - Advantages
    - No ongoing administration of the claims once the claim is paid out. ✓
    - Tends to be an easier sell as people prefer a lump sum benefit ✓
  - Disadvantages
    - More underwriting is required at claim stage to ensure that the claimant is permanently disabled. ✓
    - As a result of the permanent definition more claims may be repudiated resulting in negative publicity for the company ✓

(ii)

- Definition linked to occupation ✓
  - Examples are as follows (✓ for each example):
    - inability to perform own occupation
    - inability to perform own occupation and any other suited occupation by education, status or training
    - inability to perform any occupation
  - This is similar to the definitions used for income replacement business ✓. As the benefit is meeting a need that arises because someone is unable to earn an income this definition is the most closely linked to that particular need. ✓

The policyholder's inability to perform a number of normal everyday tasks ✓.

- Activities of daily living
  - Definitions of these typically include: feeding, dressing, washing, toileting, mobility, transfer. A common requirement for the payment of the benefit is the failure of the insured to be able to undertake, unaided, a given number of the ADLs above, commonly 3 or 4 ✓ ✓
  - This is a more objective definition ✓ and it would be possible to pay out different proportions of the lump sum depending on what activities could be performed ✓. If a person's disability deteriorated, additional payments could be made. This does not bear a link to the person's ability to earn an income but would be very useful for people who are not employed. ✓
- Specific types of disability ✓
  - Examples are loss of a limb or loss of use of a limb or loss of vision / hearing ✓

- This is the most objective definition and also tends to be permanent✓. In this situation lifestyle modifications e.g. ramps to accommodate wheelchairs are the most likely needs to arise and be met by this type of insurance. ✓

## QUESTION 4

*Parts(ii)and(iii) were very poorly answered. In part (ii) students tended to describe the differences in the nature of risk faced by group business as compared to individual business.*

*Students who performed well on this question demonstrated the ability to draw together different sections of the material and higher thinking skills.*

- (i)
- If the schemes are not compulsory for all staff members of an employer, the business will effectively be the same as individual business✓ with some administration savings✓.
  - The amount of choice which employees had in choosing the benefit level would affect the risk of anti-selection and therefore the experience assumptions✓. Assuming a limited choice would mean lower anti-selection and therefore more favourable underwriting limits and experience assumptions✓
  - The extent of underwriting permitted will depend on the regulatory environment✓
  - PMI tends to be annually renewable ✓- Group rates would also normally be annually renewable and can be changed at each anniversary✓.
  - Renewals:
    - Need to consider the likely renewals on the scheme. This is particularly important when looking at spreading initial costs✓.
    - In a competitive market schemes are likely to move regularly so assumptions should allow for this. ✓
  - Claims experience:
    - This is likely to differ by type of industry✓ as well as by the occupations of the scheme members✓
    - It may be heavier than that of the individual business as not each individual will be underwritten and the actuary would need to consider how to change the experience to allow for this. ✓
    - Look at industry experience as well as population experience✓
    - For large schemes there may be sufficient data to rate the scheme on past experience✓. Except for very small schemes, the actuary will need to decide how much credibility to place on the previous experience✓.
    - If there is a wide variety of choice in terms of the benefits which can be chosen, the business will be more like individual business and would require more underwriting✓
  - Initial Expenses:
    - These should be a lower percentage of premium than individual business as underwriting is unlikely to be performed on all scheme members. ✓
  - Renewal Expenses:

- These should be lower per member than for an individual policy✓. The premium collection is handled by the employer and a bulk payment will be made to the insurer✓
- Claims Expenses:
  - These would be similar to the individual business claims expenses. ✓
- Commission:
  - Where this is paid it will usually be a straight percentage of premium and should be allowed for as charged✓
- Investment Return
  - For the IBNR reserves, investment assumptions will be the same as for the individual business✓
  - Because large reserves are typically not built up, the investment return is not a significant assumption on this part of the business and cash or short term yields will be used. ✓
- Tax
  - There may be a difference in how group schemes are treated for tax purposes and if so, this would need to be appropriately allowed for. ✓
- For Reserving:
  - The main reserves which will be held will be an Incurred but not reported claims reserve✓. The most important assumptions will be in deriving the IBNR and will relate to likely claims delays between claims occurring and claims being reported✓.
  - The insurer may also be required to hold a solvency margin, this isn't likely to differ for group business✓.

(NOTE: Marker needs to ensure that a good range of assumptions are given – i.e. student demonstrates breadth)

(ii)

- The employer would want to keep the cost of the risk benefits as low as possible✓ and may be prepared to work with the insurer to try and achieve this. ✓
- Disease management programme: This could involve on-site clinics✓ as well as ongoing counseling✓
- Agreement to take employees back on a reduced hours basis, or to adapt the nature of the work done, as soon as possible to reduce the income protection claims✓
- Annual medicals for staff which would pick up critical illness situations early and enable employees to be treated early on before a claim becomes payable✓ However, this may lead to more claims (e.g. benign tumours that never progress to needing treatment) ✓
- Early notification of income protection claims✓ and allowing the claims management team of the insurer access to staff before the deferred period is over to start rehabilitating patients as soon as possible. ✓

(iii)

- No change for the claims in payment reserves✓ – these would generally be matched with gilts (index-linked if available and the claims escalated in payment) ✓

- Unlike the individual business there is no large-pre-funding reserve as group policies tend to be annually renewable✓. The main reserves held would be UPR and IBNR and these would be held in liquid cash-like assets✓. For individual business there would be some reserves which would be invested in gilts or a balanced portfolio✓.

## QUESTION 5

*Part(i) was fairly well answered. In part(ii) students focussed on option pricing methods (North American vs. conventional) where the question was broader and related to the entire pricing process. To score high marks students needed to address issues of data, the other pricing assumptions and the need for sensitivity testing and scenarios.*

a. Salespeople:

- Potential advantage of being able to increase commission off the same base of customers ✓ due to the additional premium that would be charged for the extended cover ✓
- May be easy to sell if the additional diseases covered are attractive to policyholders ✓ and the incremental premium is low ✓
- Provides an opportunity for contact with client base which may allow for the sale of additional products ✓
- May not be worth the effort if the additional premium (and thus the additional commission) is very small ✓
- Increased complexity of the product may be difficult to explain. Reduced comparability with competitor products may be an advantage or a disadvantage ✓
- Underwriting free so quick turn-around time and guaranteed acceptance – earlier receipt of commission ✓ ✓

b. Current policyholders

- There will be two groups of policyholders – those who are eligible for the additional product and those that are not. ✓
- Those who are eligible may perceive value in the additional coverage ✓. Broker initiated contact may be welcomed or may be seen as an imposition. ✓
- Those who are not eligible may be unhappy about not being offered the additional coverage if they are aware of the additional benefit ✓

c. The insurer

- Cost of providing cover for additional diseases may be low ✓ – additional diseases may be of lower incidence than those in the standard policy ✓
- Anti-selection risk will depend on the duration of the policies in force. ✓ (know underwriting status at time of application and also know that they have not claimed on standard diseases) ✓
- Anti-selection risk may be significant for policies with long durations ✓
- Anti-selection by age is also likely to occur (older policyholders are more likely to take out additional cover than younger policyholders). May wish to only offer the option to younger policyholders.
- May lead to fewer selective withdrawals ✓ (remind policyholders about their cover, and enhance sense of value) ✓
- Policyholder engagement with a broker may result in new comparisons of critical illness products ✓ – policyholders may switch insurers instead of extending cover. ✓
- Additional complexity ✓ – two different benefit designs, system changes, different policy wording ✓ ✓

- Response time will be quick due to no underwriting – this may enhance policyholder perception of efficiency and service levels✓

(i) The starting point for pricing the additional benefit would be the existing pricing model. ✓  
 The actuary would need to assume a take up rate for the option✓ – this would affect the choice of model points for pricing the additional benefit. ✓

Assumptions would need to be made regarding the health status of those exercising the option✓ (this would depend on factors such as the duration that the policy has been in force. ✓ Age of the policyholders will be THE most critical factor.). ✓It would be prudent to allow for a degree of anti-selection in this assumption. ✓

The claim inception rate assumption will need to be adjusted (for the affected policies) to allow for the additional diseases✓. The data on the incidence of the additional diseases will need to be obtained for external sources✓. For example(✓✓),

- Reinsurers
- Academic studies
- International experience

With the necessary adjustments made to reflect expected experience (with allowance for anti-selection) ✓

All the other assumptions in the pricing model would need to be updated with more recent data✓ e.g. expenses, investment return✓. Any increases in expenses (e.g. system changes, marketing of new benefit) ✓ would need to be taken into account✓.

Commission can be allowed for according to the terms agreed with brokers (or other methods of distribution) ✓

The allowance for profit may need to be changed✓. For instance the profit requirement may be lower given the potential for greater retention of business. ✓

Withdrawal assumptions would also need to be adjusted taking into account that the change in benefit may result in greater retention (or alternatively that the contact with the broker may result in business being diverted away) ✓✓

Given the uncertainty✓ around a new benefit, take up rates, and the incidence rates of the new diseases various scenarios would need to be run✓, and the sensitivity of the assumptions will need to be tested. ✓

## QUESTION 6

*This question was poorly answered with students making a wide range of errors. Most students did not recognise that the insurer and the reinsurer may not have the same termination basis/capitalisation factor. Students also made careless errors in their calculations, for example, forgetting to account for the quota share treaty. It appears that students were not prepared for a numerical question.*

### **i. Problems with stop loss on IP**

- At the end of the year you will know how many claims you have had (except for the IBNRs) ✓. But, unlike a death claim where you know what the benefit is, for an IP claim you will only know the true value of the claim once it has terminated (i.e. you won't know the true value of the claim at the time of the claim) ✓✓.
- Hence you need to estimate the value of all the claims at the end of the year using a termination basis. ✓
- It is possible that the insurer and the reinsurer have very different reserving bases, but for the purpose of the reinsurance treaty, a reserving basis needs to be agreed upon. ✓
- If the bases are very different it is possible that the reinsurer may make a loss but that there will be no reinsurance claim. ✓
- One way of mitigating this is to use a reinsurer who has a similar rating basis to you ✓.
- Another issue is that there are often many short term claims ✓. Hence it may be better to calculate the loss only after one year, when all the short term claims have terminated, and you can probably get a more accurate estimate of the losses just looking at the long term claims. ✓✓

### **ii. 90% cover and capped**

- The reinsurer would want the insurer to cover some of the risk in the stop loss layer otherwise the insurer has no incentive to manage the claims properly. ✓
- The reinsurer doesn't have to cap its liability but usually reinsurers don't like to have unlimited liabilities on the risks they are covering. ✓

### **iii. Reinsurer's claim**

- $135 \text{ claims} \times R50,000 \times 100 \times 50\%$  (because there is a 50 / 50 quota share) = R337,500,000.
- This is less than R350,000,000 cap, so cap doesn't apply.
- Claim in excess of retention =  $R337,500,000 - R275,000,000 = R62,500,000$
- Reinsurer's claim =  $R62,500,000 \times 90\% = R56,250,000$

#### iv. Insurer's claim

- The student needs to make some assumption on the capitalisation factors. A factor of 100 makes the most sense, but they could justify some other factor.
- From the underlying risk  $135 \times R50,000 \times 100 \times 50\%$  (because there is a 50 / 50 quota share) = R337,500,000.
- But the stop loss kicks in at R275m, so the insurer only pays R275,000,000 of the underlying claims.
- In addition the insurer must pay for 10% of the claims in the stop loss layer =  $R62,500,000 \times 10\% = R6,250,000$ .
- Therefore total claim =  $R275,000,000 + R6,250,000 = R281,500,000$

## QUESTION 7

*This question was very well answered.*

### i. Impact on underwriting

- It is possible that your underwriters have never worked with CI products ✓ and you will need to train them how they work, when people can claim how it interacts with the death benefit, etc. ✓
- There are many instances where something could lead to a CI claim but where it wouldn't have any impact on your mortality ✓. An example might be high risk of Alzheimer's disease. Previously the underwriter may have ignored this because it only impacts mortality at very high ages, but it may have a big impact on CI claims ✓.
- Another example would be an old minor cancer. This may have limited impact on mortality, but significant impact on the CI benefit. ✓
- The underwriting questionnaire will need to be changed to insure that CI relevant questions are asked ✓. For example family history may be more important for CI benefits ✓.
- It is possible that different medical tests may have to be required. ✓
- You need to make sure that your underwriters are making reasonable decisions, not too conservative because they don't know the product, but also not too aggressive. ✓

## ii. 100% or severity based

- It will depend on what the market is doing. Are both products readily available in your market?  
✓ Is one more popular than the other? ✓ Do brokers understand one better than the other? ✓
- Are you able to price both products? ✓ It is more complex to price severity based products (as there are more events and less data) ✓ so there is more chance that you can get it wrong. ✓
- Severity based products are more complex to assess at claims stage ✓. Are you comfortable that you will have the skills to assess the claims appropriately? ✓
- There are positive and negative marketing connotations for both benefit designs ✓. The 100% product will often pay a higher benefit, but the severity based products will pay more often ✓. You need to assess which model you prefer, and which model your clients would prefer. ✓
- It will depend on what you are selling the product for ✓. If it is for credit life / mortgage protection then the 100% product may be more relevant as it will pay off the entire debt ✓.
- Is there reinsurance capacity for both types of benefit (and at a reasonable price) ✓. It is likely that you will need to reinsure a significant portion of the business initially ✓.
- [Quality of healthcare provider assessments ? Network of doctors to assess? In the interests of providers to help patients declare greater severity. ]

## QUESTION 8

*This question was misinterpreted by a number of students who assumed the removal of free cover limits to mean the removal of free cover. The removal of the limit means that everyone gets free cover (imagine the limit being raised higher and higher with more and more people not requiring underwriting). A zero free cover limit is the opposite (imagine the limit being made lower and lower with more and more people requiring underwriting). From this it was clear that students did not fully appreciate the nature of free cover limits. Students are advised to read questions carefully.*

### **i. Advantages of doing away with FCLs**

- FCLs are an administrative burden. Letters need to be sent to the people who need to go for underwriting and these need to be followed up and recorded, on an ongoing basis. ✓
- Underwriting costs money, which the insurance company has to pay for✓. This is passed on to the client, so full free cover would reduce the expense loading that has to be added to the premium. ✓
- FCLs do irritate the client (and it is normally the most senior person in the organisation) and the intermediary. ✓
- Many people don't go for underwriting because they are too lazy or because it is too administratively demanding, and not because they know they are sick✓. If you do away with underwriting then you will end up insuring more people (who on average are healthy) and hence get more premiums. ✓
- The reinsurer takes most of the cover above the FCL, so for an insurance company it often does make sense to have full free cover. ✓
- The sum insured above the FCL is normally a very small portion of the total risk, especially for large schemes, and hence be a very small proportion of the premium. ✓ Hence it may not be worth the cost of underwriting to offer this cover. ✓

### **Disadvantages of doing away with FCLs**

- If you do away with FCLs you will offer cover to some people who are sick, and who would have been restricted previously. This will worsen the claims experience and lead to higher insurance premiums in the long term. ✓
- Even though much of the risk is passed on to reinsurers, if the reinsurers take all of the losses due to worse experience, the reinsurance cost will increase significantly and reinsurers may stop offering capacity in this market. ✓
- Doing away with FCLs mean that the healthy people with smaller benefits are cross-subsidizing the unhealthy people with large benefits✓. There are always many cross-subsidies in group

business but often one person with an extremely large benefit, who is unhealthy, can have a disproportionate impact on the risk. ✓

## ii. Setting an appropriate FCL

- Setting the appropriate FCL is all about getting a balance between costs and benefits. ✓
- If you set the FCL too low, it will cost too much to do all the underwriting, which will be disproportionately high portion of the premium. ✓
- If you set the FCL too high, you will not underwrite enough people and your experience may be worse than expected. ✓
- The level of the FCL is influenced by the size of the scheme you want to insure. ✓
- A large scheme will be less volatile and you there are more expected claims. Hence one extra claim won't make as big a difference✓. For a small scheme, you may only be expecting one claim every 10 years, so if you get an extra claim due to less underwriting, this can have a significant impact on the experience. ✓
- With small schemes there is much more opportunity for blatant anti-selection / fraud✓. For example, in a ten man family run business it is easy for the owner to "employ" his sick brother merely to get the death benefit from the group scheme✓. A low FCL would go some way to avoiding large anti-selective claims (but not small anti-selective claims). ✓
- A company would usually have a formulaic approach to setting the FCL✓. This is so that it can be programmed into a quotes tool, or so that quotes staff can provide consistent FCLs. ✓
- The formula should take into account the points raised above, e.g. higher FCLs for larger schemes, and should also look at the actual levels of cover, e.g. be reasonable compared to the average of the top 10 covers. ✓
- In setting the FCL you need to take into account current FCL✓. A scheme would be reluctant to move to a lower FCL (although this doesn't mean one should always match the current FCL). ✓
- In setting up your FCL basis, you should take into account what your competitors do for new business✓. If you are always out of line you will win less business (if your FCLs are too low) or you may have unnecessarily bad experience (if your FCLs are too high) ✓.