
SOCIETY OF ACTUARIES
Group and Health – Design & Pricing

Exam DP-GH

AFTERNOON SESSION

Date: Thursday, November 4, 2010

Time: 1:30 p.m. – 4:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 9 questions numbered 10 through 18 for a total of 60 points. The points for each question are indicated at the beginning of the question. There are no questions that pertain to the Case Study in the afternoon session.
2. Failure to stop writing after time is called will result in the disqualification of your answers or further disciplinary action.
3. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions on the exam booklet.

Written-Answer Instructions

1. Write your candidate number at the top of each sheet. Your name must not appear.
2. Write on only one side of a sheet. Start each question on a fresh sheet. On each sheet, write the number of the question that you are answering. Do not answer more than one question on a single sheet.
3. The answer should be confined to the question as set.
4. When you are asked to calculate, show all your work including any applicable formulas.
5. When you finish, insert all your written-answer sheets into the Essay Answer Envelope. Be sure to hand in all your answer sheets since they cannot be accepted later. Seal the envelope and write your candidate number in the space provided on the outside of the envelope. Check the appropriate box to indicate morning or afternoon session for Exam DP-GH.
6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

Tournez le cahier d'examen pour la version française.

****BEGINNING OF EXAMINATION****
AFTERNOON SESSION
Beginning with Question 10.

- 10.** (4 points) You are an actuary at an insurance company. New legislation will require business to provide health insurance coverage to their employees, and your company would like to expand into the small employer health insurance market.
- (a) (2 points) Describe the types of quoting technology available and list the advantages and disadvantages of each.
- (b) (2 points) Describe the considerations to be taken into account when designing a quoting system.

11. (4 points) You are an actuary at a health insurance company in the pricing department. You have been given the following information for your company's HMO business.

- Assumed total allowed charges in Year 1 are \$265 PMPM
- Interest income and premium taxes: 0%
- Administrative costs: 12%
- Profit target: 5%
- Allowed trend in year 2: 8%
- No benefit plan changes are made
- Value of all copayments: \$30 PMPM

Your company currently sells an indemnity plan on a 3-tier premium basis. You are trying to decide between offering a 3-tier and a 4-tier premium schedule. Information for both is provided in the tables below:

4-tier Distribution	Contract Distribution	Ratio to Single Rate	Number of Persons per Contract
Single	45%	1.0	1.0
Couple	20%	2.1	2.0
Employee-Child(ren)	25%	1.8	2.1
Family	10%	3.6	3.5

3-tier Distribution	Contract Distribution	Ratio to Single Rate	Current Indemnity Plan Monthly Premiums
Single	45%	1.0	\$425.00
2 Person	42%	2.0	\$765.00
3 or more (Family)	13%	3.0	\$1,062.50

- (a) (1 point) Calculate the HMO capitation rate for contracts renewing in the second quarter of Year 1, using the PMPM costs given above. Show your work.
- (b) (2 points) Calculate the 4-tier HMO premium rates using the distribution of employees above and results from (a). Show your work.
- (c) (1 point) Calculate 3-tier HMO premium rates to produce the same revenue per contract determined in (b) using the ratio of indemnity rates. Show your work.

- 12.** (13 points) SCREECH Dental Insurance Co. has a large block of group indemnity dental business in the U.S. SCREECH plans to begin offering a dental HMO (DHMO) plan. The indemnity fee schedule is equal to usual, customary and reasonable (UCR) charges. SCREECH's coinsurance and 2008 experience data are as follows:

Covered Services	2008 Utilization per 1000	2008 PMPM Allowed Claim Costs	Plan Coinsurance
Type I Preventive	2,250	\$15.00	100%
Type II Basic and Major	650	\$13.90	60%

The indemnity plan design has no deductible and no annual or out-of-pocket maximums.

The administrative cost structure was provided by the Finance Unit as follows:

Administrative costs	Indemnity	DHMO
Fixed	\$6.00 PMPM	\$7.00 PMPM
Variable	5% of Premium	4% of Premium
Margin	2% of Premium	2% of Premium

The historical allowed claims trend and future pricing trend for the indemnity product are shown in the table below:

Allowed Claims Trend	2009/2008 Actual Trend	Future Pricing Trend
Unit Cost	5%	4%
Utilization	3%	3%

Based on market studies and analysis, SCREECH's actuarial department has produced the following additional pricing assumptions specific to DHMO:

Type	DHMO Discounts from UCR	DHMO Management Savings
Type I	5%	0% per year
Type II	9%	2% per year on utilization trend

12. Continued

SCREECH's analytics unit produced the following claims continuance table based on 2009 net claims experience:

<u>2009 Average Net Claims Paid</u>	<u>Percent of Insureds</u>
\$0	40%
\$175	35%
\$480	12%
\$620	5%
\$1125	8%

SCREECH is hoping to gain insights and product ideas from you as well as cost guidance.

- (a) (2 points) Explain the types of delivery systems for dental plans including key differences.
- (b) (1 point) Develop talking points to illustrate current and expected future market trends in dental insurance.
- (c) (2 points) Discuss underwriting and product provisions typically found in dental plans to limit costs and control antiselection.
- (d) (8 points) Calculate:
 - (i) The DHMO Net/Allowed claims cost ratio needed to produce the same net claim costs as the indemnity plan and comment on the DHMO plan richness compared to the indemnity plan.
 - (ii) Additional claim reductions needed in 2011 to meet the goal of having a DMHO premium equal to 95% of the indemnity premium.
 - (iii) The 2011 loss ratio for the indemnity and DHMO products assuming the DHMO claim goal from (ii) is met.

Show your work and state any assumptions you have made.

- 13.** (9 points) You are the consulting actuary for NRG Solar Panel Company. NRG currently has 500 early retirees and provides them with medical benefits via a self-funded HMO plan. NRG currently funds these benefits on a pay-as-you-go basis. NRG is considering changes to its retiree benefit program, including potential prefunding mechanisms and reducing benefits.

You are given the following information about NRG's retiree HMO plan for 2010.

Covered Services	Utilization (per 1,000 members per year)	Retiree Copay
Hospital Inpatient	1,800	\$200 per admission
Outpatient Visits	3,200	\$75 per visit
Lab/Diagnostics	300	\$50 per procedure
Prescription Drugs	24,000	\$25 per script

- Retirees pay a monthly premium of \$10.
 - Medical services and prescription drug utilization are projected to increase 5% and 9% respectively in the next rating period regardless of benefit changes.
 - NRG does not plan to increase the retiree monthly premium.
 - NRG plans to make the following benefit changes in the next rating period:
 - Hospital inpatient copay = \$250 per admission
 - Outpatient visits copay = \$100 per visit
 - Prescription drugs copay = \$30 per script
- (a) (1 point) Explain the advantages and disadvantages to NRG of maintaining its retiree benefit program.
- (b) (1 point) Describe ideal funding vehicle characteristics.
- (c) (3 points) Describe the possible funding vehicles that NRG could use and the main advantages and disadvantages of each.
- (d) (2 points) Calculate the PMPM cost savings that NRG is projected to realize by making the proposed benefit changes. Show your work.
- (e) (2 points) Describe additional strategies NRG can consider to reduce the cost of its retiree benefit program.

- 14.** (3 points) You are the director of underwriting at an insurance company. A predictive modeling vendor has approached your company claiming they can improve underwriting and identification of members for case management purposes.
- (a) (1 point) List reasons why you would install a predictive model tool.
 - (b) (2 points) Develop questions to evaluate the vendor's capabilities related to your underwriting process, risk evaluation, and case management identification.

- 15.** (10 points) HABS, a company of 1,000 employees operating in Canada has a new CEO who has just moved from the U.S. HABS is in the midst of implementing a total compensation flexible benefits plan. The new flex plan will offer several choices in the following benefits: life insurance and AD&D coverage for employees and dependents, disability benefits, medical, dental and a health spending account. The cost will be shared between the employer and employees.

In preparation for the launch of the new flex plan, you have set up the following assumptions for the proposed medical plan:

Option	Expected Employee Participation	Relative Value of Each Option Versus the Current Plan
A	30%	65%
B	55%	105%
C	15%	125%

The current medical plan average monthly cost is \$120. The new flex plan is anticipated to generate an additional 3% in total costs due to antiselection.

- (a) (1 point) Outline the principles of the Canada Health Act and services generally covered by provincial Medicare plans in Canada.
- (b) (2 points) Describe total compensation flex plans and explain the advantages and disadvantages of these types of plans.
- (c) (3 points) In relation to taxation:
 - (i) For each benefit offered under the new flex plan, describe the tax treatment of the premiums paid and the benefits payable from the employees' view.
 - (ii) Describe principles that need to be considered in setting up the new flex plan structure tax effectively.
- (d) (2 points) Define antiselection and describe how the cost of antiselection can be taken into account in the pricing of the new flex plan.
- (e) (2 points) Recommend a set of price tags for the proposed medical plan and justify your recommendation. Show your work.

- 16.** (10 points) You are the chief actuary of an individual medical (IM) carrier. You are asked by the CEO of the company to maximize renewal profits of two IM blocks. The actuarial students have performed initial analysis of the mix of the insureds and computed the market price using competitors' rates for policies of comparable benefits as follows:

Initial Analysis of IM Blocks						
Block	Cell	Policy Count (Pol_0)	Risk	Cost per policy (C)	Premium Rate per policy (P_0)	Market Price per policy (M)
Block 1	1a	100	Standard	\$500	\$600	\$750
	1b	50	Impaired	\$750	\$600	\$1125
	1c	10	Impaired	\$1000	\$600	\$1500
Block 2	2a	50	Standard	\$500	\$600	\$750
	2b	50	Impaired	\$750	\$600	\$1125
	2c	50	Impaired	\$1000	\$600	\$1500

Ignore transaction cost and assume the probability of lapse L for a policy is given by a step function:

$$L = 0 \text{ if } P \leq M$$

$$L = 1 \text{ if } P > M$$

where P is premium rate and M is market price for the policy.

Assume the regulator will not approve rate increase greater than 50%.

- (a) (2 points) Define the following types of selection and their impact on claim experience:
- (i) External antiselection
 - (ii) Internal antiselection
 - (iii) Durational antiselection
- (b) (4 points) Determine the aggregate lapse rate and profits for different rate increases of 25% and 50% for each block. Show your work.
- (c) (2 points) Recommend rate increases that maximize profits separately for blocks 1 and 2. Justify your answer.
- (d) (2 points) Describe characteristics of a sustainable block and the implications of sustainable blocks for the IM market.

- 17.** (4 points) You are the Chief Actuary of a small U.S. regional health insurer and have received a call from the VP of marketing. She wants you to immediately implement health score risk adjusters into your rating methods for the small group insurance market because that is what your competition is doing. Your staff says they need time and believe this may not turn out to be worthwhile. You have to defend your staff's position. Outline your response.
- 18.** (3 points) You are the employee benefits consultant hired by a large employer in the United States. The CEO of this company has read some articles on the latest employee benefit trends and has questions about value-based insurance design (VBID).
- (a) (1 point) Describe similarities and differences between a value based approach and VBID.
 - (b) (1 point) Explain how the company could implement VBID into their existing plan and the expected result.
 - (c) (1 point) Prepare a business case that outlines the cost and benefits associated with moving to a disease-specific VBID approach.

****END OF EXAMINATION****
AFTERNOON SESSION

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