SOCIETY OF ACTUARIES

Group and Health – Advanced

Exam GHADV

MORNING SESSION

Date: Thursday, May 2, 2019
Time: 8:30 a.m. – 11:45 a.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 100 points. It consists of a morning session (worth 60 points) and an afternoon session (worth 40 points).

   a) The morning session consists of 8 questions numbered 1 through 8.

   b) The afternoon session consists of 6 questions numbered 9 through 14.

   The points for each question are indicated at the beginning of the question. Questions 9-12 pertain to the Case Study.

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 because 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 GHADV.

6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

Recognized by the Canadian Institute of Actuaries.

Tournez le cahier d'examen pour la version française.

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Exam GHADV

****BEGINNING OF EXAMINATION****
Morning Session

1. (*6 points*)

(a) (*1 point*) List measurement domains applicable to employee health management (EHM) programs.

(b) (*2 points*) List and describe leading and lagging indicators for measuring the financial impact of an EHM program.

You are given:

	Baseline Period	Intervention Period
Member Months	210,000	211,000
All Cause Hospitalizations	700	685
Potentially Preventable Hospitalizations (PPH)	7.8%	7.0%
Hospitalization Cost – All Cause	$25,000	$25,000
Hospitalization Cost - PPH	$22,500	$22,500
EHM Program Fee Per Member Per Month (PMPM)		$1.00
Return on Investment (ROI) Target		2:1

(c) (*3 points*) Evaluate whether the EHM program achieved its ROI target. Show your work.

2. (*5 points*) You are a valuation actuary evaluating premium deficiency reserves (PDR).

(a) (*1 point*) Describe the three principles of PDRs from the standpoint of solvency.

Each of your company's policies in force has guaranteed rates that extend through December 31, 2020.

The projected gain/loss for your company by line of business by year:

Line of business (LOB)	2019	2020
Group	$10	-$3
Individual	-$2	$5

(b) (*1 point*) Calculate the PDR on each of the two bases. Show your work.

Elements of the income statement as of December 31:

	2017			2018		
LOB	Earned Premium	Incurred Claims	Expenses & Commissions	Earned Premium	Incurred Claims	Expenses & Commissions
Group	$100	$80	$10	$110	$100	$10
Individual	$200	$160	$30	$210	$170	$30
Total	$300	$240	$40	$320	$270	$40

Use the PDR calculated on the block-by-block basis.

(c) (*1 point*) Calculate the total:

(i) Underwriting gain for each year

(ii) Gain/loss for each year, after PDR

Show your work.

Elements of the balance sheet as of December 31, including projections for 2019 – 2020:

	2017	2018	2019	2020
Assets	$500	$510	$515	$520
Liabilities w/o PDR	$400	$403	$410	$420

2. Continued

Use the PDR calculated on the block-by-block basis.

(d) (*1 point*) Calculate for each year the total:

(i) Liabilities with PDR

(ii) Resulting surplus without PDR

(iii) Resulting surplus with PDR

Show your work.

(e) (*1 point*) Describe the impact of PDR on surplus.

3. (*10 points*) You are the actuary responsible for the underwriting of large accounts at XYZ Insurance Company.

(a) (*1 point*) Describe considerations for the application of retrospective experience rating formulas.

(b) (*2 points*) Describe pooling methods that can be used in experience rating large accounts.

You are given:

	July 1, 2015 – June 30, 2016	July 1, 2016 – June 30, 2017	July 1, 2017 – June 30, 2018
Membership	4,150	4,100	4,200
Total Premiums (in $000)**	$12,450	$13,500	$15,225
Total Paid Claims (in $000)**	$10,075	$10,525	$13,900
Total IBNR Balance at end of period (in $000)**	$110	$540	to be determined
Pooled Premiums (in $000)	$875	$925	$925
Pooled Claims (in $000)	$375	$450	$675
Credibility Weights	1 / 14	4 / 14	9 / 14

** Total values include pooled premiums/claims

Incurred Month	Cumulative Payments as of June 30, 2018 (in $000)	% of Ultimate
17-Jul	$1,590	100%
17-Aug	$1,730	100%
17-Sep	$1,795	100%
17-Oct	$1,240	99%
17-Nov	$1,490	98%
17-Dec	$1,320	97%
18-Jan	$1,165	95%
18-Feb	$1,230	93%
18-Mar	$1,400	91%
18-Apr	$1,090	78%
18-May	$640	60%
18-Jun	$30	25%

Expenses (% of Premium)	
Administration	5.0%
Claim Adjudication	4.0%
Premium Taxes	2.0%
Risk Charge	3.0%

Claims Trend (per year)	5.0%
Interest Rate (per year)	0.0%

3. **Continued**

(c) (*2 points*) Calculate the IBNR as of June 30, 2018. Show your work.

(d) (*2 points*) Calculate the accumulated surplus/deficit as of June 30, 2018. Show your work.

(e) (*2 points*) Calculate the multi-year averaged loss ratio for the three-year period. Show your work.

(f) (*1 point*) Calculate the profitability of this account. Show your work.

4. (*4 points*)

(a) (*1 point*) Describe the Actuarially-Adjusted Historical Control Methodology for evaluating disease management (DM) programs.

You are given:

	Baseline (Jan 2017 – Dec 2017)		Year 1 (Jan 2018 - Dec 2018)	
Group	Annual Admits/1,000	Membership %	Annual Admits/1,000	Membership %
Terminating	600	20%	610	25%
Continuing	400	60%	380	70%
New Members	200	20%	180	5%

- Total Chronic Members: 50,000
- Utilization Trend: 5% per year
- Unit Cost Trend: 0% per year
- Year 1 Cost/Admit: $8,000
- DM Program cost: $8 per chronic member per month

Your company requires a return on investment (ROI) of at least 2.5:1 for the DM program.

(b) (*2 points*) Calculate the ROI of the DM program. Show your work.

The company's CFO has suggested this ROI requirement may be sub-optimal.

(c) (*1 point*) Recommend an alternate financial measurement. Justify your answer.

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5. (*11 points*) You are given:

- Insurer LMN pays Hospital A 50% of billed charges

Outpatient Surgery Setting	Annual Utilization per 1,000	Average Allowed Cost	Allowed Cost Per Member Per Month (PMPM)
Hospital A	20	$1,600	$2.67
All Other Hospitals	180	$2,600	$39.00
Hospital Total	200	$2,500	$41.67
Ambulatory Surgical Centers (ASCs)	80	$1,250	$8.33
Total	280		$50.00

(a) (*1 point*) Calculate the discount required for Hospital A's average allowed costs to equal the ASCs' average allowed costs. Show your work.

LMN is developing a quote for a prospective large employer customer. LMN recently introduced a product designed to steer care to the lowest intensity site of service. This includes shifting most outpatient surgeries from hospital settings to ASCs. The sales team makes the following statement:

> *"We would like to offer the group the new product design. Since this design saves on cost, the group will see a savings to premium."*

(b) (*1 point*) Critique the sales team's statement.

(c) (*3 points*) Compare and contrast the Fee-for-Service (FFS) payment model with global capitation in the context of:

(i) Utilization Risk

(ii) Technical Risk

(iii) Insurance Risk

(iv) Performance Risk

5. Continued

Hospital A has successful utilization management capabilities and has inquired about adopting a capitation rate with LMN for Inpatient and Outpatient services.

You are given the following 2017 FFS claims information for Hospital A:

	Annual Utilization per 1,000		Average Allowed Cost
Hospital Inpatient			
Medical	60.0	days	$3,000
Surgical	50.0	days	$5,000
Alcohol & Drug Abuse	5.0	days	$350
Maternity	35.0	days	$2,500
Skilled Nursing Facility	5.0	days	$430
Hospital Outpatient			
Emergency Room	60	visits	$1,270
Surgery	20	visits	$1,600

- Assume there is no cost sharing for the services listed above
- Unit costs increase 3% per year for Inpatient Medical and Inpatient Surgical
- Unit costs increase 0% per year for all other services
- Annual utilization trends are:
  - 0% for Maternity and Skilled Nursing Facility
  - 2% for all other Inpatient services
  - 5% for Emergency Room
  - -2% for Outpatient Surgery

(d) (*3 points*) Calculate a capitation rate for Hospital A that is equivalent to the projected FFS costs for 2019. Show your work.

(e) (*1 point*) Describe reasons Hospital A would adopt a capitation arrangement.

(f) (*2 points*) Describe ways Hospital A could mitigate its risk under:

(i) FFS

(ii) Global capitation

6. (*8 points*) You are an actuary responsible for calculating claims reserves for long-term benefits.

(a) (*2 points*) Describe aspects of long-term disability (LTD) and long-term care (LTC) contracts with respect to claim reserves.

You are reviewing the following contract:

Policy Provisions

- Premium of $1,500 are due and paid on January 1 of each year for 5 years
- Pays $10,000 upon a cancer diagnosis, if the diagnosis occurs in 5 years
- If no cancer diagnosis occurs in first 5 years, premiums are returned after 5 years
- The first year that this policy was sold is 2018

Assumptions

- Probability of cancer: 0.5% per year
- Interest rate: 3% per year
- Return on assets: 5% per year
- Expense rate: 5% per year
- Lapse rate: 10% per year

(b) (*3 points*) Calculate the percentage of premium needed to support the return of premium benefit. Show your work.

You are given:

Months from Diagnosis	Completion Factor
1	10%
2	20%
3	90%
4	100%

Month	Reported Claims ($M)
Dec-19	$1
Nov-19	$2
Oct-19	$10
Sep-19	$15
Aug-19	$14

(c) (*1 point*) Calculate the incurred but not reported (IBNR) reserve as of December 31, 2019 using the lag method. Show your work.

(d) (*1 point*) Describe the flaws in the percent of premium methodology for calculating the IBNR for this product.

(e) (*1 point*) Recommend an alternative reserving methodology for calculating the IBNR. Justify your answer.

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7. (*10 points*)

(a) (*3 points*) Compare and contrast each item in the following table for an employer group with less than 50 employees in 2019:

	Fully Insured	Self Insured	Level Funding Product (LFP)
Rate Development	…	…	…
Premium	…	…	…
Risks to Insurer	…	…	…
Risks to Employer	…	…	…
Taxes and Fees	…	…	…
Risk Adjustment	…	…	…
Risk Charges	…	…	…

(b) (*1 point*) Describe the impact that small group transitional plans had on ACA plans.

The following three groups are the small group pool for your insurance company. You are given:

- All three groups have the same benefit plan
- 2019 projected market average premium net of administrative cost is $420 per member per month (PMPM)
- 2019 combined load for administrative costs, taxes, and profit margin is 20%

Group	ABC	LMN	XYZ
Members	45	30	45
2019 Index Rate (Allowed Claims) PMPM	$200	$500	$800
2019 Projected Incurred Claims PMPM	$150	$400	$650
ACA Average Age Factor	1.10	1.28	1.65
ACA Area Factor	1.10	1.05	0.90
ACA Tobacco Factor	1.00	1.00	1.00
2019 ACA Projected Risk Score	0.60	1.20	1.50

(c) (*2 points*) Calculate the 2019 ACA premium for each of the three groups. Show your work.

ABC is considering moving to a level funding product.

(d) (*1 point*) Describe the components of a premium quote for a level funding product.

7. Continued

You are given:

- The ACA factors remain unchanged
- Market average risk is 20% higher than assumed
- Market average premium net of administrative costs: $520 PMPM

(e) (*2 points*) Calculate the impact on the ACA premiums for the remaining groups if ABC moves to a level funding product. Show your work.

(f) (*1 point*) Recommend whether or not to proceed with offering the level funding product to the small employers. Justify your answer.

8. (*6 points*)

(a) (*1 point*) Describe reasons why an insurer may not achieve expected financial results for care management programs despite improved clinical outcomes.

You are given the following for a multiyear care management program for a high cost, complex chronic disease population.

	Cost	Savings
Year 1	$2,000,000	$500,000
Year 2	$500,000	$7,000,000

(b) (*2 points*) Calculate the rate of return on investment. Show your work.

(c) (*2 points*) Explain the Pareto Principle in context of each of the following:

(i) Design of the high cost, complex chronic disease program

(ii) Evaluation of the rate of return of investment of this program

(iii) Decision to expand the program

(d) (*1 point*) Describe risks and opportunities of expanding the program.

****END OF EXAMINATION****
Morning Session

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