

# **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.

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Chairman of the Board of Examiners

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## 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).

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- (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**