

**Subject ST1 — Health and Care
Specialist Technical**

EXAMINERS' REPORT

April 2009

Introduction

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. The questions and comments are based around Core Reading as the interpretation of the syllabus to which the examiners are working. They have however given credit for any alternative approach or interpretation which they consider to be reasonable.

R D Muckart
Chairman of the Board of Examiners

July 2009

General comments

Candidates who approached the questions, especially the more substantial elements of each question, in a methodical and detailed manner were far more likely to satisfy the examiners and receive a pass in the subject. Candidates will lose marks if they do not address the question asked. There was often a lack of sufficient detail in the answers. The mark allocation for each question part gives an indication of the relative length of answer or number of points to be made to gain full marks. In general each valid point in the answer would normally attract $\frac{1}{2}$ marks with the more basic elements e.g. details in a pricing basis such as age and sex, attracting $\frac{1}{4}$ marks.

Some papers were not clearly marked at the top of each page as to which part of the question was being answered.

Marks may be lost where answers are difficult to read.

Comments on individual questions

Question 1

This question was poorly answered with many candidates not realising that the object was to test whether the claims experience was significantly different using the rating factors given.

Question 2

- (i) The question concentrated on how a market might react to a medical advance in elderly care. Many candidates missed out on marks by not taking account of the information provided in the question – it's very important for candidates to apply their answers to the exact situation given.*
- (ii) Although many candidates made a good effort at this question, more marks would have been gained had candidates addressed the cost of the treatment or given an assumption as to who paid for what. The cost of the new drug is important but is likely to be a fraction of the cost of care in an institution.*

Question 3

- (i) This question was a good opportunity for a well prepared candidate to score very highly.*
- (ii) Most candidates could generally comment intelligently on the proposal in the question. Candidates should bear in mind that the proposal has advantages as well as disadvantages, and discussing these would enable them to score extra marks.*

Question 4

- (i) *This part was generally well answered.*
- (ii) *As the question talks about the extreme case of a policy not paying out, the circumstances to be listed should be commensurately extreme.*
- (iii) *This part was generally well answered.*
- (iv) *Candidates should not automatically assume in a question like this that a "suggestion" is a bad idea, particularly where they are asked to discuss the "merits" of that suggestion. This is a process which is currently being adopted by some healthcare insurers and has generally resulted in a great reduction in non-disclosure.*

Question 5

- (i) *Candidates could generally find plenty to write about in this bookwork question – but note that to score highly, it isn't enough to repeat a standard list. The answer needed to be applied to the specific situation in the question.*
- (ii) *Candidates who knew the course could score full marks on this question.*
- (iii) *Candidates did not always calculate the retention in claim A on the basis of the life with the highest aggregate sum insured across all CI policies held. For claim B marks were awarded for all reasonable approaches for calculating the period of sickness.*

Question 6

- (i) *This part was generally well answered*
- (ii) *The better scoring answers considered a wide range of complications, ranging across both financial and practical considerations.*
- (iii) *This question caused some difficulty. Candidates who thought about the different parties and how they are affected by the level of the reserves to generate a number of answers scored well. Scripts that attempted to apply a standard list of reserving good practice generally missed out on a lot of the marks available, as their points were less relevant.*
- (iv) *Better answers included consideration of what an asset share really represents, what a reserve is intended to achieve, and how the two could be reconciled.*

1 Data should be split by family status rating basis

Data should be further subdivided by

- Sex
- Age group (as defined by the insurer)

Data required is

- Claims Incidence
- Cost of claim as defined by the insurer

Data can then be considered by

- Member
- Spouse
- Children

to check whether there is a material difference in the experience between rating classes and to see to what extent data from the various marital status areas can be combined

Data should be taken from the past few years in order to be relevant

Trends should be considered

Rating cells should be credible

Consider rating factors used by competition

2 (i) **Immediate Needs Annuity market**

The underwriters of Immediate Needs (IN) annuities will need to revise their assumptions on the progress of the disease where the insured is seeking an annuity.

The pricing assumptions will need to make due allowance for the annuity likely to be paid for a shorter period so either premium reduces or annuity increases

If the demand for Alzheimer cases reduces, the effect on incidence and availability of care will need to be considered.

If the drug evaluation is correct, i.e. two years more in the community is achieved, there will be a slowdown in annuity sales for two years as the treated Alzheimer cases are not being placed in a home.

If the use of the drug is extended to other Alzheimer cases with some duration of the Alzheimer condition, then there will be a further slowdown in annuity sales.

If the market in Actuarial for IN annuities is primarily for Alzheimer cases, the impact could be substantial.

However, Alzheimer's is not the only possible claim or reason for purchasing IN annuities. There may also be less substantial impact if people don't take the drug.

The delay in purchasing IN annuities will mean that some pre-Alzheimer cases will die before effecting the IN annuity.

However, there could be a counter-balancing effect in that more IN annuities are purchased due to more publicity and / or reduced prices

Pre – funded Long-term care insurance market

May affect underwriting procedures

Will the potentially treatable Alzheimer cases have a genetic marker so that the insurer can give a differential price for these cases?

Or will a discount due to the lower risk be applied to the class?

With a measurable proportion of cases benefiting from the delay in needing LTC there should be a drop in price for the risk (two years more premium and two years less payment) and so you might sell more

But there may be fewer sales due to a more optimistic view on the level of senile dementia (Alzheimer's)

In all probability, any spin-offs of a successful drug could lead to a new generation of more powerful drugs lowering the price for pre-funded even further.

If more pre-funded LTC sold then may sell less immediate needs business

- (ii) The impact on the medical and care costs
 The drug cost of Alzheimer's treatment at onset of the disease is A per annum
 Assume it is the same for both males and females
 Let the annual cost of care for Alzheimer's sufferer in care state s (may be residential or nursing) be C_s
 Assume care cost in state s is the same for both males and females
 Then the saving in cost at each age and sex is
 The number of cases receiving treatment multiplied by
 (the cost of the care which would have been needed minus the drug cost)
 As the drug treatment goes for two years we allow for deaths from all causes in that time
 Inflation of care cost and drug costs need to be considered (at rate j)
 This is likely to be higher than RPI
 General rate of interest assumed is rate i
 Choose discount rate approx $= i - j$
 So the unit cost per life for the two years will be $\bar{a}_{x:\overline{2}|}$ years (at rate $i - j$)

The formula will be (for males) summing for all x and s

$$\sum_{x,s} m_x (C_s - A) \bar{a}_{x:\overline{2}|} \text{ years at rate } i - j \text{ (on male mortality)}$$

Similarly for females

$$\sum_{x,s} f_x (C_s - A) \bar{a}_{x:\overline{2}|} \text{ years at rate } i - j \text{ (on female mortality)}$$

Then add males and females costs together for total population cost.

- 3 (i) Expenses will need to be split down and analysed into the required “cells”. Typically the cells may be the whole business of the insurer/each business fund/each main product line of the insurer
These may be further sub-divided between regular and single premium business.
The choice of cells will vary across offices depending upon the types and volumes of business written and the purposes of the analysis
The cells chosen should not be so small that the analysis becomes unreliable.
Also need to split by direct costs v overheads
and initial/renewal/claim/termination/investment
and proportionate to premium/sum assured/number of policies
There may be exceptions
The investigation should exclude commission
Record costs of medical reports and tests as external underwriting expenses

One possible approach to split these costs is as follows.

Salaries and salary-related expenses

A large part of the expenses are staff-related, owing to the labour-intensive nature of administering the business
In the short term, much of this may remain fixed in real terms.
In the longer term staff costs will vary to meet changing levels of new and existing business and changes in services provided
The degree of automation used to provide those services will also have an effect
Staff can be split into various groups:
Staff whose work comes entirely within a single cell
The costs for this group can be directly allocated to the appropriate cell
Staff whose work comes within more than one cell
Time-sheets can be used to split the costs of this group between the appropriate cells
Some staff will be wholly overheads
Some staff will straddle both overheads and direct expenses in which case the split between the two is likely to be made pragmatically
The direct part can be split further in proportion to the overall split of the other two groups

Property costs

If the company owns the buildings it occupies as an asset of its long-term fund, notional rent needs to be charged to the relevant departments
This rent, plus property taxes, heating costs etc., can be split by floor space and allocated in accordance to salaries.

Computer costs

The cost of purchasing a new computer could be amortised over its useful lifetime and then added to the ongoing computer costs

These can then be allocated according to computer usage (or other sensible allocation method)

Investment costs

These would be directly allocated to investment expenses and hence allowed for in assessing the investment return to be used

One-off capital costs (other than purchase of a new computer)

The expenses analysed exclude large one-off capital costs, which need to be amortised over the expected useful lifetime of the item purchased

The amortised cost may then simply be treated as part of the overheads

If the item can be treated as an asset of the long-term fund, a notional charge would usually be made

Exceptional items, which are not likely to recur, would be excluded completely from the analysis

(ii) Pros

Less hassle and allows management to focus on other areas

Initial costs may be lower

More certainty over expenses

Particularly important as company is small

Expertise provided by the third party provider

No or low fixed overheads – economies of scale

Can leverage existing experience/best industry practice

Flexible, especially for fluctuating volumes

Easier to set pricing/reserving assumptions

Lower expenses could mean more competitive premiums

Lower risk of expense overruns

Cons

May pass profit margin to supplier

There will be one-off system/data transfer costs

Adverse effect on company image

and low morale due to redundancy of staff

Loss of control

Uncertainty over service and quality

which could put brand at risk

Risk of having poor quality or no data

Compliance issues, e.g. requirements by the regulator

Need to manage relationship with third-party provider

Still need to maintain link to accounting system even though services are obtained externally

Less easy to implement changes

May not benefit from future cost savings

May not benefit from lower overhead if future business volume increases

Lock-in contract terms may have penal termination clause
Possibility of fee increases at time of re-negotiation
Small company so may not have much bargaining power
If renewal terms are unfavourable, it might be difficult to find another provider
It might be difficult or costly to set up in-house services again if the company fails to renew the agreement
Possibility of third party default

Many of the disadvantages can be managed through a carefully worded service level agreement and regular audits and checks
May do client servicing in-house but outsource the administration

- 4**
- (i) Protect the company from anti-selection
In particular, from lives whose health is so seriously impaired that it is impossible to assess the risk accurately
leading to increasing frequency of claims
and increased average cost of claims
It enables the company to identify lives with a substandard health risk for whom special terms must be quoted
or declined
It will identify the most suitable approach and premium level for the special terms
Adequate risk classification will help to ensure that all risks are rated fairly
Help in ensuring that actual morbidity experience does not depart too far from pricing assumptions
For large proposals, it helps to reduce the risk from over insurance
Helps get better reinsurance terms
 - (ii) Address/Territory (e.g. move overseas)
Occupation
Personal/family health
Hazardous leisure activities
Alcohol consumption
Smoking habits
Use of drugs
Frequency and duration of overseas travel
 - (iii) Main savings are the costs of medical examination reports
and the cost of the underwriter's time in assessing the reports
The total costs normally form a small proportion of initial expenses
Not all medical examination reports are due to sum assured exceeding underwriting limit;
some are as a result of information on the proposal forms
The prospect of higher level of underwriting limit before requiring a medical would attract more medically substandard applicants
This could increase sales
Some of these may need a medical as a result of information on the proposal forms which reduces the benefit of cost savings

Some may obtain cover on standard terms
This would worsen mortality/morbidity experience
The company would then need to increase risk premiums despite the expense savings
This would make the premium rates less attractive to standard lives
They would seek cover elsewhere with a further worsening of mortality/morbidity experience and further increase in premiums
As a small company, competitors are unlikely to follow this strategy
Need to consider reinsurance implications
The proposal would reduce the hassle factor and is likely to increase sales
It would also reduce acceptance time
Increase in sales would increase capital strain and decrease per policy expenses
May lead to higher volatility of profits requiring higher reserves
As a small company would need to consider what competitors were doing
Would need to make changes to systems and internal processes
There may be regulatory constraints
Need to monitor experience
Overall the company will need to assess the balance of the extra underwriting expenses against possible savings elsewhere

(iv) (a) **Sales Advisers**

Relieves them of what can be a difficult and time consuming process
Frees up time for what advisers do best – giving advice and making sales
Faster policy issue
Leads to earlier sales remuneration/commission payment
Advisers can track application's progress
If not currently widely used in the market, means of differentiation for sales advisers
If already widely used in the market, means of catching up with competitors
No change in commission but less work
They are not normally trained to ask/interpret medical questions
Some may find it embarrassing to ask personal medical questions

(b) **Company**

Leads to faster policy issue
Reduced medical evidence requirement – mainly fewer MARs
Better quality risk information
Reduced non-disclosure
Fewer “incomplete” applications
Fewer “Not Taken Up” cases
Improved reputation due to high quality customer service
Audit trail for application process

Additional costs of paying nurses salaries whilst still providing same remuneration for sales advisors
and the initial costs of setting the system up
Mortality/morbidity experience likely to improve

(c) **Customers**

Skilled interview by trained staff
Interview in privacy
Avoids discomfort of discussing medical history with adviser
Better service
Better customer experience due to faster policy issue
As the interview is by phone, it will be easier for customers to choose a convenient time
Should lead to fairer premiums being charged and fewer claims rejected

5 (i) Limitation of exposure to risk

Accumulation of risk could materially (negatively) affect business results

Avoidance of single large losses

Depends on size of free assets
To ensure the claims payment can be made without detrimental effect to business results

Smoothing of results

Particularly useful when the portfolio is relatively immature
Most likely to be needed for income protection due to higher level of claim volatility
Potentially also for critical illness

Availability of expertise

Particularly useful when entering new risk areas
Where the insurer has little previous experience
The reinsurer can help with product design/pricing, underwriting and claims management
Once the insurer's expertise and confidence has grown, it may choose to reduce reinsurance
Most likely to be needed for income protection

Increasing capacity to accept new business volumes

thereby potentially increasing diversification
Increasing capacity to write large cases

Financial assistance

Alleviate new business strain

Bolster free assets

Tax arbitrage

Solvency arbitrage

- (ii) First estimate the statistical distribution of the risk experience costs of the portfolio based on various assumed retention limits
For various degrees of departure from the average risk costs, needs to judge what probability should be aimed at
Can set retention level to keep the probability of insolvency below a specified level
A stochastic model can be used for expected claims rates
Project forward expected claims together with the company's assets and liabilities
Using simulation a retention level can be determined such that the company stays solvent for 995, say, out of 1,000 runs

Another possible is to consider the total of

- (a) The cost of financing a risk experience fluctuation reserve, and
(b) The cost of reinsurance

As the retention limit increases, (a) will increase and (b) will decrease

A retention can be adopted which minimises the total (a) + (b)

To calculate (a) you would use a simulation approach as above.

- (iii) (a) **Retention**

ACI + CI as based on the life with the highest aggregated sum assured

$(75,000 + 50,000) * 25\% = 31,250$

ACI claim is 75,000

So reinsurance claim = $75,000 - 31,250 = 43,750$

- (b) **Retention IP**

$7,000 * 30\% = 2,100$ p.a.

So reinsurance claim is $7,000 - 2,100 = 4,900$ p.a.

Date of sickness = 17/11/2007

With a deferred period of 26 weeks, payment would have started in the week commencing 19/05/2008

Date of death = 12/10/2008

From 19/05/2008 to 12/10/2008, there are approximately 21 weeks

Reinsurance claim for sickness = $4,900 * 21/52 = 1,979$

Retention ACI

$$80,000 * 25\% = 20,000$$

$$\text{Reinsurance claim for death is } 80,000 - 20,000 = 60,000$$

$$\text{So total reinsurance claim} = 61,979$$

(c) **Retention**

$$500,000 * 25\% = 125,000 \text{ which exceed the } 100,000 \text{ maximum}$$

$$\text{So retention is } 100,000$$

$$\text{ACI claim is } 500,000$$

$$\text{So reinsurance claim is } 500,000 - 100,000 = 400,000$$

6 (i) Information to be provided

Details of any approximations that had to be made when implementing the method

Feedback regarding the difficulties faced in implementing the method

Details of the basis used, including:

- claim inception rates
- claim termination rates
- mortality rates in claim
- mortality rates not in claim
- valuation interest rates
- inflation assumption
- expense assumption
- lapse rates
- treatment of options

Comments on how these assumptions were determined including margins of prudence

Assets backing the reserves

Details of the products the reserve relates to

The amount of the reserves on the current method and on the new method

(ii) **Complications**

Insurers may want to influence the outcome in order to reduce the level of the reserves

except possibly insurers who are very well capitalised who may wish for high reserves if they think it puts them at a competitive advantage

They may therefore wish to make their reserves look excessively large in the submission so that the rules are amended

Different insurers may have very different approaches to setting the basis which will make comparisons very difficult especially as there is no prescribed degree of prudence – it may be difficult to tell the companies which have prudent reserves from the companies with more realistic reserves

Different insurers may have very different experience

e.g. because of different underwriting approaches or target markets

May not have systems available to do this straightaway
If not compulsory, may not get many responses
The format the data arrives in may vary
There may be gaps or errors in the data or misunderstandings or misinterpretations of what the Regulator was wanting

(iii) **Possible conflict of interest and solutions**

Regulators will generally prefer higher reserves to give a high degree of confidence that the liabilities can be met
Policyholders will generally feel the same
This may conflict with shareholders, who will generally prefer lower reserves so that profit can be released more quickly

Other advantages of lower reserves:
May create more investment freedom, and ability to seek higher yielding investments
Frees up capital to write more new business, with a view to adding more shareholder value

There may be tax implications – there could be tax advantages to holding a higher reserve and deferring the emergence of profit

Possible methods to protect the integrity of the reserves
Requiring the basis used to be disclosed
Regulations could specify how the basis is to be set, even if the basis itself is not prescribed
Guidance could be issued by the regulator or the local actuarial body
Internal audit could be required, and possibly external audit
Very detailed regulations could be laid down around the method of calculation of the reserves
Segregation of duties
The introduction of a supervisory or regulated role (e.g. “Reserving Actuary”) that has a responsibility to the regulator
Introduce minimum level of reserves
Requirement to hold mismatching reserves

(iv) **Asset share basis for reserving**

Principle of statutory reserves is to meet all the liabilities arising in the future
To an extent the asset share is irrelevant, as it relates to the past
Asset share could be valid if the premium is set correctly especially if the basis is “prudent”
However, critical illness policies last many years and the premium may have been correct at the time, but may have since proved to be inadequate
This would make an asset share reserve insufficient to cover the liabilities, and hence inappropriate for a statutory reserve
Would be possible to have an asset share based reserve plus a reserve for inadequate premia – similar to a URR.

Could have potential use where a policy is reviewable, especially if the reviews are carried out actively/frequently
More useful would be a retrospective reserve calculated using a premium set using current assumptions.
Do the companies even have sufficient historic data to be able to do retro approach?
The requirement “to be prudent” is very vague and might need more clarity, especially considering the concerns about conflict of interest
What does prudent mean in the context of an asset share?
Asset share maybe negative at early durations – is the regulator comfortable with allowing negative reserves?
Approach might be beneficial for that insurer but not for the industry as a whole

END OF EXAMINERS' REPORT