

EXAMINATION

30 May 2016 (am)

Subject F101 — *Health & Care*

Fellowship Principles

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Use the instructions and password provided at the examination center to log in.*
2. *Submit your answers in Word format only using the template provided. You MAY NOT use any other computer program (e.g. Excel) during the examination.*
3. *Save your work regularly throughout the examination on the supplied computer's hard drive.*
4. *You have 15 minutes at 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.*
5. *You must not start typing your answers until instructed to do so by the supervisor.*
6. *Mark allocations are shown in brackets on exam papers.*
7. *Attempt all six (6) questions, beginning your answer to each question on a new page.*
8. *Candidates should show calculations where this is appropriate.*

Note: The Actuarial Society of South Africa will not be held responsible for loss of data where candidates have not followed instructions as set out above.

AT THE END OF THE EXAMINATION

Save your answers on the hard drive AND hand in 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.

QUESTION 1

A health insurer sells mainly pre-funded unit-linked long-term care products. The benefit is a lump sum (unit fund value) at such a time as the policyholder requires a caregiver or needs to move to a care facility. The health insurer offers a guarantee that the surrender value will be the greater of: the unit fund less a surrender charge (subject to regulatory constraints) or the sum of premiums paid.

- (i) Describe the risks to the insurer of offering this particular guarantee. [4]
- (ii) Describe ways in which these risks can be mitigated. [4]

[8 marks]

QUESTION 2

For each of the needs below, describe who may be affected, the risks faced and suitable health insurance products that can be purchased.

- (i) Sickness while in retirement;
- (ii) Access to the latest treatment technology for major illnesses;
- (iii) Medical treatment in countries with poor public healthcare facilities.

[12 marks]

QUESTION 3

You are a pricing actuary working for a global health reinsurer in Actuarial. Actuarial has a developed Critical Illness market but no health-related insurance is in place (e.g. no PMI nor fixed benefits related to health events). Your company has been approached with an opportunity to quote for a cancer reimbursement product in Actuarial for individual business. This product does not exist anywhere in the world on a stand-alone basis and there is no regulation around it apart from treating customers fairly. It is designed to pay out for all medical expenses incurred in treating cancer.

- (i) Aside from the risk-transfer advantages of reinsurance, outline how an insurer could benefit from a reinsurer's expertise in this scenario. [3]
- (ii) Outline how the actuary should project claims costs based on historical experience. [3]
- (iii) Discuss which sources of data could be used to project claim costs, the appropriateness of each source, and what adjustments would be required. [11]

[17 marks]

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QUESTION 4

You are provided with the following partial extract of statistics and hospitalization for the Palm Medical Fund:

Base Diagnostic Related Group (DRG)	Admissions		Average Length of Stay		Case mix	
	2014	2015	2014	2015	2014	2015
Newborns and other neonates	4267	4187	7.51	7.80	15.71	16.25
Adult respiratory distress syndrome	1080	1073	6.35	6.46	13.29	12.81
Heart Failure and Shock	3791	3774	1.38	1.39	2.89	2.97
Knee Replacement	1588	1597	1.37	1.36	2.86	2.88
Acute Renal Failure	883	970	1.81	1.63	3.80	3.75

- (i) Describe how the case mix factor is likely to have been determined and comment on the change in each. [3]
- (ii) Describe factors that affect the number of admissions in general. [4]
- (iii) Calculate the change in the case mix adjusted length of stay per DRG and comment on the results. [6]
- (iv) Describe how the above analysis would be incorporated into an analysis of the change in hospital costs for the Palm Medical Fund. [5]

[18 marks]

QUESTION 5

In the country of Laria medical funds provide cover for medical expenses with contribution rates fixed by the government for a defined set of benefits. You are the actuary advising one such medical fund. You have been asked to do an experience investigation into the fund.

- (i) Discuss why the government may have adopted such a policy and what rating factors are likely to be used. [4]
- (ii) Explain with reasons what you consider necessary to investigate. [6]
- (iii) Explain how you would conduct your investigation. [8]
- (iv) What strategies can the fund consider to improve its solvency levels? [5]

[23 marks]

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QUESTION 6

- (i) List the elements of a cashflow pricing model. [4]

You are the chief pricing actuary for a medium sized health insurer that sells most of its policies to individuals. The regulator currently mandates community rating within the industry with differentiation in contributions only allowed by beneficiary type, i.e. principal, adult dependent or child dependent.

The company currently offers three benefit options, arranged in order of price and benefits: Basic, Classic and Comprehensive. The company has been struggling to attract young and healthy members and thus is becoming increasingly uncompetitive within the market.

Your chief product development actuary has designed a new option aimed at attracting young and healthy members. The option makes use of a smartphone app that directs you to use a network GP as the first point of treatment, with a referral process to specialists, hospitals and other secondary healthcare providers once you have seen a General Practitioner. This is the only means of accessing non-emergency care. Emergency treatment will be covered as per usual.

The new option will have the same benefits as the Classic option.

There are currently no networks used for any of the existing options.

The clinical managed care team believes that this new benefit option will result in lower claims costs as unnecessary care will be avoided due to the referral process; and using networks might attract preferential tariffs due to volume discounts.

- (i) List the data you will need to project the expected sales volume for this option. [3]
- (ii) Describe how you would go about the process of calculating the burning cost premium (BCP) of the new option including the adjustments required to make it representative of the new option's expected claims experience. [11]
- (iii) Outline the rest of the pricing process now that you have adjusted the burning cost premium for the expected claims experience. [4]

[22 marks]

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END OF EXAMINATION