

EXAMINERS' REPORT

November 2014 examinations

Subject F101 — *Health & Care* Fellowship Principles

INTRODUCTION

The attached report has been prepared by the subject's Principal Examiner. General comments are provided on the performance of candidates on each question. The marking guide provided is an indication of the points sought by the examiners, and should not be taken as model solutions.

QUESTION 1

Students performed well on part (i) which was bookwork. Students tended to approach part (ii) very narrowly – mostly focussing on the different ways in which target market might vary, and not considering other reasons for differences in experience. The marking schedule for part (iii) was very generous – consequently it was relatively easy for students to score well on this part of the question. Many students focussed on using own data in part (iv) despite the long-term nature of the effects of the diet (and hence the low likelihood of the impact being reflected in own historical data).

- i.
 - It is a condition perceived ✓ by the public to be serious (life threatening or at least lifestyle threatening) ✓ and to occur frequently (not so rare as to not add value) ✓
 - Each condition covered can be defined clearly ✓ so that there is no ambiguity at time of claim ✓
 - Sufficient data are available to price the benefit (in practice this often doesn't hold) ✓.
 - The condition should not significantly increase the risk of anti-selection ✓

- ii. The impact on claims would depend on the popularity of the diet amongst the target market ✓ (likely to depend on age and socio-economic status ✓).
The impact on claims would also be affected by differences in benefit design ✓ (impact will depend, for example, on whether the cancers are covered ✓, condition definitions ✓, whether the benefit is tiered or not ✓)
The impact on claims will differ between group and individual business ✓ (differential scope for anti-selection going forward ✓)
Given the long-term impact of the diet, the duration of the book will affect the impact ✓

- iii. Underwriting ✓ (there is scope for anti-selection ✓ from those who have been on the diet, who now anticipate that there may be health risks associated with the diet. For example, there is potential to add underwriting questions relating to the diet ✓)
Change in distribution and marketing strategy ✓ (change in target market ✓, change from individual to group business ✓)
Education campaign about the diet to reduce future claims ✓ (marks given for comments relating to wellness programs and nutritional advice)
Reinsurance ✓ (for example, aggregate XL for cancers ✓)
Benefit exclusions ✓ (change policy wording to exclude particular cancers ✓)
Cancer screenings ✓ (the insurer can pay for early screenings to reduce claim severity on tiered products ✓)
Reserving for the additional risk ✓
Increasing price (if premiums are reviewable) to account for additional risk ✓

- iv. Would need to consider whether the price for existing policies can be increased ✓ (i.e. whether premiums are reviewable or not) ✓
For new policies, you would need to consider the likely effect of anti-selection ✓. The impact on pricing will depend on the risk management strategies put into place. ✓

You would need to increase the claim frequency assumption ✓

Would not have sufficient claims experience yet, would need to base adjustment on medical research ✓ (potentially enlist the assistance of reinsurer ✓). Data would need to be adjusted to reflect the insured population.

Need to consider the likely proportion of policyholders who have been on the diet√

Would probably only impact on claims relating to the particular cancers identified√, however diet may have (potentially positive) effects on other diseases√

Margins to allow for the uncertainty. √

Would need to account for the expenses related to any risk management strategies put in place. √

QUESTION 2

Students often referred to State benefits instead of PMI benefits in the definition (part (i)), and many confused gap cover with threshold cover. Students also tended to not point out the situations that cause the gap to occur, i.e. due to benefit limits or healthcare professionals charging higher fees.

Students that did not achieve well in part (ii) most often failed to write enough points. The question asked for the implications for the insurer but some students listed implications for the State, the clients or the competitors. Students that achieved well in this question demonstrated a clear understanding of the consequences of the regulation and articulated these in a logical manner.

Students on the whole did well in part (iii). There were several points to make and students listed sufficient ideas. Stronger students focussed on objectives of greatest relevance to the chief actuary.

On the whole students noted that renewal rates were important for part (iv). However, they did not go into detail as to how they would adjust the renewal rates for changes in premiums or changes in consumer behaviour given that they do not have the option to renew again (i.e. students frequently did not grasp that they could not simply rely on past data).

- i. Medical gap cover is designed to cover the difference between the cost of medical treatment and the amount covered by conventional PMI products√. These differences can arise due to benefit limits√ or healthcare professionals charging higher fees than are covered by the PMI benefits√. Medical gap cover usually focuses on providing cover for high cost events (in-hospital medical and surgical treatment and out-patient treatment for chemotherapy, radiotherapy or renal dialysis)√. Benefits are usually limited to an annual amount per health event√. It meets the customer need of peace of mind that the customer will be covered in the event that medical cover costs more than that covered by their PMI product √.
- ii. This means that the insurer will not have any new business on this line of business√.
This means that there would be no increase in profits over time√
Strategically this means that business growth will have to come from elsewhere√.
The size of the risk pool will decrease over time. √
This will have implications for the ability of the insurer to meet fixed costs√.
There may be a point at which there are too few policies to justify continuing with the business√
There will be no additional initial expenses or marketing and sales related expenses √
Implications for cashflow (reduced inflow from premium income) √
This has implications for the investment matching for this line of business√
Law of large numbers – as risk pool shrinks, claims experience will be more difficult to predict with certainty√

This will also impact on investment strategy√ (greater liquidity required to deal with uncertainty√)

And will impact on risk-based capital√

The quality of the risk pool will deteriorate over time√ (high risk lives are more likely to renew√)

This will also have implications for risk-based capital√

The combination of selective non-renewal, higher uncertainty and higher fixed costs to be covered per policy will mean that the premium for the product will need to increase√√ (unless the product line is cross-subsidised√) – the higher premium increases are, the faster the pool will shrink√

May have a secondary effect on PMI business, if policyholder claim costs are not completely covered√ (i.e. demand for PMI products may fall√)

Increased pressure to offer more comprehensive PMI cover where there are not gaps in coverage√

The regulation creates a barrier to innovation for gap cover products specifically if this was a focus for the insurer √.

The insurer will need to communicate the changes in regulation and implication thereof to policyholders√

There may be a loss of staff dedicated to this business or the need to find alternative functions for these staff. Distribution channel arrangements may need to change√.

iii. Necessary for calculating capital requirements for the book√

And the impact of the book on the overall business√

Necessary for calculating the premium for the renewed gap cover policies√

Necessary for estimating how to spread fixed expenses across rest of business√

Necessary for cashflow modelling√

Necessary for asset liability matching√

Necessary to calculate the impact on the insurer's future profits√

If the book is reinsured, it would be useful to have estimates of the size of the book to inform reinsurance negotiations√

iv. Key assumption is the renewal rate√

Past (own) data would provide a starting point√, but would need to be adjusted√

- Renewal rates may be higher than in the past (Policyholders may retain cover because they can't repurchase cover), and may decrease over time due to higher premium increases than in the past (shrinking pool, selective non-renewals) √√
- However, renewal rates may be lower than in the past due to compensatory changes in design of PMI products. √√
- If there exists past examples of regulation changes being implemented on similar products, could use this experience to adjust the renewal rate√

Need to construct a model that takes into account the relationship between premium increases and renewal rates√ and projects forward the number of policies in-force per year for the next 10 years√

- Splitting the data into homogenous groups may assist determining the renewal rates and premium increases√
- Need to capture circularity between rate increases and renewal rates √

- Will require a cashflow projection√, as well as balance sheet projection√
- Need to allow for secondary impact of risk pool size on assets and solvency position√√
- Test the results for sensitivity√

QUESTION 3

Part (i) was well answered in general. Well prepared students easily generated enough relevant points. Part (ii) was also generally well answered. Surprisingly few candidates realised that anti-selection and the indemnity nature of the product (so unlimited losses) are the key risks on this product. The majority of candidates thought that currency risks was a key risk. This was considered less relevant given the short term nature of the product, the fact that the majority of claims will not be large, and the globally diversified nature of the claims. Part (iii) differentiated the stronger candidates although the wording of the question lead candidates to give five longer points with explanations. Credit was given where due. Weaker candidates did not realise that the evacuation costs are part of the benefit, not expenses. Likewise, many thought that claims inflation and reserving fell under this category. Part (iv) also differentiated the candidates. Most candidates provided default answers without considering the particular circumstances of the question. A few candidates thought pre-authorisation would not be possible or useful giving the comprehensive nature of the product. Stronger candidates realised that this is necessary to control fraud and moral hazard, as well as just being a general claims control method.

- Benefits need to be attractive to the target market (executives) √
Benefits would need to meet customer needs (i.e. allow for frequent international travel) √
High levels of service are likely to be important for this market √
Would need to consider the appropriate distribution channel to reach the target market√
(likely to be independent intermediaries√)
Would need to consider competitor products (available globally) √
Would need to consider the rating factors used relative to competitors √
Price of product would need to be such that prospective policyholders perceive value. √
Terms and conditions, and is policy easy to understand
The levels and onerousness of underwriting
- Anti-selection (policyholders only take out the product when they think their risk of claiming is elevated) √√
Moral hazard (policyholders utilise healthcare services in countries where quality of care provided is superior/cost is higher) √√
High level of uncertainty regarding claims cost (including currency risk, and lack of data) √√
Insufficient volume (to cover fixed expenses and have an adequate risk pool) √√
Unlimited nature of the liability√√
Loss of control over claims cost due to international nature of benefits, including monitoring√√
Policy wording – definition of inadequate healthcare may be poorly defined leading to more claims than priced for√√
Reputational Risk – policy is aimed at executives who are influential and any disputes could result in reputational damage√√
Renewals and Expenses – short term PMI renewals may not occur as often as modelled,
Insurer will not recoup initial expenses. √√

(Max 3, only first three suggestions marked)

- iii. Initial acquisition costs are likely to be high in order to reach the target market√ (eg initial commission and other marketing and sales costs) √
Initial medical underwriting costs are likely to be high given the risk of anti-selection√
Initial administration may be complex given the global nature of the product√
Renewal reward to sales channel (ie renewal commission, or similar) will need to be high to ensure renewal of the product - annually renewable so risk of not recouping expenses in the first year of sale√
Investment expenses will be high to accommodate requirement to match currencies√
Complexity of premium collection (potential for different currencies, global nature of products) √
Complexity of claim verification (provider verification, emergencies) √
Manual claim submission (differences in tariffs, clinical codes) √
Claim dispute resolution√
High service levels and turnaround times required√
24 hour call centre (time differences) √
Evacuation arrangements in place in every country in the world√
Setting up new offices and administration branches in foreign countries where insurer does not have footprint – normally an indirect expense but if specifically for this product then would be incorporated into direct per policy expenses. √
Per policy expenses are likely to be higher due to the small target market. Thus expenses related to the product such as development etc will be spread over fewer policies√
(Full mark given where reason plus explanation was supplied.)
- iv. (a) Reinsurance will be particularly attractive for this product given:
- New product√, lack of experience√
 - the difficulties associated with data√ (global nature of claims experience) √
 - high level of uncertainty associated with claim severity√ (this makes risk XL attractive) √
 - importance of initial underwriting√ (access to reinsurer underwriting manual) √
 - Tax and regulatory arbitrage opportunities given global nature of benefits√
 - Reinsurer may have international partnerships/ offices that will assist in claims administration√
 - Smoothing results√
 - No marks given for financial assistance due to new business strain as insurer is large and likely has free capital
 - No marks for catastrophe reinsurance because policyholder base is already diversified – very very small chance that all executives are in same place at same time – also, small size of policy base means that concentration of risks should not be critically severe when combined with above reason
- (b) Eligibility and initial underwriting important because of substantial anti-selection risk√.
Will want to identify pre-existing conditions√
Limited scope to do comprehensive claims underwriting, therefore initial underwriting is important√
- Nature of evacuation benefits √
 - Executive target market will demand quick turn around on claims√.

Eligibility will need to be restricted to executives of multinational companies (this will need to be verified[√], and will probably require an “actively at work” requirement[√])

Initial underwriting and eligibility criteria will ensure that mix of business taken on matches that assumed in pricing of the product. [√]

Identify substandard risks and price them accordingly[√].

Feedback into pricing model/ actuarial control cycle given small size of target market along with the fact that it is a new product [√]

(c) Claim pre-authorization can help reduce claims costs[√] and deal with moral hazard[√]. The insurer may require the patient to receive authorisation (from the insurer) before treatment begins, both to ensure that the procedure is covered[√] and the medical facility is appropriate under the policy[√].

This will not work for evacuation benefits[√] but can be applied to other benefits [√]

Should reduce the number of disputed claims[√], ensuring that policyholders understand the extent of their cover before treatment begins[√].

Channelling patients to most cost effective centre[√]

Allows insurer to reserve appropriately and set aside funds in correct currency[√]

QUESTION 4

Students really struggled with this question. Part i) was generally well answered. In Part ii), very few of the students explicitly considered community rating in answering the question. Some students missed the relevance of community rating all together. In Part iii) most students missed that the product is short term and annually renewable, so didn't discuss the risk of non-renewal (particularly in the case when in the first year claims > premiums). Many students also missed the community rating points. In Part iv) most students understood that the risk of anti-selection was far less in group business but didn't adequately explain why this is. Most students also missed the point that you would expect higher persistency on group products.

- i. Moratorium underwriting is most suited to PMI because of the short-term nature of the commitment (typically one year at a time) [√]. Due to marketing considerations, the insurer can encourage purchase by offering the prospect of immediate cover subject only to a blanket exclusion on pre-existing conditions[√]. Relative to full medical underwriting, the moratorium process can encourage sales[√] and reduces new business costs[√]. It has however been criticised because the insured cannot be sure for what illnesses or treatments they are on risk[√], unless they are sufficiently medically aware to understand the connectivity of medical conditions. [√] There is the risk of reputational damage due to non payment of claims due to misunderstanding of the moratorium[√]
- ii. Community rating refers to the practice of charging all policyholders or a significant subset of the persons insured the same premium rate irrespective of rating factors such as age, gender and medical history[√]. This means that the premium charged will depend on the overall risk profile of the insured lives[√]. The younger and healthier the risk pool the lower the premium that is required to cover the risks[√]. It is therefore attractive from a competitive perspective to attract young families[√]. Young families will effectively cross-subsidies the elderly and sick. [√]

- iii. In a community-rated environment, young and healthy lives cross subsidise old and sickly lives (i.e. policyholders do not pay a premium that reflects their likelihood of claiming). ✓✓

This means that the value of cover for young families is relatively low. ✓

In a voluntary environment, the young and healthy are more likely to opt out of PMI cover (and to take out cover only when their health needs increase) ✓✓

For competitive reasons it will be beneficial for insurers to attract young and healthy lives (a better risk profile will enable them to set lower premiums) ✓✓

Maternity benefits are attractive and valuable for those in the child-bearing years, and therefore pose an attractive marketing opportunity ✓✓

However, the scope for anti-selection is high (i.e. people join to specifically access the maternity benefit) ✓

In the year of a birth claims are likely to exceed premiums ✓

Therefore the insurer only benefits if the family renews cover ✓

The risk to the insurer of non-renewal is high ✓, and could result in losses being incurred for all the new lives attracted ✓

- iv. Membership of a group scheme is often compulsory ✓, or a high proportion of those who are eligible to join opt to do so ✓. So group membership should consist of a mixture of good and bad risks ✓. There is less opportunity for good risks to decide not to join (i.e. less scope for anti-selection) ✓. So the insurer can be more relaxed in underwriting pre-existing conditions ✓. The risk of non-renewal by those individuals using the maternity benefit is lower for group business ✓. However, the marketing benefit may be lower too ✓, unless employers see it as an attractive option to offer their employees generous maternity benefits ✓

QUESTION 5

It was clear that a large proportion of students have not engaged with the material on GLMs – the lack of understanding of this area is concerning, particularly given that GLMs are covered extensively in the A series examinations. In part (ii) a number of students confused multivariate modelling with multistate modelling.

- i. In the same way as ordinary least squares regression, a GLM can be used to model the behaviour of a random variable that is believed to depend on the values of several other characteristics ✓. The generalised linear model (GLM) is a flexible generalisation of ordinary least squares regression ✓. The GLM generalises linear regression by allowing the linear model to be related to the response variable via a link function ✓ and by allowing the magnitude of the variance of each measurement to be a function of its predicted value ✓.

- ii. Multivariate modelling using is necessary when modelling multiple factors[√] that are likely to be related or correlated to a certain extent[√]. Examples of factors (√ per example, max √√ for examples) used in modelling health insurance claims that are likely to be correlated:
- are age and family size
 - age and chronic conditions
 - maternity and gender.
- iii. Direct modelling of risk premium or incurred loss data for PMI business is problematic since a typical pure premium distribution will consist of a large spike (ie a point mass) at zero (where policies have not had claims) and then a wide range of amounts (where policies have had claims).^{√√}
The Tweedie distribution is a special member of the exponential family that has a point mass at zero and corresponds to the compound distribution of a Poisson claim number process and a gamma claim size distribution.^{√√}

QUESTION 6

Part (i) was looking for the conditions with the highest impact on lives. The four conditions in the schedule account for the bulk of CI conditions. If students put more than 4 conditions down in their response, only the first 4 conditions were marked.

Parts (ii) and (iii) had some overlap in terms of discussing the impact of the standardised definition on both policyholder and insurer. If a mark in the schedule was allocated for discussing an impact of an event to the insurer, but the candidate could justify how the impact would benefit the policyholder, a mark would have been rewarded. If the candidate put the same point in both ii) and iii) and discussed the impact on both the insurer and policyholder, unless the impact was significantly different, only a single mark was awarded.

Students that did well on this question focused on a wide range of factors that were relevant to the question. This question overlapped a multitude of sections including CI, product design and regulation. The more successful candidates were those that were able to identify which of these factors were most relevant.

Some students made the error that open enrolment would also apply. Some students made the assumption that because the market has minimum benefits, then CI products will cover only the minimum benefits. More successful responses would also be direct to the point, practical, and ensure a wide range of issues were considered.

- heart attack[√], cancer[√], stroke[√], coronary artery bypass graft[√]
- To the layperson the terminology is complex[√] - with standardised claim conditions, policies are likely to be easier for prospective policyholders to understand[√]
Products will be easier for sales staff to explain[√]
Easier for comparisons to be made between products from different insurers.[√]
This should promote competition on other factors (e.g. service levels and price)[√] which would benefit consumers[√]
There may be negative consequences for the affordability of products if the minimum set of benefits is higher than the current benefits offered (i.e. a minimum cost of cover is introduced)[√] May also reduce innovation in product design[√].

However, minimum benefits ensure customer protection in the sense that they are assured of a minimum level of protection√

The consumer will have enhanced certainty over benefits being purchased / The consumer will be covered for the bulk of Critical Illnesses √

This enhance trust/confidence√

iii. An agreed definition is more likely to be free of ambiguity√.

In addition, insurers will want to be able to settle claims quickly√ with few disputes√ (and so reduce the expense√ and threat to reputation√ that a disputed claim settlement produces).

Agreed definitions will help here, as there is less possibility of claimants producing case law from other insurers to support their disputed claim. √

The costs of developing and maintaining policy conditions will be carried by the regulator√, resulting in reduced costs for each insurer. √

However, this introduces the risk of definitions becoming out of date (as they are outside of insurer's direct control) √

Industry-wide information and education may make the definitions better understood√.

The result will be more sales in general, leading to increased business for all insurers√, and bigger increases for those who offer better customer service etc. √

Standardised definitions may also mean that industry-wide training across underwriters and claims managers improves quality, cost and transferability of these skills. √

With standardised definitions it will be easier to collect compatible industry-wide data. √

This will mean better information on which insurers can assess risks√. This increased information may result in lower risk loadings and lower premiums, thus further increasing the potential size of the market. √

There may be a short term effect where redesigning the products, literature, retraining claims managers and underwriters, reviewing marketing material, would increase the costs for the insurer √

QUESTION 7

Students performed poorly on this question – both on the applied aspects as well as the elements relating to bookwork. It seems that a large proportion of students have not engaged with the new material that has been added to the subject. Those students who were familiar with the concepts of provider networks, per-diem and per-case rates fared better, although only the stronger candidates were able to link these concepts to the particular characteristics of long-term care (e.g. taking into account longevity risk and the long-term nature of the care provided).

i. Insurers may restrict the choice of healthcare providers to approved provider networks where the insurer has entered into an agreement with the healthcare provider. √

Entering into an agreement with healthcare providers allows the insurer to manage risk by setting service or treatment guidelines√, and having access to information to monitor and manage the cost of treatment√.

They may also be better able to monitor and provide feedback on quality of care√

The agreement can mean improved claims control processes for the insurer√ (i.e. the insurer can impose processes as a condition of belonging to the network) √ This may reduce claim settlement delays. √

The agreement may also include the level of reimbursement for medical services√.

The insurer is likely to have more ability to negotiate fees when using networks√ (for example, providers have to agree to particular fees in order to be included in the network√)

And allows for alternative reimbursement to better align the provider's incentives with the insurer's. √ For example (√√ for example)

- the use of incentives to limit costs (eg a bonus for being within budget)

- negotiation of fixed payment methods that partly transfer the risk relating to treatment costs to the healthcare provider.

However, limited choice for policyholders may have negative marketing[√] and competitive[√] consequences and may reduce the volume of business sold[√]

ii. Limited choice benefit design

- competitiveness (what are competitors doing?, what are patients used to doing? How extensive is the network) ^{√√}
- marketability (impact on reducing price – lower price will improve marketability, but tradeoff is reduced choice) ^{√√}
- Need to assess whether the product meets policyholder needs (for example, the accessibility of the network) ^{√√}

Free choice benefit design

- Pricing this product design is more difficult[√]
- Increased uncertainty over the proportion of beneficiaries that will utilise the network (effectively an option for beneficiaries) [√]
- Co-payment can be set at a level that reflects the discount obtained via the network to reduce the uncertainty associated with the pricing[√]
- Or co-payment can be set high enough to discourage use of non-network providers[√]
- The insurer's ability to offer the network guaranteed volumes will be reduced [√]– this will reduce their negotiating ability with the network[√]
- The additional complexity may have systems implications[√]
- And will reduce any efficiencies in claims processes[√]
- This product design is less simple[√]

- iii. A per diem is a fixed amount per day the beneficiary is in the nursing home[√]. The fee paid would therefore not depend on the actual services or level of care provided[√]
With a per-case rate healthcare providers are paid a fixed amount per-case or admission[√], regardless of the length of stay or variation in services provided. [√]

iv.

Indemnity product – therefore longevity of claimants and the cost of care are two major risks ^{√√}
The incentive with fee-for-service reimbursement is to over-service the patient[√]
Alternative reimbursement is a way of managing claims risk[√] It reduces the risk of the nursing home over-servicing[√]. With both per-diems and per-case rates there is the risk of the nursing home underservicing the patients. [√]

Alternative reimbursement transfers part of the risk to the healthcare service provider[√].

The transfer of risk will be attractive to the insurer[√]

But probably not attractive to the nursing homes[√], and they may not be equipped to take on the risk[√]

Per diems

- A per-diem would make the cost of each day that a beneficiary is in a nursing home certain, but would still leave the longevity risk with the insurer. ^{√√}

Per-case

- A per case-rate transfer both risk of variations in the cost of the services provided and the risk of the longevity of claimants to the nursing home. ^{√√}
- It removes the variability in the cost of treatment due to variable fees and level of treatment required[√].
- Fees paid to nursing homes will be based on the average cost per case, adjusting for future trends[√]. Given the long-term nature of admissions, adjustment will need to be made for medical inflation[√].

- Given the long-term nature of care provided, the risk that beneficiaries are admitted for longer than expected is high√√