SOCIETY OF ACTUARIES
Group and Health – Design & Pricing

Exam DP-GH

MORNING SESSION

Date: Thursday, October 30, 2008
Time: 8:30 a.m. – 11:45 a.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 120 points. It consists of a morning session (worth 60 points) and an afternoon session (worth 60 points).

   a) The morning session consists of 9 questions numbered 1 through 9.

   b) The afternoon session consists of 10 questions numbered 10 through 19.

   The points for each question are indicated at the beginning of the question.

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.

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Exam DP-GH

****BEGINNING OF EXAMINATION****
DP-GH: GROUP AND HEALTH
Morning Session

1. (*3 points*) You are a U.S. consulting actuary hired by a particular state's Department of Insurance. This state is considering implementing a high risk pool and is asking you to calculate the average premium for the pool. By state regulation, risk pool premium is defined as 150% of the average premium for a standardized $1,000 deductible plan offered by the top three Individual A&H carriers in the state. The high risk pool is expected to have an average demographic factor of 1.30.

State premium tax for Individual A&H carriers is 1.5%. The Department of Insurance has collected the following information from the top three Individual A&H carriers based on the standardized $1,000 deductible plan design:

	Market Share	Average paid claims PMPM	Administration / commission (percent of premium)	Profit margin (percent of premium)	Average demographic factor
Carrier #1	33.3%	$200	13.0%	4.0%	1.10
Carrier #2	33.3%	$180	13.0%	3.0%	0.98
Carrier #3	33.3%	$220	12.0%	2.0%	1.25

(a) Calculate the high risk pool premium. Show your work.

(b) Describe HIPAA continuation requirements and how high risk pools can be used to satisfy these requirements.

(c) Discuss funding options for subsidizing the high risk pool.

2. (*6 points*) You are the consultant for Old Days Co., a company with a traditional benefit plan offering employee life insurance, short-term and long-term disability, medical and dental benefits. Old Days Co. would like to introduce a flexible benefit plan.

(a) Discuss various flexible benefit plan structures and the advantages of each.

(b) Describe other benefits that could be added as part of a full flexible benefit plan.

(c) Outline the steps Old Days should undertake in starting up a flexible benefit plan.

3. (*13 points*) Your company introduced an individual major medical health insurance product in 2006. An alternate plan design is being considered that would result in 10% savings in 2008 compared to the current plan design. You have been asked to present your process for determining the 2008 rates for the current and alternate plan designs.

The current plan design is as follows:

- Deductible = $500
- Coinsurance = 80%
- Out-of-Pocket Limit = $1,000 including deductible, then 100% coinsurance

Assume the following:

- 75% of policyholders are healthy and would move to the alternate plan design.
- 25% of policyholders are unhealthy and would stay in the current plan design.
- Expected claim costs for healthy policyholders are 50% of claim costs for unhealthy policyholders.

For the experience period from January 2007 to December 2007:

- Claim cost PMPM = $175
- Duration = 2
- Premium rate PMPM = $250

Estimates for the projection period from January 2008 to December 2008:

- Annual unleveraged trend = 10%
- Annual age/benefit adjustment increase = 3%
- Adjustment factors for other changes = 0%
- Target loss ratio = 80%

Table 1: Durational Factors

Duration	Factor
1	0.8
2	1.0
3	1.2
4	1.4
5	1.6

3. Continued

Table 2: Density Function

Annual Frequency	Total Annual Claims
0.4	$0.00
0.2	$100.00
0.1	$500.00
0.1	$2,000.00
0.1	$5,000.00
0.1	$17,000.00

(a) (*2 points*) Outline steps involved in re-rating an individual major medical health insurance block of business.

(b) (*1 point*) Calculate the annual leveraged trend for the current plan design. Show your work.

(c) (*6 points*) Determine the premium rate increase required under the current plan design to achieve the target loss ratio in 2008 for each of the following scenarios:

(i) Assuming no anti-selection due to lapses;

(ii) Assuming anti-selection due to lapses increases claims costs by 50% of the rate increase in excess of the leveraged trend and age/benefit adjustments.

Show your work.

(d) (*1 point*) Describe premium leakage and the buy-down effect.

(e) (*3 points*) Calculate the amount of premium leakage and buy-down effect associated with the introduction of the alternate plan design using the results from (c) (ii). Show your work.

4. (*6 points*) ABC Company has hired you to review its retiree drug benefit plan and assist them in making cost savings recommendations to its Board. Retirees currently pay monthly contributions of $100 for a benefit that provides them with coverage of 90% of eligible expenses after meeting a $100 deductible. ABC wants to keep monthly contributions at the same level and change the coinsurance to 80%.

You have the following information, representing the expected claims for this population for the upcoming year.

Claims Range	Frequency	Average Claim Before Benefits	Medicare Part D Value
$0-$100	10%	$60.00	$ –
$101-$1000	40%	$600.00	$480.00
$1001-$6000	40%	$4,000.00	$1,480.00
$6001+	10%	$11,000.00	$7,100.00

The Medicare beneficiary contribution is 25.5% of the Medicare value.

(a) (*2 points*) Outline the functional approach to planning employee benefits.

(b) (*1 point*) Calculate the change in employer cost expected to result from changing the benefit design. Show your work.

(c) (*3 points*) Describe the requirements for receiving a retiree drug plan subsidy from Medicare and determine whether the current and proposed plan designs qualify for the subsidy. Show your work.

5. (*10 points*) You are the actuary for a U.S. health insurance company in a state that has adopted the NAIC Small Employer Health Insurance Availability Model Act. Your company is considering acquiring a new block of small group business from another carrier. Before proceeding with the acquisition, you have been asked to analyze the impact of the acquisition on your existing small group block. You have been given the following information:

- Base rates are before the application of case characteristics.
- Adjustments have been made to the base rate for the potential acquisition block to make it comparable to the existing block.

Block	Base Rates PMPM	Members
Current	$350	5,000
Acquisition	$430	1,000

- Experience factors are used to adjust base rates for each small group's expected experience according to the table below.

Rate Tiers	Experience Factors
1	1.00
2	1.14
3	1.29
4	1.47
5	1.67

(a) (*3 points*) Discuss important considerations in underwriting small groups.

(b) (*2 points*) Describe HIPAA regulations that specifically apply to the small group market in the U.S.

(c) (*1 point*) Outline allowable and non-allowable case characteristics under the NAIC model.

(d) (*1 point*) Describe allowable NAIC criteria for establishing a separate class of small group business.

(e) (*1 point*) Calculate the index rate for each block of business. Show your work.

(f) (*2 points*) Calculate the change in base rates required for the current block and acquired block assuming the acquired block can be established as a separate class of business. Show your work.

6. (*7 points*) You are the consultant for OUCH Co. The short-term and long-term disability experience has deteriorated over the last few years, and you have just received the most recent renewal. OUCH Co. has asked you to establish a strategy to reduce its disability costs and develop a health promotion program.

A summary of the benefit plan provisions and the most recent renewal analysis is as follows:

	Short-term Disability (STD)	**Long-term Disability (LTD)**
Benefit Plan Provisions		
Carrier	Claims adjudicated and paid by OUCH Co.	Long Insurance Co.
Benefit amount	100% of salary for the first 2 weeks, reducing to 80% (taxable)	80% of salary (taxable)
Benefit period	4 months	To age 65
Elimination period	None	4 months
Integration	None	None
Cost of living adjustments	4%	4%
Renewal Analysis		
Loss ratio	185%	215%
Top cause of disability	Mental disorders	Mental disorders

(a) Describe typical STD and LTD benefit plan provisions and recommend a complete plan design that would reduce OUCH Co.'s disability costs.

(b) Discuss management practices and programs that could be implemented by OUCH Co. to improve their future disability claims experience.

(c) Describe steps for OUCH Co. to follow in designing a health promotion program.

7. (*6 points*) You are the benefit consultant for Big Co., a Canadian company offering a flexible benefit plan. You are given the following information for a sample employee living in Quebec.

Benefit	Annual Price Tags
Life Insurance	$500
Long-term Disability	$400
Medical and Dental	$500

Annual flexible credits:	$1,100
Federal marginal tax rate:	30%
Provincial marginal tax rate:	20%

(a) Describe the administrative policies that govern the structure of flexible benefit plans including their tax implications.

(b) Describe the tax treatment applicable to each benefit under this flexible benefit plan.

(c) Determine the flexible credit allocation that will minimize the sample employee's taxable benefit amount and calculate the taxable benefit. Show your work.

8. (*5 points*) You are the pricing actuary for the Group Insurance line of business. You have been asked by your V.P. of Sales to explain why a large group is rated using manual rates for the long-term disability benefit and 100% experience-rated for pharmacy benefits.

(a) Define credibility and its uses.

(b) Describe credibility formulas that can be used.

(c) Describe characteristics of these two product lines that impact the level of credibility assigned to each of the two products.

9. (*4 points*) You have been asked to review a predictive model that will be used to identify members eligible for a new congestive heart failure disease management program at your company.

(a) (*3 points*) Describe different methods to identify members eligible for enrollment in disease management programs, including strengths and weaknesses of each approach.

(b) (*1 point*) Describe confounding variables that need to be considered in building and evaluating predictive models.

****END OF MORNING SESSION****

SOCIETY OF ACTUARIES
Group and Health – Design & Pricing

Exam DP-GH

AFTERNOON SESSION

Date: Thursday, October 30, 2008
Time: 1:30 p.m. – 4:45 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

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****BEGINNING OF EXAMINATION****
DP-GH: GROUP AND HEALTH
Afternoon Session

10. (*5 points*) You are working with an employer who has been offering his employees a non-managed care standard indemnity plan with medical and drugs covered under a coinsurance arrangement. The employer is considering changing carriers and offering PPO, Point-of-Service and HMO alternatives. For each of these alternatives, drugs will be covered under a copay arrangement.

(a) Evaluate each of these alternatives based on potential employer needs and objectives.

(b) Discuss how the key features of each of these alternatives may impact employees.

(c) Discuss advantages and disadvantages to consider when moving from drug benefits covered under a coinsurance basis to a copay plan.

11. (*5 points*) You are reviewing the impact of trend on medical and pharmacy costs. You are given the following information:

2006 Pharmacy Experience:

	2006 Copay	Number of Scripts	Allowed Cost/Script
Generic	$10.00	2.00	$18.00
Brand	$25.00	1.00	$80.00

- Annual pharmacy allowed cost trend is 8%.
- Pharmacy utilization trend is 0%.

(a) Describe components of medical trend.

(b) Calculate the annual paid pharmacy trend from 2006 to 2008 given no adjustment to benefit design. Show your work.

(c) Calculate the required increases in generic and brand copays for 2008 to result in no additional pharmacy trend due to benefit leveraging. Show your work.

(d) Calculate the annual pharmacy trend from 2006 to 2008 assuming the copays are increased to $15 for generics and $30 for brand drugs. Show your work.

12. (*8 points*) DEF Corporation has experienced significant dental cost increases over the last several years. The VP of HR has decided to change DEF's dental plan in 2008 from a traditional fee-for-service plan to a plan with a choice between a PPO and a fee-for-service option.

DEF's 2007 dental plan design is as follows:

Plan Information	
Class I: Diagnostic and Preventative	100% coinsurance
Class II: Basic	80% coinsurance
Class III: Major	50% coinsurance
Deductible	None
Annual Maximum	None

The distribution of insureds by annual paid claims for the plan in 2007 is as follows:

Percent Insureds	Class I	Class II	Class III
40%	$150	$80	$0
30%	$400	$200	$100
20%	$600	$400	$200
10%	$975	$600	$350

In 2008, the plan design will be changed as follows:

Class	PPO Option	Fee-for-service Option
I: Diagnostic and Preventative	100% coinsurance	80% coinsurance
II: Basic	90% coinsurance	60% coinsurance
III: Major	75% coinsurance	40% coinsurance
Deductible (Class II)	$0	$150
Annual Maximum (All classes)	$1,000	$1,500

You are given the following assumptions:

- 80% of employees will move to the PPO option.
- Utilization under the PPO option is expected to be 20% less than the current plan for Basic and Major services.
- Dental costs increase 5% per annum.

12. Continued

(a) *(2 points)* Describe plan design factors that impact dental claim costs.

(b) (*2 points*) Describe characteristics of the insured population that impact dental claim costs.

(c) (*4 points*) Calculate DEF's 2008 per member per month (PMPM) cost for the combined options. Show your work.

13. (*5 points*) You are a consulting actuary. Your client has asked for your assistance in deciding whether or not to prefund its retiree health benefit plan. You have calculated the following FAS 106 costs for the plan.

	Assuming health inflation	Assuming no health inflation
Normal Cost	$60,000	$20,000
Active Liability	$700,000	$400,000
Retiree Liability	$200,000	$150,000
Current Benefit Payments	$50,000	$50,000
Interest Rate	6.00%	3.50%
20 Year Annuity Factor	12.10	14.70

The liability amortization period is 20 years.

Your client also has a retiree pension plan with a normal cost of $150,000.

(a) Describe advantages and disadvantages of prefunding a retiree health benefit plan.

(b) Calculate the allowable tax deductible contribution using

(i) An IRC 501 (c) (9) trust;

(ii) A 401(h) account.

Show your work.

(c) Compare the IRC 501 (c) (9) trust to the 401(h) account with regard to each of the desired characteristics of an ideal funding vehicle for retiree health benefits.

14. (*10 points*) Your company is considering adding individual major medical plans to its current portfolio of group insurance products. Your executive management team would like to better understand issues and practices involved in the administration and pricing of individual products.

(a) (*1 point*) Describe the individual product cycle and how it is managed by insurance companies and regulators.

(b) (*1 point*) Describe the major causes of durational effects and methods commonly employed to manage those effects.

(c) (*1 point*) Describe the causes of claims cost increases other than durational effects for individual major medical policies.

(d) (*4 points*) With regard to managing anti-selection:

(i) Define anti-selection, including the specific points in the product life cycle at which anti-selection can occur.

(ii) Describe underwriting actions to control anti-selection at policy issue.

(iii) Describe criteria and tools to address undisclosed conditions in applications for coverage.

(e) (*3 points*) For the initial pricing of individual policies:

(i) Describe characteristics of a good pricing model.

(ii) Describe the asset share approach used to develop gross premiums.

15. (*7 points*) ABC Insurance Co. is reviewing its methodology for calculating LTD expected claim costs. ABC currently performs loss ratio studies using the calendar year approach and is considering moving to an incurral year approach.

You are given the following information for Client A:

	Claim Paid Year				
Claim Incurral Year	2005	2006	2007	% of Claims Incurred and Reported as of 12/31/2007	Claim Reserve as of 12/31/2007
2005	$2,500,000	$3,400,000	$3,300,000	70%	$16,000,000
2006		$2,300,000	$3,500,000	50%	$10,000,000
2007			$2,000,000	20%	$ 4,000,000

Year	Number of Employees	Monthly Covered Pay
2005	60,000	$325,000,000
2006	60,000	$330,000,000
2007	60,000	$330,000,000

Credibility:	100%
Expenses (including profit):	11% of premium
Interest rate:	5%
Benefit payments are made mid-year.	
Renewal paid rate based on the calendar year approach:	$0.90 per $100 of covered pay

(a) (*1 point*) Describe the two methods for performing LTD loss ratio studies.

(b) (*5 points*) Calculate the 2008 renewal premium rate based on the incurral year approach. Show your work.

(c) (*1 point*) Explain possible reasons for the different renewal rates under each approach.

16. (6 *points*) Your employer is interested in implementing a disease management (DM) program. The feeling is that this will save money, and it will aid marketing efforts. You receive bids from two DM vendors, shown below as Vendor A and Vendor B.

	Vendor Estimates	
	Vendor A	Vendor B
Number of Total Health Plan Members	260,000	260,000
Number of Chronic Members to be Enrolled	12,000	50,000
Annual Cost	$388,000	$1,200,000
Annual Gross Savings	$2,000,000	$4,000,000

After reviewing the vendors' savings calculations you determine that they are not accurately considering all of the costs. Furthermore, your Medical Director is skeptical about the savings assumptions given by the vendors, and feels that they have misestimated the enrollment into their program. Below are revised inputs to the savings calculations:

	Internally Revised Estimates	
	Vendor A	Vendor B
Number of Total Health Plan Members	260,000	260,000
Number of Chronic Members to be Enrolled	15,000	38,000
Annual Cost	$699,400	$2,365,200
Annual Gross Savings	$1,500,000	$2,500,000

(a) Describe typical measures of financial success for disease management programs.

(b) Describe additional considerations involved when analyzing financial outcomes of disease management.

(c) Calculate the savings for each proposal using typical measures of financial success based on:

(i) Initial vendor estimates;

(ii) Internally revised estimates.

Show your work.

(d) Recommend which vendor should be selected and identify other items that would be considered in your recommendation.

17. (*5 points*) Compare the following characteristics of Medicare in Canada and Medicare and Medicaid in the US:

(a) Financing

(b) Eligibility

(c) Covered Services

18. (*5 points*) You are a pricing actuary in the group insurance line at Big Ticket Insurance Inc. The Chief Actuary requests that you perform a credibility analysis and determine a claims rate for Product A.

You are provided the following information on Product A for the previous calendar year:

- Average Number of Members: 100
- Claims Cost PMPM: $300
- Manual Rate Cost PMPM: $550

You are provided the following information for the claims cost distribution:

- Expected value of the process variance = $8,000,000
- Variance of the hypothetical means = $20,000

(a) Describe specific internal data sources used when gathering experience data.

(b) Describe the types of data structures used to retrieve past internal experience data.

(c) Describe the various types of physical media for data storage and considerations when choosing the media.

(d) Using the Bühlmann credibility model, determine the level of credibility and claims cost associated with Product A. Show your work.

19. (*4 points*) Your company enrolled all of its chronically ill members in a Disease Management (DM) program with the following results:

Population	Baseline Period	Intervention Period
Non-chronic Member Cost PMPM	$125	$135
Non-chronic Risk Score	0.90	0.92
Chronic Member Cost PMPM	$350	$355
Chronic Risk Score	3.20	3.05

(a) Calculate the estimated DM savings using unadjusted trends and cost PMPM. Show your work.

(b) Calculate the estimated DM savings using risk-adjusted trends and cost PMPM. Show your work.

(c) Describe implications of this type of trend analysis for DM purchasers.

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