SOCIETY OF ACTUARIES
Group and Health – Design & Pricing

Exam DP-GH

AFTERNOON SESSION

Date: Thursday, November 1, 2012
Time: 1:30 p.m. – 4:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This afternoon session consists of 7 questions numbered 8 through 14 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.

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Exam DP-GH

****BEGINNING OF EXAMINATION****
Afternoon Session
Beginning with Question 8

8. (*5 points*) Your company would like to add a low cost group Medicare Advantage option to improve sales. This option will add a deductible and coinsurance to the services covered under Part B.

Part B Services Excluding Preventive Care					
Range of Claims	**Frequency**	**Average Claims**	**Annual Cost**	**Accumulated Frequency**	**Accumulated Annual Cost**
$0	0.01	$0.00	$0.00	1.00	$5,876.55
$.01 - $100	0.06	$77.00	$4.62	0.99	$5,876.55
$100.01 - $300	0.05	$215.60	$10.78	0.93	$5,871.93
$300.01 - $500	0.15	$431.20	$64.68	0.88	$5,861.15
$500.01 - $1,000	0.11	$793.10	$87.24	0.73	$5,796.47
$1,000.01 - $1,500	0.17	$1,386.00	$235.62	0.62	$5,709.23
$1,500.01 - $2,000	0.1	$1,925.00	$192.50	0.45	$5,473.61
$2,000.01 - $3,000	0.06	$2,664.00	$159.84	0.35	$5,281.11
$3,000.01 - $5,000	0.05	$3,927.00	$196.35	0.29	$5,121.27
$5,000.01 - $10,000	0.12	$7,700.00	$924.00	0.24	$4,924.92
$10,000.01 - $25,000	0.08	$16,170.00	$1,293.60	0.12	$4,000.92
> $25,000	0.04	$67,683.00	$2,707.32	0.04	$2,707.32

(a) (*2 points*) Calculate the impact to the net claim liability of applying a $500 deductible and 20% coinsurance to all non-preventive Part B services. Show your work.

(b) (*2 points*) Determine the incremental impact to net claim liability of also applying an Out of Pocket limit of $1000 (including deductible). Show your work.

(c) (*1 point*) External forces, other than competitive pricing pressures, may be adversely impacting Medicare Advantage sales.

(i) List reasons why employers would not want to offer a retiree group benefit.

(ii) List characteristics considered by an employer when selecting a retiree group benefit.

9. (*7 points*) UniDirection has historically had three inpatient facilities in their network.

The experience is as follows:

Facility	Admissions /1,000	Average Length of Stay (days)	Payment Method	Cost per Admit
A	21	3.6	Per Diem	5,750
B	21	2.9	Case Rate	5,100
C	43	3.1	Per Diem	5,800

- UniDirection is creating a narrow network with Facility A & B only.
- The facilities have a similar risk mix and admission profile.
- As a part of agreeing to be in the network, Facility A agrees to become 10% more efficient in managing length of stay for all cases in their facility.
- Facility B agrees to decrease the cost per admission by 15%.
- Assume that 70% of the admissions from Facility C move to Facility A; the rest go to Facility B.
- All other costs will remain the same.

(a) (*2 points*) Calculate the restated inpatient base costs (PMPM) for the plan. Show your work.

(b) (*1 point*) List the measurements of performance for a network, give an example of each and state how they would apply in this situation.

(c) (*2 points*) Due to cost considerations, the plan would like members to use Facility B as a preference over Facility A. Choose the benefit design below that best accomplishes this. Justify your choice.

Benefit Design	Facility A	Facility B
Design 1	$200/admit	$175/admit
Design 2	$250/admit, $75/day	$250/admit, $50/day
Design 3	$200/admit $100 copay first day, $50 for the second	$175/admit, $100 copay the first day, $50 for the second

(d) (*1 point*)

(i) List the elements of the managed care spectrum.

(ii) Identify which elements are applicable to this tiered network and plan design.

(e) (*1 point*)

(i) List the considerations for establishing a provider network.

(ii) Identify what further information is required to establish the narrow network.

10. (*16 points*) You are an actuary at White Whale (WW), Inc., a US insurance company that specializes in managed care and group disability insurance. WW has decided to diversify business by getting into the specialty insurance market. The first new product to be developed is cancer coverage, and you have been asked to take the lead on product development, pricing, and setting up an appropriate underwriting process.

You have developed the following manual rating information for cancer products:

Treatment Benefit	Prevalence Rate	Average Treatment Period (Days)	Percentage of Days with Treatments Administered	Average Cost per Day of Treatment	Desired Indemnity Amount per Day
Chemotherapy	0.0005	120	30%	$8,500	$3,000
Infusion	0.0001	45	10%	$3,500	$2,000
Radiation Treatments	0.0003	140	30%	$12,000	$6,000
Surgical Procedures	0.0002	2	80%	$32,500	$10,000
Other Cancer-Related Care	0.0001	150	50%	$2,000	$1,000

Definition of provided data elements:

- "Prevalence Rate" is the likelihood that any person will need the specified cancer treatment in a year.
- "Average Treatment Period (Days)" is the average total number of days elapsed from first treatment to last.
- "Percentage of Days with Treatments Administered" is the percentage of days in the treatment period when treatments are administered for that specific treatment.
- "Average Cost per Day of Treatment" is the average cost of the given treatment on each day a treatment is administered.
- "Desired Indemnity Amount per Day" is the daily indemnity amount that will be offered for each treatment period for that specific treatment.

WW is targeting administrative expenses of 5% of annual premium, and a 10% of annual premium profit margin on these cancer products.

(a) (*1 point*) List and describe external data sources that can be used to assist in actuarial analysis.

(b) (*5 points*) Calculate the required monthly gross premium rate using the given indemnity amounts per day for each benefit for:

(i) An uncapped product

(ii) An indemnity product

Show your work.

10. Continued

(c) (*4 points*) Construct the lowest price hybrid plan and calculate its required monthly gross premium rate maintaining the 10% profit margin. Justify your answer, and show your work.

(d) (*1 point*) Describe factors to consider when choosing between offering individual or group specialty products.

WW's senior leadership has decided to market the cancer products to large groups, and they have asked you to help create underwriting guidelines. Currently, WW only has underwriting processes for managed care and group disability income.

(e) (*2 points*) Compare and contrast underwriting processes for group managed care versus group disability income.

(f) (*2 points*) You have decided to develop the underwriting process for the new group cancer products using one of WW's existing underwriting processes as a template. Recommend which process to use and justify your answer.

(g) (*1 point*) Describe the steps to follow when creating an underwriting process for a group specialty insurance product.

11. (*5 points*)

(a) (*1 point*) Describe factors used historically for rating small group medical business.

(b) (*2 points*) Compare and contrast the availability of these factors for rating small group medical business under the following federal regulatory schema:

(i) Health Insurance Portability & Accountability Act of 1997

(ii) Patient Protection & Affordable Care Act of 2010

(c) (*2 points*) Identify provisions of PPACA which offset the impact of reduced underwriting flexibility.

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12. (*8 points*) You have been asked to price dental benefits using a simulation approach.

(a) (*2 points*) Describe factors impacting claim costs for dental plans.

(b) (*2 points*) Define the following modeling strategies and list the advantages of each.

(i) Deterministic Method

(ii) Stochastic Method

(iii) Empirical Method

(iv) Parametric Method

(c) (*4 points*) Calculate the annual net claims cost by using a stochastic approach and the information provided below. Show your work.

Benefit Design

Class	I: Diagnostic and Preventative	II: Basic
Coinsurance	100%	80%
Deductible	Waived	$100
Annual Maximum	Waived	$1,000

Claim Type	Frequency
Class I: Diagnostic & Preventative	0.70
Class II: Basic	0.30

Class I 2011 Claims Distribution	Frequency	Average Claim Cost
$0 - $50	0.20	$40
$50 - $100	0.25	$90
$100 - $200	0.33	$160
$200 - $300	0.17	$220
$300 - $500	0.05	$340

Class II 2011 Claims Distribution	Frequency	Average Claim Cost
$0 - $100	0.19	$90
$100 - $250	0.26	$240
$250 - $500	0.33	$480
$500 - $750	0.12	$600
$750+	0.10	$1,000

12. Continued

Using a U(0,1) distribution, random numbers were generated for determining the class and cost of 10 claims.

Claim	Class	Cost
1	0.31	0.13
2	0.23	0.75
3	0.06	0.08
4	0.07	0.24
5	0.51	0.47
6	0.19	0.23
7	0.34	0.08
8	0.91	0.98
9	0.98	0.51
10	0.56	0.51

13. (*8 points*) You are a consulting actuary retained by Bear Suspenders Inc. (BSI), a Canadian company, to advise BSI on extending its Canadian flexible benefit plan to its new US employees.

(a) (*1 point*) Explain advantages and disadvantages of cafeteria plans in the US from the perspective of

(i) The employee, and

(ii) The employer.

(b) (*1 point*) Describe the different types of cafeteria plans that may be offered in the US.

(c) (*2 points*) Compare and contrast rules in Canada and in the US that must be followed to receive favorable income tax treatment of benefits in flexible benefit plans and cafeteria plans.

(d) (*2 points*) Calculate the total difference in tax amounts between the US and Canada for an employee receiving the employer-paid benefits listed below. Assume all currency amounts are in US dollars and an average tax rate of 20% in the US and 30% in Canada.

- $20,000 in adoption assistance
- $5,000 in expenditures for use of an automobile
- $15,000 in health and dental insurance costs
- Group life insurance coverage in the amount of $300,000 with an annual premium of $400
- Employer contributions of $5,000 towards a retirement plan

Show your work.

(e) (*2 points*) The BSI Canadian flexible benefit plan requires two years of service for eligibility and provides the same employer contribution toward health benefits for all employees. BSI spends approximately 30% of its annual benefit expenditures on officers all of whom earn more than $200,000 a year.

(i) Determine if the Canadian flexible benefit plan meets the requirements of a qualified cafeteria plan in the US. Justify your answer.

(ii) List and describe other tests necessary to be a qualified Section 125 plan in the US.

14. (*11 points*)

(a) (*1 point*) List five examples of the benefits covered in a post-1990 Medicare Supplement policy.

(b) (*2 points*) Outline the differences in design, administration, regulation and population between an individual Medicare Supplement Plan, an individual Medicare Advantage Plan, and Medicare fee-for-service (FFS).

(c) (*2 points*)

(i) Explain the concerns which led to the NAIC regulations on Medicare Supplement plans.

(ii) Explain how the NAIC regulations address the concerns raised in the rationale for the regulation.

(d) (*2 points*) List and differentiate ways that employers can offer employer coverage for Medicare eligible retirees. Provide an example of a benefit payment for an acute inpatient hospital admission under each scenario.

(e) (*2 points*) Describe the rate management process for a Medicare Supplemental product. Differentiate rate management from pricing policy, where applicable.

(f) (*2 points*) Calculate the Medicare Supplement lifetime loss ratio based on the following experience. Comment on the results, and required next steps and suggest any remedies. Show your work.

Policy Year	Attained Age	Investment Income	Premium Income	Commissions	Admin Expenses	PV of Incurred Claims	PV of premium
1	80	10,748	$2,515,550	$ 533,969	$253,635	$1,678,275	$2,515,550
2	81	18,822	$1,860,849	$ 296,248	$187,624	$1,200,607	$1,772,237
3	82	14,291	$1,412,082	$ 224,804	$142,376	$ 880,534	$1,280,800
4	83	10,944	$1,058,854	$ 168,570	$106,761	$ 637,521	$ 914,678
5	84	8,271	$ 783,437	$ 124,723	$ 78,992	$ 455,278	$ 644,535
6	85	8,162	$ 571,240	$ 90,942	$ 57,596	$ 320,220	$ 447,582
7	86	4,632	$ 434,197	$ 69,124	$ 43,779	$ 234,736	$ 324,004
8	87	3,540	$ 324,665	$ 51,687	$ 32,735	$ 169,315	$ 230,734
9	88	2,661	$ 238,680	$ 37,998	$ 24,065	$ 120,020	$ 161,548
10	89	1,965	$ 172,423	$ 27,450	$ 17,385	$ 83,439	$ 111,146
Total		84,036	$9,371,978	$1,625,515	$944,948	$5,779,945	$8,402,814

****END OF EXAMINATION****
Afternoon Session

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