

EXAMINATION

27 April 2010 (pm)

Subject ST1 — Health and Care Specialist Technical

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 15 minutes before the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all seven questions, beginning your answer to each question on a separate sheet.*
6. *Candidates should show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

<p><i>In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.</i></p>
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1 Outline the measures that a health and care insurer should take to ensure that its policy and claims data are complete and accurate. [7]

2 (i) State the general considerations for any health and care insurer when setting assumptions. [4]

A large health and care insurer is reviewing its lapse assumptions for critical illness business. The Chief Actuary has stated that the results of this process need to be widely communicated to the actuaries in the business.

(ii) Explain why this wide communication might be needed. [5]
[Total 9]

3 Describe the main distribution channels for health and care insurance products. [8]

4 An insurance company writes a range of healthcare products other than long term care insurance.

It also sells an equity release product, which is a loan taken by homeowners on the security of the equity in their owner occupied property. The loan is rolled up with interest and is repaid when the property is sold on the death of the last surviving policyholder or when the last surviving policyholder moves to a care home.

It has been suggested that the company could enter the immediate needs annuity market. For joint life equity release policies, in the event that one of the policyholders enters a care home, the cost of the required immediate needs policy could be added to the equity release loan. This would enable the remaining policyholder to remain in their own home whilst the other is in the care home.

(i) Discuss this suggestion. [10]

(ii) Review the viability of the scheme where policyholders other than those who are legally married husband and wife apply to take an immediate needs annuity. [2]
[Total 12]

- 5** A health and care insurer writes a range of long term products. It is carrying out a review of the financial performance of its business, including calculating the embedded value.

- (i) Outline the calculation of embedded value. [5]

The following information and assumptions have been provided in respect of a block of existing stand-alone critical illness business:

Number of policies	10,000	as at 01/01/2010
Average premium	120	p.a.
Average sum assured	100,000	
Claims rate	0.001	p.a.
Lapse rate	10%	p.a.
Expenses		
• Renewal	20	per policy p.a.
• Claim	250	per claim
Reserve (immediately before premium and expense payments)	50%	of premium
Investment return	5%	p.a.
Tax	20%	of profits

As part of the calculation of the embedded value, the company needs to determine the expected shareholder profit arising on this block of business during 2010. It can be assumed that premiums are payable annually in advance, renewal expenses are incurred at the beginning of the year, claims and lapses occur at the end of the year and the claims rate and lapse rate are mutually independent.

- (ii) Calculate the net of tax shareholder profit expected to arise during 2010. [8]

The senior management team of the insurer has commissioned the production of a regular management information report. This is to assist the financial management of its business.

- (iii) Outline the information that could be included in the following sections of the management information report:

- (a) Key Performance Indicators
- (b) Operational
- (c) Risk and compliance

[12]

[Total 25]

- 6** (i) State the key reasons for calculating the technical reserves of a health and care insurer. [3]
- (ii) Describe how the following situations would affect the reserves for existing business of a health and care insurer writing accelerated and stand-alone critical illness, income protection and a comprehensive PMI product:
- (a) Improvements in recovery rates from cancer.
- (b) A sudden, unexpected, decrease in the supply of hospital operating theatre nurses.
- (c) Increase in the take-up rate of a diagnostic test for a serious cancer, following a high profile celebrity case. [12]
- [Total 15]

- 7** A health insurer which writes only individual critical illness and income protection insurance has in place a quota share reinsurance treaty and an aggregate excess of loss reinsurance treaty.

The finance director has identified that the total amount of reinsurance premiums paid by the insurer is 80% higher than the amount of reinsurance claims received from the reinsurer. The industry average is 30%, so she is concerned that the company is not receiving value for money from its current reinsurance strategy.

- (i) Discuss possible reasons for the difference and the investigations that should be carried out in order to respond to her concerns. [18]
- (ii) Suggest alternatives to continuing with the current reinsurance strategy. [6]
- [Total 24]

END OF PAPER

EXAMINERS' REPORT

April 2010 Examinations

Subject ST1 — Health and Care Specialist Technical

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 2010

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 gain few marks if they do not address the question asked. 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 0.5 marks with the more basic elements e.g. details in a pricing basis such as age and sex, attracting 0.25 marks.

Comments on individual questions

Question 1

This question was generally well answered. Candidates who spent time to structure their answer would generally have been able to make more distinct points and hence score more highly.

Question 2

- (i) This was a straightforward bookwork question which most candidates scored well on.*
- (ii) Candidates needed to consider how the lapse assumptions would be used to score well.*

Some candidates mistook the question as meaning that the lapse assumptions would be made available across the industry rather than just across the company.

Question 3

Most candidates got very high marks on this bookwork question.

Question 4

- (i) Many candidates made a good effort at this question by applying common sense to the subject matter contained in the course and providing a good range of ideas.*
- (ii) Only the better candidates did well on this question part, by thinking about the real world implications of such a situation.*

Question 5

- (i) Straightforward bookwork, generally well answered.*
- (ii) Candidates should make use of the assumptions stated in the question; several made their own simplifying assumptions and hence failed to gain full marks. A few candidates did not approach this systematically – this adversely impacted their ability to get the right answer. In numerical questions it is always helpful to carry out the calculation in a logical order and to show the workings. This enables marks to be awarded for answers which are incorrect, for example because the wrong formula*

was used or an arithmetic slip was made but otherwise the answer given would have been correct.

- (iii) *Most candidates were able to make a good attempt at this part.*

Question 6

- (i) *Straightforward bookwork, generally well answered.*
- (ii) *Candidates who considered the effect on each product systematically and gave their reasoning scored well. However, candidates should be wary of concluding too easily that something is unaffected. Few candidates made the crucial link that a decrease in supply may trigger a rise in cost. There was some confusion between stand-alone critical illness and accelerated critical illness.*

Question 7

- (i) *Several candidates omitted to suggest any investigations which should be carried out. In long questions such as these, structured answers are generally able to hit a wider range of the points on the marking schedule.*
- (ii) *Most candidates did suggest more than one alternative but did not give enough to gain near to the total number of marks available.*

1 (i) Regular vetting, spot checks

Carry out regular inspection of the processes by which data is accepted by the system.

Check that the data captured is comprehensive.

Carry out systematic comparison of paper records against data stored on system.

Include modules in the system to detect/query inconsistency or unusual features in the data.

Check internal consistency of data – e.g. sum assured v. premium.

Check consistency of data over time – i.e. compare data on policies at this valuation and last valuation (e.g. numbers of policies or total sums assured, allowing for movements).

Check policy records “end to end”, especially if the data is passed between several systems and/or manual processes.

Have a single system storing all the data.

Controls on data acceptance

Inbuilt checks to prevent erroneous items from being accepted at the time of data input, for example:

- sex field will only accept M or F

- maximum age at entry cannot exceed 120

- sum assured must be in whole number

- any special features of the product that could impose further restrictions on data acceptance.

Certain “exceptions” must only be overwritten by persons of pre-specified status and an audit trail of such special exceptions will be stored by the system.

Compulsory fields

An individual policy record will have certain fields which are mandatory. The input will not be accepted unless all such information is included, for example:

- age/date of birth

- sex

- benefit

- term

A claim record will not be accepted unless there is a policy number for cross-reference.

Staff training

Ensure adequate training provided to staff responsible for data input.

Establish a culture of the value of accuracy of data and develop the ability to spot information which may have been submitted wrongly, either deliberately or accidentally.

Encourage close liaison between staff responsible for establishing the software and the staff involved in the training.

Encourage feedback from the staff responsible for data input.

Ensure that proposal form and input screens have the same format.

Ensure that systems are developable and refineable in order to continue to capture all required data.

- 2**
- (i) Consider the use to which the assumptions will be put and the needs of the user.
Take particular care over the choice of those assumptions which will have the most financial significance.
Allow for any consistency which should exist between the various assumptions.
Ensure that the parameters derived from data are done so as accurately as the body of data will permit.
Ensure that the data used to derive these assumptions are relevant to the risks which the policies encompass.
Ensure that bases used for periodic valuations and reserves are flexible to reflect changing risk circumstances.
Consider any legislative or regulatory constraints.
- (ii) The lapse assumptions may be used for reserving, pricing and embedded value purposes, amongst others.
Communication across the company ensures consistency between these metrics – so that actuaries calculating all metrics make the appropriate updates. This ensures that good management decisions are made. In particular, if pricing assumptions are not updated to reflect the latest lapse assumptions then prices may be set incorrectly. Similarly, if reserving assumptions are not updated then reserves may be inadequate. If EV assumptions are not updated then the EV may be misreported.
It also ensures consistency between products – for example, an actuary working on a new product development may wish to make allowance for the changes when estimating their future lapse assumptions.
The lapse assumptions will interact with other assumptions: if lapse assumptions increase, we might expect to need to review morbidity assumptions also. This is due to the effect of selective lapsing. Lapse rates may also impact per policy expense assumptions.
If the review highlights a problem with persistency, action may also be able to be taken to address it (e.g. change commission structure).
Professional guidance relevant to that country is likely to encourage open communication.
Reinsurers may also require regular experience updates, so the actuaries that liaise with them will need to be kept up-to-date.

3 Insurance intermediaries (brokers)

Insurance intermediaries must act independently of any particular insurance company (although they may be owned by one). Their aim is to find the best contract, in terms of benefits and premiums, for their clients. They are usually remunerated via commission payments from the health and care insurer. Alternatively they may receive a fee from their clients.

It will often be the client who initiates the sale. However, they may also promote themselves actively to existing clients.

Products sold through this channel can be relatively sophisticated.

Tied agents

These are insurance intermediaries who are “tied” to one, or sometimes several insurance companies. Typically they may be employees of a bank or other similar financial institution. Where the tie is to more than one company, the product ranges of the companies are usually mutually exclusive. Tied agents are remunerated via commission payments from the companies to which they are tied. Often the policyholder will initiate the sale, but some tied agents may actively engage in selling.

Own salesforce

Members of an own salesforce will usually be employees of an insurance company; hence they will only sell the products of that company. They may be remunerated by commission or salary or a mixture of both.

It will usually be the salesperson who initiates a sale, making use of client lists. The client often initiates further sales once the salesperson manages to build a relationship.

Direct marketing

This could take the form of:

- Mailshots
- Telephone selling
- Press advertising
- Internet

The initiator of the sale varies according to the marketing method used.

Products sold through this channel generally need to be relatively simple.

Worksite marketing

This is a process whereby a broker or insurer representative obtains permission from the client (an employer) to address the workforce and sell the products. The insurer is able to engage a large number of employees, potentially with similar characteristics, at one time. Also, the employer may permit the premium to be deducted from the payroll.

Products sold in this way will normally be of simple design.

- 4** (i) This scheme will only apply to policyholders who have sufficient equity remaining in their property.
- Research will be needed to see if there are sufficient cases to qualify to make it worthwhile for the company to proceed with the scheme. The proposed product can be seen as meeting the needs of those who need LTC but have partners who wish to stay in their home. On the other hand, it may be perceived as complex and hard for policyholders to understand.
- The product will increase the marketing potential for new business if the target market is compatible with the LTC option and thus will increase profits to the insurer. However, it will also increase the number of questions asked at entry. As the insurer does not currently write any long term care business, it is likely to find the pricing of the immediate needs annuity difficult and similarly the underwriting, which is vital for this type of business. Therefore the company may need external assistance.
- As well as couples there may be other combinations who take out the policy, e.g. parent/child. Such combinations may be particularly difficult to price.

The insurer needs to consider whether this proposal will sell enough additional business to justify the development costs.

The company may wish to consider whether any other companies are offering this. If so, the company would consider whether the terms can be competitive. If not, the product may be a unique selling proposition.

The insurer will have to consider how to structure the immediate needs annuity, for example, whether the amounts are index-linked and whether there is any capital protection.

The new product is capital intensive since the premium for the annuity is not received until the second death. The company therefore needs to consider whether it has sufficient capital to support this new product and, if not, whether it can be sourced from elsewhere for example from reinsurers (financial reinsurance).

The company needs to consider whether the return on capital will be adequate relative to other possible opportunities.

The company must consider the additional risks arising from this product, whether these are in line with its risk appetite and whether reinsurance is available to help mitigate risks; for example, the risk of policyholders living longer than expected in the pricing, the risk of increased house prices.

The company would also consider whether there are any reputational risks that might arise. The insurer should ensure that policyholders seek financial advice at the LTC decision point.

The company will have to amend its admin systems to accommodate the new product and it will have to ensure that there are sufficient staff recruited and trained to support the new business.

The company needs to assess whether the product can be distributed via its normal sales channel(s) and the extent to which there are cross-selling opportunities amongst existing customers.

The company must take into account any additional regulatory requirements specific to long term care insurance and the level of state LTC benefit provision.

- (ii) It will depend upon the local social legislation on the destination of monies and property on death whether the property devolves to the other party in the equity release transaction and on the legal and contractual arrangements regarding ownership of that specific property. If the property does devolve to the "spouse", then it should be possible to design the contract to allow for the problems. If not, then the equity release contract may have to exclude the specialist circumstances where the property passes elsewhere. However, there may be legislation that prevents discrimination in this way.
Pricing/capital issues could be more significant for "non-standard" joint policyholders, particularly where there is a large age difference (e.g. parent & child).

5

- (i) *Embedded value can be calculated as the sum of:*

The shareholder-owned share of net assets

where net assets are defined as the excess of assets held over those required to meet liabilities. These assets may be valued at market value or discounted to reflect “lock-in”, for example if they are required to be retained within the fund to cover solvency capital requirements, **and**

The present value of future shareholder profits arising on existing business

For conventional without profits business this would be the present value of:

future premiums
plus investment income
less claims
less expenses
plus the release of solvency reserves

For unit-linked business this would be the present value of:

future charges
including surrender penalties if applicable
less expenses
less benefits in excess of the unit fund
plus investment income earned on any non-unit reserves
plus release of any non-unit reserves

Calculations may be done using full data or model points. Future cashflows will be discounted at the risk discount rate, reflecting the shareholders' required rate of return. Experience assumptions may be best estimate, but this depends on the purpose of the embedded value calculation. Tax is allowed for within the calculation as appropriate.

It is important that the reserves used in the determination of net assets are the same as those used in the determination of the present value of future profits.

(ii)	Premium	$10,000 \times 120 = 1,200,000$
	Number of claims	$10,000 \times 0.001 = 10$
	Amount of claims	$10,000 \times 0.001 \times 100,000 = 1,000,000$
	Number of lapses	$10,000 \times 0.1 = 1,000$
	Number of policies as at 31/12/2009	$10,000 - 10 - 1,000 = 8,990$
	Renewal expenses	$10,000 \times 20 = 200,000$
	Claim expenses	$10 \times 250 = 2,500$
	Reserve – start of year	$1,200,000 \times 0.5 = 600,000$
	Reserve – end of year	$8,990 \times 120 \times 0.5 = 539,400$
	Change in reserves	$539,400 - 600,000 = 60,600$
	Investment income on reserve	$600,000 \times 0.05 = 30,000$
	Investment income on net cashflows	$(1,200,000 - 200,000) \times 0.05 = 50,000$

Gross profits = Premium – Claims – Expenses – Change in reserves +
Investment income

$1,200,000 - 1,000,000 - 200,000 - 2,500 - (539,400 - 600,000) + (30,000 + 50,000) = 138,100$

Tax $138,100 \times 0.2 = 27,620$

Net profits $138,100 - 27,620 = 110,480$

(iii) (a) **Key Performance Indicators**

Examples include:

Total new business volume by premium (or annual premium + single premium/10, say)

Total sales by number of policies

Comparison of actual sales with business plan

Market share (if available)

New business profitability and new business strain

New business pipeline report

All new business information should be split by product line and by distribution channel (if appropriate)

Total premium income

Total claims

Details of particularly large claims

Comparison of actual claims with expected

Average premium and/or average benefit

Total reserves

Total expenses, split between acquisition and ongoing and by business area

Comparison of actual expenses with budgeted expenses and actual commission against budget

Persistency analyses (comparison of actual with expected)

Asset under management, by asset class and investment performance

Asset liability management issues or changes

Value of in-force by major product line

Embedded value profits and analysis of change in embedded value

Trend analysis of any of the above indicators

Shareholder profits / earnings

Return on capital

Solvency balance sheet

Capital cover ratio

Analysis of surplus

Current credit rating (if applicable)

Share price information / trends

Any tax issues

Results may be presented both as current month and year to date

(b) **Operational**

Examples include:

Outsource provider financials

Reinsurance information, for example. changes in reinsurance profile
and data on reinsurance premiums and recoveries
Changes in underwriting / claims management processes
Underwriting statistics, e.g. % declined
Claim management statistics, e.g. levels of non-disclosure/fraud
Other fraud issues
Governance issues
Treating customers fairly issues or other complaints
Staff headcount and staff turnover / retention
Legal issues
Details of key projects
Loan analyses, if applicable
Any IT or data issues
Information on the achievement of customer service standards
Results from customer or staff satisfaction surveys

(c) **Risk and compliance**

Examples include:

Risk register
Statements of risk appetite
Details of key risks and details of mitigation plans for key risks
Trends in risk development
Audit and compliance monitoring of risks
Emerging compliance issues
Details of risk events/risk crystallisations
Details of regulatory changes

6

- (i) Reasons to calculate technical reserves include:
- to determine the liabilities to be shown in the insurer's published accounts
 - if separate accounts have to be prepared for the purpose of supervision of solvency, to determine the liabilities to be shown in those accounts
 - to determine the liabilities to be shown in internal management accounts of the insurer
 - to estimate the cost of claims incurred in recent periods and hence provide a base for estimating the future premiums required to attain a given level of profitability
 - to value the insurer for merger or acquisition
 - to set investment strategy
 - to assist with the assessment of reinsurance
- (ii) (a) **Improvements in recovery rates from cancer:**
The impact depends on whether the cancer referred to is covered by the critical illness policy wordings. For accelerated critical illness, even if it is covered there is unlikely to be much change in reserve. Payouts will be unchanged, as the policy is not affected by recovery.
For SACI, if this cancer is covered then it depends whether the rate of survival through the survival period is changed. If more people now survive the survival period, then the rate of pay-out will increase, and hence reserves should rise. If it is the longer-term rate of recovery that

improves, then the reserve will be unaffected as for accelerated critical illness. However, claims may in fact reduce if the cancer definition is no longer triggered due to the appropriate severity level not being reached.

For income protection the payments could be expected to be paid for a shorter duration. Policyholders may be more able to return to work on a part-time basis with reduced benefits. If the policy has a long deferred period, a claim may be avoided. Hence reserves could be expected to reduce. Alternatively, benefits could be paid for a longer duration, for those cases where the claimant would otherwise have died; hence reserves could increase.

Similar considerations apply to PMI reserves: some patients may incur lower treatment costs due to quicker full recovery, and others may incur higher treatment costs if they might otherwise have died.

(b) Sudden, unexpected, decrease in supply of hospital operating theatre nurses:

This would primarily affect the PMI reserves. If the reduction in supply of nurses caused the wage paid to the nurses to increase, costs would go up. Hence the reserves would be expected to rise for claims already incurred for those cases involving surgery and for claims not yet incurred, the URR would go up. However, the cost rise will depend on whether there are fixed rate agreements in place between the insurer and hospitals.

If the shortage was so severe that many operations were cancelled then claim costs could temporarily fall, but as the operations are still likely to take place at some point then it is unlikely that the company would release reserves.

It is possible that claims could rise if waiting list time increases lead to greater use of private insurance rather than relying on any state provision, either due to waiting list clauses or personal choice (noting that private providers may be more likely to obtain replacement staff).

Cancellation of operations could similarly reduce recovery rates, increasing claim costs for income protection (with consequent increase in reserves)

Critical illness could be affected if falls in quality of care lead to increased rates of mortality in the survival period. This would reduce reserves slightly for SACI and for accelerated CI this could lead to slightly higher reserves. However, CI claims could increase if important surgery is missed which leads to more severe illness, which would indicate higher reserves.

(c) Increase in take-up rates for cancer screening following celebrity case:

This could increase the incidence of treatment for the cancer, and so increase the rate of claim on PMI so PMI reserves would increase.

PMI reserves would go up even more if the screening test were covered on the PMI policy.

If the change caused diagnosis rates to increase, then accelerated critical illness pay outs could be brought forward, causing reserves to increase slightly. This could similarly increase the rate of claim on SACI, causing reserves to increase, perhaps more significantly. SACI claim rates would also be increased due to more cases being diagnosed prior to death and if the CI policies are defined term, claim rates could be increased due to more cases being diagnosed prior to the end of the policy.

If the treatment for the cancer was debilitating, this could increase claim rates on income protection. Similarly the treatment could prolong life, but not in a sufficient level of health to return to work so IP reserves could possibly increase. On the other hand if cases are picked up early as a result of the screening, they might be treated before triggering an IP/CI claim definition, so claim rates and thus reserves could reduce.

- 7 (i) It should first be checked that the figures quoted by the finance director are correct

The comparison may not be like for like

Need to ensure the company's figures and the industry figures are restricted to the same

- product classes
- territories
- target market
- distribution method

Check whether the comparisons are over the same time period. If the time period is not sufficiently long then the difference could be due to random fluctuations. An investigation over a longer period would therefore be useful.

The premiums the company has been charged may have been higher than the industry average

Ensure premiums have been calculated on a consistent basis e.g. earned, written, net etc. Also retention levels will be different – try to standardise. The extent of commission payback or the way in which it is allowed for in the figures may differ; similarly with any profit sharing arrangements, including experience refund premiums.

Type of reinsurance will be different – try to standardise.

If the quota share policy is written on original terms, it might be because the insurer's own premium loadings are very high. If written on level risk premium terms then it might reflect a relatively immature portfolio, with premiums being expected to exceed claims at earlier durations.

The XoL treaty may appear very expensive, particularly if it has a high retention and there have been no "catastrophes" to trigger it.

The combination of the two treaties might be inefficient.

The company might be relatively small and therefore suffering a high fixed loading component of the reinsurance premium.

The company's treaties may have been written at a different point in the business cycle from the rest of the industry i.e. when rates were harder.

This company may have weaker underwriting and claims management processes and rules than the industry average. The company could investigate if cheaper rates would be available for introducing better underwriting and claim handling standards. The rates available from different quality reinsurers would also be investigated.

The company might have received less claim repayment than the industry average

Ensure claims are calculated on a consistent basis e.g. paid, reported, incurred etc. For IP need to allow for the present value of expected recoveries under existing claims. This may also apply to CI if not paid as a lump sum.

Investigate the calculation of estimates e.g. IBNR.

Investigate the number of claims declined by the reinsurer as invalid and the number of claims outside the scope of the treaty.

Investigate delays in the payment from the reinsurer of valid claims.

The company should estimate the value of the other benefits the company receives from reinsurance

such as:

- the cost of otherwise having to increase the margins in the pricing basis
- having to reduce the options and guarantees which can be offered
- the cost of having to increase the margins in the reserving basis or holding additional reserves
- the cost of holding more liquid assets
- the intangible benefit of having smoother profits, particularly the effect on the attitude of shareholders and analysts and on supporting the share price
- the value of being able to write more business due to an increased capacity to accept risk
- the need for capital e.g. commission or deposit back or other financial reinsurance arrangement
- the extra cost of having to replace assistance received from the reinsurer, e.g. with underwriting, data, claim handling etc
- the cost of writing own manuals and training staff
- the value of any tax and solvency arbitrage

The insurer should attempt to compare the value of these other benefits to those gained by other insurers so that cost comparison includes all value generated from the reinsurance strategy.

Further data investigations required:

Investigate in more detail the cost of reinsurance premiums compared to the claims received.

If sufficient volume to be credible, data should be split by:

- product line
- sales channel
- reinsurer / treaty
- target market

commission level
underwriting method

Investigate how the claims experience varies by level of the sum at risk by splitting the claim data into tranches according to the sum at risk. Also, investigate whether reinsurance premium rates available differ between all the above tranches / data splits.

Investigations to determine appropriate retention levels:

Vary the retention limit and calculate the corresponding probability of ruin. A stochastic model could be used with the claims rates as the stochastic variable. Project forward expected claims together with the value of the company's assets and liabilities. Use simulation to determine a retention level so the company stays solvent for say 995 out of 1,000 runs. Alternatively vary the retention limit to minimise the cost of financing an appropriate risk experience fluctuation reserve plus the cost of obtaining reinsurance.

Then compare the cost of reinsurance premiums to the claims received at each of these retention levels allowing for the different reinsurance rates available for different retention levels.

Investigate other types of reinsurance:

Investigate the rates available for the different types of reinsurance cover and for alternative reinsurance arrangements e.g. facultative instead of a treaty.

(ii) **Continue with the same reinsurance but with a different company**

Find a cheaper reinsurer for either or both treaties.

Might choose to reinsure both treaties with the same company especially if a discount is available.

Different layers could be brokered to different reinsurers.

The insurer could enter into reciprocity agreements with other insurers.

Reduce reinsurance

For example, increase the retention limits and/or reduce the upper limit of the XoL, or add one if not already included.

Set up claim fluctuation reserves.

Don't reinsure categories where the amount of claims recovered is less than the cost of reinsurance over a sufficiently long investigation period.

Withdraw from classes where recent claim experience has been poor and where reinsurance rates might therefore be very high.

Stop reinsurance completely and self insure or set up a captive.

Stop only the XoL treaty, if deemed to be too expensive.

Increase levels of reinsurance if these can be obtained for cheaper rate and gain better recoveries

Change types of reinsurance

Use different type of proportional reinsurance e.g. surplus in place of quota share or different non proportional reinsurance e.g. catastrophe instead of excess of loss.

Don't renew treaties, use more facultative reinsurance.

END OF EXAMINERS' REPORT

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7 October 2010 (pm)

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- 1** (i) State the principles of investment. [2]

A health and care insurer writing a range of long-term business outsources the management of the assets backing the reserves to an external fund manager.

- (ii) Outline the factors to take into account in assessing the performance of the fund manager. [4]
[Total 6]

- 2** (i) Outline the different types of commission that may be paid to a sales adviser selling health and care products. [3]

A health and care insurer is considering stopping paying commission, and moving to alternative methods of remunerating sales advisers.

- (ii) Discuss the possible reasons for this move. [3]
[Total 6]

- 3** (i) List the reasons why a health and care insurer might want to analyse its supervisory surplus and the change in its embedded value. [5]

A health insurance company has been making losses over the last few years and its solvency position has worsened. The company has performed analyses of experience, surplus arising and the change in embedded value and is using this to reassess its view of how to manage the future.

- (ii) Suggest actions that may be taken to improve the financial position of the company. [10]
[Total 15]

- 4** (i) Discuss the following profit criteria commonly used for the pricing of health and care insurance products:
- (a) net present value
 - (b) internal rate of return
 - (c) discounted payback period
- [8]

You have been given the following pricing cashflows of a portfolio of health and care policies. It should be assumed that the premiums are received at the start of each year, the profit cashflows arise at the end of each year, the survivorship factors are the probability of surviving from the start of the policy to the end of the year shown and the figures given are per policy in-force at time zero.

Product A

Year	1	2	3	4	5
Premium	100	100	100	100	100
Outgo	200	50	50	50	50
Profit	-100	50	50	50	50
Survivorship factor	0.9	0.8	0.7	0.6	0.5

- (ii) Calculate the following profit criteria at time zero, using a risk discount rate of 8% p.a.:
- (a) net present value as a percentage of the present value of premiums
 - (b) discounted payback period (in whole years)
- [5]

You have also been given the following pricing information of another portfolio of health and care contracts.

Product B

Year	1	2	3	4	5
Premium	100	100	100	100	100
Outgo	150	60	70	80	90
Profit	-50	40	30	20	10
Survivorship factor	0.9	0.8	0.7	0.6	0.5

Net present value (NPV) 14.66
 Present value of premiums (PVP) 285.62
 NPV / PVP 5.1%

Discounted payback period 3 years

- (iii) Comment on the relative financial attraction of the two products. [2]
 [Total 15]

- 5** A health insurance company sells pre-funded long term care insurance business, funded either by a single premium or by level annual premiums.

These products currently do not provide a lump sum cash value on lapse, but the insurer is considering whether to introduce this feature.

- (i) Discuss whether the products should offer a lump sum cash value for policyholders who wish to surrender their policy. [7]
 - (ii) List the data and assumptions required in order to determine the cash values, if the suggestion goes ahead. [3]
- [Total 10]

- 6** A large health and care insurer is well established in the critical illness market. The marketing manager has proposed introducing tiered benefits as a variant to the standard critical illness product. None of its competitors is currently offering a tiered benefits critical illness product.

- (i) Outline the product features of a critical illness policy with tiered benefits. [4]
 - (ii) Discuss the proposal to introduce tiered benefits. [14]
- [Total 18]

- 7** A small health and care insurer is considering launching a group Locum Protection insurance product for chiropractors.

Locum Protection insurance is a form of income protection insurance which is purchased by professionals. It has a short deferred period and offsets the salary and other employment costs of a temporary replacement professional by paying a regular income during periods of incapacity of nominated staff.

- (i) Outline the needs that this product addresses. [4]
 - (ii) Discuss the risks to the insurer arising from selling this product. [18]
 - (iii) Discuss how the insurer might sell this product. [8]
- [Total 30]

END OF PAPER

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2010 examinations

Subject ST1 — Health and Care Specialist Technical

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.

T J Birse
Chairman of the Board of Examiners

January 2010

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 gain few marks if they do not address the question asked. 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 0.5 marks with the more basic elements e.g. details in a pricing basis such as age and sex, attracting 0.25 marks.

Some candidates wasted time by copying out large parts of the question to head their answer. Answers were easier to mark when they followed a logical sequence; such answers also tended to avoid wasting time by making the same point again later in their solution. It is often helpful to use subheadings when answering long part questions.

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 was a bookwork based question, and it caused difficulties for those students who did not demonstrate good knowledge of the core reading. However, this question was generally well answered.

Question 2

This question was well answered by many students who clearly had a good grasp of current issues in life insurance, but crucially were also able to think widely about possible reasons.

Question 3

Students who had studied the core reading thoroughly were better able to score highly on this question. Part (ii) demonstrated the importance of sound brainstorming techniques and an ordered approach (to avoid repeating the same points).

Question 4

As described in the more detailed report below, a number of different approaches were acceptable for the calculations in this question. Most students were able to perform the NPV calculations accurately, but some made slips and the DPP calculation proved more challenging.

Question 5

This question provided an opportunity for a good student to think deeply about the scenario presented and put forward meaningful suggestions. The question was fairly challenging, and considering thoroughly the ramifications of the suggestion would have been a good use of a student's reading and planning time.

Question 6

Again, students with an ordered approach had the best chance of scoring highly. Well-prepared students generally performed well on this question.

Question 7

This question was often not well answered. Candidates are expected to apply their knowledge of bookwork to the specifics of the question asked. A list of all distribution channels available for health and care insurance is not an acceptable answer for part (iii).

- 1**
- (i) The principles of investment
- (a) a company should select investments that are appropriate to the nature, term and currency of the liabilities
 - (b) the investments should also be selected so as to maximise the overall return on the assets, where overall return includes both income and capital. The extent to which (a) may be departed from in order to meet (b) will depend, inter alia, on the extent of the company's free assets and the company's appetite for risk
- Or equivalently, the company should invest so as to maximise the overall return on the assets, subject to the risk therein being within the financial resources available to it.
- (ii) The investment strategy they have been given and the targets originally set for overall return.
- The amount of freedom they have been allowed / the riskiness of the strategy undertaken.
 - The extent to which they have deviated from any benchmark asset allocations they have been given.
 - The performance of benchmark indices compared with actual investment performance.
 - The performance of other fund managers with similar briefs
 - The period over which they are being assessed – short periods may show random deviation (ie luck!).
 - Whether they have been given any additional constraints, such as liquidity targets or other constraints eg regulatory
 - Whether any tactical investments have been profitable, and within an acceptable range of “riskiness”
 - The amount of investment expenses incurred
 - Size of fund may influence investment strategy
 - Performance manager's customer service/SLA
 - Use of appropriate indicator to allow for cashflows
 - Compare volatility with market volatility
- 2**
- (i) **Types of commission**
- Indemnity commission means the insurer pays the distributor commission in respect of premiums the insurer has yet to receive
 - Level annual commission may be paid, where the insurer pays the distributor an amount of money whenever a premium is received
 - Initial commission is a system between indemnity and level annual commission, where the commission is spread over a limited number of years, e.g. four and there is normally a lesser amount of renewal commission paid for the balance of the policy term.
 - Commission may be paid in proportion to sum assured (reflecting the insurer's preference for higher sums at risk). Clawback of commission may be put in place so that if a policy lapses, the distributor must repay a proportion of commission already paid.
- (ii) **Reasons to stop paying commission**
- May be able to sell more of the product due to more attractive premium rates.

There may be a market move away from commission in the territory in which the insurer operates. This might be due to regulatory change or change in tax treatment.

They may be moving to a tied sales force, who they could remunerate via salaries and bonuses.

They may be uncomfortable with the level of risk or capital requirements involved in initial or indemnity commission eg this could be because they are worried about third party default or because it exposes them to higher levels of financial loss on early lapse.

They may feel that paying commission encourages inappropriate sales behaviour, for example, with sales advisers making sales of products offering higher rates of commission

It may simply not want to sell much business, due to capital constraints or inability to tolerate high level of initial strain

They may feel the alternative is more profitable, for example, due to lower lapse rates and/or lower costs.

3 (i) **Analysis of surplus**

To show the financial effect of divergences between the valuation assumptions and the actual experience

To expose which assumptions are the more financially significant

To show the financial effect of writing new business

To provide a check on the valuation data and process, if carried out independently

To identify non-recurring components of surplus thus enabling appropriate decisions to be made about the distribution of surplus

To give information on trends in the experience of the company

Analysis of change in EV

To validate the embedded value calculations, assumptions and data used

To reconcile the embedded values for successive years

To provide management information

To provide detailed information for publication in the company's accounts or those of any parent company, in particular the value of new business taken on by the company

(ii) Increase sales in order to generate higher profits and cover overheads, e.g.:

- Remove unnecessary margins in the pricing basis
- Revise the product features
- Increase marketing or improve the marketing message
- Improve the quality of sales staff/advisors through training
- Review and select more appropriate distribution channels/sales methods

Since higher sales may temporarily worsen the solvency position if product design results in new business strain, the company could revise product design to minimise capital requirements eg by removing guarantees.

Strengthen the pricing basis to increase new business profitability/ need to ensure that the pricing assumptions reflect current experience

Consider increasing reviewable premiums on existing business provided this is expected to net a profit after allowing for lapses
Remove unnecessary margins in the statutory reserving basis
Revise wording and format of sales literature to minimise risk of anti-selection
Revise the mechanics of commission payments and clawback to improve persistency experience or to reduce capital strain
Improve the quality of customer services
Set up a customer retention strategy unit to target profitable business
Review the adequacy of staffing, in terms of numbers
Review the competence/efficiency of staff
Try to find expense efficiencies
Review reinsurance arrangements
Raise capital eg financial reinsurance/securitisation
Review outsourcing arrangements
Review investment strategy/ALM
Revise underwriting processes
Revise claims handling processes
Review capital policy to minimise capital requirements
Improve the systems and data recording processes
Reword policy contracts to remove any hidden mistakes in policy design which have surfaced
Improve tax efficiency
Use results of review to prioritise actions
Merge with another company or sell off part of company
Consider outsourcing eg claims control
Review the reviews of premiums
Stop selling unprofitable business

4 (i) Net present value

- (a) This is calculated by discounting the profit signature at the risk discount rate. Given a choice between the future cashflows from two different investments, an investor should choose the one with higher net present value. This implies that net present value is the best profit criteria to use, and if any other profit criteria disagrees with it a company should go with the net present value. However, this assumes that there is a perfectly free and efficient capital market and that when two risky investments are compared each is discounted at a risk discount rate appropriate to its riskiness. NPV is subject to the law of diminishing returns. It says nothing about competition and saleability. As such, one approach is to express net present value in a way which reflects the effort which would be expended in selling a policy, e.g. as a percentage of commission. Alternatively it could be expressed as a percentage of the present value of the premiums which will be paid under the policy

(b) Internal rate of return

This is defined as the rate of return at which the discounted value of the cashflows is zero. All other things being equal, a company should prefer a contract which has a higher internal rate of return. However, the internal rate

of return does not always agree with net present value and the net present value may be more reliable.

If there is more than one change of sign in the stream of profits in the profit signature, there is not generally a unique internal rate of return.

The net present value can be related to useful indicators, such as sales effort or market share, but there is no way to do this with the internal rate of return

If a policy makes profits from the outset then the internal rate of return may not even exist

(c) **Discounted payback period**

This is the policy duration at which the profits which have emerged so far have present value zero. It is the time it takes for the company to recover its initial investment with interest at the risk discount rate.

A company with limited capital might prefer to sell contracts with as short payback period as possible

The discounted payback period may not agree with the net present value as it ignores completely all the cash-flows after the discounted payback period

Some students described the payback period rather than the discounted payback period, which would not have gained full credit.

- (ii) A number of different calculation approaches were deemed by the Examiners to be acceptable for this question part, each of which was given full credit:

The net present value (NPV) calculations should be performed by multiplying each cashflow by the appropriate probability in-force and by the appropriate discount factor, and then summing. Discounting should be from each year end, given that the profit cashflows are described as arising at the year end. The probabilities in-force either as at the start of each year (e.g. 1.0 for the first cashflow) or as at the end of each year (e.g. 0.9 for the first cashflow) could have been used, giving NPV = 23.88 or 17.81 respectively.

The present value of future premiums (PVP) calculations could have been performed using the same approach, noting that premiums are payable at the start of the year and therefore should be multiplied by probabilities in-force at the start of each year and discounted by one year less than the profit cashflows above. This approach gives a PVP of 351.59.

Alternatively, some students deduced that the PVP for Product A should be the same as for Product B, given the same probabilities in-force and premium amounts. This approach gives an alternative PVP of 285.62.

Any ratio of NPV/PVP using a combination of the above results was given full credit (5.1%, 6.2%, 6.8%, 8.4%).

The discounted payback period (DPP) calculations required calculation of the cumulative discounted profit to each time period. Under the two approaches acceptable for the NPV calculations, this would give either of the following patterns:

Period	1	2	3	4	5
Cumulative Discounted Profit					
v1	−92.59	−54.01	−22.26	3.47	23.88
v2	−83.33	−49.04	−21.26	0.80	17.81

For either approach, this gives a DPP of 4 years (the first year in which the cumulative discounted profit is positive).

- (iii) Product A has the higher Net present value/Present value of future premium ratio.
 The discounted payback period for Product B is shorter due to the fact that the initial loss is smaller.
 As net present value is normally the best profit criteria to use, Product A is preferable.
 However, Product B may be preferred if the company has limited capital to write new business.
Alternatively, full credit was given to those students using the approach in part (ii) that gave a ratio of 5.1%, who commented that the NPV/PVP ratios are the same and hence need to consider the DPP as a possible deciding factor, which would favour Product B.

- 5** (i) The company would need to investigate the position of competitors in this market and check whether their products have features different from this company which encourage or discourage them from having a cash value
 Demand for a cash value may come from
- the insured wishing to spend the cash value on other projects
 - the insured's health deteriorating and, as a result, requiring immediate funds, but not to a sufficient degree to be able to make a LTC claim
 - may be significant change in state provision which reduces or negates the requirement for personal provision
 - may be attractive due to changes in policyholders circumstances
- Reserves do accrue under these policies and so a cash value might be justified but only if the insured is *competent* to give a valid agreement to the transaction.
 There is also considerable anti-selection risk. Those who perceive themselves as very healthy are more likely to surrender
 The level of death benefit within the contract will also need consideration
 The impact of a cash value transaction on the position regarding tax will need to be reviewed by the insurance adviser
 In addition to the above, for the annual premium version demand for a cash value is also going to come from the insured being unable to afford the premium in full. In this situation, a paid-up policy or a reduced premium with reduction in benefits could be offered
 The company may wish to obtain input from reinsurers
 The marketing position *and distributor opinion* needs to be considered

Offering surrender values could improve the attractiveness of the product. Policyholders might also perceive it as unfair that no cash sum is received on surrender, particularly later on in the funding period. The premium would need to be increased if cash values were offered eg to cover expected losses from early lapses for which initial expenses have not yet been recouped. The pricing would need to allow for the anti-selective effect although may now attract more healthy lives on average. Changes in admin systems may be required. There may be professional guidance/regulatory constraints. Doing this may preempt/mitigate anticipated future legal or regulatory changes. Can the lump sums be costed so as not to generate losses? If surrender values are too generous may encourage lapse and re-entry. Need to consider liquidity requirements/may need more liquid investments. Would also need to take into account the likely strict initial underwriting, which would tend to select healthier lives (i.e. lives which are more likely to lapse)

- (ii) Age
Sex
Term/duration
Premium frequency
Premium
Benefit amount
Options
Underwriting status/rated life
Expected mortality during funding period
Expected mortality during claim
Expected morbidity
Expected future renewal expenses
Expected surrender claim expenses
Expected future expense inflation
Future commission
Expected future benefit inflation (if relevant)
Yields on the corresponding existing assets and the yield which it is expected will be obtained on sums to be invested in the future.
Assumptions on take up
Tax
Any profit margin required on surrenders

- 6**
- (i) A CI policy with tiered benefits would pay out a lump sum on diagnosis of a covered critical illness. The payment could vary according to the type of illness.
For one or more of the illnesses covered, the payment of the sum insured is linked to the severity of the disease. The payment would be a proportion of the full benefit (dependent on the progress of the disease). Further claims may be lodged if the disease advances. Further payments are made from the balance of the sum assured to reflect the increasing impairment.

The level of severity (and proportions attaching) will be clearly specified in the policy documents using objective medical definitions. There are often four severity levels but some policies may have conditions with up to seven levels. Premiums do not typically reduce with any proportionate claim payment.

- (ii) May be deemed more comprehensive and more fair as a benefit is offered at levels of disease progression which would not have triggered payment under a standard critical illness contract. This would also provide a closer fit possibly to medical distress and financial needs, reducing the incentive for anti-selection and reducing the incentive for exaggeration of symptoms at the claim stage.

Multiple claims are possible which enhances policyholder satisfaction and retention.

As a variant of the standard product, it permits the insurer to differentiate itself from its competitors. Thus it may sell more business and generate higher profits.

A large and well established company is likely to have greater influence on the market. Also, as there are no competitor products the insurer may be able to increase margins and hence profits

However, this is a more complex product; there is the risk that consumers would prefer to keep critical illness cover simple. Also, it makes comparisons more difficult with other (tiered or level) critical illness products. This could also reduce its appeal to the financial advisers.

A lot will depend on whether the policyholder has to pay more, less or the same amount in premium.

Need to consider consistency with and impact on existing CI products

There is potential for a higher degree of claims dispute and resulting reputational risk. In particular it is difficult to define the additional stages of disease that trigger benefit. These need to be both legally and medically objective whilst being understandable to the consumer. Weaknesses in definitions can lead to higher claims.

Pricing the business will be complicated, including determining a much greater number of claims assumptions:

- several severity levels
- several transition intensities
- each required for every rating factor.

and not having any credible own experience data to help do this. Also, the underlying incidences and transitions may change frequently in the future.

There will be many overlaps between related illnesses. Pricing and management is also complicated by cross-correlations between illnesses.

The mix of people buying the product likely to be different as there is no competition.

The company may need to include high margins to allow for these uncertainties, which will reduce the attractiveness of the product or they may have to offer only reviewable rates, which also reduces the attractiveness.

Underwriting could be more complex. In particular the bringing forward of potential claims situations is going to increase the importance of any pre-existing conditions and change the seriousness of any material non-disclosure. The claims manager is going to be faced with considerably more claim forms,

with complex definitions and they may also face significant policyholder (and possible adviser and GP) pressure to “upgrade” to a higher level of benefit. There are likely to be much higher claims expenses.

The new variant will require systems changes/ staff training.

Need to take into account the total product development costs and whether there will be enough sales to justify the cost.

Need to undertake market research before launching and to bear in mind that future demand could be impacted by other companies following suit launching similar products.

The company is likely to need the assistance of a knowledgeable reinsurer but reinsurance may not be available at an acceptable cost.

As a completely new product to the market, the company is unable to use industry data to help with the launch

Can you sell through existing current distribution channels?

Any regulatory requirements or constraints

Tax treatment in policyholders hands of an income stream as opposed to capital may be different

What are capital requirements for the product?

Is there any better alternative use of the development capital?

- 7
- (i) Allows the practice to secure a replacement and continue to provide services to its customers
To avoid losing customers whose treatment is cancelled
To reduce pressure on the other partners who may have needed to work harder
To avoid the risk to customers of the other partners working on their day off or more than a safe number of hours
Allows a partner to return to work for reduced hours
Finding a suitably qualified replacement at short notice is likely to be expensive
Generally the policy can help to ease the mind of the sick partner and may accelerate their recovery
Compensation for loss of profits
Reduces the risk to the partnership of making a large capital payment through having to bear the costs of the ill-health of a partner or employee (or allays fears)
The short deferred period is useful as it means that benefits are paid sooner
- (ii) **Morbidity risk**
Claims inception rates being higher than expected and claims termination rates being lower than expected.
This could be due to model risk, parameter risk, volatility risk or random fluctuation risk especially as this is a small insurer and a small niche product. Determining suitable rates for the different classes of risk may be difficult eg will the policy cover partners and employees.
Not even the largest practices will merit pricing as a group scheme using its own experience. The small number of employees per scheme means that claims experience can be very volatile.
Statistics may not be available to price contract.
Changes in practice membership due to death, retirement, joiners.

The short deferred period leads to additional morbidity risks.
Difficult to determine an unambiguous definition of a claim inception, recovery and relapse, this will also effect the data collected for pricing etc.
Claim amount risk if the benefits are indemnity ones, or if fixed and linked to inflation, may be higher than expected. A larger than expected volume of claims could also lead to strains on system and staff resources.
The company needs to ensure that it has taken into account in its pricing the specific additional risks related to this type of cover:
Experience likely to be subject to latest germ going around e.g. bird flu due to contact with patients.
Higher risk of accidents due to equipment used and manual nature of work
Need to be fully well to be able to carry out work to the required level of patient safety.
There may be accumulations due to group and occupational risks.
Practice may be inefficient or understaffed, thus increasing stress related illnesses.
The short deferred period and claim payment term could make reinsurance difficult to obtain. If used, the company is exposed to reinsurer default risk.
The company is subject to **anti-selection risk**, which is related to morbidity risk especially if membership if not compulsory for all partners/employees
Risk of non-disclosure
Risk of over-insurance e.g. if partners have their own IP policy as well
Moral hazards e.g. child illness
Difficulty and cost of obtaining certification due to the short deferred period and payment term. However this should be balanced by the professionalism of self employed chiropractors
Maternity or paternity absence would be anti-selection risk, unless excluded
Degree of risk depends on how it is underwritten

Expense risk

Risk of higher than expected expenses
Risk of higher than expected inflation
The short deferred period and claim payment term lead to greater volatility of claim payment expenses, as does the small size of the book

Withdrawal/non-renewal risk

Selective withdrawals could result in higher morbidity experience
Financial risk on withdrawals where asset share is negative
Higher than expected withdrawals can also increase the per policy expenses for remaining business.
If the policy is annually renewable there is the risk that the practice will not renew leading to a financial risk if several claims have been accepted and are in payment.

New business risks

Risk of higher than expected volumes of new business impacting capital and administrative strain. However, as this is a very niche product this is unlikely.
Higher cost than a standard IP product due to the short deferred period may make sales more difficult unless meeting a real need

Risk of lower than expected volumes of new business meaning that fixed expenses are not recovered

Risk of different mix of business than that assumed eg smaller than expected average cases, reducing the expense contribution, geographical area or risk of selling more business at the less profitable rates, if there are cross-subsidies

Other risks

If the policy is not subject to annual renewal there is a risk of not being able to vary the policy rates after particularly poor experience (either of a scheme or of the whole class)

Reputational risk e.g. Pre-existing exclusions may be difficult to enforce

Data errors mean that pricing or reserving may be wrong

Investment performance lower than expected

Corporate bond default risk, if held to back reserves

Actions of competitors, e.g. reducing their premium rates to “steal” the market

Regulatory changes

Tax changes

Fraud (either by staff or policyholders)

Failure of internal systems or controls

Risk of misselling

Because small company, may outsource and hence counterparty risk

- (iii) May already have a relationship with an **insurance broker**
Could be sold as a package, possibly alongside other necessary insurance e.g. professional indemnity, employers liability etc.
Brokers are able to deal with complicated products and offer market comparisons but the product would need to have competitive premiums and offer a competitive level of commission
The target market will have relationships with their business bank which may have **tied agents**. Therefore possibly market alongside the chiropodists' business bank account services.
Don't need to be as competitive (similarly with own salesforce)
The company's **own sales force** – may already sell the practice other types of non-healthcare insurance.
The company could undertake **tailored marketing** e.g. through Society of Chiropodists (could have advertising/articles on their website)
May be able to offer discounts
Preferred supplier status
Articles in their magazine
Brand awareness through small gifts with the magazine or through sponsorship (eg brand presence at conferences)
Other forms of **Direct marketing (eg telesales)** are unlikely due to the special nature of the product
Worksite marketing is not an option because of small size of companies

END OF EXAMINERS' REPORT

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

21 April 2011 (am)

Subject ST1 — Health and Care Specialist Technical

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 15 minutes before the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all seven questions, beginning your answer to each question on a separate sheet.*
6. *Candidates should show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

<p><i>In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.</i></p>
--

- 1** A health and care insurer is considering whether to use model points or full data for its actuarial modelling.
- (i) Discuss the relative merits of these two approaches. [6]
 - (ii) Describe the factors that the company would take into account when setting model points. [4]
- [Total 10]
- 2**
- (i) Define keyperson insurance cover, giving two categories of policy design. [2]
 - (ii) Outline the possible target market and how the sum assured might be set, for each of these two categories. [3]
 - (iii) Outline the key risk management issues that might arise for an insurance company as a result of writing this type of business. [4]
- [Total 9]
- 3** An insurance company writes private medical insurance, critical illness insurance, income protection insurance and immediate needs annuities, in many countries around the world.
- One of its non-executive directors has heard about a blood test that has been developed and is now undergoing trials. The claim is that the test can detect a particular protein, a high level of which is a very good indicator of the onset and development of a form of senile dementia called Alzheimer's disease. It is thought that this protein marker appears up to ten years in advance of the onset of this disease.
- The non-executive director has asked what the effects of the introduction of this blood test will be on each of the types of insurance business written.
- Outline the points that should be made in response, including actions to be taken by the insurer. [9]
- 4**
- (i) List the sources of risk that a health and care insurer commonly faces. [5]
 - (ii) Suggest ways in which a health and care insurer can manage its risks. [12]
- [Total 17]

- 5** The government of Actuaría pays a weekly cash benefit to any of its citizens after six months' absence from work by reason of sickness or injury. The benefit is paid until the first of the following events: the claimant recovers and returns to work, dies or reaches normal retirement age, which is currently 65 for both males and females.

There are regular checks on benefit entitlement for all claimants currently residing in Actuaría. These checks can include a face-to-face interview with a government employee to establish that the claimant is still incapacitated and not working, and/or a physical examination by a government doctor to check on the current incapacity and future fitness to work. In the event that the citizen is declared fit for work, the benefit ceases. Checks are not made on claimants residing outside Actuaría.

Recently, a member of the Actuaría Parliament has stated that some form of check on benefit claimants residing outside Actuaría will be introduced.

- (i) Suggest the data items required in order to assess the current amount of claims liability in respect of those living outside Actuaría. [4]
 - (ii) Discuss the checks that the government might implement for benefit claimants residing outside Actuaría. [4]
 - (iii) Outline the problems that may arise if the claimants living outside Actuaría are required to undertake a physical examination by a designated doctor. [3]
- [Total 11]

- 6** A health and care insurer has a portfolio of private medical insurance (PMI) business written in the country of Actuaría. It also has a reinsurance subsidiary in a different country, Bankonia.

Actuaría is currently undergoing major changes to its insurance regulations and it is expected that the capital requirements under the new regime are likely to increase significantly.

It has been suggested that a significant proportion of the insurer's PMI business should be reinsured to the subsidiary in Bankonia with the aim of reducing the overall capital requirements.

Describe the considerations when assessing this suggestion from the perspective of:

- (i) the health and care insurer in Actuaría [9]
 - (ii) the reinsurer in Bankonia [8]
 - (iii) the overall group [3]
- [Total 20]

- 7**
- (i) Explain what is meant by the following terms as used in health and care insurance:
 - (a) Continuation option
 - (b) Guaranteed insurability option
 - (c) Buy-back option

[5]
 - (ii) Explain the principles which determine the cost of an option.

[3]
 - (iii) Outline three ways in which an option could be valued (formulae are not required).

[6]
- A health and care insurer writes stand-alone critical illness (CI) policies.
- (iv) State with reasons which method would be most appropriate to value the options that could be offered under this product type.

[3]
 - (v) Outline the main risks of writing options under stand-alone CI policies, and how these risks can be managed.

[7]
- [Total 24]

END OF PAPER

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2011 examinations

Subject ST1 — Health and Care Specialist Technical

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.

T J Birse
Chairman of the Board of Examiners

July 2011

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 gain few marks if they do not address the question asked. 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 0.5 marks with the more basic elements e.g. details in a pricing basis such as age and sex, attracting 0.25 marks.

Some candidates wasted time by copying out large parts of the question to head their answer. Answers were easier to mark when they followed a logical sequence; such answers also tended to avoid wasting time by making the same point again later in their solution. It is often helpful to use subheadings when answering long part questions.

- 1** (i) Relative merits of the two approaches:
- Model points*
- Save model running time and calculation time (models are also useful if running many times). This may be significant for a very large health and care insurer with a large portfolio of business and saves data storage.
- Could potentially be better approach if need to manage problem/missing/inadequate data. However, health and care insurers need to keep a lot of data electronically and should have found cheap and reliable ways to do this.
- Output is more manageable and easier to inspect. This can facilitate checking of the output.
- For some types of modelling (e.g. new business pricing) model points are the natural choice, since outputs are only required for specimen policies in order to produce a manageable premium rate scale
- Full data*
- Full data is better if data is very heterogeneous.
- Outputs obtained using model points are generally less accurate than full data as they do not capture the full features of the data. They may for instance group together bands of ages, which would otherwise affect morbidity experience significantly.
- Detailed characteristics of the business may be lost, e.g. a correlation between age, sex and benefit size might be expected for income protection, which could be “smoothed away” if model points are used.
- Time spent identifying and validating model points may outweigh the time saved in running the model.
- Considering which are the most significant features may be a large piece of work for health and care business where there are many risk and rating factors to allow for.
- Some results may have to be highly accurate, meaning that model points would not be appropriate (e.g. statutory reserves)
- (ii) The model points chosen must be such as to reflect adequately the distribution of the business being modelled. The number of model points to be used will be a trade off between time saved and accuracy
- Need to consider the relevance of particular factors to the experience when deciding on the extent to group by that factor (this would depend on product). The level of heterogeneity within the data set would be relevant.
- The model point choice should be validated by running the model on both full data and model points, and calculating the difference. Alternatively, the model points can be used to recalculate the mathematical reserves at a valuation date, and the results can be compared against the full data valuation. Some maximum “error” will be set, and this will help determine how many model points to use.
- The usage of the model points will affect the choice – for some purposes some features will be more crucial than others (e.g. for reserving purposes, pricing new business). For example, in pricing, the amount of initial commission paid is important, but this is not important for reserving.
- The model points used last time would normally be the starting point. These would then be adapted for known changes in the business mix.

This question was well answered by those students who demonstrated familiarity and confidence with the Core Reading bookwork, and who were also able to think about the issue in a practical context.

- 2**
- (i) Keyperson products are taken out by an employer to provide cover if key employees fall sick, become disabled or die
They fall into two categories:
Those designed to provide compensation for loss of profits
Those designed to cover the key employee's salary (to facilitate the temporary recruitment of a replacement)
 - (ii) *Loss of profits*
Small and family businesses, partnerships
Key people in key jobs e.g. tea taster, perfumer, locum protection
Individual sum assured linked to a proportion of loss of profits (this would need to be defined in some way) or the cost of buying out a partnership.

Employee costs
May be purchased by any company with salary-related employees; for example, to cover senior managers.
Individual sum assured linked to expected cost of recruitment and the cost of training and additional cost of hiring a temporary replacement (e.g. consultant)
In both cases, the amounts would be capitalised over an appropriate period
 - (iii) *Risk management issues*
Sums assured may be very high; individual underwriting would be required for large sums assured. In particular, there is a need for automatic medical tests at underwriting stage for higher sums assured to detect non-disclosure and a need for robust claims management. Would also need to perform financial underwriting in order to avoid over-insurance.
The level of underwriting required will be very expensive.
Reinsurance contract likely to be required. It might be difficult to obtain reinsurance or the cost may be too high.
Reinsurer's expertise may also be required for pricing and underwriting, particularly if own experience is limited, which is likely given that this is probably low volume business and the individual keypersons are not necessarily typical of the insured population.
It is particularly important to ensure that benefit amounts and payment conditions are well defined.
Diversification could be difficult to achieve.

This question was challenging for many candidates who appeared to be insufficiently familiar with the core reading description of these contracts (candidates are reminded that the glossary does form part of the core reading). Applying common sense did, however, enable candidates to gain marks without being familiar with the theory.

3

Overall

Check the information given by the non-executive director.

Determine the likely timescale for the introduction of the test.

Ascertain how accurate the test is thought to be and the cost of the test.

Is the test available in all countries covered?

Engage in debate with the H&C industry and elsewhere.

This may increase demand for PMI, CI and IP products.

Need to check with reinsurer before changing any product coverage.

Underwriting

Need to consider whether the underwriter would be allowed to use the results of the test in underwriting (or whether the proposer would even have to disclose that they had had the test) and whether the insurer would be allowed to require this test to be taken by the proposer for a new policy. If so, the insurer would need to consider how it would deal with the mental anguish involved (or whether it would put people off buying insurance if having the test is a requirement).

Underwriting permissions will vary around the world.

Effect of test

PMI

Need to consider whether the disease is chronic or acute as chronic diseases may be excluded from the PMI cover.

The company should consider whether to add it as a separate benefit in the PMI benefit schedule.

Is the cost of the test covered?

Will a positive result trigger a treatment cost or costs for preventive measures? If so, how much and for how long?

How does the underwriter check for prior conditions – may use a moratorium

May not have a big impact on PMI as this is a short term renewable product

CI

Consider wording of policy in relation to Alzheimer's disease.

Need to ascertain whether Alzheimer's disease is one of the listed critical illnesses for this company's product(s) and to consider the point at which the CI contract pays out.

What proportion of overall claims relate to Alzheimer's disease?

If covered, then need to consider pricing/loading implications if a proposer has a positive result.

If an existing policyholder has a positive result then unlikely to be able to cancel the policy or increase premiums but would have to increase reserves

IP

The considerations are similar to those for CI and PMI if proposers/existing policyholders have a positive result.

Consideration would be needed as to whether a positive result would trigger an immediate claim.

The effect on IP might be less than for CI, since IP tends to be sold to younger policyholders.

Immediate Needs Annuities

There is likely to be no effect since this product is only purchased at the time of care need.

This question was well answered by those candidates who were able to demonstrate their ability to apply their knowledge to an unfamiliar subject. However, many candidates appeared confused as to the difference between pre-funded long term care and immediate needs annuities – this is an important distinction that candidates should be clear on.

- 4**
- (i) Data – own experience, insured experience, population data, overseas data
Claim inception and termination rates
Claim cost information: by treatment, per diem, length of stay, medical inflation
Investment performance
Expenses and inflation
Withdrawals
Mix of new business by nature and size of risk and by source
Volumes of new business
Guarantees and options
Competition
Management of insurer
Counterparties in distribution
Counterparties in provision of medical services
Counterparties in reinsurance
Regulation and fiscal developments
Customer service shortcomings/reputational risks
Internal audit failures/fraud
Physical risks including IT recovery
Aggregation and concentration of risk
Catastrophes
Non-disclosure – underwriting at outset versus underwriting at claim stage
Earlier screening/diagnosis
Anti-selection
Liquidity risks
 - (ii) Obtain appropriate reinsurance arrangements
Deposit back or collateral arrangements to mitigate counterparty default risk
Asset liability matching in terms of nature, term and currency
Cash flow monitoring as a tool to manage liquidity risk
Review actual experience against pricing basis e.g. monitor levels of expenses
Set up a retention team to reduce lapses (or offer loyalty discount)
Service level agreements with outsourcers
Competence assessments for key inhouse staff
Competence assessments for sales staff, distribution channels
Checks on policy data
Surveys on customer service satisfaction
Underwriting as gatekeeper and risk analysis
Claims management – in line with policy conditions and underwriting
Treating customers fairly

Controlling the distribution process
Market research and analysis of likely business volumes and mix
Keeping abreast of regulatory developments
Keeping abreast of market and medical developments
Appropriate product design that meets the needs of customers
Comprehensive and unambiguous policy wording
Appropriate risk and governance structure
Robust management and controls on systems
Well defined investment strategy
Investing in lower risk asset types, e.g. avoiding corporate bonds below a certain credit rating
Comprehensive and relevant management information
Robust policy on appointing third party service providers, including due diligence
Using more than one counterparty (e.g. a number of different reinsurers) to avoid concentration risk
Ensure that senior management understand the risks, risk management policies and their limitations
Regular solvency and capital monitoring
Appropriate commission structure
Independent internal/external review of financial results
Reduce level of guarantees (e.g. have reviewable premiums)
Hold higher levels of capital (e.g. mismatching reserves)
Internal/external audit to reduce fraud
Diversify business portfolio (e.g. by region) to counter aggregation of risk
Budgeting / internal expense controls

This question offered an opportunity for a well-prepared candidate to score highly. The best scores were achieved by considering a wide range of ideas, also noting that the command words used (list, suggest) are not looking for detailed descriptions or discussions. Planning this answer may have been a good use of the reading time for some candidates.

- 5** (i) Data is required for each claim, both in payment and under consideration.
Data also required for past claims, in order to assess likely duration of current claims.
Each claim should be assigned a unique identifier.
The equivalent information for domestic claims would also be needed, in order to assess the differences – and there may be little data for overseas claims.
Need data on reporting delays to help assess IBNR.

Splits required:
Country/territory/region
Age / date of birth
Sex

Information for each claim:
Date payment started
Date payment ended, if applicable
Reason for claim

Reason for termination of claim

Date of moving in and out of Actuarial, if the claim is only partly overseas

- (ii) It is unlikely to be practical to impose exactly the same checks as are done in Actuarial. However, the checks should be consistent with those applied to claimants living within Actuarial so that each group is treated fairly. Could check that the claimant was not dead e.g. from national death records or require self-certification or could carry out spot checks.
The government could require a local doctor in the country where the claimant is currently residing to sign a special benefit note.
Consideration of past experience in Actuarial can establish which incapacities have a relatively quick recovery. Cases with incapacities where there may be a quick recovery should receive a medical questionnaire for completion by the claimant. This should be adjudicated by the normal income benefit assessment panel. Alternatively, it may be possible to arrange a telephone interview.
Compliance is to be encouraged by stopping the payment of benefit for all cases not replying.
An appeals process will be required.
The normal Actuarial guidelines should be followed wherever possible to resolve query cases.
The scrutiny on longer term income benefit cases can then be rolled out to all taking into account information derived from the initial screenings.
If possible, the qualifications and reputation of the permitted signing doctors should be controlled.
- (iii) There may be a large number of claimants that need to be investigated. They may be spread over a large number of different countries.
The government will need to go through diplomatic channels to inform the country concerned of its checking on income benefit claimants.
The government may need to hire local medical staff to undertake the screening of existing claimants. There may be language barriers if local staff are used.
In some countries, it may be difficult to ensure that the medical staff are of sufficient quality and probity. In those cases the government may therefore need to bring in its own specialists.
The costs of checking may be higher than the expected benefit saving.
There may be problems in getting access e.g. if living in remote areas.

Candidates who thought about this particular scenario and answered carefully would generally have scored highly. Many candidates answered the question as if there were a commercially provided insurance contract involved – this would have hampered their ability to score well. Reading the question carefully is important, as is reminding oneself frequently of what it says.

6 (i) Issues specific to the company in Actuarial

Regulation

Research whether any reserve reduction could be achieved under Actuarial regulations without reinsurance. For example, consider whether the Actuarial

statutory rules would allow company to move from a net premium valuation method to gross premium valuation method, remove excess margins in the valuation assumptions etc.

Look into what reserve reduction could be achieved by reinsurance. In particular, investigate whether there will be restriction on reinsurance reduction if the proportion reinsured exceeds a certain limit.

Look into what capital requirements reduction could be achieved by reinsurance. In particular, whether there will be restriction on reinsurance reduction if the proportion reinsured exceeds a certain limit.

May need to consider statutory capital as well as risk based capital.

Consider any other potential constraints on capital reduction. For example, timing and how quickly a reduction in working capital is required. Also the insurer may need to hold a counterparty default risk reserve for the reinsurance.

Investigate whether there are any restrictions under Actuarial regulation about reinsurance arrangements. For example, any restrictions on intra-group reinsurance or any requirements on minimum credit rating and reinsurance default.

Consider whether Bankonia may copy Actuarial's changes in regulations.

Expenses

If the reinsurance is only in respect of mortality and morbidity risks, residual risks such as expenses will still need to be reserved for locally.

The reinsurance terms should take into account the expenses incurred locally, both acquisition and renewal.

Need to consider how facultative cases will be dealt with e.g. policies with unusually high mortality/morbidity risks.

Consider whether these cases would require additional external reinsurance.

Investigate the potential effects of the reinsurance on the competitive pricing of the policies.

Need to consider the appropriate reinsurance terms and premium rates.

Consider impact on profits within own company.

Administration

Consider the appropriate structure required for the reinsurance (eg treaty rather than facultative) and the appropriate type of reinsurance (eg quota share).

Consider the appropriate proportion of risks to be transferred to the reinsurance subsidiary. May need to model different retention proportions in order to maximise overall benefits.

It may take longer to process claims and more staff may be needed.

There is a risk of reputational damage.

Tax

Consider how the reinsurance premium will be treated with regard to tax.

Consider how commission from reinsurer will be treated with regard to tax.

Investigate the tax implications in terms of the immediate reserve and capital release.

Dividends

Consider the current dividend policy and how the reinsurance may affect future dividend payments and policy.

Systems

Consider what modifications will need to be made to IT systems to maintain the reinsurance records and the modifications that will need to be made to the actuarial & finance systems to allow for the effects of reinsurance

(ii) **Issues specific to the reinsurance subsidiary in Bankonia**

Regulation

Assess the likely level of capital requirements, both statutory and risk based capital. Need to consider whether there is likely to be any need of upfront capital injection.

If the subsidiary does not currently underwrite health and care reinsurance business, there may be need for new expertise/staff in this office and changes to systems.

Investigate whether there are any other health and care accounting issues that need to be considered.

Legal

Need to draft a treaty covering:

- Type of reinsurance
- Retention limits
- Rebate/commission
- Guarantees such as deposit back (if any)

Consider whether the reinsurance subsidiary is authorised to accept inward health and care reinsurance and whether different regulations apply to overseas business. If not, need to consider the process and associated costs of a separate authorisation.

Consider the requirements in respect of any approved persons, e.g. to sign off reserves.

Consider the likelihood of future reinsurance arrangements with the group's other business units. It may not be cost effective only having one health insurance treaty on the books.

Administration

Administration in the reinsurance subsidiary: costs and who it will be done by (reinsurance subsidiary/company in Actuarial/third party administrator).

Need to decide who will be responsible for the valuations and how often valuations will be carried out and what external assistance will be required.

Need to agree the process of transacting reinsurance accounts (premiums & claims) and policy data.

Need to consider the checks to be carried out on the cedant's data.

Comparison of rates, terms and conditions offered by other reinsurers.

Consider the size of the block of business compared to existing business

Dividend

Consider the dividend policy and whether there be any restriction on their payments in Bankonia.

Expenses

Need to set expenses – consider the source of data on which this will be based.
Consider any further reinsurance/retrocession that may be required.
Consider impact on profits within own company.

Tax

Tax position and other fiscal developments in Bankonia. Check how this could affect the profitability of the business; for example, investigate whether there are any tax rules on transfer pricing (i.e. price agreements between related companies).

Profits/Other considerations

Assess the expected profitability of the reinsured business.
Are there any diversification benefits to be achieved given the existing business reinsured?
There may be additional risks arising from currency differentials.
It may be a good opportunity to get the reinsurer started in the PMI market, if this is not already the case, and attract more PMI reinsurance from other external companies.

(iii) **Issues for the Group**

Investigate how the reinsurance arrangement could reduce the overall capital requirement of the group and to maximise the overall profits for the group. This could be achieved through greater capital efficiency, lower costs, increased sales through more competitive premiums although this could potentially be offset by higher administration expenses of the arrangement, or adverse taxation.
Need to decide how the profits are to be split between the two business units to maximise the return for the group. Also need to consider the timing and size of the emerging profits.
Need to consider the capital support, tax implications and dividend policy from the group's perspective.
Investigate the implications of the arrangement on the group's Embedded Value (EV) and Risk Based Capital (RBC) calculations.
The implications will need to be considered at the global level as well as individual business unit level
Consider the implications of the arrangement on the governance and risk management between the group, the business unit in Actuarial and the reinsurance subsidiary in Bankonia.
Need to consider the potential reaction of market analysts and shareholders and the impact on the share price.
Consider other alternatives to raise capital or reduce capital requirement eg withdraw from PMI in Actuarial.

This was a challenging question, and many candidates struggled to come up with a broad enough range of points. When faced with a question like this with a large number of marks, candidates may be able to bolster their answer by considering widely across which areas of the course may be relevant to the question.

- 7**
- (i) (a) Describes a benefit under an insurance policy whereby the insured can choose to continue with the cover provided by a policy under circumstances where the cover would otherwise have ceased. The insured does not have to provide evidence of health at the time of continuation.
Circumstances could include: where the individual has left work and is thus no longer covered by an employer sponsored scheme or where an individual policy has expired.
The terms under which the option is effected are those applicable to a healthy life for the age at the date when the option arises.
- (b) Describes the ability to purchase additional cover without further evidence of health.
The option is exercisable on certain life-events, for example, marriage, mortgage increase, birth/adoption of a child
The option will be available at the normal premium rates, in force at the date on which the option is exercised, for a healthy life of the policyholder's age
- (c) The ability to reinstate mortality cover after the policy has paid out on a specified disease event.
Applies to accelerated critical illness plan.
- (ii) The cost of an option is the value of the extra premium that should, in the light of full underwriting information, have been charged for the additional insurance over the normal premium rate that is charged. Thus there is no cost for a life in good health at time of exercise.
Lives in poor health who exercise the option lead to potentially considerable extra cost. Thus the total expected additional costs of an option depends on the probability that the option will be exercised and the expected mortality/morbidity of the lives who choose to exercise the option.
Mortality/morbidity experience tends to be worse when only a small proportion of eligible lives exercise the option.
- (iii) *Conventional method*
Assumes that all lives eligible to take up the option will do so and the mortality/morbidity experience of those who take up the option will be the ultimate experience which corresponds to the select experience that would have been used as a basis if underwriting had been completed as normal when the option was exercised.
The mortality/morbidity basis used is not usually assumed to change over time, so the tables are as per the original policy basis.
- North American method*
This method requires two additional items in the pricing basis:
a double (or triple) decrement table for lives who have not yet exercised the option, with decrements of death/disability and exercising the option represented by dependent rates of decrement and
a mortality/morbidity table for lives who have exercised the option represented by heavier mortality/morbidity rates

Stochastic modelling

Establish a suitable model to project the future experience of the option - both the numbers effecting the various options and their subsequent claim propensity.

Carry out a large number of simulations to determine the cost distribution and calculate the cost of the option to an acceptable statistical degree of adequacy

- (iv) Considerations in choosing which method to use include:
Shouldn't use conventional if there are many possible exercise dates or there are several alternative options to choose from, if 100% take up rate is not reasonable or if ultimate and/or select table is not appropriate.
Would need to assume all options will be on the worst case scenario

The North American method is more complicated than conventional. It can be difficult to estimate the take up rates and the additional morbidity

Stochastic modelling is difficult if there is insufficient computing power/data. There may be insufficient options to make the time/cost worthwhile. A more complex method can lead to a risk of spurious accuracy. If the risk is "symmetric" then little added value. Stochastic modelling produces confidence intervals.

Other considerations include:

The ability to allow for lapses.

The ability to obtain rates for a new line of business

The special circumstances of the company e.g. size, experience in market

- (v) The main risk is of selection against the office by policyholders in poor health, either at the point of purchase or when exercising the option. The cost incurred may be more than the premium charged for the option, it being difficult to estimate the parameters for pricing.
Medical advances may enable greater anti-selection than previously assumed. The range of CI events covered and hence underwritten may be very different from the situation when the original policy was taken out.
Risk that the options have insufficient impact on sales volumes to justify cost.
Risk that the expenses of offering and reserving for the option are greater than expected when pricing.
Risk of selective withdrawals.

Ways of managing these risks include:

Impose a time limit after the specified event in which to exercise the option.

Only allow options if the original policy was issued at standard rates.

Limit the qualifying events.

Only allow regular (inflation) increases if they were selected at outset and all previous increases have been taken up.

Impose a maximum upper limit on the benefit amount e.g. the additional sum insured cannot exceed the original sum insured.

Carry out initial underwriting assuming that the maximum potential SA will always be reached.

Specify the terms and conditions under which the option can be exercised very clearly in the original policy.

Regularly remind policyholders of their option in order to encourage healthy policyholders to exercise their options. Have a marketing campaign to sell more of the policies.

Monitor the sales levels and stop selling the product or remove the options if the level of sales is insufficient.

Regularly monitor normal rates to ensure they are suitable for the target market.

Regularly monitor the cost of the option to the company in the light of any particular CI's which emerge.

Obtain reinsurance and/or the assistance of the reinsurer in pricing options.

If the experience worsens, set up reserves as soon as possible.

Include margins in the pricing basis.

Quite a few candidates missed out on relatively straightforward bookwork marks in this question, which again showed the benefit of being really familiar with the core reading. In the later parts, tailoring the answer to the specific question will have been a good way to improve scoring. In part (iv) some students did not state which method would be most appropriate to use, as required by the question.

END OF EXAMINERS' REPORT

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

28 September 2011 (am)

Subject ST1 — Health and Care Specialist Technical

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 15 minutes before the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all seven questions, beginning your answer to each question on a separate sheet.*
6. *Candidates should show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

<p><i>In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.</i></p>
--

- 1** (i) State the principles of setting statutory reserves. [6]

An actuarial student has recently joined a small health and care insurer. His role is to calculate the statutory reserves for the long term health insurance business. He is concerned about making mistakes, as he is new to the company.

- (ii) Discuss the checks he might carry out in order to ensure that the reserves that he has produced have been calculated accurately. (You may assume that the data with which he has been provided is correct.) [5]

[Total 11]

- 2** The health and care committee for the Continuous Mortality Investigation Bureau for Actuarial (CMIBA) has decided to investigate critical illness claims experience by occupation.

- (i) Discuss how the CMIBA could create an occupational classification for this project. [3]

- (ii) Outline how the experience would be split by sex and marital status, including any difficulties that might arise. [3]

It has now been established that two insurance companies dominate the critical illness market.

- (iii) Discuss whether the CMIBA should publish a combined experience. [2]

The background to the investigation is that the Actuarial insurance regulator wants insurance companies to introduce standard rates defined only by sex, age and occupational classification. Each insurer would only provide a standard critical illness product with set approved terms, conditions and rates.

- (iv) Discuss this proposal. [6]

[Total 14]

- 3** A doctor's practice office has the following staff:

Four fully qualified doctors

Five fully qualified nurses

Ten support staff (clerical and IT)

The doctors and nurses are members of a pension scheme that provides for ill-health early retirement benefits as well as other standard retirement benefits.

A broker is writing a report on the health insurance benefits that should be provided for the staff.

- Outline the points that should be made in this report (a draft is not required). [8]

4 Suggest ways in which a health and care insurer can improve the efficiency of its financial reporting process. [9]

5 The government of Actuarialia has recently introduced a ban on employers carrying out pre-employment health checks on prospective employees.

A large established health and care insurer is interested in responding to this change in legislation by bringing out a new product that would insure an employer against recruiting employees in poor health.

The product would pay out an indemnity amount to compensate the employer for sick pay and recruitment costs incurred in respect of a new recruit who is unable to work due to ill health for more than 13 weeks during the first year of their employment. The product would be written as an annually renewable policy, with guaranteed acceptance on renewal.

(i) Explain the rating factors that could be used to determine the appropriate premium for this product. [7]

(ii) Discuss the main risks to the insurer that would arise from writing this product, including how they might be mitigated. [12]
[Total 19]

6 (i) Outline the benefits included in a typical comprehensive private medical insurance (PMI) product. [6]

(ii) List the general exclusions commonly used by PMI providers. [3]

(iii) Suggest reasons why such exclusions are used. [5]

(iv) Suggest potential disadvantages to an insurer of using such exclusions. [3]
[Total 17]

7 A small health and care insurer which already sells dental plans is planning to develop a new health cash plan that specifically covers physiotherapy care.

(i) Outline the features of a health cash plan. [3]

(ii) Outline the two methods that the insurer could be using to operate its existing dental plans. [4]

The insurer is planning to operate its new health cash plan in the same manner as the dental plan.

(iii) Discuss the issues that the company is likely to encounter when pricing the new plan, considering both of the possible methods of operation. [12]

The insurer currently uses insurance intermediaries, tied agents and its own salesforce to distribute its plans.

(iv) Suggest alternative sales and marketing methods that it could consider for the proposed new version. [3]

[Total 22]

END OF PAPER

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2011 examinations

Subject ST1 — Health & Care Specialist Technical

Purpose of Examiners' Reports

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and who are using past papers as a revision aid, and also those who have previously failed the subject. The Examiners are charged by Council with examining the published syllabus. Although Examiners have access to the Core Reading, which is designed to interpret the syllabus, the Examiners are not required to examine the content of Core Reading. Notwithstanding that, the questions set, and the following comments, will generally be based on Core Reading.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report. Other valid approaches are always given appropriate credit; where there is a commonly used alternative approach, this is also noted in the report. For essay-style questions, and particularly the open-ended questions in the later subjects, this report contains all the points for which the Examiners awarded marks. This is much more than a model solution – it would be impossible to write down all the points in the report in the time allowed for the question.

T J Birse
Chairman of the Board of Examiners

December 2011

General comments on Subject ST1

Candidates who approach the questions, especially the more substantial elements of each question, in a methodical and detailed manner are far more likely to pass the subject. Candidates will gain few marks if they do not address the question asked but merely write around the topic of the question. 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 0.5 marks with the more basic elements e.g. details in a pricing basis such as age and sex, attracting 0.25 marks, and key points gaining 1 mark.

It is often helpful to use subheadings when answering long part questions.

Comments on the September 2011 paper

Although the paper was towards the more difficult end of the range, the general performance was better than in April 2011 with well-prepared candidates scoring well across most of the paper. As in previous diets, questions that required an element of explanation or analysis were less well answered than those that just involved calculation. In particular, many candidates found it difficult to gain many marks on questions 3 and 4. The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates approaching the subject for the first time are advised to concentrate their revision in these areas.

- 1** (i) Principles of setting statutory reserves:
- The amount of the reserves should be such as to ensure that all liabilities arising out of insurance contracts can be met by the insurance company. The amount of the reserves should be calculated by a suitably prudent valuation of all future liabilities for all existing policies including guaranteed benefits, options available to the policyholder, expenses, including commission, and taking credit for the premiums which are due to be paid under the terms of each policy in the future.
- A prudent valuation is not a “best estimate” valuation, i.e. neither too much nor too little, but should include an appropriate margin for adverse deviation of the relevant factors.
- The valuation should take account of the nature, term and method of valuation of the corresponding assets, depending on the type of policy.
- The use of appropriate approximations or generalisations should be allowed.
- The rate of interest (where appropriate) used in the calculation of the reserves should be chosen prudently, taking into account the currency in which the policy is denominated, having regard to the yields on the corresponding existing assets and to the yield which it is expected will be obtained on sums to be invested in the future.
- The statistical elements of the basis, that is the demographic and persistency assumptions, should be chosen prudently, having regard to the type of insurance, as should the allowance for expenses used in the calculation, the territory of the persons insured, and the administrative costs and commission expected to be incurred.
- If a valuation method defines in advance the amount of expenses to be used in the valuation, the amount so defined should be not less than a prudent estimate of the relevant future expenses.
- The method of calculation of the reserves from year to year should be such as to recognise profit in an appropriate way over the duration of each policy and should not be subject to discontinuities arising from arbitrary changes to the valuation basis.
- Each insurance company should disclose the methods and bases used in the valuation.
- Some actuaries would prefer to strengthen these principles to say that the allowance for expenses should allow for the possibility of the company ceasing to write new business, if that would increase the reserve.
- The setting and calculation of statutory reserves must comply with local statutory requirements.
- (ii) Checks to ensure statutory reserves are accurate:
- Cross-check carefully a printout of the model input parameters against a list of the required assumptions, by product.
- Break down the results, as this makes it easier to find mistakes. Valuation class or product level would be appropriate.
- Compare the values with those from the last exercise and investigate any very large changes. Check for any areas where business has “vanished”, as this probably indicates an error.
- Check some summary statistics, such as total sum assured, between those implied by the data and those output by the reserving programming, to ensure no data points have been lost.

Compare the size of the reserves with the number of policies, for both this time and last time, to give a rough check.

Consider the direction of the changes – should reserves have gone up (if new business is being written) or down (if the business is running off and the reserves are unwinding). Need to estimate/adjust for the effect of basis changes.

Are there seasonal variations in the reserves – e.g. IBNR reserves may be higher in winter months for some classes of business. Look back at previous levels of reserves.

Look at the reserve for one sample policy (or several if time). Estimate the value of the reserve manually, and compare with the value the program has produced.

Explain movements between current and previous reserves or perform an analysis of surplus.

Compare results against other investigations the company is carrying out. Making use of benchmarking publications, if available.

Check against regulatory or other relevant guidance.

In general this question was well answered. Part (i) of this question is straight bookwork, well answered by those who were familiar with the Core Reading. Part (ii) was more difficult but was also generally well answered - the Core Reading points in the direction of several of the points which might be made.

- 2**
- (i) It could be similar but not identical to that used on income protection business, if such an investigation has already been performed by the CMIBA.
A survey of data kept by existing CI insurers will be needed.
There may already be a consensus of opinion or consistency of approach.
The classification may be weighted by size of CI claims for each insurer.
Data collected should be sufficient to give credible experience.
Advice and information may also be needed from reinsurers or consultants.
The CMIBA could consider similar classifications used by experience investigation bureaux in other countries.
There may be a regulatory standard or guidance that should be followed.
Occupations would need to be grouped into classes so that there is relatively homogenous experience in each class. Need to generate an appropriate number of classes. The draft occupation classification can then be developed and circulated for discussion and approval.
It will be necessary to create a 1-to-1 conversion table from each contributing office's data to the CMIBA classification.
 - (ii) Recording of sex in the data and investigations should be straightforward.
Marital status should be broken down into:
 - Single
 - Married/civil partnership
 - Divorced/separated
 - Widow/ered
 - Living together but not married.Need to decide if required at inception or at status of claim.

The data may be incomplete on marital status, for example for joint life policies.

There may be a lack of data in some cells, therefore not credible.

Changes in classification (predominantly of marital status) may lead to compromises on what can be used.

- (iii) Would provide useful information for other insurance companies writing small amounts of this business. However, the CMIBA will need to obtain the permission of each office to publish. The main issue is that the two offices will be able to estimate their competitor's experience knowing the complete experience and their own data.

The data may not be homogenous, e.g. the two companies may have different definitions, and difficult for other users to make the appropriate adjustments. Should seek the views of the regulator and other interested parties (e.g. other smaller insurers).

- (iv) Easier for customers and distributors to understand and compare products and less hassle in the sales process, particularly as there will be limited medical underwriting. Overall market new business levels might therefore increase.

The insurers' expenses will reduce, e.g. no medical underwriting costs, no pricing calculations to perform.

There is less scope for anti-selection as can't go to insurer with least underwriting and for disputes at claim stage.

However, insurers are no longer able to apply premium loadings based on medical underwriting. They may still be able to decline business based on proposal form answers but overall the scope for underwriting appears to be considerably limited. Insurers may decide to decline a high proportion of business based on proposal form answers, in order to be prudent and to manage the average claim experience. This will result in those in less good health becoming uninsurable; whereas if full underwriting had been permitted then they may have been provided with cover, albeit restricted.

Since the proposal is applicable to all insurers, this reduces the potential for anti-selection between companies based on differing strictness of underwriting but it is still possible that the overall claim rates will increase because those who previously would have been rated may now be more inclined to take out insurance.

It will be difficult for the insurer to anticipate the average standard of health within its portfolio in order to determine whether it will be profitable to offer this business.

Need to consider whether reinsurers will be prepared to accept this business.

May need to hold higher reserves, at least initially, due to increased uncertainty regarding likely claim rates.

Competitive advantage would have to be based on something else now rather than on policy design or price, for example service levels or it may be commission driven.

There also does not appear to be any scope to amend the medical conditions covered, so products may fall behind customers' requirements (depending on how frequently the standard terms are updated).

May need a one-off change to systems with related cost.

The main way to obtain higher profit per policy will now be through low costs, therefore it may be difficult for smaller companies / new entrants. Harder to differentiate product and stifles innovation. CI business in the market may not be attractive to insurers so capacity in the market may be reduced.

This was a difficult question. In part (i) many candidates did not appear to understand the practical aspects, with most apparently answering a slightly different question (e.g. why would you do it).

Candidates generally scored reasonably well on parts (ii) and (iii).

In part (iv) some students made comments about setting premiums, but these are not valid, as the question states that rates will also be defined.

3 Check whether staff have any existing health insurance benefits as part of their benefit package.

Doctors and nurses:

Will probably receive standard health treatment from within the clinic as part of their employment contract, although doctors may be entitled to more than nurses.

PMI may be needed but only with quite a high excess.

Health cash plans are unlikely to be needed.

Income protection will be desirable, particularly for younger members of staff, (to cover, for example, monthly mortgage payment or salary replacement) but only to such an age as to not provide an overlapping benefit with the ill health early retirement. Again, this may vary between doctors and nurses.

The precise details of the cover will need to be investigated so that someone is not materially disadvantaged by falling ill just before or just after a significant birthday. Critical illness would be a useful benefit, to cover, for example, a mortgage. This is unlikely to be covered by any other benefits available from working at the clinic.

The ready access to health care will affect the propensity to claim – this should be reflected in the price offered.

Clerical staff:

Most relevant points are similar to those for doctors and nurses, however income protection would need to be a more comprehensive cover and the insurer should check whether the clerical staff have the same access to health care as the medical staff.

General

Possible benefits to employer include attracting/retaining good staff. Also, staff may return to work quicker.

The staff may value/see the need for these products more than the general population. Moral hazard/anti-selection – the staff may be in a better position to exploit the insurance eg expensive treatment, friendly doctor to sign off IP, earlier knowledge of impending pre-existing illness.

The degree to which State provides benefits and potential overlap should be considered.

Consider the affordability of the benefits if staff are required to contribute; doctors are more likely to be able to afford them. May need to offer different options to different

staff and different levels of excess and there may be different incapacity definitions used.

Compare with what is offered at other practices.

This was a challenging question and candidates struggled to come up with many of the points available. Many candidates described product features rather than why or how the product may be appropriate for this group of individuals. Few candidates considered how potential benefits should complement existing benefits or the specific needs of this group. Very few candidates considered the differing needs of doctors, nurses and support staff.

- 4** Improve the efficiency of the IT systems.
- Integrate the IT platforms and database.
 - Use model points instead of policy by policy approach.
 - Consider using data from an earlier period and using roll forward techniques wherever possible.
 - Reduce the level of manual calculations/valuation procedure.
 - Produce robust revenue account forecasts at the same level of detail as accounting information is held; actuarial balance sheet liabilities at the same level as accounting information.
 - Integrate models. e.g. tax models.
 - Ensure timely production of internal data/information. Negotiate timely supply of information from third party providers and reinsurers.
 - Reduce the number of stochastic runs to a level that is appropriate to the size, nature and complexity of the business.
 - Reduce the projection frequency period (e.g. monthly to annual) if it doesn't compromise accuracy.
 - Simplify the expense allocation processes.
 - Use appropriate simplifications based on materiality.
 - Streamline the production process of disclosures and other non financial data not supported by systems.
 - Identify and remove duplicated effort created by separate teams doing similar work.
 - Streamline the data checking process such that many of the potential errors could be identified and corrected at an early stage of the valuation process. Build automated checks into the projection system, which would flag up inconsistencies automatically in output results and so can more quickly be fixed.
 - Clarify accountability and roles and responsibilities (poor accountability is often a cause of delay).
 - Streamline the population of end user applications.
 - Reduce the number of reports, streamline to one version for all interested stakeholders.
 - Build key analytics ahead of time.
 - Gain a thorough understanding of what management needs. Improve the quality and relevance of the management information to help speed the management review and quality processes.
 - Review governance structures and timetables – inefficiencies in this area can cause unnecessary lags and re-work.
 - Identify whether outputs can be used for more than one reporting purpose.
 - Make use of internal/external programme management specialists to spot inefficiencies.

Have good quality process documentation.
Assign project manager to manage the reporting process.
Regular meetings and updates between those producing the results, to encourage full knowledge sharing.
Hold a review (e.g. just after a recent reporting exercise) in order to identify the key inefficiencies, so that know where to focus improvement efforts.
Engage auditors/reviewers early on in the process.
Have ongoing staff training.
Outsource if more efficient, with deadlines enforced by SLA.
Keep up-to-date with regulatory changes as they are announced.

This was often found to be a challenging question. It should be noted that the command word is "Suggest" rather than "Describe"/"Discuss" etc – a detailed discussion of the ways efficiency could be improved was not required. Several candidates went completely down the wrong track, by describing the actual tasks involved in the reporting process rather than how to improve it, as the question asked.

5 (i) Pricing factors

The number of employees recruited would be needed, to "size" each policy in relation to number of claims. This may need to be estimated in advance, and therefore a "true-up" premium may be required at the end of the year.

Depending on the product structure, this might alternatively be proxied using number of employees (which would eliminate the need to "true up" but would bring in additional risks).

Another factor would be needed to "size" the policy in relation to the benefit size. This is likely to be related to salary level, so salary of employees recruited might be used. However, if the product is sold based on number of employees, this would be related to total annual salary.

Some adjustment would be needed in the pricing to allow for the fact that one might expect a company to have a salary distribution of a large number of relatively lowly paid staff and a smaller number of more highly paid staff. Need to take into account the method of recruitment used by the company, as the product also covers recruitment costs.

The type of work undertaken would be relevant to the pricing of the policy. For an annual policy, the relevant rating factor might be the industry the company operates in and the split of blue and white collar workers. For a "per-employment" policy, the pricing could be based on the occupation of the role concerned.

The age of the individual would affect the likelihood of a claim – again the rating factor here would depend on the type of policy taken out. The sex of the individual employed would also affect the likelihood of a claim, and so this may be used as a rating factor. Location would be likely to affect the number of claims – it is less likely, however, that this would be used as a rating factor.

Distribution channel - closeness to/cooperation with employer.

The intention is to use the suggested factors as a proxy for health related questions not being asked.

It is possible that there may be a profit-sharing arrangement. This would only be the case for large employers.

- (ii) Volume risk: risk of low take up – so that development costs are not recouped. This could be because there is no interest in the product (i.e. employers do not view this as a risk that warrants insurance, little recruitment due to a recession) or because the price is set too high or action of competitors. Alternatively, if the product is extremely successful, then the admin teams may be unable to cope and there may be excessive strain on capital resources.
Mitigation: thorough market research before too much development costs are incurred to gauge uptake, and to assess what a reasonable price would be, including liaison with distribution channel, which is likely to be specialised brokers.
The risk of renewal rates being lower than expected.
Mitigation: through appropriate remuneration structure / incentives to distributors or market / advertise the product well.
Risk of pricing too low, so that losses are incurred. This is exacerbated through not having experience data for this specific type of business.
Morbidity risk: there could be more claims than expected. Claim amounts may be higher than expected, e.g. due to longer periods of sickness than expected or, for the annual policy, due to higher than expected salaries or higher recruitment costs than the average allowed for or due to a higher number of recruitments than expected.
Mitigation: tight claims controls. Thorough research, data collection and careful pricing including margins. Reinsurance may be available to share the risk. However, it may not be available, or only at a prohibitive price so the company should engage early with reinsurers and if no reinsurer can be enticed in, consider co-insurance with another direct writer.
Change product design, for example, place a cap on the amount that may be paid out, increase the deferred period, reduce coverage period, cover salary or recruitment costs but not both.
Ensure no guarantees are in place on the price, so that the price can be increased in the light of poor experience.
The pricing risk is increased due to the guaranteed acceptance, as the insurer may be constrained in the extent to which it can increase the price.
Mitigation: remove this feature or stop selling the product.
The pricing/claims risk is increased due to aggregation by industry/location.
Mitigation: try to sell across wider range of employers/locations.
Expenses may be higher than those assumed in the pricing basis, leading to losses on the business.
Mitigation: thorough bottom-up analysis of the expense model. Outsource the administration of the product, if a fixed price contract can be negotiated.
Moral hazard and anti-selection: Employers with this contract may take less care to ensure they employ individuals they believe will be able to attend and contribute. More extremely, they may employ friends or relatives they know to be unable to work.
Mitigation: profit sharing and other experience rating mechanisms will limit the impact. Place a cap on benefits so that the product does not provide full indemnity. Ensure the employer is motivated to retain staff, for example by not indemnifying training costs. Require the employer to cover all recruits for all roles.
Regulation – there may be difficulties in getting such an innovative product agreed by the regulator and future regulatory changes might cause problems.

Mitigation: early engagement with the regulator and ongoing lobbying.
Legislation change – the ban could be reversed when a new government takes over, or if employers lobby hard and are successful. In that case, the insurer would lose their investment in developing this product.
Mitigation: delay product development until the legislation is embedded.

In general, part (i) was well answered although some candidates did not explain the factors, as required. Not all candidates appreciated that this is a product sold to the employer and thus it is effectively the employer that is rated - some of the suggestions provided were more appropriate for rating an individual, and would not be information to which the employer is likely to have access (for example, dangerous hobbies).

In part (ii), candidates who applied their knowledge to the particular scenario scored well. However, suggestions about generic risks such as operational risks, flood/fire etc that the company would face anyway, irrespective of writing this product, did not answer the specific question asked and gained no marks.

- 6** (i) Generally only covers acute conditions
Indemnity basis, possibly subject to limits
Annually renewable

Hospital costs or day care operations

For in-patient treatment:

- Accommodation
- Nursing care
- Operating theatre
- Diagnostic procedures
- Surgical dressings
- Drugs

Specialist consultations and physiotherapy received as an inpatient.

Accommodation for one parent to stay in hospital with an insured dependant under 12 years old.

Specialist Fees

Surgeons' and anaesthetists' fees for in-patient and day care operations and physicians' fees for in-patient treatment

Out-patient treatment

Specialist consultations

Diagnostic procedures such as radiology and pathology

Physiotherapy

Radiotherapy, chemotherapy and scanning

Other Features

Private Ambulance

Recuperative care, to include nursing and domestic services

Overseas cover

Cash payments for treatment received as an inpatient on a State healthcare funded basis

- (ii) Drug abuse
Alcohol abuse
Self-inflicted injuries/suicide
Out-patient drugs and dressings
HIV/AIDS
Normal pregnancy
Cosmetic surgery
Gender reassignment (also known as sex change)
Preventative treatment
Kidney dialysis
Mobility aids
Experimental treatment/drugs
Organ transplant
War risks
Injuries arising from dangerous hobbies (often called hazardous pursuits).
Chronic conditions
Pre-existing conditions
Failure to follow medical advice
Illegal acts
- (iii) Better risk control.
Prevent anti-selection, particularly of pre-existing conditions.
Reduce moral hazard e.g. injuries arising from participation in reckless activities, self-inflicted injuries, cosmetic surgery.
Protect the company against extreme and unpredictable events, e.g. arising from war or terrorism.
Excludes risks that are difficult to price.
Excludes risks that might have too high a cost if loaded into the premium.
Protective effect throughout lifetime of policy.
Provide a deterrent at the outset.
Define benefit limitations and increase customer certainty.
Align pricing assumptions with risk exposure.
Reduce underwriting expenses and effort.
Speed up the application process.
Avoid bad publicity in specific areas, e.g. experimental medical treatment that goes wrong.
Some benefits are covered elsewhere, e.g. by the State.
Keep in line with competitors.
Some exclusions may be mandatory or required by the regulator e.g. it may be unlawful to provide a benefit if injured as a result of committing an illegal act (e.g. terrorism).
- (iv) Risk of being perceived as hiding behind the small print/risk of being perceived as not treating customers fairly.
Doesn't meet customers' needs.
Not always noticed or well understood.
Exclusions are not popular with policyholders and leave gaps in cover.
Insurer can be in an uncomfortable position when declining claims. This could lead to potential complaints, even legal actions. If legal ruling is in

favour of policyholder, this could set a precedent of expected additional future claims.

Reputational risk, which can reduce future sales and renewals.

Low volumes insufficient to recoup expenses.

Increased underwriting cost/more cost and work at claim management stage.

May lose business if other competitors don't use these exclusions.

This question was generally well answered. In part (iv) some students mentioned that the exclusions might not be allowed by the regulator – however, this is not a disadvantage of using such exclusions since in that case they would not be allowed to use them in the first place.

- 7** (i) This would normally be a defined-benefit defined-premium insurance product. For low premiums, the subscriber and family would be entitled to a cash payment when having treatment or a consultation. Schedules of benefits are bought in "units" with equivalent levels of contribution increase. Limits may apply to ensure that the payout is no more than, say, 50% of the medical bill or there may be a maximum payment per treatment. There will usually also be an annual limit on the total payment. Short-term, annually reviewable.

- (ii) **Capitation basis**
This is the practice of charging for cover by forecasting the likely claims on an individual basis and charging this, adjusted for expenses and profit, as the premium. In effect, the insurance company “carves out” the cost of all dental claims and passes this risk on to the provider by giving a proportion of the insurance premium for each person managed to the provider up-front rather than an amount per claim. The insurer and provider agree an amount per annum per person insured

Indemnity basis

This is where the insurer covers pound for pound of treatment delivered subject to any excess or policy limits. Insurers work closely with providers to ensure that applicants are screened initially for pre-existing conditions or imminent treatment, and to ensure that treatment thereafter is in accordance with risk expectation.

- (iii) Under the capitation method the provider takes on the main risks:
They may not offer all of the required treatments, so would have to arrange to subcontract to other providers.
The insurer may not be able to find enough physiotherapy practices large enough to be willing to take on these risks.
There may not be sufficient local coverage.
Costs of negotiating with many providers.

Under the indemnity method the insurer retains the main risks:
That the number of patients requiring treatment may be higher than expected and the cost of treatment increases faster than expected.
Pricing risk is more of an issue since a small company.

Pricing will need to be more accurate, with higher margins to allow for the greater uncertainty and don't want to have to increase premiums too much at each annual review date. There are likely to be inadequate data available for pricing purposes. National data may not reflect insured population.

Data will need to be tabulated by age/age group and sex (even if not used).

Systems/admin/staff costs.

Patients will be likely to have more routine physiotherapy appointments than dental. Regular appointments and treatment are at the policyholder's option (doctor referral not required). The cost of routine physiotherapy appointments will be relatively low compared with other types of health treatment:

if reimbursement is 50% of cost there will be many claims for small amounts

if reimbursement is subjected to an excess (unlikely) it will not meet policyholder need and lead to trivial payments.

Need to allow in pricing for moral hazard - physiotherapists may inflate bills (or number of appointments in course of treatment) if insured.

Some claims may be large.

Cost will vary significantly by area; as area is unlikely to be used as a rating factor the claim amount will depend on the location mix of the business sold. Profitability for the insurer is dependent on long-term policyholder loyalty, cost-efficient claims admission procedures and volumes in force.

Likely to be a low number of policyholders so more difficult to establish suitable average cost per treatment and inception rate to calculate premiums.

More variability in expenses.

There is no previous experience on which to base estimates. Even if an existing plan covers physiotherapy the experience is unlikely to be relevant – policyholders of general plans may forget that it covers physiotherapy treatment; this is unlikely under a physiotherapy plan.

Products are typically community-rated. More difficult to establish a suitable age (range) estimate on which to determine a flat rate premium.

Plan may be particularly attractive to certain segments e.g. sports players, manual workers.

Risk of accumulation of certain lives due to marketing method.

Particular risks due to some illnesses e.g. back problems which may become more prevalent in the population or extend to younger or older ages than at present.

Standard long waiting periods may not meet customer need and reduce sales.

Standard risk reduction procedures e.g. screening for pre-existing conditions or imminent treatment will involve more providers and hence be costly.

Anti-selection risk – may actively target certain groups which recognise their greater need for cover particularly since there would be limited underwriting as low cost.

Competitor price comparison difficult if limited market.

Will be more difficult to identify imminent treatment.

More option of elective treatment which would need to be excluded.

Need to allow for potential changes in the level of State provision of physiotherapy services.

- (iv) Contact existing policyholders to advise of the new product
 - Offer a discount/guaranteed acceptance/no waiting period if add on this plan
 - Leaflets/posters in suitable locations e.g. doctors' surgeries, hospitals, sports clubs, gyms
 - Direct marketing
 - Mailshots, perhaps offering a free gift to encourage enquiries
 - Telephone selling
 - Press advertising e.g. advertise in fitness magazines
 - Internet
 - Affinity clubs
 - Unions
 - Worksite marketing
 - Organisations aimed at people with specific diseases/injuries

Parts (i) and (ii) were bookwork and generally reasonably well answered.

The question is about pricing the new plan, not all the factors to consider when launching the new plan. In part (iii) points that wandered away from specific pricing considerations into more general product launch/design considerations did not receive many marks. Also the question asks about issues and not about how the pricing should be done; again some candidates provided a description of how the product would be priced rather than thinking about related issues and hence gained few marks.

In part (iv) the command word is "Suggest", so explanations, descriptions and discussions of the methods were not required.

END OF EXAMINERS' REPORT

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

24 April 2012 (pm)

Subject ST1 – Health and Care Specialist Technical

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 15 minutes before the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all eight questions, beginning your answer to each question on a separate sheet.*
6. *Candidates should show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

<p><i>In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.</i></p>
--

- 1** Suggest reasons why private medical insurance may be purchased. [6]
- 2** A survey has been carried out by a health and care insurer in Actuarial, which suggests that only two-thirds of employers collect sickness absence data relating to their employees.
- (i) Outline the advantages and disadvantages to employers of collecting sickness absence data. [3]
 - (ii) Suggest reasons why the insurer carried out the survey. [3]
- [Total 6]
- 3** A health and care insurance company reinsures its critical illness business on an original terms basis. It has set up a process which automatically extracts the data which it has to send to its reinsurer.
- List the additional data that it would have to add to the existing extract if it decided to start reinsuring its income protection business. [6]
- 4** The government of Actuarial uses an incapacity benefit payment system. Under this system, workers who are unable to work due to illness or injury qualify for the payment of a fixed benefit after 26 weeks of incapacity, as defined by the government. The benefit is payable until the first of the following events: the worker recovers, dies or reaches normal retirement age, which is currently age 65.
- Payments under the system have become a serious burden for the State. The government is therefore proposing that the benefits should be discontinued after one year's payment, in any event.
- (i) Discuss this proposal. [6]
- A member of the Actuarial government has claimed that the one year cut-off period would be devastating to some claimants. Two alternative suggestions have therefore been made:
- (a) Lengthen the proposed maximum payment period.
 - (b) Drop the proposal to introduce a maximum payment period, but instead strengthen the definition of incapacity and make payment of the benefit subject to tighter controls.
- (ii) Discuss these alternative suggestions. [6]
- [Total 12]

5 A health and care insurer operates a scheme underwriting system. Under this system the insurer provides tailored quotes for group business, based on facts collected about the company involved.

(i) Describe how underwriting differs for a group scheme compared with individual business. [2]

(ii) Explain what is meant by a credibility factor. [2]

Where the group's own experience is not available, the insurer adjusts its standard premium rates based on the industry in which the group operates.

(iii) Explain the adjustments that might be made to a standard set of assumptions for groups in the following areas:

- (a) Religious leaders
- (b) Fried chicken outlets
- (c) Sports centres

[9]

[Total 13]

6 Describe the different types of proportional reinsurance available, indicating the extent to which they would be suitable for a company writing health and care insurance business for the first time. [16]

7 (i) Describe the features of an income protection (IP) product. [6]

(ii) Explain the different definitions of disability that may be used in an IP product, including the relative levels of cover provided. [8]

In the country of Actuaria, health insurers are finding it difficult to sell IP products.

(iii) Suggest possible reasons for this. [7]

[Total 21]

8 In the country of Actuaria, the business environment is being reviewed with a view to making it easier for small businesses to get established. This will include requiring insurers to make it easier for small businesses to obtain group health protection insurance.

(i) Outline the likely health insurance requirements of small businesses. [7]

A health and care insurer writes critical illness, income protection and private medical insurance in Actuaria.

(ii) Explain the issues that might arise for this insurer if it is required to make it easier for small businesses to purchase contracts. [5]

(iii) Outline the actions that the insurer could take to manage these issues. [8]

[Total 20]

END OF PAPER

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2012 examinations

Subject ST1 – Health & Care Specialist Technical

Purpose of Examiners' Reports

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and who are using past papers as a revision aid, and also those who have previously failed the subject. The Examiners are charged by Council with examining the published syllabus. Although Examiners have access to the Core Reading, which is designed to interpret the syllabus, the Examiners are not required to examine the content of Core Reading. Notwithstanding that, the questions set, and the following comments, will generally be based on Core Reading.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report. Other valid approaches are always given appropriate credit; where there is a commonly used alternative approach, this is also noted in the report. For essay-style questions, and particularly the open-ended questions in the later subjects, this report contains all the points for which the Examiners awarded marks. This is much more than a model solution – it would be impossible to write down all the points in the report in the time allowed for the question.

T J Birse
Chairman of the Board of Examiners

July 2012

General comments on Subject ST1

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 gain few marks if they do not address the question asked. 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.

It is often helpful to use subheadings when answering long part questions.

Comments on the April 2012 paper

The paper was generally towards the more straightforward end of the range, with well-prepared candidates scoring well across most of the paper. As usual, questions that focussed on knowledge of the Core Reading were well answered by those who had prepared thoroughly. However, questions requiring wider thinking or application of core reading to specific circumstances, such as question 8, were less well answered and students should recognise that these are generally the questions which differentiate those students with good grasp and understanding of the subject. The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates approaching the subject for the first time are advised to concentrate their revision in these areas.

- 1**
- Hospital accommodation is more comfortable / get a private room
 - No waiting list
 - Able to choose a location to suit
 - Able to choose a particular doctor/specialist
 - Wider range of treatment options e.g. homeopathy
 - See a specialist at a time to suit
 - Able to see the same consultant
 - Better quality treatment and advice, therefore likely faster recovery
 - Perception that hospitals are more hygienic
 - Overall, greater peace of mind
 - It may be a mandatory requirement in that country e.g. because State provision does not exist or because the person falls outside the eligibility criteria for means-tested State provision
 - There may be very limited State provision available in that country for those who are not insured
 - Perceived to provide value for money in individual circumstances
 - Costs are more predictable than paying for treatment when required
 - There may be tax benefits in purchasing this insurance
 - Employers may purchase group PMI as part of a benefits package to attract and retain good staff and to ensure faster return to work

In general this question was well answered being straight bookwork. However, several candidates included background bookwork that was not asked for (for example, the definition of PMI) – the question asked for reasons why someone might purchase PMI, not for a description of the benefits provided.

- 2**
- (i) **Advantages**
- May allow absence rates to be better managed and assist in resource planning/productivity analysis.
 - May help to identify reasons for sickness which are within the employer's direct control and could be mitigated, e.g. removal of potential workplace hazards.
 - Allows employers to spot any trends – e.g. employees who are frequently absent on a Monday.
 - Could discourage false sickness absence.
 - May allow employers to use their own data in getting quotes for insurance.
 - However, this may be good or bad depending on whether they think their rates are higher or lower than normal.
- Disadvantages**
- It costs money to collect and store the data.
 - It might in some cases aggravate staff who think they are now “getting in trouble” when they take a sick day.
 - Employees may feel pressured to return to work whilst still too sick or infectious.

- (ii) The insurer might have wanted to increase the number of employers collecting data. This would increase the number of quotes where they can use own data and reduces the risk of incorrect pricing/reserving.
The insurer might have wanted to increase awareness of their brand by getting their survey reported in the press.
The insurer may want to use the results to help target marketing.
The insurer might have wanted to use this as a precursor to designing or launching a new product.
The insurer might have wanted to highlight the risks of absence, so that they can increase volumes sold of insurance protecting against absence.
It may have been done as a precursor to setting up industry data.

Most candidates were able to make a good attempt at this question, particularly part (i) where a good range of valid points was generally provided. In part (ii) some candidates seemed to interpret the survey as being a collection of sickness data itself, rather than simply finding out whether such data were collected or not.

- 3** Replacement ratio
Net post-claim income
Pre-claim income net of income taxes
Occupation class
Recorded change of occupation
Claim definition
Country of residence
Group/individual indicator if CI only sold on an individual basis
Contract type (with profits, conventional, unit-linked) if CI only sold on one basis
Guarantees/options/riders
No claims discount
Full time/part time/hours worked

Premium escalation
Benefit escalation before claim
Benefit escalation in deferred period
Benefit escalation in claim
Partial/proportionate benefit level
Maximum payment age or date
Benefit payment frequency
Linked claim period
If currently in linked claim period
Date of linked claim period expiry
Waiting period
If currently in waiting period
Deferred period

Reinsurance basis if more than one type of reinsurance used for IP

Whether or not currently claiming
Notification date of current claim
Start date of current claim

Cause of current claim
Amount paid to date in current claim
Date of any payment increases due in current claim
Percentage of any payment increases due during current claim
Maximum potential payment which could be made in current claim
Maximum potential term of current claim

Start date of each previous claim
End date of each previous claim
Cause of each previous claim
Amount paid in each previous claim
Date of any payment increase in each previous claim
Percentage of any payment increase during each previous claim
Reason for termination of each previous claim
Claim definition used in each previous claim

The question only asks for additional data, so data that would already be included in the extract (e.g. age, sex) would not be required. Some candidates discussed the nature of the reinsurance or how the product might be underwritten, which was not sufficiently closely related to the elements of a data extract, as required by the question. Candidates who paid close attention to key words in the question (such as “list” and “additional”) were able to score most highly in this question.

- 4** (i) The proposal would save the government money both in benefit payments and admin costs. Thus helps with their objective of “balancing the books”. It would encourage people back to work which helps to boost economic production. It would also reduce exaggerated claims.

It would encourage the use private insurance for illnesses of longer duration and encourage innovation in insurance products. Private insurers are often better at controlling long term claims.

However, there are many serious illnesses which would result in incapacity of more than a year. Cessation of a claim after one year will give genuine hardship to many, particularly the lower paid, who tend to have jobs with a higher potential for injury and a higher rate of sickness. Therefore it fails to meet a potential objective of “subsidising the poor”.

Those for whom benefits cease may become more sick as a result. It therefore fails an objective of “protecting the nation’s health”.

It could be perceived as treating disability as a “crime” and hence could be unpopular with voters, with serious political implications for the government. It might also go against previous political promises.

The costs of other State benefits that would need to be provided after expiry of the incapacity benefit may increase *and there may be other secondary effects*, e.g. increased housing costs.

There would be short term costs in changing and also need to publicise the change. It would also be necessary to consider if this is only for new claims or also claims in payment.

Would need to consider whether a linked claims type clause or maximum number of claims should be included.

- (ii) (a) The costs of different periods could be modelled using existing data.

The term might vary according to some feature (eg type of illness).

There are similar basic advantages to the proposal as in (i) (albeit to a lesser extent). It makes life easier for claimants with incapacity of longer than one year and so is more palatable politically but could encourage longer claims at more government expense and it does not solve the problem of what happens when claim payments stop.

- (b) This proposal focuses benefit on those most in need so may be more politically acceptable as provides less disadvantage to vulnerable groups.

Stronger definition of incapacity will reduce the number of claimants. Stronger controls should reduce the time for which benefit is paid. In particular, should better help the government to identify and stop/reclaim fraudulent claims. Therefore overall the government will spend less on benefit payments. However, changes to incapacity definition may not be popular politically.

If medical professionals (e.g. GPs) are required to perform more work in implementing the controls, this may also be unpopular.

It requires a new and more rigorous administration system/organisation which costs money to run so need to compare this against the expected benefit savings. It also requires tight rules based on objective tests to confirm claimant is fit for work. This is difficult since the same medical condition can affect claimants in different ways from day to day. Hence implementation is likely to cause issues and complaints/appeals that will also need to be dealt with.

Would need to explain/publicise the change clearly and carefully and would need to review existing claims, if applied to them

Many candidates appeared to forget, as they were answering this question, that they were writing about a state benefit (rather than one provided by an insurer). In part (i) several candidates suggested potential reasons giving rise to the problem rather than discussing the proposed solution. In part (ii) several candidates suggested other alternative solutions, which were not asked for. It is important to focus on the specifics of the question being asked, in order to score fully.

- 5** (i) The health status of the actual *individual* members of a group scheme is not taken into account up to the free cover level. Rather, a more global view is taken in assessing the expected experience of the group as a whole. Some lives in poor health may be accepted because they will be balanced out with lives in good health. Account may, however, be taken of the actual experience of the group and an “actively at work” requirement may be imposed.

Limited underwriting is often the case where take up rates are high or compulsory. The amount of underwriting may also be dependent on size of scheme or eligibility options.

- (ii) The term refers to a number between 0 and 1 which represents the proportion of the final risk premium that is derived from the past experience of the company with the balance coming from book rates.

The value of the factor depends on the amount of data available due to the size of the scheme and/or length of historic recorded experience. Thus, a larger scheme, with more experience, would have a higher credibility factor

- (iii) (a) Little data available so may make no adjustment

There may be very low turnover so lapse rates should be reduced

They may have very healthy lifestyles e.g. lower than average levels of drinking/smoking or relatively well educated. Also, there is likely to be less risk of faking illness so may have lighter morbidity. However, may not have a stable home environment or time to take exercise so may have heavier morbidity.

May be very motivated to work so recovery rates may be better than average.

May on average be older than the normal insured population due to having obtained “leader” status. However, pricing may or may not be based on average age, so this may not be a factor for which a change should be made.

- (b) There might be very high turnover so lapse rates should be increased. However, cover may only be offered to senior management in which case lapse rates may be fairly average.

Most of the staff *may* be lower socio-economic class and may have a poor diet if meals are generally provided at the outlet. If so morbidity rates may be higher. There may also be high rates of job-related injuries e.g. burns. There may be low motivation to return to work.

They may on average be younger than the normal insured population.

- (c) Leisure centres can have high staff turnover too, so increase lapse rates

Staff may take a higher than average amount of exercise so morbidity rates may be lower. However, they may have a lot of sports injuries and they may be more likely to be more aware of need for treatment (e.g. physiotherapy). Depending on the covers involved, these factors may worsen claim rates. However, fitter people generally recover faster so recovery rates should be improved.

Not all leisure centre staff will be very active, but on average this should tend to be the direction in which the assumptions move.

This question was reasonably well answered. Candidates who had a deep understanding of the concepts covered by this subject were able to demonstrate that to the examiners in this question by applying their knowledge. Some candidates did not tailor their answers closely enough to the specific groups given. Some answers were rather narrow and tended to focus on aspects which would affect the rates in one direction only, without going on to discuss potentially offsetting effects (e.g. pointing out that morbidity rates might be lower for those working in fried chicken outlets due to lower average age, but without mentioning the potential for higher rates due to poor diet and/or socio-economic status).

6 General considerations:

All reinsurance passes a share of any profit to the reinsurer so the suitability of any type would depend on its perceived value for money, on the cedant's solvency position and risk appetite, on the potential for tax arbitrage where the reinsurer is taxed on a different basis to the insurer and on the potential for solvency margin arbitrage where the reinsurer is required to hold less capital per unit of risk. The security of reinsurers should also be considered i.e. increases counterparty risk. A company entering a new market will need assistance which can be provided alongside any of the types described here e.g. could include the provision of data for claims, pricing, risk premium rates or with underwriting, claim handling etc.

Proportional reinsurance:

Reinsurer covers agreed proportion of each risk

Administered automatically

A treaty may be required. All policies complying within treaty scope must be ceded.

Can be facultative or obligatory. If facultative, the reinsurer can decide whether to accept or reject the business.

The proportion can vary as the insurer gains experience of new product or territory though variation usually applies to future new business, not retrospectively to the existing business.

May provide income in the form of commission or deposits back

Can be written on an "original terms" basis i.e. sharing all aspects of the original contract or a "risk premium" basis i.e. based on the reinsurer's premium rates.

Premium rates may or may not be guaranteed and may be level or increasing.

Sum-at-risk can be used rather than initial sum assured to achieve a similar effect.

Proportional reinsurance would be suitable for the company entering the new market e.g. to help it accept a greater capacity of business. However, because it does not cap

the cost of any very large claims the insurer would also need some form of non-proportional reinsurance.

It is generally used for long term health insurance lines. However, quota share may be used for new PMI business.

Quota share

Fixed proportion of each risk

Often used in this type of situation to spread risk e.g. to allow the insurer to write larger portfolios of risk and encourage reciprocal business or to improve the solvency ratio and satisfy the statutory solvency requirement.

It can be useful as reinsurer may want to have a significant participation in risk to compensate for expertise being provided.

Quota share has the disadvantage of ceding the same proportion of each risk, irrespective of size. The insurer may prefer to cede a greater proportion of the larger risks than the smaller ones, owing to their greater loss potential.

Provision of financial assistance (new business strain, bolstering free assets) could be very useful for a new venture.

Surplus

Proportion ceded relates the insurer's preferred monetary retention to the overall sum assured. May be used to write larger risks, which might otherwise be beyond the insurer's writing capacity. The major benefit is to enable the insurer to limit its exposure for the policies concerned on an individual basis. It can be used fine-tune experience by allowing different proportions of each policy to be ceded.

Many candidates did not indicate how or why proportional reinsurance would be suitable for a new company writing health and care business. There was often confusion between the various types of reinsurance which hampered many candidates' ability to score highly in this question. Learning the bookwork, and understanding the effects of different types of reinsurance, is to be recommended. Many students did not appear to have left themselves sufficient time to do justice to this question, given the fairly high number of available marks which suggests that a lot of detail and depth must be required.

- 7** (i) IP pays a benefit in the form of a regular income if the insured life is unable to work (referred to as incapacity) through illness or accident or injury. The specific conditions under which the benefit becomes payable and under what circumstances it will cease, will be clearly defined in the policy document. Unemployment, redundancy, early retirement and reluctance to return to work would not normally be included. There is also likely to be exclusion of certain kinds of illness / physical injury — e.g. HIV, attempted suicide. The policy is usually written as a long term policy under which a number of separate periods of benefit payment can occur, without the policy ceasing. There may be a clause dealing with linked claims. There may be a waiting period during which a claim may not be made. There may be a maximum benefit formula, relating to replacement ratio. Benefits are not normally paid during the first few weeks of sickness (the deferred period).

There will be an expiry age, at which any benefits in payment cease, which is often the same as the expected retirement age. There may be a further limit to the term of payment of benefits.

Benefits can be level (i.e. fixed at outset) or may escalate in and/or out of claim (e.g. in line with prices).

There may be proportionate benefits or other benefits available to aid rehabilitation.

There may be guaranteed insurability options or other options.

Premiums do not usually increase with age. However inflation linking of premiums is common, particularly when benefits escalate when not in claim.

Policy can be written under guaranteed or reviewable premium rates. For reviewable product, insurers reserve the right to revise the premiums should claims experience across the whole portfolio be poor (and may reduce premiums if the experience is good). There may be a waiver of premiums whilst the policyholder is receiving benefits.

There may be a no claims discounts.

There are also group IP products, bought by employers wishing to provide benefits to their employees

(ii) **Own occupation**

This definition of incapacity provides the greatest level of income protection cover. For example, a policyholder may have a high pressured job that leads to high stress levels which in turn leads to them no longer being able to fulfil the duties of that specific occupation. The policy would pay out and the insurer would not require the policyholders to take a less stressful position.

Suited occupation

This provides a lesser degree of cover than a policy with the “own occupation” definition. Under this definition the insurer may require the policyholder to return to work in an occupation for which they are suited. The insurer will determine what is a suited occupation based on the policyholders’ skills, training, qualifications and experience. For example, a policyholder suffering from stress may be required to take a less stressful position at the same firm or elsewhere.

Any occupation

This definition provides less earnings protection than a policy with an own or suited occupation incapacity definition. The insurer may ask the policyholders to undertake any occupation for which they are deemed to be medically capable. For example, policyholders who previously had an active occupation but are now suffering from physical disability may be required to take an office based position at their existing company or elsewhere.

A time limited mixtures of the above may be used e.g. inability to perform own occupation for an initial period (e.g. the first two years) of claim followed by inability to perform any occupation thereafter.

Work tasks / Activities of daily living

Using a work tasks or activities of daily living definition of incapacity provides the lowest level earnings protection. Under this definition the

income protection policy would pay out based on the ability of the policyholder to complete certain tasks, regardless of occupation. For example, common tasks include the activities of daily living (ADLs) – feeding, dressing, washing, toileting, mobility and transfer. It is usually the case that the policy would pay out if two or more of these tasks cannot be completed without further risk to health.

Functional assessment tests (FATs), activities of daily working (ADWs) and personal capability assessment (PCA) are other examples.

- (iii) Intermediaries may be uncomfortable with the limitation of benefits or may not be clear on the key sales messages.
IP may be perceived to be more difficult to sell than other health products, so sales advisors choose not to focus on it. Similarly, sales remuneration may not be as generous for IP as for other health products. The sales process may be regulated.
Consumers may struggle to understand the true value of cover and/or do not see the need to protect against long term disability.
There could have been unfavourable press about the product or insurance industry in general e.g. due to strict claims management and high levels of declined claims.
Consumers may already have, or think they have, disability cover, e.g. from the government or they may have generous employment provisions (or think that they do) which mean that their employer will continue to pay them whilst sick.
Consumers may be completely unaware of the existence of the product, e.g. due to lack of marketing by the industry.
The product design may be too complex. Consumers may prefer lump sum benefits.
The application process may be too lengthy. Consumers may be put off by medical underwriting requirements.
Premiums may appear too high particularly if the country is in an economic downturn and disposable income is reduced. IP insurance may be seen as a “luxury” item rather than a necessity.
Taxation treatment of premiums or benefits may be relatively unfavourable.
There may be cultural differences/barriers to sale.
The market may be saturated.

Most candidates did well on part (i) which is bookwork. In part (ii) several candidates did not explain “the relative levels of cover provided” as asked in the question. Part (iii) was generally well answered.

- 8** (i) Products will need to be simple since a small business needs cover but probably has limited time to “read the fine-print”. The products need to be affordable and tax efficient. All embracing cover is likely to be required, with minimal exclusions.

The business is likely to expect relatively light touch (and thus low cost) underwriting.

The business is likely to wish to swap the uncertainty of pay as you go costs for certainty in costs.

PMI may be provided for employees in order to speed up recovery and return to work but this is likely to be provided for higher earners only.

CI is less likely for a small business as it is more likely to be more popular in larger cafeteria schemes. But there may be opportunities for keyman insurance to cover sickness for particularly important employees whose absence would cause significant loss in profits or additional recruitment costs or it may be used to buy out a sick partner.

IP may be provided in order to speed up recovery and return to work.
May be used to provide locum cover (eg for doctors or dentists partnerships)
Would probably be a simple benefit formula.

LTC very unlikely to be required.

Likely to require some employee contribution.

- (ii) The proposal suggests that underwriting and acceptance criteria will have to be significantly relaxed, but that premiums also need to stay acceptably low. The major risks are therefore anti-selection by the “control group” in the small business, in particular, inclusion of bad insurance risks.

Small group business could constitute a wide variety of risks. Niche businesses will be difficult to price. Claims fluctuation is higher for smaller group insurance. Therefore need higher reserves and capital requirements

Some individuals could be particularly high risk (e.g. keyman insurance on the business owner) and a disproportionately large part of the overall insured group.

May experience higher lapse/non-renewal rates due to higher rate of failure of small businesses.

May not be able to obtain reinsurance unless the government also makes this a requirement for reinsurers.

The business may not be profitable for the insurer under the easy access requirements, for example due to disproportionately high expenses / fixed costs.

May need to change distribution methods to those more empathetic to small businesses.

May be more difficult to differentiate from competition; for example, through price or service.

- (iii) Seek adequate reinsurance if it is available, e.g. quota share, risk premium or stop loss, to reduce volatility or to provide technical expertise.

Ensure that underwriting is as stringent as it is permitted to be e.g. enforce an “actively at work” requirement or take up at first opportunity or compulsory membership. Have a sensible free cover limit. Introduce exclusions, e.g. PECs.

Good claim control system. Require pre-authorisation for a PMI claim. Use preferred providers to manage PMI costs.

Change the product design; for example, use excesses/ experience sharing, introduce waiting periods and/or longer deferred periods, provide rehabilitation / partial benefits, impose maximum benefit amounts, if permitted, consider limiting conditions for which payments would be made and don't provide guarantees.

Make sure there are clear terms and conditions / documentation

Include adequate loadings in premium for cost of administration and for uncertainties

Ensure that administration processes /systems are efficient. Provide good broker support personnel and good service levels to ensure lapse rates are low.

Pricing advice from consultants/reinsurers

Diversify by region, type of business covered etc

Undertake aggressive marketing to increase volumes of sales

Engage in risk management processes with employers

Lobby the government to ensure precise details work for the insurance industry

Could attempt to subsidise with profits from business with large employers but this would depend on level of competition

In part (i) many candidates did not think about health insurance requirements which are specific to small businesses, but merely named and briefly described all types of health insurance. In general, many candidates did not give enough points in parts (ii) and (iii) to score highly.

END OF EXAMINERS' REPORT

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

5 October 2012 (am)

Subject ST1 – Health and Care Specialist Technical

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 15 minutes before the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all seven questions, beginning your answer to each question on a separate sheet.*
6. *Candidates should show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

<p><i>In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.</i></p>
--

- 1** (i) Explain why a risk discount rate assumption used for product pricing purposes may contain a “risk premium”. [3]
- (ii) Describe how this risk discount rate assumption might be derived. [7]
[Total 10]
- 2** Explain why a large established life insurance company moving into the health and care insurance market is likely to make use of reinsurance to reduce its risks. [10]
- 3** (i) Describe the typical types of reserves for short term health insurance. [7]
- (ii) Describe the factors that may drive future claim costs (per insured life) under private medical insurance. [7]
[Total 14]
- 4** A company currently offers standard private medical insurance (PMI) cover to all its employees. The costs of this cover have risen by 50% in the last five years, and the cover has become unaffordable.
- (i) Discuss ways in which the company can seek to reduce the cost of its PMI cover. [7]
- The Human Resources director of the company has suggested that an alternative to providing health insurance to its employees would be to set up a “cycling to work” scheme. Under this scheme, employees would be able to obtain a subsidised bicycle for commuting, and the company would provide facilities at its offices to assist people cycling to work.
- (ii) Comment on this proposal. [4]
[Total 11]
- 5** Claims arising from the following risks are often excluded from cover in income protection contracts:
- AIDS/HIV
 - War
 - Misuse of alcohol or drugs
 - Residing abroad
- (i) Explain why each of these might be excluded. [8]
- A health and care insurer has decided that it should be possible to include income protection claims arising from war risks.
- (ii) Discuss the factors that the insurer would need to consider when assessing the additional morbidity risk which would arise from removing this exclusion. [9]
[Total 17]

- 6** (i) Describe the needs which are met by long term care insurance. [5]
- (ii) Outline the features of long term care insurance products that could be used to meet these needs. [12]

A health and care insurance company is offering both pre-funded and immediate needs long term care insurance contracts.

- (iii) Give an example of a possible target market for each. [2]
- [Total 19]

- 7** In the country of Actuarial, a growing number of dental procedures have been transferred from the subsidised State-run health service to the private sector over recent years. As a result, the cost of dental treatment incurred by residents of Actuarial has risen sharply. These increased costs have been funded by many individuals or groups through dental insurance. At the same time, the number of dentists undertaking treatment under the State-run health service has declined.

As a result of the increased treatment costs, there has been a recent trend of Actuarial residents seeking dental care in overseas countries where costs are lower.

A health and care insurance company is considering whether to enter the market for dental insurance. It has been suggested that the insurer should concentrate on providing dental care abroad for Actuarial residents.

- (i) Discuss this suggestion. [7]
- (ii) Describe the considerations for the insurer when deciding which dental providers to use for this proposed product. [4]

Initial research by the insurer has revealed that this product could be designed as either insurance or “non-insurance”.

- (iii) Describe the likely form of the “non-insurance” version of the dental product. [3]

Further research by the insurer has revealed that the proposed product would be of interest to two target markets:

- people having no access to subsidised State-run health service dental treatment
- people needing highly expensive dental procedures

- (iv) Outline how the insurer could evaluate the market potential for the proposed dental insurance product for each of these target markets. [5]
- [Total 19]

END OF PAPER

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2012 examinations

Subject ST1 — Health & Care Specialist Technical

Introduction

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For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

D C Bowie
Chairman of the Board of Examiners

December 2012

General comments on Subject ST1

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 gain few marks if they do not address the question asked. 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.

It is often helpful to use subheadings when answering long part questions.

Comments on the September 2012 paper

Overall, the paper was towards the more difficult end of the range; however well-prepared candidates scored well across most of the paper. As usual, questions that focussed on knowledge of the Core Reading were well answered by those who had prepared thoroughly. However, questions requiring wider thinking or application of core reading to specific circumstances, such as questions 5(ii) and 7, were less well answered and students should recognise that these are generally the questions which differentiate those students with a good grasp and understanding of the subject. The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates approaching the subject for the first time are advised to include these areas in their revision.

- 1** (i) Writing new products requires the use of capital. This is provided by the owners of the company (normally shareholders). The “risk premium” is the excess return required by the providers of the capital over and above risk-free returns.

It is reasonable to suppose that the owners of an insurance company decide where to invest by comparing the returns offered by different companies relative to the risks that are run. They are able to move their capital from one company to another if they wish. An investor will demand a higher expected rate of return from a risky investment than from a safe investment in order to compensate the investor for the risks of default, commercial failure and so on. Investing in an insurance company is not risk free and therefore investors will demand an expected rate of return equal to the risk-free rate plus a risk premium.

Alternatively product pricing may be done on a “market consistent” basis, i.e. with no risk premium, but this would require the need to make other adjustments for risk.

- (ii) First the risk-free rate of return must be set, which needs to be based on an asset that offers a certain return, absolutely free from all risk of default. A suitable proxy can be chosen to represent risk-free assets, such as short term deposits issued by a stable government or swaps.

The key consideration then is to determine what risk premium is appropriate to compensate for the risks of investing in this insurer. The Capital Asset Pricing Model (CAPM) has been widely used by stock market investors to help determine an appropriate risk premium. The idea behind CAPM is that a well-diversified portfolio of shares cancels out the risks of investing in individual shares and leaves only the unavoidable risks of investing in the stock exchange.

The average risk premium that the diversified portfolio of shares has yielded over the risk-free rate, over a period of time, is estimated. The factor to consider next is how risky a particular company's shares are compared with the diversified portfolio. The result of the CAPM is that the proper risk premium for any particular share is in proportion to its Beta.

The CAPM is just one example of how the market might assess the shares of a company – other methods could be used.

Having considered the overall riskiness of the company, it also needs to be born in mind that not all product developments are equally risky. The level of risk premium set would depend on the extent to which risk margins are included within the experience assumptions.

The insurer should view itself as an investor like any other when it considers the riskiness of a new product, as in the long run the profits emerging from the whole company are the profits emerging from the products that it sells.

A change in the mix of business, for example away from old and “safe” contracts towards new and innovative contracts, would change the market’s evaluation of the company’s riskiness.

The company may use a different risk discount rate according to the specifics of the product and its level of risk.

The following are among the features that can make a product design riskier:

- lack of historical data
- high guarantees
- policyholder options
- overhead costs
- complexity of design
- untested market

The level of statistical risk (i.e. variation about the mean) attaching to the cash flows under a particular contract could be assessed:

- in some situations analytically, by considering the variances of the individual parameter values used
- by using sensitivity analysis with deterministically assessed variations in the parameter values
- by using stochastic models for some, or all, of the parameter values and simulation
- by comparison with any available market data.

In theory, a separate risk discount rate should be applied to each separate component of the cash flows because the statistical risk associated with each component will be different. In reality, it is not easy to assess these risks, and it is even harder to say what effect they should have on the risk discount rate. Therefore broad brush approaches to risk premium setting tend to be used.

Although a bookwork question, many candidates did not score highly, particularly in part (ii) where, generally, too few points were provided for the marks available.

- 2** (i) Reinsurance will limit exposure to risk. Health and care insurance business has volatile claims patterns and accumulation of risk could materially impact the business results of the insurer. Despite being a large established insurance company it lacks experience of this type of business and so may be uncomfortable about the unpredictability of future claims. It may have a low appetite for risk generally or just in this area. Also, although a large insurer, it may need protection against large individual claims or total claims if it has relatively low levels of free assets available.

Reinsurance can help to smooth results. Although a large established insurer, this may be useful in the early years of expanding into new risk areas.

The need for reinsurance depends on the level of fluctuation acceptable to shareholders and regulators and the expected volume of new health and care insurance business relative to the size of the existing portfolio.

The insurer is expanding into new risk areas where it has little or no expertise. Therefore reinsurance can provide the company with necessary technical expertise, for example:

- product design
- data
- terms and conditions/policy wording/claim definition
- rating/pricing
- underwriting
- claims management
- staff training
- short term business
- income benefits

The insurer may choose to reduce reinsurance later on when its own expertise has grown.

Reinsurance can increase the life insurance company's capacity to accept risk, singly (e.g. large sum assured) or cumulatively (e.g. large number of claims) and this allows the company to obtain diversification benefits more quickly.

It could provide financial assistance to support new business strain, if this is expected to be high or to bolster free assets, if these are not large or to cover development costs.

There may also be potential for tax arbitrage or solvency/capital arbitrage.

Despite being a larger insurer, the company might have to have big margins in its assumptions to allow for the uncertainties involved. Reinsurance will reduce solvency capital requirements.

Reinsurance could improve the company's credit standing/reputation.

The reinsurance might simply offer good value for money.

Most candidates were able to make a credible attempt at this question. The better candidates related their answers to the fact that the insurer in question was a large established company, where relevant.

3 (i) *Unearned premium reserve*

The balance of premiums received in respect of periods of insurance not yet expired. This is often the largest component of the technical provision of a short term health insurer.

Unexpired risk reserve

Reserve in respect of the above unexpired insurance premium where it is felt that the premium basis is inadequate.

Outstanding claims reserve

Reserve in respect of claims notified to the insurer but not yet fully settled.

Incurred but not reported

Reserve in respect of claims that have arisen but that have yet to be notified to the insurer.

Incurred but not enough reported

As above but where it is felt that not all detail has yet been submitted and a provision needs to be established for the remainder.

Equalisation or catastrophe reserves

Reserves where it is felt that the current year is atypical and amounts will have to be held back for abnormal events.

Claims in transit

Reserve in respect of claims reported but not assessed, or not recorded.

- (ii) The factors will relate to both changes in the numbers of claims made and individual claim amounts
- Advances in medical technology is a significant factor driving medical inflation
- Use of more expensive new treatments, medication, equipment and surgical procedures
- Changes in recommended medical protocols
- Increasing availability of many (formerly complex) treatments, such as coronary by-pass grafting
- Changes in hospital capacity, which can impact the likely length of stay as an in-patient for a given procedure
- Better diagnostic capabilities resulting in earlier detection of conditions, which may result in higher numbers of claims (which might otherwise have not been renewed or the insured life might even have died)
- Higher prevalence of screening programmes, e.g. due to encouragement by medical professionals or national screening campaigns
- Rising expectations and higher demand from individuals for newer technologies and treatments
- Changes in policy coverage, underwriting procedures, claims management
- Changes in cultures may lead to changes in propensities to claim

There may be an increase in the rate of referrals by general practitioners.

There may also be increased propensity to claim on employer-provided insurance due to job worries or due to an increased understanding of insurance and insurance products or due to changes in the quality and/or availability of State healthcare provision (e.g. length of waiting lists)

With a growing market for healthcare services, healthcare providers need to be able to maintain growing profit margins. Levels of competition between hospitals and other private medical providers also affects the charges levied as will changes in health care providers. General underlying inflation would also have an impact on the fees charged by providers, particularly inflation of health professionals' salaries and accommodation costs. Health professional's salary inflation will depend to some extent on the supply of such qualified professionals to the employment market.

An ageing population (or portfolio) would impact average medical costs per insured life as would other changes to mix of business in the insurance portfolio or target market e.g. a shift in socio-economic groups covered, location.

Changes in lifestyle factors will also influence claims costs as might changes in regulation or legislation.

Need to consider the impact of selective non-renewals.

Part (i) of this question was generally very well answered with many candidates covering most of the reserves. Many candidates also provided a good description of factors which might drive future claim costs per insured life.

- 4** (i) The company could provide PMI to only some of its employees. This would cut the costs dramatically but would annoy those who no longer received the benefit, with the risk that they might look for another job.

The company could offer an increase in pay in lieu of providing the health insurance or ask employees to contribute towards the cost.

The company could seek to reduce the level of cover provided under its PMI e.g. by increasing the excess level
or by capping claims
or reducing choice of treatment providers (or other suitable examples)
or removing some of the areas covered
or withdrawing cover for family members/dependents

This would have a smaller impact on the cost but might be more acceptable to the workforce. The risk would be that the staff might not fully understand the change.

The company could move to a budget version of PMI such as major medical expenses or a health cash plan version or an optical/dental plan or a waiting list plan. This would have a greater impact on the level of costs than simply reducing the cover and would be perceived as fair if the same change was made for everyone. However, it is a noticeably reduced benefit for staff, and carries some risk that staff may leave.

The company should certainly shop around to see if it can get a better deal and should also investigate whether there are any product variants that might be advantageous, such as profit sharing.

The underwriting procedure could be tightened up e.g. have full medical underwriting rather than MHD.

It is possible (but unlikely) that if the company is very large it might be feasible to self-insure and still provide the staff with the underlying benefits. This increases the level of risk to the company. This would require more internal administration but reduces the transfer of profit to the insurer and

loses any bulk purchasing power which insurers have with healthcare providers.

The company could try to encourage better lifestyle behaviour in its employees but this would be unlikely to have an immediate effect on the cost of claims.

- (ii) The director may be thinking that this has a health benefit to staff and so is in the same sphere as health insurance. This might be well received by some staff i.e. those who like cycling and who do not anticipate claiming on the insurance, especially if there is adequate provision of cycling lanes in the area / showers in the building etc. However, for many staff, cycling will not be feasible, because of the distance they commute, or the need to do the school run, or they are disabled etc. They will not welcome the change. Similarly for those who value the current health insurance benefit highly, which may result in good staff leaving or the employer not being able to recruit good staff so easily.

Need to consider the overall costs; although there may be savings in the long run (capped amounts per staff member, more predictable outgoings, more up-front costs so fewer ongoing costs) there will be initial set up costs (e.g. provisions of showers, bicycle racks etc).

The director may wish to consider whether this could be done alongside one of the options under i) above because a healthier workforce could potentially mean lower premiums.

Cycling may also cause injuries and involve accidents.

It would be useful to look at what other local companies are doing.

Both parts of this question were generally well answered; candidates who came up with a wide range of answers scored more highly than those who came up with several very similar ideas. Several candidates did not understand the different emphasis being made by the dropping of the PMI contract in favour of bicycles.

5 (i) General

All the options listed are difficult to price because of lack of data or uncertainty

Competitors will usually have these exclusions so not having them will generally give rise to uncompetitive premiums and lead to anti-selection

AIDS/HIV

Development of AIDS/HIV is often related to lifestyle choices. Therefore it is deemed to have a strong potential element of selection, hence its exclusion.

Rapid changes in available treatments/medication may also make it difficult to price. Additionally, there could be long IP claim periods because of reduced immunity

War

Major exposure to the effects of war is generally confined to a small subset of the population (e.g. members of the armed forces). Therefore the exclusion has a limited impact on the normal insured population. Also the government often covers war risks in times of a major war.

There are problems in assessing the likelihood of exposure to war. There could also be an unacceptable exposure to aggregation of claims (e.g. from a nuclear attack on a country).

Alcohol/drug abuse

It may be self-inflicted/done by choice; therefore there is a strong element of selection. It may also be seen to be encouraging irresponsible behaviour if covered.

Recovery/cure is less clear than for more standard medical conditions and cannot be controlled by the insurer

Residing abroad

There will be a loss of claim control by the insurer. Recovery times may potentially be long because the insurer may be unable to provide suitable rehabilitation support overseas. Also, the geographical location of the claimant can be a problem for the insurer. There is also more scope for claimants to manipulate the claim.

Overall, it could be difficult to price because of exposure to different diseases, climate etc.

(ii) *War Risk Factors*

Risk is independent of age and sex

Splitting by "occupation" will be most important e.g. armed forces, aid workers, non combatants/civilians, journalists. Also likely to need to split further, since specific armed forces units will have different potential exposures to active service. At least, split between frontline armed forces / aid workers and armed forces / aid workers in the supply chain.

May also split by territory in which the active service would be expected to take place and the political stability and/or history of war in the territory. Would need to consider both current known wars and potential for future conflicts during the policy term.

Risk would differ between armed forces currently on active service and those who currently are not but may be so during the insured period. Non combatants would need to be split into active conflict zones and elsewhere.

Need a clear definition of war.

Need to consider incidence of claims and duration of claims.

Need to consider different types of disability than for “standard” claims, in particular:

- Loss of limbs
- Loss of eyesight / hearing
- Severe mental trauma (e.g. post traumatic stress syndrome)

Need to consider the disability definition e.g. own occupation v any occupation.

It could be difficult to obtain data on which to price so likely to need large margins. Data based on past conflicts may not be relevant to future experience. Need to consider future trends and developments in warfare e.g. potential increase in biological or nuclear attacks.

Need to consider possible accumulation of risks and cost of capital required.

May need reinsurer and/or consultancy help but may not be able to find a reinsurer willing to take on these risks. Could seek additional data from the government to improve understanding of potential risks. Could consider a coinsurance arrangement with the government to gain such data.

There may be reputational risks involved.

In general, neither part of this question was well answered, with candidates often only providing a few points. Some candidates did not demonstrate awareness that alcohol abuse causes lasting adverse impact on an individual's mortality and morbidity experience (beyond the falling-over-drunk effect). For part (ii) candidates did not always restrict themselves to considering morbidity risk only, which wasted valuable exam time for them. Also, many candidates did not look beyond the armed forces or civilians in the calculation of war risk.

- 6** (i) To provide financial protection when a person becomes unable to look after him or herself
To finance the provision of care and assistance in old age
To avoid dependence on the loyalty of unpaid care provided by family or friends, particularly in later stages, the level of need may be beyond the ability of the family to provide due to ageing of friends or spouse or the level of skill needed to provide specialised care
To avoid uncertainty as to the role of the State in the future in paying for care
To provide peace of mind to the person to know that there is an independent source of cash that will be triggered when severe incapacity sets in and to provide protection against the uncertain survival duration
To protect inheritance or protect against value of estate falling
Provides inflation protection, if an indemnity product
Provides potentially greater flexibility/choice of care (relative to relying on the state provision)
Advice may be provided
At the time of claim the policyholder may need various levels of care e.g. domestic support such as a nurse or other carer visiting the patient's home

periodically to monitor wellbeing, progressing to live-in care as the claimant becomes more incapacitated.

Alternatively, residential care may be sought in establishments that can provide various levels of care and vigilance

There may also be a need for medical care, where physical (or possibly mental) breakdown requires the intervention and supervision of doctors and nursing staff.

(ii) *Pre-funded contracts:*

Premiums could be regular or single

Premiums may increase

Premiums may be guaranteed or reviewable

Regular premiums may cease at a certain age or once a defined level of disability has been reached

Single premiums may be paid retrospectively e.g. from equity released after sale of a house. These would help meet the affordability need

Benefits are payable when the claim definition is triggered, i.e. the appropriate level of disability is reached e.g. being incapable of performing a number of ADLs or a mental impairment trigger or on an event such as entry into a nursing home

There may be a deferred period e.g. three or twelve months

There may be a waiting period

Unit-linked products would provide additional flexibility

Different levels of benefits may be payable depending on the level of disability

Benefits could be regular payments or a defined lump sum. Regular payments could be guaranteed throughout the annuitant's lifetime (subject to ongoing disability) or subject to a maximum total amount or paid for a maximum period of time. An assistive devices benefit may be included

The benefit may be offered as a rider to a pension policy

The contract could be indemnity based paying for all or a defined proportion of the costs of care throughout the remainder of life or could provide a cash lump sum or annuity to contribute towards the costs of care. This annuity may escalate, e.g. in line with inflation or at a fixed rate. Alternatively, the product could be unit-linked.

Most pre-funded long term care products do not provide a benefit on death, although there may be some partial return of premium on death for single premium products. The most basic products do not offer a surrender benefit

but in some cases a paid-up benefit will be available after premiums have been paid for a minimum period

Immediate needs contracts:

Single premium

Benefit payable immediately and cease on death; the benefit amount could be level or escalate (fixed or inflation-linked). A death benefit may be provided (e.g. capital protection on part of the single premium)

In both cases provides a choice in location of care home

(iii) *Pre-funded:*

Younger person with excess income and few family members wanting to secure their old age at point of retirement

Immediate needs:

Retired person already needing care using lump sum from equity release or pension to ensure their final years are provided for or the family of a retired person already needing care using excess assets to provide certainty about the total cost of their relative's care

This question was generally reasonably answered, although several candidates showed a lack of understanding of immediate needs insurance. It's crucial to understand the basic features of the contracts covered in the core reading, in order to pass ST1.

7 (i) Dental insurance facility

Advantages

As dental costs are lower overseas, the premium will be lower, thus more attractive to potential policyholders. Also this may be a niche market which other insurers are not currently filling. Thus overall there may be a large potential volume of new business which therefore could increase the profits of the company

Disadvantages

However, the company does not appear to sell any dental insurance already so lacks experience so pricing could be difficult

Will need to set up new systems and processes at a cost

The attractiveness may only be temporary e.g. due to changes in future State provision in Actuarial or due to an increase in overseas costs as a result of higher demand

The overseas treatment market may already be adequately catered for by other insurers therefore wouldn't be able to sell a high enough volume to recover development costs etc

The quality of treatment may be in doubt which may lead to reputational issues

Need to consider how this product would be underwritten

The insured will incur substantial travel and accommodation costs

Overall the quality of the treatment and any cost savings (net of travel costs) must be sufficient to justify the inconvenience of travel for treatment, in order to be attractive to potential policyholders

The insurer may have less control over dental costs overseas (an issue if indemnity cover provided) and there is an increased risk of fraud

The dental facility will need to be selected and regularly inspected by the insurer. This adds to the costs

There may be additional currency risk

Higher risk/higher margins/higher capital

Reinsurance may not be available

People may only go overseas for treatment because that's their only option; they would not necessarily buy insurance to get cover overseas but may buy insurance to get domestic cover

- (ii) The insurer will need to research which countries provide appropriate dental care and their political and economic stability and then seek out suitable facilities within those countries offering required treatment. These would need to offer an acceptable level of quality of treatment and staff e.g. professional body/qualification/registration/approval

Feedback from previous customers may be reviewed. Feedback may be sought from other sources within the country, e.g. journals, international medical associations

Size/capacity of the facility which may affect waiting times

The treatment would have to be available at a reasonable price with quality accommodation and access to international travel facilities which also have a reasonable cost (e.g. low-cost flights)

The facilities will need to have Actuarian speaking staff and be prepared to work closely with the insurer

Whether willing to offer cover on a capitation basis

- (iii) This refers to the capitation basis. Likely claims are forecast on an individual basis. This is charged to the individual as the premium, plus adjustments for expenses and profit.

The risk that this is insufficient to cover treatment is passed to the provider, i.e. the dentist. This is done by giving a proportion of the insurance premium for each person managed to the provider up-front, rather than an amount per claim.

(iv) **Basic market:**

Look at areas of Actuarial where there is a shortage of State-run capacity and obtain estimates of the shortfall in these areas. Look at why people were ineligible for access to State-run dental treatment

Consider the capacity of residents of those areas to pay for overseas private treatment

Expensive procedures:

Assess the potential amount of money to be saved for each different procedure taking into account the offsetting travel costs

Look at market statistics on non take-up of Actuarial recommended treatment

Consider the implications of the current economic climate e.g. if Actuarial is in the lower part of an economic cycle, this could dampen uptake due to reduction in disposable incomes

General:

Assess whether the proposed product is a viable alternative to travelling within Actuarial and the willingness of individuals to overcome the hassle factor of travelling. Assess statistics available on the number of Actuarial residents travelling overseas for dental treatment at present, without insurance

Carry out market research on whether there is a perceived need for insurance in these groups

Consider future State actions

Make sure any data used are accurate and reliable

If any other company offers such a product already, consider their new business statistics and assess the degree to which the insurer can compete with them

Good familiarity with the parts of the core reading relating to dental insurance would have assisted candidates greatly in interpreting this question. Whilst reasonable attempts were made for part (i), in general, many candidates did not give enough points in the later parts to score highly. For example, many candidates did not apply actuarial logic in part (ii) to discuss the insurer's requirements that their insured patients would get good treatment at a fair price. In part (ii) candidates mentioned capitation but did not realise that this was the likely method of non-insurance to be explained in part (iii). Several candidates did not take on board that the proposed insurance was to provide dental treatment overseas rather than in Actuarial for Actuarial residents.

Part (iv) could have been better answered if candidates had laid out their answers dealing with each target market separately and evaluated the market potential in turn.

END OF EXAMINERS' REPORT

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

25 April 2013 (am)

Subject ST1 – Health and Care Specialist Technical

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 15 minutes before the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all eight questions, beginning your answer to each question on a separate sheet.*
6. *Candidates should show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

<p><i>In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.</i></p>
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- 1** (i) Explain how commission can be a source of risk to a health and care insurer. [5]
- (ii) Suggest ways of managing this risk. [3]
- [Total 8]
- 2** (i) State the principles of investment. [2]
- (ii) Suggest, with reasons, assets that a health and care insurer may choose to hold as a suitable match for the following reserves:
- (a) IBNR reserves for critical illness insurance
 - (b) unit reserves for unit-linked long term care insurance
 - (c) policy reserves for immediate needs annuities
 - (d) outstanding claims reserves for private medical insurance (PMI)
- [8]
- [Total 10]
- 3** State the types of restrictions that governments may impose on health and care insurers for the purpose of policyholder protection. [6]
- 4** Explain the factors that influence the proportions of private medical insurance (PMI) policies that are renewed. [12]
- 5** A health insurer that has only ever sold critical illness business has recently failed to meet its minimum solvency capital requirements and hence has become technically insolvent.
- Suggest possible reasons for this. [16]
- 6** The government of Actuarialia has announced that insurers will no longer be able to use gender as a rating factor for income protection insurance policies.
- Discuss the potential impact of this proposal on a health and care insurer that currently writes income protection and critical illness insurance policies in Actuarialia. [20]

7 (i) Explain the following terms, including how they are used in practice:

- (a) waiting period
- (b) deferred period
- (c) linked claim

[6]

The following table shows a claim extract from a health and care insurer for a policy which offers payments of £500 per month to members who are absent from work due to sickness or accident and who have a valid claim. All of the policies have a deferred period of four months and a linked period of six months. The “end of absence” date represents the first day of the member’s return to work or the date of their death, as applicable. Dates are presented in the format day/month/year.

<i>Claimant</i>	<i>Start of absence</i>	<i>End of absence</i>	<i>Cause of absence</i>
Mr A	1/4/10	1/4/11	Stress
Mr A	1/6/11	1/7/11	Fall at work
Mr A	1/9/11	1/4/12	Stress
Mr B	1/2/10	1/4/10	Broken leg
Mr B	1/7/10	1/4/12	Terminal cancer
Ms C	1/1/10	1/4/10	Back pain
Ms C	1/5/11	1/6/11	Back pain
Ms D	1/9/11	1/8/12	Terminal cancer
Mr E	1/11/10	1/4/11	Viral infection
Mr E	1/6/11	1/11/11	Torn ligament
Mr E	1/12/11	1/4/12	Viral infection

(ii) Calculate how much benefit is paid to each policyholder in each of the calendar years 2010, 2011 and 2012.

[6]

[Total 12]

8 The government of Acturia has just announced that it is closing down half of its State-run residential long term care homes. The cost of an individual living in one of these homes is entirely met by the government.

(i) Suggest possible reasons for the closure.

[5]

(ii) Discuss the possible implications for residents of Acturia.

[7]

(iii) Discuss the possible implications for insurance companies selling long term care insurance in Acturia.

[4]

[Total 16]

END OF PAPER

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2013 examinations

Subject ST1 – Health and Care Specialist Technical

Introduction

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

D C Bowie
Chairman of the Board of Examiners

July 2013

General comments on Subject ST1

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 gain few marks if they do not address the question asked. 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.

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- 1** (i) Commission can sway a distributor into taking actions that may not otherwise be the best thing to do, such as recommending a product that would not be the most suitable or churning business or encouraging a customer to pay a higher premium than they might reasonably be able to afford. This could lead to an increase in lapses, which could result in loss of profit or it could lead to mis-selling/reputational risk and/or regulatory fines with a potential decrease in new business volumes.

Paying a higher average rate of commission (e.g. due to a different mix of business to that expected) than the rate loaded into the policy pricing would lead to lower profits per policy than expected. In extremis, paying too much commission could lead to a policy making a loss.

Commission is often paid early in the lifetime of the policy. Hence, if a policy lapses before the accumulated cashflows have become positive, the insurer will make a loss.

For products under which good persistency generates higher profits, poor commission structure (nil or low renewal commission) can lead to higher lapses and therefore lower profits.

Low commission rates or rates that are out of line with competitors could lead to distributors not promoting the product and hence a decrease in new business volumes, possibly resulting in fixed expenses not being covered. Conversely high commission rates may lead to more business being sold than expected, possibly leading to admin/capital strain.

There may be a counterparty risk relating to payment of clawback monies owed.

- (ii) Ensure commission is commensurate with sales effort
Ensure commission paid is commensurate with policy loadings
Ensure commission levels do not introduce product bias
Ensure that commission does not encourage over selling
Ensure the commission is matched with clawback controls on early lapse
Monitor experience, such as business volumes, mix and persistency by distributor channel and set commission rates accordingly
For products under which good persistency generates higher profits, offer renewal as well as initial commission, or offer level commission
Monitor competitors' commission rates and stay in line
Maintain good communications with brokers
Move to a fee model

Many candidates scored well on this question, providing a good range of ideas in answer to both question parts.

- 2**
- (i)
 - (a) a company should select investments that are appropriate to the nature, term and currency of the liabilities
 - (b) the investments should also be selected so as to maximise the overall return on the assets, where overall return includes both income and capital

The extent to which (a) may be departed from in order to meet (b) will depend, inter alia, on the extent of the company's free assets and the company's appetite for risk.

Or, alternatively:

The company should invest so as to maximise the overall return on the assets, subject to the risk therein being within the financial resources available to it.

- (ii) For all, the reserves should be matched by currency.

For (a), (c) and (d) there will be an expense element to the reserves (as well as benefit reserves)

Since expenses increase at real rates, index-linked government bonds or similar may be appropriate for part of the investment.

In general, need to consider liquidity and security aspects when choosing types of bonds – most likely to be government bonds.

- (a) Claims are guaranteed in monetary terms, so cash or money market instruments would be most suitable.

These claims have already been incurred, so will mainly be payable imminently or at least in the short term. Therefore short term assets would be suitable and the assets need to be liquid. Would also hold some medium term bonds to reflect that some of the benefit payment may be rather longer tailed.

- (b) The liability under these reserves is the value of the units. Hence the assets should ideally be a perfect match to the description of the units; units in the funds which are used to derive the unit price for policyholders are the best match. This may also be a regulatory requirement. It depends on what is said in the policy documentation whether investments are made in the underlying assets and whether or not the unit fund is protected.

- (c) These annuities will have duration of up to around five years, but the precise duration will not be known. The outgo amount is often known apart from any step ups/indexation or guarantees on early death. Assuming a reasonable size of portfolio, a matching portfolio of bonds can be developed. This will have coupon and redemption payments

matching the expected outgo from the annuities, so would comprise a range of short term bonds.

If the annuities are index-linked then the bonds chosen may also be index-linked.

- (d) These claims have already been incurred, and notified, but not settled. As such they will start to be payable imminently, but some claims may have a relatively long tail. An estimate of the run off of the claims should be made, to estimate the future pattern of outgo, including medical cost inflation - which may be difficult to match.

As for (a) the most likely backing asset is cash and some longer duration assets (e.g. bonds) should also be held.

Part (i) was standard bookwork and well answered. There were several good attempts at part (ii). However, not all candidates applied the principles of investment they had stated in part (i) in answering part (ii); in particular not mentioning considerations which related to most of the reserves, such as matching by currency or matching of the expense elements.

- 3** A restriction on the types of contract that an insurance company can offer
Restrictions on the premium rates or charges that can be used for some types of contract
Restriction on rating factors that can be used to calculate premiums, for example gender or age
Requirements relating to the terms and conditions of the contracts offered, for example, with regard to how paid-up policy and surrender values are to be calculated
Restrictions on the channels through which insurance may be sold
Restrictions on commission payable
Requirements as to the procedures to be followed or the information required to be given as part of the selling process
Restrictions on the ability to underwrite; for example, a prohibition on the use of genetic test results or prohibition on the use of past claims history or medical history
An indirect constraint on the amount of business that may be written due to minimum reserving and solvency capital requirements
Restrictions on the types of asset or the amount of any particular asset in which the insurance company may invest for the purpose of demonstrating solvency
Restrictions relating to counterparties/custodianship
Restrictions on business operations e.g. minimum risk management policy/reporting/data protection
Authorisation of insurer's senior staff (e.g. directors)

This bookwork question was generally well answered, although some candidates focussed excessively on investment restrictions, which limited their ability to score fully.

4 Individual business

Renewal rates are heavily correlated with claims experience. Generally the lowest claiming members have renewal rates that are significantly lower than the renewal rate of the highest claiming members. This is because the latter will find it more difficult to obtain similar insurance cover with another insurer and are likely to value the benefits of the product more highly.

Renewals are also highly dependent on the distribution method and levels of commission. For example, insurance intermediaries might be more active in encouraging their clients to renew as this will result in additional commission or fees. Renewal rates will also be dependent on the quality of after sales service.

Renewal rates are likely to depend on the state of the economy and level of economic confidence. PMI may be deemed a “luxury” spend which would be dropped if disposable income levels fall or are uncertain.

Renewals will be dependent on the ongoing competitiveness of the product. Renewal rates for a PMI product would likely reduce if competitors reduce premium rates or offer a more comprehensive set of benefits or a simpler and quicker underwriting process. Similarly, renewal rates will reflect the level of premium increase at the renewal date – and thus will vary according to whether premium rates are guaranteed or not, and whether age at entry pricing/community rating has been used.

The existence of a no claims discount system could influence renewal rates, unless the accrued discount level is “portable” to products offered by other companies.

Changes in terms and conditions could influence renewal rates e.g. level of excess/cover provided.

Renewals will also depend on the perceived level of service delivery within any State-provided alternative, including quality of treatment / accommodation and length of waiting lists. Changes in the range of health services provided by the State will also influence PMI renewals. These aspects will be dependent on the confidence in the economy and the ability of the State to continue to fund its healthcare services.

Renewal rates can also depend on changes in related government incentives for self-provision.

Renewal rates may also vary by age, sex, socio-economic status or affluence of the policyholder and location e.g. territory.

Renewal rates may vary by method of premium collection; for example, if the policyholder has a direct debit set up with the insurer, they may be more likely to renew.

Renewal rates may be affected by publicity, good or adverse, and concerns about the financial strength of the insurer.

Culture in some countries may lead to regular changes in policies or providers; in others there may be little change in renewal rates.

Group business

Renewal of group PMI business is likely to depend mainly on the financial health of the employer.

It may also depend on the extent to which the employer perceives the benefits to be of value to the company relative to the cost incurred e.g. due to faster return to work therefore higher productivity or because it is easier to retain or attract good staff. This will also depend on the extent to which employees value the benefits (which will for example depend on State healthcare provision quality).

The existence of profit sharing/experience rating may affect renewal rates, as might whether the PMI benefits are included as part of a wider employee benefit package.

Group renewal rates can also depend on changes in related government incentives, e.g. tax breaks or legislation.

Candidates who came up with a wide range of ideas, rather than writing at length about just a narrow range, were able to demonstrate better breadth of understanding and hence scored most highly here. Considering individual and group business separately helped with idea generation – many candidates did not comment on factors affecting renewal rates for group business.

- 5** This serious situation is likely to have been the result of a combination of several of the following reasons acting together.

Claims

Claims could have been much higher than expected, perhaps due to improved/earlier diagnosis of a key critical illness

Business mix could have been poor, e.g. a relatively small number of high sum insured contracts making the insurer highly exposed to claim fluctuations

There may have been concentration risk e.g. a work environment related cancer affecting a large group scheme

Actual incidence rates for critical illnesses could have increased significantly in this country

The insurer may have sold guaranteed rather than reviewable products and was unable to increase premiums in line with underlying changes in incidence rates

Pricing margins could have been inadequate

May not have allowed adequately for the characteristics of the target market

May have experienced more selective lapses than expected, thus increasing average claim rates

Take up of options may have proved to be more expensive than expected

Underwriting

Underwriting standards may not have been in line with pricing assumptions

The insurer may have been suffering greater anti-selection than it anticipated due to its underwriting standards being weaker than those of competitors
Claims management standards may have been poor
Poorly worded terms and conditions could have resulted in more claims than intended having to be accepted
Product design could have been poor

New business

The insurer will have suffered from lack of diversification across other business lines
It may have sold too little new business and therefore found itself unable to cover overhead and fixed expenses; for example, due to increased competition from other insurers or a general downturn in the economy, reducing disposable income or poor publicity e.g. due to a high level of claim rejections
Conversely, the insurer may have sold too much new business with insolvency occurring due to the high new business strain
There may have been a poor mix of business sold, if there are significant cross-subsidies

Expenses

Expenses may have been materially higher than allowed for in the pricing. The insurer may have incurred very high one-off expenses e.g. significant project cost which failed to deliver timely benefits
Or expense inflation may have been very high and the insurer was not able to (or did not) increase premiums accordingly
Actual commission rates paid might have been materially higher than those allowed for in the pricing

Lapses

An unexpectedly high proportion of policies may have lapsed early on, before initial expenses were recovered. Alternatively, later lapse rates might have been significantly lower than anticipated and hence the expected profits did not emerge

Investment

Assets and liabilities may have been mismatched and performed adversely This also might have led to liquidity problems
The insurer may have invested heavily in risky assets which have performed badly e.g. high investment in corporate bonds which have defaulted or surplus assets invested in equities which have suffered from a stock market crash

Regulatory

The reserving basis used may have been found to be inadequate and the insurer had to strengthen it
Poor data / systems might have meant that the insurer was previously not reserving accurately
There may have been the introduction of a new regulatory regime which strengthened minimum solvency requirements and the insurer was unable to meet these new standards
There may have been retrospective legislation introduced which led to higher claims/reserves, lower asset value, payment of more disputed claims than expected

Tax regulations may have changed, with an adverse impact on this insurer's narrow business profile

The insurer may have suffered a significant regulatory fine e.g. for mis-selling contracts

Capital

The insurer may have tried to raise additional capital in the market to offset any of the above but been unable to, for example, due to difficult economic conditions

The insurer may have been operating at the minimum permitted capital without any cushion

Other

The insurer may have been the victim of fraudulent activity or of an operational catastrophe for which it was not adequately insured

Poor management decisions may have been made e.g. deciding to sell products at a loss in order to gain market share

Risk management and governance may have been poor

The reinsurance programme may have been inadequate or a key reinsurer may have defaulted

There may have been an outsourcer/distributor default or other large increases in bad debt

The most successful responses to this question approached the question in an orderly fashion with some sub-headings – this helped to generate a wide range of ideas and to avoid repetition. Some candidates had not necessarily thought through their suggestions fully – it's worth noting that any event that causes both assets and liabilities to drop will have only a minor impact on a company's solvency.

6 Critical illness

There will be no direct impact on the CI policies

The insurer may choose to stop writing IP and concentrate on CI. Need to be aware that other insurers might do the same (or switch from IP to CI) which could make the CI market more competitive

Need to consider whether similar legislation could be introduced in the future for CI business

CI could become more attractive as an alternative product for the gender for whom IP premiums will increase, thus altering the gender mix for CI too

The insurer might consider increasing the coverage of the CI terms and conditions in order to make it more like an IP replacement, if permitted

Rating factors

With IP the main risk relates to the sickness transfer probabilities in the underlying multiple-state model i.e. both the claim inception rates and the claim termination rates, which impact the number and magnitude of claims.

These vary most significantly with gender and age. Age is still a permitted rating factor; however, the insurer may need to identify alternative rating factors as an alternative to gender. For example, occupation may be considered as a "proxy" factor

as it may have a correlation to gender and so the insurer might decide to have a more sophisticated occupation based rating system than previously (more “bands”)

The insurer would need to confirm whether the use of “proxy” factors which are strongly correlated to gender would be permitted under the new legislation, or whether these would be considered indirect discrimination

The insurer can also continue to underwrite by health status

Pricing

The single-gender premium rates will need to be based on an assumed gender mix. This exposes the company to significant new business mix risk. There will therefore likely be higher margins in the pricing assumptions

There will be no impact on existing policies unless premium rates are reviewable. The insurer therefore needs to clarify whether the new legislation applies only to new policies or whether future reviewable premiums also cannot be determined by gender.

For existing business, there is a risk of selective lapse and re-entry in respect of the gender for whom the premium will fall

Insurer may be more likely to offer the business only on a reviewable rather than guaranteed premium basis going forwards, given the gender mix uncertainty

Reserving

It is likely that the company can still collect and store data relating to gender. Reserves can still be calculated dependent on gender. However, larger margins in reserves may be needed due to increased uncertainty. Hence there may be additional capital required (also to meet costs) and there may be second order effects such as free assets falling

Sales/profit

Premium income and profit could increase if similar numbers of policies are sold with higher margins. However, the gender which is more risky might find the product much more attractive due to lower aggregated premiums and the less risky lives might find the price increases unacceptable. The latter could choose not to purchase, therefore overall sales/profit could fall and the overall business mix would have a higher weighting towards the higher risk gender which has further implications for pricing and profit. This would lead to the average premium increasing and hence more low risk people exiting - and hence a potential “death spiral” of the market.

Also need to consider the level of competition within the IP market under the new regime. If other providers decide to exit the market as a result of the change, this could enable this insurer to gain higher profit margins

Expenses

There will be increased initial costs e.g. to identify alternative rating factors, train underwriters, make changes to literature, obtain data to test the effectiveness of new rating factors and convert quote systems

The insurer should investigate whether indirect targeting is possible e.g. paying higher commission to outlets with higher sales to the lower risk gender (which may lead to higher overall commission) or the insurer could advertise in magazines targeted to the lower risk gender

There is likely to be an increase in underwriting as more policies will be underwritten to determine the accurate premium, assuming that underwriting can continue to use gender specific ratings or exclusions e.g. for female cancers

Higher expenses may be incurred in finding new markets and sales channels.

There may be higher legal costs if any challenges to indirect discrimination.

Extra renewal expenses may arise due to needing to monitor the new business mix and reprice more actively

Group schemes

Will need to investigate whether these can still be priced on actual group experience. Insurers would normally use gender specific rates to calculate the group premium, hence changes in the gender mix of a group would lead to a different premium. Continue to calculate rebates and profit shares

Other considerations

Will need to estimate the expected total number of policies sold after the change
Potential for anti-selection e.g. if purchases can be made with overseas based provider
And high risks choosing high levels of benefit could generate additional selection against the market
Reinsurance may still be allowed to differentiate so no immediate change
May need to increase reinsurance, at least initially
Reinsurer could help advise on the premium averaging
Potential to lobby and have the decision changed
Potential for future changes e.g. may also introduce restrictions on rating by age or there may even be reversals

Candidates who had a clear grasp of the concepts involved here were able to make a good attempt at the question. However, many candidates did not give sufficient attention to the mix of the business sold by the insurer or comment on the potential impacts on the critical illness business, which inhibited their chances of achieving high marks. Many candidates also did not provide a sufficient range of different points to gain high marks, noting the high mark allocation for this question.

- 7** (i) (a) A feature adopted by friendly societies under which sickness benefits will not be paid for a specific period after the member first joins the society. Most commonly used for health cash plans or, more generally, where a benefit will not be paid for a specific period after the health insurance policy first commences. This waiting period may also be applied to any additional benefit from the date that the member buys the additional units of cover. Can also be called a no-claim period.

There may also be a “waiting period” under Total Permanent Disability benefits, where this is used in order to allow time following the claim date to determine whether the disability is permanent and therefore whether to accept the claim as valid.

Used to reduce the potential for anti-selection.

- (b) Most often encountered in income protection (IP) insurance.

It is the period of incapacity before any benefit is paid. The standard deferred periods offered by companies are 4, 13, 26 and 52 weeks (or 1, 3, 6 or 12 months). Group schemes may offer 28 weeks deferment.

May have a split deferred period.

Used to reduce the number of trivial claims and associated expenses and to avoid overlap with any State benefit provision for short term sickness.

- (c) Relates to IP claims.

If a claimant, having been in receipt of claim payments, recovers and returns to work but suffers a recurrence of the same disability within a specified period (the “link period”) they will be eligible for immediate claim payments without the imposition of another deferred period. The standard definition refers to a linked period of 6 months.

Used to encourage return to work.

- (ii) Benefits payable in each year

	2010	2011	2012
Mr A	£2,500	£3,500	£1,500
Mr B	£1,000	£6,000	£1,500
Ms C	£0	£0	£0
Ms D	£0	£0	£3,500
Mr E	£0	£1,000	£0

Candidates with a good grasp of the bookwork had the opportunity to pick up full marks here. For part (ii), candidates taking a careful and methodical approach should have had little difficulty, but many made minor errors which reduced their scores.

- 8** (i) The government could be cutting its costs or it may be part of “balancing the books”; for example, Actuarial might have a debt crisis or falling tax revenues and needs to undertake austerity measures, or perhaps running costs have increased materially in recent years

The quality of the care homes being closed might not have met the required minimum standards and it was deemed too costly to rectify this. There may

have been complaints about standards, or there may have been scandals or media pressure relating to those homes

It may have been part of a political promise, e.g. to encourage more private provision or to encourage more non-residential provision of care services e.g. enhanced payments/support for carers

Demand for places in the State-run homes may have fallen in general or in specific localities e.g. due to increased affluence of the population leading to a preference to make private arrangements which may be of better quality or offering more choice or in more convenient locations or due to being more able to have care provided at home (e.g. due to a cultural shift towards family network support)

It may be due to a fall in the elderly population or an improvement in the general health of the elderly

(ii) **Those currently employed**

This sector could benefit from lower taxes or from improved other services if the State uses the cost savings elsewhere

Those with elderly parents needing care: there may be an increased burden on those individuals to provide that care themselves if the parent has to rely on domestic support only. These enforced carers may end up with lower incomes or increased costs to themselves if the parents cannot afford private residential provision, or they may find themselves with a reduced inheritance.

Partners of those in care may need to sell the home and downsize. Families may need to move to be closer to location of new home or have longer journeys to visit

Individuals living in Actuarial would also need to pay or make provision for their own care. The government is likely to tighten the criteria for entry to State-run homes, e.g. increase the threshold in any means test. The cost of long term care insurance may change

Those in State-run residential homes

These may be turned out of the homes which are to close. They may be too sick for domestic care only and may find it difficult to find a convenient and affordable alternative sufficiently quickly. This could lead to long stays in hospital

However, the closures may lead to a rise in standards of care in remaining State-run homes

Those in privately-run residential homes

Those currently in private residential homes may not be affected. However there could be a fall in care standards if there is a sudden increase in the number of private homes or spaces made available. Or, if there is a rise in

demand without a corresponding increase in supply, there could be a rise in costs

Those on need of long term care in the short term

These could face higher costs if residential care is needed and there is potentially less choice. They may face inadequate levels of care if forced to accept domestic care rather than private residential provision

Staff in long term care homes

These may be relatively unaffected if total demand for nursing care homes is unchanged. However, the quality of employment may differ between the private and public sectors. To the extent that fewer people are able to afford such care, there may be fewer jobs. However, this may provide business opportunities for people to set up private long term care homes.

There may be increased job employment opportunities elsewhere, e.g. insurance

- (iii) To the extent that this increases demand for LTCI, this will be beneficial to the insurers who will be able to sell more business, both immediate needs and prefunded – which may increase profits

The cost of care may rise which will also affect insurers:

For indemnity products, they will need to factor in the change in cost for new business and, if costs rise, they may suffer a loss on existing business, depending on the policy terms

Pre-funded long term care is likely to be reviewable, so the impact to the insurer should be less

For non-indemnity (which is the majority) the amount of cover required may rise - which is akin to selling higher volumes, and again is good for business. This may become a growth area, which would have knock on impacts for underwriting, marketing, systems etc and there may be opportunities to raise brand awareness through advertising and public education on the need for provision of care. This may lead to innovative product design e.g. equity release

There may be changes in the markets which the insurer might target

May need to refocus distribution efforts if the closures are concentrated in certain areas

The mix of business may change, affecting experience

May be increased competition from other insurers entering the market

Consider implications of any new State subsidies (e.g. for provision of care at home)

The insurer might purchase some of the care homes

Regulation of LTCI may become more stringent

Candidates prepared to think through the consequences of a scenario had an opportunity to score highly in this question. Taking time to think carefully about the possibilities involved in this question would have been a good use of the reading time.

END OF EXAMINERS' REPORT

INSTITUTE AND FACULTY OF ACTUARIES



EXAMINATION

3 October 2013 (am)

Subject ST1 – Health and Care Specialist Technical

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 15 minutes before the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all seven questions, beginning your answer to each question on a separate sheet.*
6. *Candidates should show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

<p><i>In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.</i></p>
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- 1**

 - (i) List incentives that the State can use to encourage self-provision of healthcare funding. [2]
 - (ii) Explain ways in which these incentives might be applied to a pre-funded long term care insurance product. [4]
 - (iii) Suggest product features that might be used to define whether a long term care insurance product is eligible to qualify for State incentives. [4]

[Total 10]

- 2**

 - (i) Outline the new business sales analyses that a health insurer might perform. [7]

A health insurer that sells long term health and care insurance business has just calculated its current embedded value, but has since decided that its future new business sales volumes are likely to be lower than it had previously expected.

 - (ii) Explain how lower than expected future new business volumes might impact the current and future embedded value of the insurer. [3]
 - (iii) Suggest ways by which the insurer could attempt to increase sales of its income protection insurance business. [6]

[Total 16]

- 3**

A health insurer currently sells individual and group private medical insurance (PMI) and health cash plan business through insurance intermediaries and specialist brokers.

The marketing director has proposed that the insurer starts to sell its business using the internet.

Discuss this proposal. [15]

- 4**

Discuss the relative merits of offering individual critical illness insurance policies on guaranteed and reviewable premium rates. [7]

- 5**

 - (i) Suggest possible reasons why group health insurance is purchased. [3]
 - (ii) Describe the benefits that may be provided under group income protection insurance. [5]
 - (iii) Describe the typical reserves and reserving methodologies for group income protection insurance contracts. [14]

[Total 22]

- 6** ABC Health is a health insurer based in the country of Actuarial. It writes income protection and critical illness insurance business on a mutual basis (i.e. it has no shareholders).

For the last ten years it has reinsured 50% of the sum insured on all of its business using risk premium reinsurance. The reinsurer has just informed ABC Health that it intends to cancel the reinsurance treaty for new business, although existing policies will continue to be reinsured.

- (i) Discuss the possible implications for the insurer of this intended cancellation, if the reinsurance protection cannot be replaced. [13]

ABC Health has subsequently heard a rumour that the reinsurer is in financial difficulties and may default on payment of reinsurance claims.

- (ii) Outline the additional considerations for the insurer. [3]
[Total 16]

- 7** In the country of Actuarial, the presenter of a television programme on consumer affairs has recently been very critical of the health and care insurance industry.

She has drawn attention to the practice of declining to pay claims in some situations and has stated that this is not acceptable.

- (i) Outline the points that the insurance industry should make in response to this statement. [6]

She has also said that she does not believe there to be any need for a health and care insurance industry, as Actuarial has a State healthcare service which is free to all residents.

- (ii) Discuss this comment. [8]
[Total 14]

END OF PAPER

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2013 examinations

Subject ST1 – Health & Care Specialist Technical

Introduction

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

D C Bowie
Chairman of the Board of Examiners

January 2014

General comments on Subject ST1

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 gain few marks if they do not address the question asked. 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.

It is often helpful to use subheadings when answering long part questions.

Comments on the September 2013 paper

Overall, the paper was of a fairly standard level and well-prepared candidates scored well across most of the paper. As usual, questions that focussed on knowledge of the Core Reading were well answered by those who had prepared thoroughly. However, questions requiring wider thinking or application of core reading to specific circumstances, such as questions 6 and 7, were less well answered and students should recognise that these are generally the questions which differentiate those students with a good grasp and understanding of the subject. The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates are advised to include these areas in their revision.

- 1** (i) The State can offer tax relief on premiums for appropriate insurances.

The State can exclude some or all of the population from certain aspects of the national welfare scheme.

The State can offer a reduction in general taxation where appropriate insurance is in place.

The State can reduce the cost of private purchase of healthcare services by direct subsidy to the providers.

- (ii) The premiums for LTCI could be paid out of gross income, thus reducing the policyholder's tax bill. This could be done by employers paying the premiums before tax or by policyholders reclaiming the tax on the premiums.

Policyholders with LTCI cover may pay a reduced rate of income tax or have a flat rate deduction from their tax bill. People with total assets over a certain amount could be ineligible to live in State run nursing homes or might be ineligible to get benefits to help them with nursing home costs.

The State could pay insurers a specific amount of money for offering an LTCI product or pay a set amount of money per LTCI policy sold or provide a tax subsidy for LTCI business.

Benefits could be made tax-free.

A layering arrangement could be introduced where the State indemnifies above a certain level which should encourage insurance provision up to that level.

- (iii) Policies may need to offer at least a fixed minimum level of benefit.

The product may need to offer guaranteed benefits (rather than being purely unit-linked).

The product may need to meet requirements for escalation of benefits once in payment.

Policies may need to have an element of indemnity (rather than just a cash benefit).

Policies may need to meet requirements about the definition of incapacity triggering claim.

Policies may need to have at least a certain capital backing (to ensure that the payments are actually made when due).

Benefits may need to be dependent on professional care being required (rather than paying out if a spouse provides the care).

There may be requirements on the premium payment structure – e.g. the incentive only applies for policies paying regular premiums (rather than paid-up or deferred policies).

There may be limits on premiums or premium increases.

There may be restrictions on the maximum deferred period (no longer than a specified maximum number of months).

Surrender values may be prohibited to ensure that money is used to purchase long term care rather than providing a lump sum which has benefitted from tax breaks but is used for purposes other than providing long term care.

Benefits could be made payable to the provider rather than the individual.

Many candidates scored well on the first part of this question, but then failed to apply the incentives listed to a pre-funded long-term care product in part (ii). Similarly few candidates provided more than one or two product features that might be used to determine whether a long term care product would be eligible to qualify for State incentives. As a result this question was generally not well answered.

- 2** (i) New business premiums/amounts split by regular and single, or perhaps as regular premium + single premium/ N
Numbers of new policies
Average sums insured
Value of new business
New business strain
Capital requirements; how does new business affect the solvency requirements
- Likely to be split by product, design features, size of policy, by distribution channel / distributor, territory and by group/individual. May also split further e.g. by gender, occupation, age band to help with setting model points for pricing.
- May split by guaranteed/reviewable premiums and between standard rates and underwritten rates
- May split by reinsurance terms
- Collect and report on a monthly basis and look at trends over time, e.g. year on year. Compare month with same month in previous year to allow for seasonality effects.
- Compare actual new business sales with targets and market share information (if available).
- Need to decide how to deal with any “cooling off” period (e.g. lapse very quickly due to change of mind) and whether increments are included in the analysis.

(ii) *Current embedded value*

Embedded value is the value of shareholder profits arising from existing business only, with no credit taken in respect of profits on future new business. Hence there is no direct impact on the current embedded value due to lower expected future new business volumes. However, lower expected new business volumes are also likely to mean higher per policy expenses due to the need to spread overheads and fixed expenses over a smaller portfolio. This could reduce the current embedded value, due to the existing business needing to support a greater proportion of these overheads.

Future embedded value

In future, lower new business volumes will mean lower present value of future profits; however net assets may be higher than previously expected if the products generate new business strain. Overall the likely outcome is that the embedded value will increase more slowly under lower new business volumes than it would otherwise assuming that new business is written on terms which are profitable on the embedded value basis.

(iii) The insurer could simply reduce the premiums or could attempt to reduce premiums by increasing expense efficiency or by increasing capital efficiency.

The insurer could offer cheaper, more affordable, product design variants e.g. lower benefit amounts, longer deferred periods, more stringent benefit criteria or limited payment term. Alternatively, may need to improve the above features (for the same premium) in order to make the product more attractive.

The insurer could offer a variant which differentiates itself more clearly from competitors e.g. could offer guaranteed premiums if competitor products are mainly reviewable premiums or rehabilitation services, linked periods, riders.

The insurer could offer more attractive distribution remuneration to reward effort appropriately. The insurer could invest in sales training to assist distributors or in a marketing campaign to educate the potential policyholders as to the benefits of this type of insurance and to correct any misconceptions relating to State provision.

The insurer could change distribution channel or change target market.

The insurer could offer both group and individual policies, if not already doing so.

The insurer could aim to improve the overall perception and profile of the company and/or industry e.g. through sponsorship or donation to worthy causes or by improving customer services.

The insurer could develop a highly simplified version to make it easier to explain to customers or try and make it more popular e.g. with free gifts or add-ons like vouchers or memberships.

The insurer could try and sell it as an add-on to other products – the expenses would be lower so the marginal cost of the add-on could potentially be smaller.

The insurer could reduce the underwriting burden.

It is important to note that many of these approaches could increase risks (e.g. lapses) or reduce profits per policy, and hence not necessarily be entirely constructive.

Part (i) was not well answered with candidates appearing to struggle to generate a wide range of ideas, perhaps due to not thinking enough about what insurance companies would do in practice. In particular, few candidates mentioned analysing trends over time or discussed how to deal with cooling off periods.

Parts (ii) and (iii) were generally better answered with candidates particularly providing a good variety of different ways in which an insurer might increase sales in part (iii).

- 3** The internet is most appropriate for simpler products. It might therefore be more appropriate if the insurer were to use it for its health cash plan products. It could also consider offering a simplified version of its individual PMI product. However it is unlikely to be feasible to sell group business through the internet: this normally requires specialist broker advice. Alternatively the internet could be used to provide information leading to sales by telephone or other means or encourage renewals for group business.

Selling via the internet could give the insurer access to a wider target market and hence sell more business and increase its profits. The insurer needs to consider how much additional business it might sell through this route, allowing for the possibility that some who currently use insurance intermediaries may switch to the internet. It also needs to consider the insurance intermediaries' reaction to the proposal; it could have an adverse affect on their willingness to give business to this insurer, if it is perceived as competing against them.

The target market for the two types of distribution channel is likely to differ on average. Those using insurance intermediaries are likely to be more affluent and financially sophisticated. Therefore average premiums may be lower for products sold via the internet. The underlying experience of the internet target market is likely to differ from that of the insurance intermediaries; morbidity levels might be higher, as might non-renewal rates since insurance intermediaries will normally aim to maintain a relationship with clients and because there may be more impulse purchases via the internet.

Distribution costs will also differ. The internet is likely to be a cheaper distribution channel if insurance intermediaries demand high commission. However, if the intermediaries instead receive fees direct from the client then the internet sales would require a higher distribution cost loading.

Underwriting is likely to be simpler for products sold via the internet; this will reduce the costs for the internet products. However, the insurer will need to develop new systems and processes to deal with this new distribution channel, including secure internet sites and staff will need to be trained. These developments will incur additional costs.

Overall, the insurer may therefore need to reprice its products for sale via this new distribution channel. It should also consider whether its key competitors use the internet distribution route. If so, it needs to ensure that the products which it is intending to offer will be similar in design and competitive in price, particularly if there are "comparison sites" on the internet.

The insurer will not have any direct experience of the new target market which increases pricing risk and it may also need to hold higher reserving margins. The level of disclosure/moral hazard is likely to be different. Anti-selection risk might be lower for this target market as insurance intermediaries may be more likely to identify and take advantage of anti-selective opportunities or higher because of simplified underwriting. The risk of selective non-renewals might be lower for the internet sales.

The insurer may include more incentives for renewal (eg no claims discount)

The extent of internet usage amongst the intended target market for this product would need to be considered. There is a risk that the insurer would not sell sufficient volumes under this new distribution method and therefore would not recoup the development costs or too high a volume and systems unable to cope.

The risk of mis-selling will differ for this new distribution channel, since the insurer now has direct control of the whole sales process. There may be greater risk of customers not having understood the product sufficiently if purchased without insurance intermediary advice which could lead to higher claims rejection rates and consequently greater reputational risk.

Counterparty risk (insurance intermediaries failing to pass on premiums) would be lower for the internet distribution channel.

If the insurer currently uses reinsurance, it needs to consider the views of the reinsurer and get their technical assistance, if necessary. It also needs to consider any additional regulatory implications, e.g. specific legislation relating to internet sales.

The insurer could instead consider alternative distribution channels which might be more effective for these product types e.g. worksite marketing.

This question was generally well answered with candidates providing a wide variety of points and showing that they understood the different markets likely to purchase private medical insurance through intermediaries and brokers and through the internet. Not all candidates mentioned points related to group PMI; in particular, that it was unlikely that group PMI would be sold via the internet.

4 *Guaranteed rates – advantages*

Guarantees are attractive to consumers so you may sell more business

They give policyholders financial certainty and peace of mind

They make it easier to understand and for intermediaries to explain at point of sale
An insurer may need to offer guarantees to compete with other companies who offer them

There is less ongoing administration than reviewable products and expenses are likely to be lower per policy for guaranteed rates

Guaranteed rates generate higher profits if morbidity experience is better than that expected

Reviewable products have a heavier burden of demonstrating treating customers fairly and need to have more carefully worded terms and conditions. Reviewable products may also cause poor reputation if premiums are increased materially on review which might impact future sales or the insurer may find at review that rates cannot be increased (or not by as much as needed) due to policyholder reasonable expectation considerations or competitive reasons, therefore the rates might effectively be guaranteed anyway.

Reviewable products may be more prone to lapsing at the review date. These lapses are likely to be selective lapses.

Reviewable rates – advantages

An insurer can offer the product at lower premium rates than if guaranteed; affordability leads to greater financial inclusion and increased consumer choice.

More easy for an insurer to allow for adverse experience in existing business and able to amend more quickly to allow for medical advances.

The use of reviewable rates is likely to encourage innovation.

Reviewable premiums can go down leading to happy customers.

There is likely to be lower morbidity risk than for guaranteed products and hence lower risk margins in pricing. This leads to lower reserving and capital requirements.

Reinsurance is likely to be more readily available.

If CI rates are falling, less prone to lapsing.

This was a standard question which was generally well answered by the better prepared candidates. Whilst most candidates gave several advantages of guaranteed rates, rather fewer gave many advantages for offering reviewable rates.

- 5** (i) Group arrangements may have to be purchased because it is a legal requirement

e.g. income protection insurance in some territories.

It may be purchased to cover employer's statutory sick pay payments or to provide protection against absence of key persons such as its use as locum protection. It may provide a positive message to prospective employees at the recruitment process or to existing employees at a certain stage of promotion. It may also help to retain good staff. It can act for both parties to promote health and ensure a speedy return to work following operation (group PMI).

It can act as a mechanism to smooth the process of early retirement when an employee is in continuing poor health (group IP).

Group covers may have tax advantages over individual insurances in some territories or may be cheaper than individual insurances, e.g. due to economies of scale.

- (ii) The basic benefit is payment of a regular income whilst the employee is unable to work due to sickness or accident. It is normal to base the scheme benefit on salary gross of tax. This would have a maximum benefit of perhaps two-thirds to three-quarters of gross salary, perhaps with some offset in respect of entitlement to State incapacity benefits. However, net pay schemes are offered by some insurers. In these cases, incomes after tax are compared and a claimant can receive up to 90% of net pre-disability income.

The claim definition is likely to be occupation based rather than other alternative incapacity criteria.

In addition to covering the scheme members' salaries, additional cover may be provided under the group policy, such as employee pension contributions, employer pension contributions, employee State welfare contributions and employee State welfare contributions.

Policy benefits may escalate whilst in claim in order to maintain the claimant's standard of living.

A continuation option may be offered. This allows the employee of a company to effect an individual policy without providing evidence of health when he or she leaves the service of the employer. Continuation option benefits are limited to those that were offered under the group IP policy.

May have limited benefit period, or deferred period or linked claims clause.

May provide recuperation/rehabilitation services or provide proportionate benefits.

Under the locum protection version benefits are designed to cover the costs of a temporary replacement professional.

(iii) *General point:*

There might be a need for prudential reserving depending on the purpose of the reserves e.g. more realistic for internal management accounts.

Reserves should be net of reinsurance, if applicable.

The methodology may be prescribed to some extent by the regulator.

Unearned premium reserve

This reserve is the balance of premiums received in respect of periods of insurance not yet expired.

Determine the total time from the valuation date to the end of coverage as a proportion of one year, this gives the percentage of the premium which is deemed to be "unearned". Multiply this percentage by the actual premium paid to get the unearned premium.

Unexpired risk reserve

This reserve is in respect of the above unexpired insurance premium where it is felt that the premium basis is inadequate. This would normally be set as an approximate uplift to the unearned premium reserve. Using the ratio of the theoretical premium which should have been charged over the actual premium charged.

Outstanding claims reserve or Claims in payment reserve

This reserve is in respect of claims which are in payment as at the valuation date. This is often the largest component of the technical provision for group income protection business. This would normally be calculated using the discounted cash flow method. Assumptions will be needed for the future experience items including recovery rates, mortality, expenses (including claims expenses) investment return and inflation.

Incurred but not reported

This reserve is in respect of claims that have arisen but that have yet to be notified to the insurer. This could be determined as an uplift to the outstanding claims reserve depending on historic analysis of IBNR ratios. Estimates of both the possible numbers of IBNR claims and the potential duration of such claims will be needed, which would on average be expected to be longer than for those currently in-force as they have not yet commenced. Any historical data used should be adjusted to allow for known changes/trends.

IBNR reserves are not so relevant for this type of business.

Incurred but not enough reported

As for IBNR but where it is felt that not all detail has yet been submitted and a provision needs to be established for the remainder. This could be determined on a case by case basis using statistical analysis and historical data or may simply be estimated as an approximate uplift to the IBNR.

Equalisation or catastrophe reserves

These are reserves where it is felt that the current year is atypical and amounts will have to be held back for abnormal events. They are high level reserve which would be set based on expert judgement and analysis of claim trends.

Claims in transit

This reserve is in respect of claims reported but not assessed, or not recorded. Methodology would be similar to calculating IBNER reserves

Investment mismatching reserve

This could be determined by carrying out yield stresses calculations.

Options reserve

This could be determined using stochastic/multi-state modelling.

Reinsurer default reserves

This could be determined taking into account credit rating and exposure.

Parts (i) and (ii) were standard bookwork questions and generally well answered by the better prepared candidates. In part (iii) whilst many candidates listed most of the typical reserves, it was disappointing that rather fewer gave indications of how those they listed might be calculated.

- 6** (i) The insurer may start by checking the terms of the treaty in relation to cancellation such as the appropriate notice period and definitions of new v existing business, e.g. to clarify treatment of increments. The insurer may also wish to confirm that existing reviewable premium business will continue to be reinsured past the review dates.

Because the reinsurance remains in place for existing business, the effect of the cancellation will be gradual. The impact will also depend on the level of new business relative to the existing reinsured portfolio (e.g. more significant if new business levels are much higher now than in the past).

The insurer will be exposed to more volatile claims experience and to single large or accumulated losses. Hence profits will be more volatile. This may not be a particular issue for ABC Health as it does not have shareholders and so smooth earnings may not be expected although this depends on how the profits are actually distributed, e.g. if to policyholders via dividend or bonus payments then they may expect this to be relatively smooth.

Volatile profits and exposure to large losses could also lead to higher risk of solvency problems. The insurer might therefore have to limit the amount of new business written or stop selling. Alternatively it could reduce the maximum sum assured offered, avoid certain risks (e.g. high risk occupations or areas), strengthen its underwriting processes or its terms and conditions (e.g. more exclusions).

The above product changes would likely have adverse implications for new business volumes with corresponding implications for future profits and the ability to cover overheads and fixed expenses. They may make products less capital intensive.

The insurer might have to consider launching other products to provide some diversification e.g. long term care insurance.

The reinsurer may be prepared to reinsure and provide assistance with other product lines: it may be just CI and IP business that it no longer wishes to reinsure.

New business strain may be higher going forwards. Reserves could be higher if the cost of reinsurance is lower than the cost of claims on the reserving basis. Higher margins might also be required in the reserving basis due to greater uncertainty or the insurer might need to hold a claim experience fluctuation reserve. Additional solvency capital requirements could also be higher although there could be a slight offset from lower credit risk.

The risk premium reinsurance arrangement might also include an element of financing (e.g. via commission payment), which would no longer be received. The implication of all of the above would be lower surplus assets.

The investment strategy may have to be reviewed.

Since the insurer is a mutual, it may find it difficult to raise additional capital or demutualise. There may be a negative impact on the mutual's credit rating.

Reinsurance generally passes profit to the reinsurer. Therefore without the cover in place, new business may be more profitable or it may be possible to price the CI and IP products more competitively. Alternatively, if the reinsurer was able to offer very competitive terms then prices would have to increase (or profits could fall) for example this could be due to tax arbitrage or solvency capital arbitrage benefits.

There is a risk that the reinsurer will withdraw any technical experience which it was providing, now that there is no longer a new business relationship. This could have implications for the ongoing quality of pricing and underwriting and costs. The insurer may need to seek alternative expertise.

On the other hand, the insurer may now have gained sufficient experience to enable it to perform adequate pricing and have generated sufficient surplus assets to absorb greater volatility. Perhaps it had intended to reduce its reinsurance programme anyway; therefore the cancellation might not have any impact other than the timing of the decision.

Some of the above changes will take time to have an effect – they are not all immediate solutions.

- (ii) The insurer should investigate to determine how much truth there might be in the rumour. If it proves to be correct, then the implications in part (i) will now be more significant as will now also apply to the existing portfolio. The terms of the existing treaty should be considered for possible actions.

The insurer could delay making premium payments or try to increase netting off of payments, if possible.

It might be harder to unentangle from IP claims in payment

The insurer may be more likely to do its best to find an alternative reinsurance arrangement in this situation (if the reinsurer is expected to collapse) even if it has to be a different type of reinsurance e.g. excess of loss. However there may be penalties if the insurer decides to exit now.

The insurer could seek some form of guarantee or collateral from the reinsurer.

The insurer may need to hold higher reserves immediately to allow for anticipated non-recovery of reinsurance claims currently owed. Solvency capital requirements also may increase further if explicit allowances are included for credit risk as the insurer may need to allow for a higher default probability than previously assumed (even 100%). Extra capital may need to be raised.

The insurer could consider holding back on any bonus distribution to policyholders.

If the reinsurer is a big player in the market, the insurer also needs to consider whether to communicate and reassure customers and distributors that the reinsurer's default will not affect the insurer's ability to settle claims.

The insurer will need to consider what to do for reinsuring future business and any lessons learnt.

Candidates who had a clear grasp of the concepts involved here were able to make a good attempt at both parts. However, many candidates did not develop some of the points they made (for example, claim payments could be more volatile potentially leading to higher reserves). Also several candidates did not mention that there is a cost to reinsurance and that this also involves sharing potential profits. Many candidates also did not provide a sufficient range of different points to gain high marks, noting the high mark allocation for this question.

- 7** (i) It is important that the claims paid are consistent with the assumptions made when the product was priced and designed. If more claims are made then premiums would have to increase accordingly.

It should be noted that not all claims meet the terms and conditions of the product.

Insurers have formal complaints procedures to deal with any cases where individuals feel that they have been declined unfairly.

Claims can be declined when the underlying medical condition resulting in the claim is one of the exclusions listed in the policy conditions at the time at which the contract was taken out. These may be general exclusions which are imposed on all policyholders or specific to the particular policyholder, e.g. a pre-existing condition. These exclusions are used in order to ensure that the price of the insurance is affordable to the individual and to reduce the risk of anti-selection against the insurance company, i.e. the risk of selling high volumes of business to those who know they are very likely to claim which would then further increase the cost of health insurance to all.

Claims can also be declined because information provided at the time of claim materially contradicts information provided when the policy was taken out where this is deemed to have been deliberate. Overall the practice of declining claims in these circumstances is intended to protect other policyholders by ensuring that premiums remain affordable.

The practice of claims pre-authorisation (for PMI) is intended to reduce the level of declined claims. However, the industry should check the limits of the cover provided and it might have to acknowledge that there could be an inherent problem to some extent if the terms and conditions relating to

exclusions and disclosure are not sufficiently clear, or may be out of date, in which case this should be improved.

The industry might also decide to undertake a wider educational campaign to help policyholders understand the importance and benefits of claim management.

There could be more training of distributors to ensure that customers understand the policies they are buying.

- (ii) If the majority of healthy individuals take out private insurance the experience of those remaining people including those uninsurable could prove too expensive for the State to meet all the cost. However, even with a free State healthcare service, individuals may still prefer to purchase insurance in order to gain access to private healthcare provision. The quality of the private healthcare provision may exceed that of the State service; for instance it may offer more choice of treatments, more choice of providers / specialists, more choice of location. Private healthcare may reduce the waiting time for non-urgent procedures. The State may offer only a basic or limited range of benefits for free. Purchasers may have worries about future state provision.

The government of Actuarialia may encourage more affluent individuals to make their own insurance arrangements in order to help reduce the overall healthcare cost to the State i.e. helping the government to meet an objective of “balancing the books” or in order to allow it to prioritise State healthcare spending to those less able to provide for it themselves i.e. helping the government to meet an objective of “subsidising the poor”.

It may only be private medical insurance (PMI) which has benefits that overlap with the services provided by a State healthcare service.

There may not be universally available free long term care provision in Actuarialia. Hence long term care insurance solutions may still be needed to protect individuals from the financial burden of not being able to care for themselves in old age. It may be purchased by individuals who are worried that the State may not be able to provide for them in this capacity when they need it in the future (even if there is an LTC State provision now).

State benefits payable to employees who suffer significant sickness or accident may not be generous and it may not be a requirement in Actuarialia for employers to provide such benefits (or such provision may be limited) so there remains a need for income protection insurance to protect individuals from loss of income due to incapacity (or meeting loan repayments).

Although the State healthcare service will provide medical support if an individual suffers from a critical illness, the State may not provide significant additional welfare benefits in such a case so there remains a need for critical illness insurance to protect individuals from financial hardship as a result of suffering a critical illness, such as for example the repayment of a loan, installation of specialist equipment at their home or rehabilitation treatment.

Health care may not be free to non-Actuarial residents in Actuarial (or to Actuarial residents overseas).

Having a H&C insurance sector may encourage innovation in protection, products, treatments.

This question was a good differentiator. In part (i) only the better candidates mentioned pre-authorisation, campaigns to educate potential policyholders or training for distributors. For part (ii), candidates often made high level comments but could have scored more marks by considering the potential need for each type of health insurance in turn.

END OF EXAMINERS' REPORT

INSTITUTE AND FACULTY OF ACTUARIES



EXAMINATION

30 April 2014 (am)

Subject ST1 – Health and Care Specialist Technical

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 15 minutes before the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all seven questions, beginning your answer to each question on a new page.*
6. *Candidates should show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.

- 1** Define the following terms in the context of income protection insurance business:
- (a) linked claims
 - (b) proportionate benefit
 - (c) rehabilitation/partial benefit
 - (d) replacement ratio
- [4]

- 2** A health insurer uses statistical analysis of its claims paid data in order to set claim reserves for its private medical insurance (PMI) product.

- (i) (a) State when it is appropriate to use statistical analysis for this purpose.
- (b) Outline the approach that is taken.

[5]

To reduce expenses relating to claims, two months ago the insurer reduced significantly the size of the team that is responsible for claim payments. As a result there have been much longer delays in paying claims.

- (ii) Discuss how the longer delays will impact the PMI claim reserves and their calculation, which is based on a claim run-off triangle approach.
- [4]

After six months, the healthcare providers (hospitals) are complaining about the longer delays in the payment of their invoices. As a result, the insurer hires temporary workers to clear the backlog.

- (iii) Outline the implications of this action for the PMI claim reserve calculations.

[2]

[Total 11]

- 3** A health insurer offers income protection and critical illness insurance products.

- (i) Outline the key purposes of underwriting.
- [4]

The insurer has identified that its cost of underwriting has increased significantly over recent years.

- (ii) Suggest possible reasons for this.
- [10]

[Total 14]

- 4** Describe the types of reinsurance that might be appropriate for conventional accelerated critical illness business, written on guaranteed terms by a health insurer which has a low level of solvency.
- [15]

- 5** The country of Actuarial is currently experiencing low interest rates and low rates of inflation.

Discuss the implications of a low interest rate, low inflation environment for health and care insurers, including consideration of:

- asset-liability management.
 - customer demand.
 - product design.
 - experience and pricing.
- [16]

- 6** An actuarial student has produced a new set of premium rates for the individual income protection insurance product offered by a health insurer. The new premium rates have been produced using the pricing model that has been used for many years.

- (i) List the cashflows that should be allowed for in the income protection pricing model. [3]

All inputs to the model and the assumptions used have been checked and were found to be reasonable and loaded correctly into the model.

- (ii) Outline the other checks that should be performed to ensure that the results from the pricing model are correct. [9]
- [Total 12]

- 7** A large well-established health insurer which only writes PMI business currently manages all of its business functions in-house.

The insurer is now considering outsourcing its claims administration and management process.

- (i) Discuss the advantages and disadvantages of this proposal. [12]
- (ii) List the controls and monitoring activities that the insurer would need to put in place if it decided to go ahead with this proposal. [8]

The Chief Actuary is concerned that outsourcing the claims process will have a serious impact on her department's work, which involves pricing new business and calculating reserves.

- (iii) Explain the implications that the proposed outsourcing could have for this work. [8]
- [Total 28]

END OF PAPER

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2014 examinations

Subject ST1 – Health and Care Specialist Technical

Introduction

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

D C Bowie
Chairman of the Board of Examiners

July 2014

General comments on Subject ST1

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 gain few marks if they do not address the question asked. 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.

It is often helpful to use subheadings when answering long part questions.

Comments on the April 2014 paper

Overall, the paper was of a fairly standard level and well-prepared candidates scored well across most of the paper. As usual, questions that focussed on knowledge of the Core Reading were well answered by those who had prepared thoroughly. However, questions requiring wider thinking or application of core reading to specific circumstances, such as questions 5 and 6, were less well answered and students should recognise that these are generally the questions which differentiate those students with a good grasp and understanding of the subject. The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates should include these areas in their revision.

1 Linked claims

These relate to IP claims whereby a claimant, having been in receipt of claim payments, recovers and returns to work, but within a specified period (the “link period”) suffers a recurrence of the same disability, and is eligible for immediate claim payments without the imposition of another deferred period.

Proportionate benefit

Under IP policies, if a claimant takes up employment in an occupation that is different to the one from which he or she was originally incapacitated, it is usual for the continuing benefit to be reduced. The reduction will relate to the ratio that the gross earnings from the new job bear to those from the occupation against which disability was being claimed.

Rehabilitation/partial benefit

This IP benefit is payable when a claimant is no longer totally unable to follow his or her original occupation and returns to it in a reduced capacity. The amount of benefit is usually calculated in the same way as that for proportionate benefit, as described above.

Replacement ratio

This refers, in the context of income protection insurance, to the ratio of net (in benefit) income to net pre-disability income.

This was a standard bookwork question and many candidates scored well. However, not all candidates knew the differences between proportionate benefits and partial/rehabilitation benefits.

- 2
- (i) (a) Statistical estimation is appropriate for particular types of homogeneous claims where the portfolio is large enough and the experience is deemed to be stable.
 - (b) Outstanding claims are assessed “en masse” in relatively homogeneous cohorts and credible groupings based on historical trends and patterns adjusting for known or anticipated future changes.

The portfolio might be split by contract type, by distribution type or by geographical region (or other splits such as age, gender, claim type). A statistical distribution is fitted to the past experience to estimate the claims incurred. Extreme outliers may need to be excluded from the statistical analysis.

The measure of exposure used is typically earned premium.

Changes in trends in incidence and in cost should be allowed for through specific adjustments to factors or reserves. An element of

prudence may be included depending on the purpose of the reserves. An allowance for IBNR may also be included.

Other available data could be used to benchmark the results.

- (ii) As claims now take longer to be paid, the recent claim development factors (from the statistical analysis / claim triangles) will not be directly relevant.

Impact on reserves

The recent development factors would not be relevant for the latest claim paid data and the estimated outstanding claims will be too low as these development factors assume that claims have developed more than is the case. Hence (if no adjustments are made) the reserves would not be sufficient to pay for claims relating to this period.

If discounting is used in setting claim reserves, there will be a slight reduction in reserves due to the deferral of payments.

Impact on calculation

The OCR (outstanding claims reserve) [or IBNS (incurred but not settled)] will be higher/increased. To allow for the change in claim payment pattern, the reserves need to be strengthened, i.e. increased. The insurer could add a manual reserve or additional margins or it could make adjustments to the development patterns to reflect the fact that claims are taking longer to be paid, and allowing for the possibility that larger claims may take longer to settle and that there may be increased errors due to greater workload.

There may be an effect on the IBNR depending on how it is calculated.

The reserve calculations should then be monitored and updated over the next few months.

It is important to understand whether these new payment patterns will become the norm. The claim payment pattern should be monitored going forward to see if these patterns continue. When the payment patterns have stabilised, the observed development patterns can be used without further specific adjustments.

- (iii) This will cause volatility in the claims payment development patterns. Applying recent development patterns to these payment amounts will lead to reserves being higher than required to pay claims relating to this period.

As temporary workers are used, these payment patterns are not likely to continue in the future.

The impact of these payments on the development factors (trends) should be removed for setting reserves.

Errors in claim payments made by the temporary workers, due to lack of experience, could also have implications for the claims development analysis.

Part (i) of this question was bookwork and whilst (a) was generally well answered, few candidates included sufficient detail of the approach under part (b).

Parts (ii) and (iii) were more challenging, and candidates appeared to struggle to generate a wide range of points with many not considering that the pattern of development factors would change and what the implications of this would be for estimating reserves. [Candidates are reminded that understanding of the technical principles covered in the CT subjects is expected for ST1.]

- 3** (i) Underwriting can protect an insurance company from anti-selection and in particular from lives whose health is so seriously impaired that it is impossible to assess the risk accurately.

It enables insurers to identify lives with a substandard health risk for whom special terms must be quoted. For the substandard risks, it will identify the most suitable approach and premium level for the special terms to be offered.

Adequate risk classification within the underwriting process will help to ensure that all risks are rated fairly.

Underwriting will help in ensuring that actual morbidity experience does not depart too far from that assumed in the pricing of the contracts being sold.

It may help to obtain reinsurance at affordable rates.

For larger proposals, financial underwriting will help to reduce the risk from over insurance.

Claims stage underwriting ensures only valid claims are paid.

- (ii) **Business levels**

The insurer might have grown its new business volumes significantly, and hence there has been a significant increase in total cost of underwriting, although the per policy cost of underwriting might not have increased.

Alternatively, if the increase identified is the cost per policy, then it may have been due to a fall in new business levels, so that fixed costs have been spread over fewer policies.

Inflation

The increase may be in line with the general level of inflation, which has been high recently.

Underwriting cost is mostly related to medical inflation, which might have been exceptionally high recently e.g. the introduction of more costly and sophisticated special medical tests.

The State health service might be in need of extra funds and so has increased the costs of the medical attendant reports.

The increase might reflect high wage inflation e.g. because of competition for underwriting staff/medical staff.

There might be a new statutory requirement to pay pension contributions for employees / increased social welfare contributions.

New underwriting system

The higher costs might reflect the development of new systems.

The system might have failed to perform and more policies needed to be manually underwritten than before, which is more costly.

It may have come to the end of an outsourcing agreement and the renegotiations (or a new provider) have resulted in increased costs.

Or there may have been change in reinsurer, requiring a change in underwriting manuals/systems

Change in underwriting strategy

The insurer might have changed its underwriting strategy to be more stringent e.g. moved from medical history disregarded to full underwriting, or no longer using reinsurance and losing the technical expertise provided by the reinsurer. This may have increased the amount of information asked for on the proposal form and/or increased the cost due to a higher number of medical exams, doctors' reports. For example, it might have reduced the sum insured limits which trigger the additional evidence requirements.

New underwriting strategies may have evolved (e.g. based on genetics).

The insurer might have found that it needed to use more highly qualified and hence costly staff in its underwriting team in order to maintain standards.

The insurer might have decided to reduce its use of pre-existing condition exclusions and hence needs to perform more underwriting in order to assess additional premium loadings. Similarly the insurer might have decided to reduce the number of declinatures at outset.

If the increase relates to initial underwriting costs rather than claims management costs, then it may reflect a change in focus from the latter to the former e.g. due to poor publicity following refused claims.

A reinsurer might have required the insurer to improve the stringency or quality of its underwriting or it might have decided to do this in order to obtain cheaper reinsurance rates.

There may have been more claims underwriting because of an increase in the number of claims or a change in the claims definition (e.g. becoming more complex). There may have been an increase in claim fraud and non-disclosure, so increased claim underwriting has been needed (if this is included in the costs that are being considered).

Mix of business

There might be a different customer base which results in an increase in the average per policy cost of underwriting e.g. due to using a new distribution channel, or a shift from internet distribution to broker distribution, or a shift from group business to individual business.

There may have been a shift towards older customers, triggering earlier the non-underwriting limits, or customers of worse health, requiring extra investigations to find appropriate policy loadings or larger policy sizes, triggering more evidence limits, or customers in different territories where the cost of underwriting is higher.

For group business there could be more business over the free cover limit.

There could be a shift in product mix if different levels of underwriting are used.

Anti-selection

The insurer might have been experiencing increased anti-selection e.g. due to increased understanding amongst distributors or due to changes in the underwriting strategies used by other insurers in the market.

Other

There could have been a worsening of health within the general population, leading to an increased need for underwriting.

There may have been changes in regulatory/compliance requirements, with related underwriting costs e.g. more documentation.

It may reflect the loss of experienced staff, resulting in operational inefficiencies and the costs of training and recruiting new staff or setting up a new team.

Part (i) was standard bookwork and most candidates scored very well.

Part (ii) was also generally well answered, with candidates providing a wide variety of points and showing that they understood the various factors that might affect underwriting costs.

Not all candidates mentioned points relating to anti-selection or the underwriting system itself.

- 4** The product could be reinsured using original terms (also known as coinsurance). This method involves the sharing of all aspects of the original contract. The ceding company will supply the reinsurer with the premium rates it is using for the critical illness product it wishes to reinsure. In return the reinsurer will determine the level of reinsurance commission it is prepared to pay the ceding company for the business. In some countries, the supervisory authority may require the reinsurer to “deposit back” its share of the total reserve under a reinsured contract with the ceding company e.g. to reduce credit/counterparty risk.

The amount to be reinsured could be specified on a quota share basis, i.e. a fixed proportion of each policy is reinsured, or it could be specified on an individual surplus basis, i.e. the proportion relates the preferred monetary retention to the overall size of the sum insured. Proportional reinsurance may be used, for example, to reduce solvency capital requirements or increase the capacity to write business.

Proportions may be based on the sum insured or the “sum at risk” i.e. the excess of the stated policy benefit over the reserve that the ceding office holds. For critical illness business, reserves may be relatively low and the sum insured approach may be preferred for administrative ease.

Another method of reinsurance that could be used would be risk premium reinsurance. Here the reinsurer charges a specific premium for the risk. This may be level over the term of the policy or may vary annually with the probability of claim. In this situation, it is most likely that the risk reinsurance premiums would be on a net level premium basis, in order to match the policy premiums.

Risk premium rates may be guaranteed or reviewable. Here, it is likely that the insurer would want them to be guaranteed in order to match the policies. Risk premium rates are applied to the sum reinsured, which may be a proportion of the sum insured or of the sum at risk.

For either of the above types of reinsurance, the retention limit may be relatively low given the solvency position of the company. If the retention level is set at a low level, the company may receive more technical help from the reinsurer.

A facultative arrangement could be put in place to deal with large individual cases. The company might decide to purchase aggregate excess of loss (or stop loss) reinsurance or catastrophe reinsurance which would cover total losses under the particular class of business above an agreed limit and possibly below an upper limit. This would help to reduce the claims volatility of the portfolio, and protect it against an accumulation of losses which could jeopardise its solvency e.g. by location. However, the claims volatility may not be sufficiently high to warrant paying for this type of protection.

The company may also decide to use financial reinsurance to improve its low level of solvency. Reinsurance commission can be provided to the ceding company under

either an original terms or risk premium method. This helps to meet any new business strain incurred when writing the business. It represents “factoring” of future margins in premiums to be passed to the reinsurer. “Repayments” of this “loan” are added to the reinsurance premiums, spread over several years.

An alternative approach is to make use of the future profits contained in a block of new or existing business. The reinsurer again provides a loan to the direct writing company. However, as the repayment is contingent on the emergence of future profits being generated by the business the direct writing company does not have to reserve for the repayment within its supervisory returns (depending on the regulatory regime). This increases the assets in the regulatory balance sheet, but has no impact on the amount of liabilities – and hence improves the solvency position.

A company with low solvency would also need to take particular care over its choice of reinsurer to minimise counterparty risk.

This was a relatively standard question which was generally well answered. It was good to see candidates linking their points to the fact that the insurer had a low solvency margin. This helped identify candidates who could show that they could apply their knowledge to the characteristics of the insurer given in the question rather than just providing a list of facts about reinsurance, some of which were irrelevant. When discussing financial reinsurance many candidates made the relevant points about the paying back of the loan, but did not describe how this is relevant to the solvency position of the company, i.e. that the insurer does not have to reserve for this and hence it increases the assets but not the liabilities.

5

(i) Asset-liability management

Low asset yields imply higher reserves as lower discount rates increase reserves. They also imply likely higher capital requirements.

When interest rates fell to the current low levels, the value of fixed interest assets would have increased. The extent of asset/liability matching is therefore important. If well matched, there is more protection provided from changes in interest rates. If the duration of liabilities had exceeded that of assets when interest rates fell, this could have caused solvency problems depending on the speed and magnitude of the change. This is particularly the case for long-term health insurance business.

Asset-liability matching could also be important if yields are expected to increase in the short to medium term future. If the duration of assets exceeds that of liabilities, then such a change would cause a loss. For short-term health insurance business, the value of liabilities is expected to be less sensitive to a change in interest rates than that for long-term health insurance. In addition to differences in duration, the relative size of liabilities is generally larger for long-term health insurance than for short-term health insurance business.

The level of guarantee is also relevant: renewable products and products with reviewable premiums are expected to have lower and shorter-term liabilities.

The impact of lower interest rates on the value of assets and returns will depend on the relative proportion of bonds in the insurer's asset portfolio. A reasonably high proportion of assets held are likely to be fixed interest assets, which increase in value when interest rates fall. However, any cash held will now have lower expected future returns (without any offsetting increase in value).

Overall the impact on the investment return of the asset portfolio will also depend on how the returns on equities and other asset classes are affected by lower interest rates and low inflation.

Some insurers may implement hedging strategies using derivatives such as swaps and options to allow them to "lock in" higher interest rates. However, making use of hedging strategy tends to increase the counterparty risk. There is a reinvestment risk where the duration of liabilities exceeds that of the assets.

Some insurers may adopt a riskier investment strategy in order to increase returns.

The insurer might invest more in corporate bonds in order to take advantage of illiquidity spreads. However this also increases credit risk. The insurer might seek alternative asset classes, e.g. property, if the market looks strong.

The low inflation environment may reduce the need to invest in index-linked assets. However, if inflation is expected to increase in future may invest more in such assets now.

The overall approach may depend on the level of free assets.

Customer demand

If the low interest rates are linked to a stable economy then new business levels could also be stable. However, if the low interest rate environment is protracted then it could indicate slow economic growth or a recession, leading to higher unemployment and lower levels of disposable income. In this case, new business could be low as health insurance is often seen as a "luxury" spend. Similarly, employers may give group insurance schemes low priority in such economic conditions.

On the other hand, if the low interest rates result in a stimulation of economic growth then this could increase sales e.g. increased employment levels could lead to higher sales of income protection insurance. There may be more individual purchases linked to mortgages e.g. critical illness cover if the low interest rates mean that the residential house purchase market is buoyant. Low mortgage rates may also mean higher disposable income. Employers may be more able to afford group insurance schemes due to lower interest costs on capital or due to more stable input costs.

Some customers may prefer to purchase insurance contracts than to save in a low interest rate environment.

Individuals might be deferring their retirement due to the low interest rates (and thus poor annuity rates) and hence there may be greater demand for health insurance coverage during this extended pre-retirement period.

If premium rates generally increase (see below), this could reduce demand (or vice versa). Specific types of business might appear less attractive due to higher premium rates e.g. immediate needs annuity rates (based on short term yields) could be seen as poor value.

Demand may be linked to changes in State provision e.g. cutbacks in medical treatments provided for free in a recessionary environment with lower taxation receipts.

Product design

Unit-linked variants (e.g. for pre-funded long term care insurance) might be preferred if they are perceived as better value in these economic conditions.

Product designs could be adapted to allow for later retirements (e.g. later termination dates on income protection).

Inflation-linked benefits and premiums will increase at relatively low rates so benefit increases could appear to customers to be poor value e.g. for long term care insurance, where index-linked benefits might not keep pace with care cost inflation. For long-term business, there could be more customer interest in benefits that are not index-linked (as the inflation effect is not perceived to be significant) though this could prove problematic if inflation increases in future.

If demand falls this may encourage more innovative product design in order to attract new customers, or the introduction of simpler/cheaper products in order to offset any premium increases and keep products affordable. Alternatively, a different subset of the market might be targeted e.g. the more affluent.

Experience and pricing

Premium rates may have to increase due to lower expected future investment returns, particularly for long-term insurance business products, and due to higher reserves. Similarly, premiums may rise because claim experience might be higher, if linked to a recession e.g. higher claims on group insurance if employees think they might be made redundant or they think the scheme might be withdrawn by the employer or there may be an increase in stress-related claims.

For existing products where premiums cannot be increased (guaranteed premiums) the impact will be lower profitability. More emphasis will then have to be placed on underwriting and managing persistency experience.

The above adverse experience impacts could be offset to some extent by lower inflation of benefits and of expenses.

Lapses/non-renewals could be higher if the environment is recessionary as policyholders may be unable to afford to continue to pay their premiums due to other priorities or due to having lost their job.

There may be greater selective lapsing and hence higher average claims experience.

Medical and technological advances mean that PMI premiums are likely to increase at a rate which is greater than the low levels of inflation which could similarly reduce the renewal rate. Per policy expenses would be higher if business volumes fall.

If the economic conditions are unstable, risk margins may need to be included. Alternatively, if the low interest/low inflation regime is thought to be temporary then the insurer may decide not to change assumptions.

This question was not particularly well answered, despite the solution (particularly the sections on customer demand and experience) being based on detail given in the Core Reading. Many candidates did not demonstrate that they understood the effects of low interest rates on reserves or pricing and what those conditions might mean in the wider economy. The section on asset-liability management was generally poorly answered, with few candidates discussing the duration of the assets and liabilities or even recognising that the value of fixed interest assets would rise when interest rates fell. The question was looking for demonstration of basic understanding of how assets and liabilities interact and their relationships with interest rates, and demonstration of understanding of a likely investment strategy for a typical health and care insurer, as described in the Core Reading. [Candidates are reminded that the principles studied in subject CA1 are assumed knowledge for the ST subjects.]

Credit was given for any examples where candidates argued in the opposite direction under the appropriate alternative economic environment (provided the example given still made sense in terms of low interest rates and low inflation).

Not all candidates answered the question under the headings provided, which made their answers more difficult to mark.

- 6** (i) Premiums, with inflation (if relevant)
Expenses e.g. initial, renewal, claim, termination, investment, with inflation
Commission
Claim payments allowing for both claim inceptions and recoveries
Benefit inflation (if relevant)
Options and guarantees (if relevant)
Investment return (on reserves and cashflows)
Tax, if applicable
Changes to reserves
Changes to solvency capital

Reinsurance premiums
Reinsurance recoveries

(ii) **Input = Output:**

Reconciliations between inputs to and outputs of the model, for example on the total premiums and number of policies.

Projections:

Check all benefit features/variations have been allowed for and check all regulatory and /or tax changes have been allowed for.

Check that projections within the model are reasonable.

Check that lapse rates have been correctly applied within the cashflow projections, i.e. that any year dependent or duration dependent rates apply to the correct year or duration.

Check that expense output from the model increases in line with the inflation assumption.

Check that output numbers of claim inceptions are higher for older ages and recoveries are lower for older ages. A similar check can be done for different occupation classes.

Check that premiums and sums insured increase each year in line with the relevant increase option (i.e. no increase, RPI, or fixed percentage).

Check that no claims outgo is paid during the deferred period.

Output checks:

Carry out spot checks on some calculations to ensure correct.

Check that the profitability indicated by the model is reasonable.

Profitability can be compared to output from previous pricing exercises and to new business profitability information produced by a reporting team.

Check that profitability rates are in line with profitability requirements that have been set.

Could check against the results from a formula approach.

Check that the sensitivity analyses give sensible results.

Have an external review done or review by internal audit.

Premium rates:

Check that premium rates are consistent with the objectives set for the pricing exercise; for example, it could be to reduce premium rates to be more competitive or to increase rates to improve profitability or it might have been due to changing the benefit definition/term.

Check that premium rates look sensible by “model point” e.g. higher premium rates for older lives, but need to consider that premiums for ages nearing the ceasing age would reduce (due to the potential benefit term reducing); higher premium rates for shorter deferred periods compared to longer deferred periods; higher premium rates for occupation classes that pose a higher risk; higher premium rates for increasing cover compared to level cover.

Check the new rates against the old ones.

Compare results against competitor rates.

Part (i) was relatively straightforward and was well answered.

For part (ii), whilst candidates generally mentioned several of the points relating to output checks and pricing checks, relatively few discussed how the cashflow projections themselves might be checked. Some candidates also discussed data checks, even though the question states that inputs to the model and assumptions used had already been checked and that only “other” checks were required.

7 (i) Advantages

The insurer can make use of best industry practice, resulting in happier customers (faster claims payments) and a better company reputation.

A third party provider may be able to offer a range of claim handling services to a higher standard or more cheaply or may offer additional services that cannot currently provide e.g. preventative/rehabilitation services.

Less hassle involved and allows management to focus on other areas

There is more certainty over expenses and hence margins can be reduced. It is also easier to set pricing/reserving assumptions.

There is a lower risk of expense overruns

Claims management fixed overheads can be reduced or eliminated.

Provides flexibility, especially if the insurer expects to increase/decrease volumes.

The insurer can benefit from the economies of scale that an outsourcer is likely to have.

Lower expenses could mean more competitive premiums or higher profits.

There is the potential to outsource further functions if this is successful.

Reinsurance premiums may be reduced if outsourcing results in better quality claims underwriting.

Disadvantages

There will be a loss of control over the process and data collected.

Claims payments could be more generous than expected since the company making the payments is not the one that is bearing the claim cost.

Uncertainty over service and quality e.g. delays in claim payments.

There may be a lack of understanding of the product (and/or the insurer ethos) by the outsourcer's staff. This could lead to an adverse effect on the insurer's image or put its brand at risk which could lead to lower new business and/or lower renewal rates.

There is the possibility of third party default, increasing counterparty risk. This may increase capital requirements.

The insurer will still need to retain resources to manage relationship with third-party provider.

There will be one-off system/data transfer costs. There will also be a need to maintain link to insurer systems even though services are obtained externally.

There is a risk of having poor quality (or even no) claims administration data. Any data provided by the outsourcer will need to be carefully checked.

It will be less easy to implement changes.

The profit margin is passed to the supplier.

As the insurer is large, there may be a limited number of outsourcers large enough to be able to tender for the business.

There is the possibility of fee increases at time of re-negotiation. 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 insurer fails to renew the agreement.

There will be a loss of in-house expertise.

Lock-in contract terms may have a penal termination clause.

There will be costs of making current staff redundant. This may result in low morale amongst remaining staff due to redundancies. There may also be

problems of morale during (prolonged) service transfer and possible reputational impacts.

There may be compliance issues, e.g. requirements by the regulator.

The insurer may not benefit from future cost savings.

It may not be possible to reduce the insurer's overheads materially (e.g. property).

There may be data protection/confidentiality issues.

There may be potential conflicts of interest if the outsourcer also works for providers.

Distributors may not like it.

- (ii) The main control would be a service level agreement, which would set out:

- Data format
- Costs per type of activity
- Method by which the costs are inflated
- Turnaround time per activity
- Dates when data etc must be received by the insurer
- Quality of data supplied
- Process to be followed in the event of any disagreements or failures
- Confidentiality agreement
- Customer service standards/minimum satisfaction ratings
- Financial penalties/profit sharing
- Data security arrangements
- Acceptable termination clause
- Agreed providers/rates

The insurer will need to monitor performance against all these agreed standards e.g. failure to meet given deadlines to the insurer, failure to meet turnaround times (delays/time to service)

Carry out spot checks on data quality and claim amounts.

Record claim

Authorise treatment

Assess claim

Set case reserve

The insurer will need to monitor claims experience including:

- Number of claims and individual amounts
- Number of adjustments to reserves required and implemented
- Ultimate claim cost compared to estimates
- Ultimate claim cost compared to past experience (inflated/adjusted as relevant)
- Proportion of declined claims
- Proportion of reopened claims

- Number of disagreements between outsourcer and insurer staff split by type and whether resolved to the insurer's satisfaction
- Legal action required by the insurer
- Level of complaints from customers
- Number as a proportion of claims handled
- Time to resolve and cost of resolution
- Number declined leading to further complaint e.g. to ombudsman

All the above would be compared to past experience.

The insurer could carry out customer satisfaction surveys and health care provider satisfaction surveys.

The insurer would need to monitor costs for additional services e.g. prevention/rehabilitation.

Agreement costs would be compared to past experience, inflated where relevant.

The insurer would have regard to the costs of monitoring the third party.

Non-renewals should be monitored including:

- Relationship between claims and non-renewals
- Time until lapse

All the above would be compared to past experience.

Counterparty risk controls would include:

- Careful due diligence of the outsourcer at outset
- Checking the outsourcer's past PMI claims management experience in particular
- Monitoring the average amount of insurer's and client money held at any time
- Checking the credit rating of outsourcer
- Investigating any changes in the above
- Any warning signs of potential default e.g. build up of funds, increases in delays would also be investigated
- Monitoring media reports on outsourcer

The insurer may commission an external audit.

Ensure regular communication between the two companies, including visits by insurer's staff.

Carry out outsourcer staff training and second some of the experienced insurer staff to the outsourcer, at least initially.

The insurer should retain some in-house expertise.

A reconciliation of the data on initial transfer would be performed.

- (iii) The main impact will be loss of control over the data. Poor quality data could result in incorrect reserves, which could cause reputational damage or regulatory intervention or require higher margins.

Poor quality data could result in mis-pricing, which could impact competition or sales volume or profit or result in greater anti-selection.

There may be frictions and compromises as the existing systems have to be fitted to the outsourcer's existing systems or new ones designed. This will take up the time of her team and lead to other tasks being delayed or cancelled, which will adversely affect actions which depended on the delayed or cancelled work.

Alternatively if her staff is not asked to comment on transfer plans the decisions made may not be acceptable, leading to future problems. Decisions may have been made to make the admin system handover as easy as possible rather than to safeguard actuarial systems e.g. claims which are part paid at the handover date may be closed and subsequently reopened on the new system by the new claim handlers.

Even if the process was intended to retain ongoing claims using the same definitions as previously, there is likely to be a discontinuity in the data pre- and post-outsourcing e.g. new staff will take time to understand the systems and agreed processes, and new staff may take the easy option when correcting mistakes – their own or ones made by the previous team - which may be inconsistent with previous procedures. A claim closed early or in error cannot be changed. Other errors in classification of claims, updates in case reserves etc will be more difficult to correct. This may extend over a significant period as the old team may close claims (possibly prematurely) prior to the handover and the new team may need to reopen the same claim.

The close link between claims underwriting and pricing may be more difficult to maintain.

Staff may leave and replacements have to be recruited and trained. The remaining staff may be stressed leading to further delays. There may be loss of product knowledge if key actuarial staff or claim handlers leave.

Changes in claim underwriting standards will impact the level of claims expected when pricing. The method of allowing for expenses will need to change as will the method of estimating inflation.

Projection models may need to be changed e.g. if the agreed expenses vary across model points by more factors than they previously did. Renewal rates may need to be reconsidered.

The risks have changed, in particular the importance of counterparty default has increased and so a suitable reserve/capital requirement will need to be calculated. Similarly the risk margins used in pricing and in reserving will need to be updated.

Changes in the time taken to record, authorise and pay claims will lead to changes in the run-off patterns (pre and post the outsourcing) which will affect the claim reserves calculated.

Changes in the amount set aside for authorised claims will impact reserve calculations as will changes to how far ahead future medical procedures are reserved for.

Claims in transit could be more difficult to determine.

Many candidates scored well on parts (i) and (ii), generating a wide range of ideas.

For part (iii) candidates generally scored less highly. Whilst candidates tended to make high level comments on changes in expenses and updating risk margins used in pricing and reserving, few mentioned the potential operational problems arising from the changeover from in-house to outsourced claims management in more detail or the potentially poor quality data that the insurer might receive.

END OF EXAMINERS' REPORT

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

30 September 2014 (pm)

Subject ST1 – Health and Care Specialist Technical

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 15 minutes before the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all seven questions, beginning your answer to each question on a new page.*
6. *Candidates should show calculations where this is appropriate.*

AT THE END OF THE EXAMINATION

Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.

<p><i>In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.</i></p>
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- 1** Outline the key product features of a group critical illness insurance scheme. [6]
- 2** A health insurer currently reinsures 80% of its individual critical illness insurance business on a risk premium basis. The Chief Financial Officer has stated that the company is currently passing a significant proportion of its profits to the reinsurer and so has suggested that the level of reinsurance retention should be increased.
- Discuss this suggestion. [13]
- 3** A health insurer has a large portfolio of private medical insurance business.
- Describe how reserves for the following claims would be set:
- (a) A large cancer claim, the spend on which is already five times more than the average cost for a cancer claim and remains ongoing.
 - (b) A claim for back pain, requiring a series of physiotherapy treatments, which has just been reported.
 - (c) A minor sports injury claim that required only one treatment and has already been paid.
- [9]
- 4** (i) Explain what is meant by moratorium underwriting, as used in private medical insurance (PMI) business. [4]
- A health insurer has recently moved from front-end underwriting to moratorium underwriting for all new PMI policies sold. Under this new approach, the moratorium exclusion is completely removed five years after initially taking out the PMI policy, irrespective of policyholder health and treatments received.
- (ii) Discuss how the claims experience is likely to differ under this new moratorium underwriting approach compared with if the previous front-end underwriting approach had continued. [6]
- [Total 10]

5 A health insurer writes individual and group income protection insurance business.

The analysis of surplus on a realistic valuation basis shows that this business has been making morbidity and persistency losses over the last few financial years.

(i) Outline the investigations that the insurer should carry out in order to identify in more detail the causes of these losses. [10]

(ii) Suggest actions that the insurer could take in order to avoid making such morbidity losses in the future. [12]

[Total 22]

6 A large well-established health and care insurer sells critical illness, income protection, long term care and private medical insurance contracts.

Explain the effects that the following developments would have on its pricing:

(i) The introduction of home use test kits which identify the onset of Alzheimer's disease five years before it presents any symptoms. (Alzheimer's disease leads to cognitive impairment, particularly amongst the elderly.) [10]

(ii) The introduction of a drug which doubles the probability of surviving a stroke. [10]

[Total 20]

7 An insurer writes a range of long term health insurance business. Its Chief Financial Officer has suggested that, in order to cut costs, the amount of underwriting that the company carries out should be reduced.

(i) Discuss the advantages and disadvantages of this suggestion. [13]

(ii) Discuss ways in which the company could reduce underwriting costs. [7]

[Total 20]

END OF PAPER

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

September 2014 examinations

Subject ST1 – Health and Care Specialist Technical

Introduction

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context at the date the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

F Layton
Chairman of the Board of Examiners

December 2014

General comments on Subject ST1

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 gain few marks if they do not address the question asked. 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.

It is often helpful to use subheadings when answering long part questions.

Comments on the September 2014 paper

Overall, the paper was towards the harder end of the range. As usual, questions that focussed on knowledge of the Core Reading were well answered by those who had prepared thoroughly. However, questions requiring wider thinking or application of core reading to specific circumstances, such as questions 3, 4 and 6, were less well answered and students should recognise that these are generally the questions which differentiate those students with a good grasp and understanding of the subject. The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates approaching the subject for the first time are advised to concentrate their revision in these areas.

- 1** (i) Group critical illness insurance is normally purchased by an employer and written on the lives of the employees. The premiums may be shared between employer and employee. It is more likely to be stand alone CI than accelerated CI.

It would normally be written on a short term (annually renewable premium) basis.

A lump sum benefit is normally payable, typically a fixed multiple of salary, upon diagnosis of a “critical illness”. These illnesses are defined by the insurer and specified in the contract. They may cover conditions such as cancer, heart attack, kidney failure, major organ transplant, multiple sclerosis, stroke.

TPD (total and permanent disability) cover may be included and terminal illness benefits may also be provided.

Tiered benefits may be offered whereby the benefit payment is linked to the severity of the disease.

There will be a definition of who is eligible for benefits under the scheme. This may include spouses and other dependants.

Exclusions may be applied.

There may be a free cover limit.

There may be a waiting/assessment period.

There will be a survival period (for SACI).

Members may be required to be “actively at work” when cover begins and there may be a minimum take-up rate if it is a voluntary scheme.

There may be a continuation option.

There may be a profit sharing arrangement.

[6]

This question was generally well answered, although some candidates didn't focus their comments on group CI schemes but also discussed features relating to individual CI which were not relevant.

- 2** The Chief Financial Officer (CFO) is correct that reinsurance can pass profits to the reinsurer, and it can also involve paying an expense, profit and/or contingency loading across to the reinsurer. In which case, increasing the retention level should increase the insurer's profits.

However, it may be the case that the reinsurance premiums obtained are cheaper than the expected cost to the insurer e.g. due to tax benefits or regulatory benefits such as lower capital requirements or because the reinsurer benefits from greater diversification. In which case, the proposal would not be beneficial.

Further investigation will be required to understand better the reinsurance performance before such a decision is taken.

It is important to understand how the CFO has measured reinsurance "profit". It could be measured as the excess of reinsurance premiums over reinsurance claims.

It is unclear how long the time period is over which the CFO monitored performance in order to form his/her view. Ideally it would need to be based on the aggregate results over a reasonably long period of time to avoid undue influence from random fluctuations. If it is just the past few years in isolation, there is a need to investigate further whether the apparent trend of favourable morbidity experience is likely to continue into the future.

It is also important to take into consideration other treaty terms such as any profit sharing arrangements (if these have not already been included in measuring the reinsurance performance).

There is a need to consider whether the reinsurance arrangement is on guaranteed or reviewable reinsurance premium rates. If it is the latter, there may be scope for a rate reduction in the future. It would also be necessary to consider whether the risk premium is level or increases with age. If it is level, a simple measure of comparing reinsurance premiums and reinsurance claims without taking into consideration the change in reinsurance reserve is likely to overstate reinsurance loss at early durations.

The original level of retention may have been determined because the insurer relies heavily on the reinsurer for other services such as underwriting, pricing and claims management.

The insurer may have chosen to have a low retention level due to lack of data and experience in the critical illness product. If the insurer has now gained sufficient own experience in these areas, the retention level could be increased beyond the point at which such services are provided.

There may be financial reinsurance arrangements in place, which could have influenced the original level of retention.

The level of retention may depend on any guarantees/options in the products e.g. premium guarantees, renewability options.

It is also necessary to consider the volatility of the portfolio. This may depend, for example, on the maturity or mix of the business written, and on the degree of diversification within it.

Any changes that can be made to the existing treaties will be governed by the terms and conditions of those reinsurance arrangements. If it is not possible to make alterations to the existing treaties, the only option may have to be recapture. Again, the exact costs and process of recapture will be governed by the terms and conditions of the reinsurance arrangement.

It is worth noting that if the changes made to the insurance treaties only apply to future new business, this will not address the issue of passing excessive profits to the reinsurers.

Increasing the retention level is not the only option; it might be more effective to negotiate more favourable reinsurance premium rates. The insurer should obtain new quotes from other reinsurers to assess the competitiveness of current reinsurance premium rates and could switch to these alternative reinsurers if the existing one will not match these rates. The assessment should take into consideration the corresponding credit rating and other services offered by the respective reinsurer(s).

The insurer could consider other types of reinsurance if they are cheaper, for example, it could replace a treaty with facultative insurance

The insurer should consider the size of the critical illness business/new business volumes in relation to the insurer's overall business to decide the appropriate level of effort to be spent on this exercise.

The insurer should consider its relationship with the reinsurer, including what other business is also currently reinsured with the reinsurer and the reinsurance performance of these other reinsurance arrangements.

The premium rates charged might vary by retention level, and therefore could rise if the insurer goes ahead with the suggestion.

The insurer needs to consider the level of its surplus assets. The greater the cushion that these provide, the greater the ability to withstand claims volatility, and hence the retention can be higher.

The decision should be consistent with the company's risk appetite (e.g. of its shareholders).

An increase in retention could result in:

- Having to hold greater margins in the pricing basis.

- Having to increase the margins in the reserving basis or holding additional reserves.

- Having to hold more liquid assets.

- Having more volatile profits which could have an impact on market perceptions and share price support (if applicable).

Less capacity to write new business.

An inability to accept very large individual risks or cumulative risks.

The insurer could perform further investigations to determine the optimal retention level. For example, it could calculate the probability of ruin under different retention limits using a stochastic model, with the claims rates as the stochastic variable.

Alternatively the retention limit could be set to minimise the cost of financing an appropriate risk experience fluctuation reserve plus the cost of obtaining reinsurance.

[13]

This question was generally well answered. Most candidates discussed relevant points relating to why a high percentage of business was currently reinsured and the possible effects of increasing retention levels and other options for changing the company's reinsurance arrangements. However, many candidates did not discuss the CFO's statement in any detail – for example, how the CFO might have measured reinsurance profit and over what period. Similarly few candidates discussed the need to consider the terms and conditions of the existing reinsurance treaties, the current relationship with the reinsurer or ways of determining an optimal retention level.

3 (a) Large cancer claim

This claim is an abnormal claim, therefore setting a reserve for this claim based on historical statistical trends will not be appropriate. Instead, a case estimate of the total claim cost for this claim should be used to set a reserve. The case estimate should be set by claim experts in the business.

The relevant reserve is the outstanding claim reserve (i.e. the reserve in respect of claims notified to the insurer but not yet fully settled).

The following factors will/may be taken into account:

Type of cancer

Procedure type/treatments — this will indicate the cost of the procedure itself and the likely in-patient duration for accommodation costs

Current state of health and response to any treatment already undergone

Hospital (medical centre) to be used

Name of surgeon, consultant or other medical principal

Policy coverage (full indemnity, excess, limits, recuperation benefit etc.)

Age and gender

Past claims history of claimant

Current levels of medical inflation

The assessment needs to take into account that payments are likely to cease when the condition becomes chronic.

(b) **Recurring back pain**

On the overall portfolio, the PMI provider is likely to have many claims that are similar to this claim. These claims will be grouped together to set a reserve that cover this cohort of business or claim type.

The relevant reserve is the outstanding claim reserve (i.e. reserve in respect of claims notified to the insurer but not yet fully settled) (or claims in transit).

The reserve will be set using statistical analysis (e.g. claim triangles). This approach uses historical trends to estimate the ultimate claim amounts for the cohort. The reserve for this claim will be incorporated within the reserves for this cohort, rather than being set in isolation.

An IBNER (incurred but not enough reported) adjustment may be made (or separate reserve held) if it is felt that not all the detail of the claim has yet been submitted.

The assessment needs to take into account that payments are likely to cease if the condition becomes chronic.

(c) **Sports injury claim**

In isolation, no reserves are likely to be required because the claim has already been paid and because no further treatments are expected. However this claim will be grouped together with other claims (either by cohort of business or claim type) and statistical analysis (e.g. claim triangles) will be used to set reserves for this cohort. This will result in a small outstanding claim reserve for this claim (as part of the reserves set for the whole cohort) as the statistical analysis will show that historically for similar claims, some of these claims will require further treatments in future (i.e. claims “develop” further in future).

For all three claims a reserve for claims handling costs will also be set in addition to the claim reserves based on historic expense experience and allowing for expected cost inflation (where appropriate).

[9]

This question was generally not well answered. Many candidates described reserves such as the unexpired premium reserve and unexpired risk reserve, which are not claims reserves and were not relevant to the question. Few candidates provided more than a brief description of how the reserves would be set.

For case (a) few candidates provided a list of the factors that would be taken into account in determining a case estimate.

For case (b) there was generally little or no description of how statistical analysis would be used to set a reserve.

For case (c), only the better candidates mentioned that a small outstanding claims reserve might be needed to cover the possibility of further treatment being required in future.

Very few candidates mentioned the need to take into account for all the claims that if the condition becomes chronic then payments are likely to cease.

- 4** (i) No formal underwriting is carried out at the point of acceptance. Past medical history is examined at the time of claim.

The applicant can claim for any covered condition other than those pre-existing conditions which occurred in a defined period before taking out the policy for the first time; this defined period is often two to five years. This effectively excludes any conditions for which the applicant has received treatment (or experienced symptoms) during that defined period. This exclusion is waived after a period of time, usually two or three years, if the policyholder receives no further treatment for the condition.

[4]

- (ii) The following answer assumes that the exclusion waiver period (assuming no treatment) is two years. *(Credit was given for any other suitable period assumed):*

In the first two years (policies with duration less than two years), claims experience should be at least as good as (i.e. not worse than) if front-end underwriting was done. The experience will be the same under both for healthy lives (or those with no PECs) and the overall expectation is that claim experience would be better (lower claims rate) under moratorium underwriting. However, full underwriting may attract a different set of persons, so this may not happen in practice.

A policyholder will not be able to claim for any pre-existing conditions (that they suffered during the defined period) under moratorium underwriting and therefore are likely to have more potential claims excluded than if front-end underwriting was used; therefore claims experience may be better under the moratorium during the first two years. Alternatively, claims experience may be worse under the moratorium approach because some poor lives may be covered (who may have higher levels of non-excluded claims) and these lives may have been declined under the more thorough front-end underwriting approach.

Under front-end underwriting, some of the pre-existing conditions may still be allowed in claims. This might be partly due to wishing to avoid the negative publicity associated with applying exclusions. Pre-existing conditions might be allowed for by applying premium loadings rather than excluding such claims, so the claims rate per policyholder (rather than as a proportion of premium) would be higher.

For policies with duration greater than two years: under certain conditions (i.e. no treatment or symptoms), claims relating to the recurrence of pre-existing conditions will be paid, and hence claims experience may start to deteriorate for the moratorium business.

However, those who had a recurrence of treatment or symptoms within the first two years will still not be covered under the moratorium version, but might have been under the front-end underwritten version, so claims experience may still be better compared to policies which had front-end underwriting.

After five years, the moratorium has been completely waived, so claims experience is likely to deteriorate further. Claims experience at this stage may be worse than for policies which had initial underwriting as initial underwriting may have led to permanent exclusions (or loadings) that remained on the policy.

[6]

[Total 10]

In part (i) many candidates had difficulty in describing moratorium underwriting in a clear way; in particular what happens in respect of pre-existing conditions and any treatments received for them in the defined periods before and after the policy is taken out. In many cases it was not clear that candidates understood there to be two distinct periods: the period before the policy is taken out which determines the conditions that are excluded under the moratorium, and the period after the policy is taken out during which the policyholder has to remain treatment free for those conditions in order for the moratorium to be lifted.

In part (ii) there was a general view that the experience under moratorium underwriting would be worse than under front-end underwriting for all periods of cover, which is not necessarily the case. Only the better candidates considered how the relative experiences might change when the moratorium period ends. Few candidates discussed the possibility that the two underwriting approaches might attract different sets of people with different characteristics or considered the case that some poor lives may have higher claims throughout under the moratorium approach because not as wide a range of underwriting had been applied as for front end underwriting. As in part (i), there seemed to be confusion about the different time periods involved under this type of underwriting approach.

5

(i) **Morbidity**

A detailed morbidity experience investigation of both claim inception rates and claim terminations/duration would be carried out, split by the following factors:

- Age
- Gender
- Duration from entry
- Duration from start of claim
- Cause of claim
- Size of benefit/salary
- Smoker/non-smoker status
- Underwritten status
- Source of business
- Benefit conditions e.g. length of deferred period
- Geographical location

Occupation or industry (for group business)
Size of group (for group business)

The insurer would also investigate whether there were any exceptional large claims over the period or whether there was an accumulation of large numbers of small claims.

Claim results would be investigated both gross and net of reinsurance.

The insurer may investigate the adequacy and effectiveness of the underwriting process and of the claims management process.

The insurer could review the policy terms and conditions to identify whether there has been any possibility of anti-selection or acceptance of claims that were not intended.

The insurer could also investigate medical advances that have taken place in the last few years in order to understand better their likely impact.

Lapse

A detailed persistency experience investigation would be carried out, split by the following factors:

- Duration in-force
- Sales method (distribution channel) used
- Potentially also by individual sales adviser
- Target market
- Geographical location
- Frequency of premium
- Size of premium / benefit
- Premium payment method
- Original term of contract
- Whether claimed before
- Age
- Gender

General

Separate investigations would be carried out for individual and group business.

There needs to be enough data in a cell for it to be credible, but it also needs to be homogeneous.

The accuracy of the data and valuation calculations should be investigated.

Trends over time would be looked at.

The insurer would investigate whether the profile (or mix) of business has changed significantly over the period.

Any analysis should be carried out against known changes such as:

- Policy terms and conditions
- Target market
- Underwriting approach
- Medical advances / early diagnoses (particularly for morbidity)
- Competitors' product changes (particularly for lapses)
- Service/standards/customer satisfaction
- Any changes in State benefit provision
- Any changes in tax/legislation/regulation/reinsurance
- Economic conditions.

The results would be compared with other companies' experience, if available, and/or with reinsurers' data.

Once the investigations are done, the results would be compared against the realistic valuation assumptions (to spot where losses are happening).

[10]

- (ii) Greater use of reinsurance could be made e.g. quota share or individual surplus (i.e. proportional reinsurance) or excess of loss to reduce the impact of single large claims or stop loss reinsurance. Use could also be made of reinsurers' technical expertise.

The insurer would ensure that underwriting standards are in line with the pricing assumptions.

Underwriting could be made more stringent (for new business) e.g. lower "free cover" limits (group business), more use of pre-existing condition clauses, more use of general exclusions or more cases declined at the initial underwriting stage.

Clear application/proposal forms that reduce the chance of non-disclosure could be introduced, as could more stringent/effective claims management.

The insurer could actively target the most profitable segments of business. This could require a change of target market e.g. the avoidance of high risk geographical areas, higher risk occupations, high risk industries (group business) or lower socio-economic groups. This may also involve a change in distribution channel.

The insurer could increase diversification of business sold e.g. by product or by territory / occupation.

The terms and conditions (for new business) could be more carefully worded to avoid unexpected claims.

The product design for new business could be changed, e.g. lower the maximum replacement ratio, switch to a budget plan option, reduce or restrict benefit escalation, introduce a maximum payment term (or decrease expiry

ages), introduce services that encourage return to work e.g. rehabilitation or introduce proportionate benefits.

A linked claims period could be introduced or the deferred period could be increased.

A stricter disability definition could be required e.g. any occupation.

A “no claims discount” type arrangement, whereby a lower premium is charged if no claims have been made could be introduced.

The insurer could decide not to include guarantees or options and to offer reviewable rather than guaranteed premiums.

The pricing should reflect adequately the expected morbidity levels for both new business and reviewable premium business (at review dates) by having more granular risk rating.

Future trends need to be allowed for, as do anticipated levels of anti-selection (and non-disclosure).

An appropriate level of risk margin should be included and premium rates reviewed and updated more frequently.

For group business, profit sharing or experience rating could be introduced. A minimum take-up rate could also be required or take-up could be made compulsory.

Future surpluses could be stabilised or accelerated through securitisation or financial reinsurance.

In the extreme, the insurer could stop writing new business or de-risk through transferring the block of business to an external buyer.

[12]

[Total 22]

Part (i) was generally well answered with most candidates providing many relevant points.

Part (ii) was also reasonably well answered, with many candidates providing a wide range of possible actions. However only the better candidates discussed the possibility of making changes to the product design or specific actions that could be taken for group business.

6 (i) Alzheimer's test

IP

Alzheimer's mainly affects older policyholders so the test will have little impact on IP business. Stress-related claims under IP may be increased for those at older ages who have performed the test and had a positive result.

PMI

Alzheimer's is a chronic disease so it will not be covered under most standard PMI policies. However, the effects of accidents brought about by Alzheimer's may be covered e.g. pedestrian or kitchen accidents or forgetting to take medication which could lead to worsening of other conditions.

CI

Alzheimer's may be covered as an additional condition under CI policies. If it is not explicitly listed as a critical illness, then it may be covered by TPD (if this is provided under the policy).

The payment may be brought forward significantly if the home test counts as diagnosis. Even if it does not, the test is likely to encourage the policyholder (or their carers) to seek an official diagnosis now or to make a note to seek an official diagnosis before the policy expires.

Thus the number of claims falling within the CI policy term could increase and therefore premiums could increase for new business/reviewable premium business. However, it may have a relatively limited impact on pricing if claims are dominated by cancers, heart attacks and strokes.

For accelerated CI there might be an even lower impact, to the extent that pricing is dominated by deaths rather than CI diagnosis.

Given that it mainly affects the elderly, there is also likely to be low impact for CI policies that do not provide cover beyond working age.

There is greater anti-selection risk. Existing policyholders may use options to extend the policy term or won't lapse, if they know they will be developing the disease. They may lapse or transfer to a policy that doesn't cover Alzheimer's if they take the test and it is negative (or vice versa if policy doesn't cover Alzheimer's and test is positive).

New policyholders who have performed the test (with a positive outcome) will be more likely to take out a policy with Alzheimer's as a covered condition. This will lead to an increase in price.

Alternatively, the insurer could consider the removal of Alzheimer's from the list of covered critical illnesses or require the policy to have been in force for over 6 years for this condition to be covered or have it as a pre-existing condition exclusion if the test has been taken with a positive outcome.

LTCI

Immediate needs LTCI may be affected, but the impact is likely to be small or minimal as policies are priced at the point of need and survival from then is generally less than 5 years. However, in future policyholders who had a test 3 or 4 years previously may make use of this knowledge when deciding when to take out an immediate needs policy.

There may be a significant impact on pre-funded LTCI. Premiums are likely to increase significantly at older ages due to the potential for policyholders to choose to start funding only when they have had a positive result. This will reduce the term over which premiums will be received to at most 5 years.

Potential policyholders could have taken the test years previously and approached the insurance company before symptoms occur. The insurer would need to consider whether policyholders can be asked to disclose the results of tests, subject to regulations allowing this.

There is increased potential for non-disclosure as this is a home test so there will be no record on official medical files. The insurance company may need to add the routine use of a test to its underwriting, which may increase the costs and hence premium.

[10]

(ii) **Stroke drug**

IP

It would increase the duration of claims for those policyholders who would not otherwise have survived the stroke. However, IP covers those of working age who will be less likely to have strokes so there would be little effect. Also, survivors may return to work quicker (leading to shorter claim periods).

PMI

The drug is new and could be expensive or it may need to be taken for a long time. If it is covered by the PMI policy, there may be a corresponding significant increase in expected claim costs. There may also be an increase in the number of physiotherapy claims due to more stroke survivors and length of claims. Hence PMI premiums would need to be increased.

For new policies consideration needs to be given as to whether the cost of the drug should be included in cover, and terms and conditions altered to reflect the decision.

This enhanced benefit may increase sales, which could affect pricing (e.g. spreading of overheads). However, allowance also needs to be made for the recovery of the costs of training sales and claims staff and changing marketing literature.

CI

There will be a small delay in payment of benefit on accelerated CI policies (payment now made on survival rather than earlier death) but this will likely be insufficient to allow the price to be reduced by any noticeable amount.

However, there could be a significant effect on stand-alone CI policies as stroke is normally one of the critical illnesses covered and policyholders are now more likely to survive the survival period required for payment.

There will therefore be an increase in claims and hence a need to increase the price.

It may be difficult to rewrite the terms and conditions to exclude this for new business (e.g. if it is a requirement to cover strokes in order for the policy to be called CI, as in the UK).

LTCI

Since immediate needs LTCI is usually individually underwritten at the point of need, the development will need to be reflected in the level of annuity offered. Any LTCI indemnity benefit may increase if a higher level of care is required (also for pre-funded LTCI) and individuals may live for longer (in care) if they now survive a stroke as a result of the drug (also for pre-funded LTCI).

The level of annuity offered for a given premium will be lower, hence policies may be less attractive leading to lower sales, which could lead to higher expenses per policy and hence further worsening annuity rates. However, demand could increase as there may be more stroke survivors who need care – which could lead to lower expenses per policy, potentially improving annuity rates.

For pre-funded LTCI the premiums are likely to increase as there will be higher survival from strokes and hence more people needing care post-stroke.

Points applicable to either part:

The extent of any change will depend on the proportion of claims arising from this cause.

There will be less impact on group versions of the policies as the members are more likely to be of working age.

Where claims are expected to be higher, there would also be an increase in claim expenses if there are more claims to deal with.

Margins may need to be increased for uncertainty, given that the treatments/tests are new.

Data are unlikely to be available, so consideration needs to be made as to how to estimate the increase in claims.

Where appropriate, premiums for policies with reviewable rates or with the exercise of lifestyle increases or indexation options should be increased as well as for new business when possible.

[10]

[Total 20]

This question was designed to get candidates to apply their knowledge to specific scenarios. Overall this question was not well answered. Only the better candidates discussed that the extent of any changes would depend on the proportions of claims arising from the causes, that if claims increased there would likely be an increase in claim expenses or that data are unlikely to be available for pricing and margins may be needed for uncertainty.

In part (i) many candidates didn't discuss that Alzheimer's impacts mainly older people beyond working age so that there would be relatively little impact on IP policies (or CI policies that did not extend beyond working age). As a result there would also be less impact on group policies as members are more likely to be of working age. Similarly, few candidates discussed that, as a chronic disease, it would not be covered under most PMI policies. In general there was also little distinction made between immediate needs LTCI and pre-funded LTCI (and also, for CI, between stand-alone and accelerated CI).

In part (ii) there was relatively little discussion of whether PMI products would (or should) cover the cost of the drugs. As in part (i) there was generally little distinction made between immediate needs and pre-funded LTCI or between stand-alone and accelerated CI.

- 7** (i) The CFO is correct that reducing underwriting can reduce expenses e.g. through a lower number of underwriters or fewer medical examinations.

Reducing underwriting can also result in increased volumes of business sold. This is because distributors (and customers) may favour a more relaxed underwriting stance with less "hassle" factor (or intrusion) and reduced processing time.

Lower costs could lead to lower and therefore more attractive premiums (all else being equal) which may outweigh any increase in morbidity cost.

Greater sales volumes could increase total profits to the company and reduce per policy expenses, but may lead to admin/capital strain.

There will also be the implementation costs for any new processes introduced, including any systems changes, amendments to the wording of application forms and proposals and retraining /redundancy costs. The company also needs to consider higher potential claims costs, the risk of increased anti-selection and lapse and re-entry.

If the company takes a very prudent approach given the reduced underwriting information, then more customers may be declined than previously. This could adversely impact the company's reputation, which could have a knock-on impact for sales volumes.

Reducing claims underwriting is likely to lead to increased fraudulent claims being paid. In particular, there would be an increased risk of non-disclosure at the claims stage.

Reduced financial underwriting may lead to moral hazard.

The insurer will need to consider the level of underwriting carried out by its competitors for this product to ascertain whether it is currently generally in line with the market or is taking an overly cautious approach. A reinsurer may be able to offer advice on this.

If reducing the level of underwriting would put the insurer out of line with its competitors then the insurer is likely to attract a disproportionate share of the adverse risks (i.e. anti-selection), which would increase the average morbidity experience of the portfolio. The insurer will want to charge for this additional morbidity risk and so is likely to have to increase premium rates. But this can further exacerbate the anti-selection effect, as the healthier lives are more likely to be take advantage of lower basic premium rates offered elsewhere where there is stricter underwriting.

If there are any options available on the product (for example, increasing cover with no evidence of health), reducing initial medical underwriting will also increase the anti-selection risk on these options.

Even if the impact of the lower underwriting costs exceeds the expected future additional claims costs, the company may not reduce its premium rates as it seems that the CFO is looking to reduce costs and increase profit margins rather than passing on all the cost reductions through to policyholders via lower premium rates.

Further, if reinsurance is used then it is likely that the reinsurer will either increase its rates significantly if the level of underwriting is significantly reduced or in the extreme may not wish to continue reinsuring this product and this might also be reflected in higher premiums (or lower profit margin).

Less underwriting will mean less homogeneity, making pricing harder. The lack of historic experience under the revised underwriting approach also makes parameter estimation and hence pricing more difficult. A margin might be included in premiums for uncertainty.

If premium rates are increased then this is likely to be unpopular with the insurer's sales channels, which could offset the sales advantage from the reduction in the level of underwriting.

The company may also need to hold higher reserves due to increased uncertainty about future morbidity experience. Increased reserves may affect the solvency of the company.

There are other implications of lower sales (e.g. increased per policy overhead costs, lower market share) and these may not be implications that the CFO has intended.

[13]

- (ii) The company could reduce the number of cases that go through the underwriting process. For example, it could analyse how many cases are fully underwritten but where no additional premium is ultimately charged, to determine whether there are ways to avoid such cases unnecessarily going through the full underwriting process.

The company could increase the limits at which further evidence is required e.g. increase the sum assured above which a medical test is required or increase the free cover limits if it writes group business. In considering this, it should compare the costs involved in obtaining further evidence at lower sums insured versus the additional premium charged and/or the savings in respect of cases refused.

The company could include more detailed questions on the application form. It could carry out less expensive on-line automated underwriting checks or use simplified telephone underwriting processes.

The company could decline more cases rather than putting them through underwriting in order to determine an appropriate additional premium. For example, in the extreme, only those that answer all of the health questions positively could be offered cover.

The company could rely more heavily on exclusion clauses or have simple rating scales for substandard risks. It could extend the waiting period or remove medical or lifestyle or financial underwriting.

The company could improve the efficiency of its existing underwriting processes e.g. through introducing intelligent underwriting systems. The company could also review (and aim to increase) the number of cases handled by each member of underwriting staff and/or it could reduce the ratio of full underwriters to support staff.

The company could improve staff training.

The company could review and simplify processes.

The company could use outsourcing, if cheaper.

The company could reduce the fees paid to professionals or negotiate special rates or it could use lower qualified professionals, e.g. nurses rather than doctors for medical testing.

If it is found that the underwriting of one particular product absorbs most of the underwriting resource, the insurer may focus on improving the efficiency for that particular product.

The company could consider introducing a modified product that requires less underwriting. It could even stop selling that particular product.

The costs will be higher for some of these proposals initially (implementation costs) but should be lower in the longer term.

[7]

[Total 20]

Part (i) was generally well answered with most candidates discussing many relevant points. However, only the better candidates tended to mention the effects of any options on the products or the effect on sales channels.

Part (ii) was also well answered although few candidates discussed considering whether particular products incurred most of the underwriting costs or whether products could be modified to reduce underwriting costs.

END OF EXAMINERS' REPORT