
SOCIETY OF ACTUARIES
Group and Health – Advanced

Exam GHADV

MORNING SESSION

Date: Thursday, October 29, 2015

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 10 questions numbered 1 through 10.
 - b) The afternoon session consists of 5 questions numbered 11 through 15.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 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.

Tournez le cahier d'examen pour la version française.

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

- 1.** (4 points) You are an actuarial consultant hired by Company QRS. Senior management has been working with an outside vendor to design and implement a disease management (DM) program targeting a chronic disease.

The CFO of QRS has expressed concern over the value of a DM program, and is insisting on a return on investment (ROI) of 250% for the program. The vendor believes this can be achieved.

- (a) (1 point) Explain reasons why the CFO's ROI expectation is sub-optimal.

The vendor plans to identify and rank chronic members using an algorithm that analyzes pharmacy data and medical claims. A nurse will then attempt to contact and "re-stratify" members based upon subjective criteria.

- (b) (1 point)
- (i) Define false positives and false negatives in regard to this algorithm.
 - (ii) Describe risks involved with false positives and false negatives when managing members identified for this program.
- (c) (1 point) List the subjective criteria that would be used to re-stratify the identified chronic members.

The following data has been provided by the vendor to demonstrate the effectiveness of the program:

	Baseline Period	Measurement Period
Period	1/1/2012-12/31/2012	1/1/2013-12/31/2013
Average Total Population	100,000	100,000
Average Chronic Population	7,000	7,000
Chronic Member Months	84,000	84,000
Chronic Inpatient Admissions	2,800	2,660
Cost per Admission	\$9,000	\$10,000
Utilization Trend		2.8%

- (d) (1 point) Calculate the estimated savings for the program. Show your work.

2. (5 points) You are the actuary at LMN insurance company. LMN has provided you with the following incurred and paid health claims data:

		Incurred Quarter							
		1Q 13	2Q 13	3Q 13	4Q 13	1Q 14	2Q 14	3Q 14	4Q 14
Paid Quarter	1Q 13	\$10							
	2Q 13	\$20	\$10						
	3Q 13	\$40	\$15	\$5					
	4Q 13	\$20	\$40	\$20	\$10				
	1Q 14	\$10	\$15	\$35	\$10	\$5			
	2Q 14	\$5	\$10	\$20	\$35	\$15	\$10		
	3Q 14	\$5	\$5	\$10	\$25	\$40	\$20	\$10	
	4Q 14	\$0	\$5	\$5	\$20	\$20	\$40	\$20	\$10

The premiums for each incurred quarter are \$150 PMPM.

- (a)
- (i) (1 point) Describe the loss ratio method to calculate IBNR reserves.
 - (ii) (3 points) Calculate the ultimate claims level for 3Q 2014, using the loss ratio method average from the first three quarters in 2013. Show your work.
- (b) (1 point) Explain situations where the loss ratio method may be appropriate.

3. (6 points)

- (a) (2 points) Describe the Actuarially-Adjusted Historical Control Methodology for evaluating disease management programs.

You are given the following information:

	Baseline	Intervention Year 1	Intervention Year 2
	August 2012 - July 2013	October 2013 - September 2014	October 2014 - September 2015
Measured Population Average Members	15,000	18,000	19,000
Measure Population Claims per member per month (PMPM)	\$175	\$190	\$210
Base-Case Chronic Population Average Members	3,500	4,500	4,800
Base-Case Chronic Claims PMPM	\$445	\$450	\$480
Cohort Chronic Population Average Members	3,500	3,600	2,900
Cohort Chronic Claims PMPM	\$445	\$455	\$490

The base-case chronic group permitted new entrants subject to a 3-month claim-free requirement, whereas the cohort chronic group was closed following the baseline year.

- (b) (2 points) Calculate the estimated PMPM savings for each intervention year for the base-case and cohort populations. Show your work.
- (c) (2 points) Evaluate the savings results by using an actual to expected analysis. Show your work.

4. (7 points) You are a health actuary responsible for large employer group medical accounts. Your responsibilities include new business underwriting, contract renewals and experience refund calculations.

(a) (1 point) List factors that impact expected costs in the prospective rating period.

(b) (1 point) Describe methods to pool claims.

One of your large employer clients offers its employees three medical options with the following experience. Assume no trend.

Value of Claims in Excess of \$50,000	Year $t - 1$	Year $t - 2$	Year $t - 3$	Year $t - 4$
HMO	\$25,000,000	\$7,500,000	\$22,500,000	\$5,000,000
PPO	\$2,500,000	\$750,000	\$2,250,000	\$500,000
Indemnity	\$1,000,000	\$ - -	\$1,000,000	\$ - -
Total Claims	\$500,000,000	\$490,000,000	\$480,200,000	\$470,596,000
Total Member Months	1,250,000	1,200,000	1,150,000	1,100,000

(c) (2 points) Calculate the average per member per month (PMPM) pooling charge for the three options using prior year claims experience. Show your work.

(d) (2 points) Calculate the impact of using multi-year averaging on the pooling charge. Show your work.

(e) (1 point) Recommend to your customer if they should use multi-year averaging on the pooling charge. Justify your answer.

5. (11 points) You are a Long-Term Disability valuation actuary.

(a) (4 points)

(i) (2 points) List and describe categories of long-term disability claim reserves.

(ii) (2 points) Illustrate the timeline of the categories.

You are reviewing reserve adequacy by claim duration. The analysis is shown below. Valuation interest is assumed to be 3%.

<u>Claim Duration</u>	<u>Reserve at January 1, 2014</u>	<u>Actual Payments</u>	<u>Reserve at December 31, 2014</u>
7+	\$750	\$140	\$590
6	\$350	\$69	\$256
5	\$355	\$66	\$299
4	\$410	\$70	\$354
3	\$540	\$79	\$489
2	\$615	\$82	\$567
1	\$810	\$108	\$757

(b)

(i) (3 points) Calculate the total reserve sufficiency or deficiency. Show your work.

(ii) (2 points) Identify key findings of your analysis.

(c) (2 points) Recommend changes to the reserve assumptions. Justify your answer.

6. (6 points) You are an actuary reviewing claims costs for a large group of specialist physicians.

(a) (1 point) List principles to follow when preparing provider profiling reports.

When reviewing the group's updated profile, you notice that the group has higher than expected claims costs and are concerned that practice patterns appear inconsistent with typical standards.

(b) (2 points) Describe principles to consider when seeking to change physician practice behavior.

(c) (3 points) Develop a project plan (with timelines) to ensure the group adopts better clinical practices.

7. (8 points) You are an actuary at XYZ Corp. The CEO has become concerned with the increasing costs associated with chronic care patients over the past few years.

(a) (1 point) Describe the following medical and pharmacy care management interventions:

- (i) Pre-Authorization
- (ii) Concurrent Review
- (iii) Case Management
- (iv) Disease Management
- (v) Pharmacy Drug Utilization Review
- (vi) Medication Adherence

(b) (2 points) Explain how the value chain method is used to implement a medication adherence based intervention program.

XYZ implemented an automated telephone outreach reminder of upcoming prescription refills effective July 1, 2014.

Results of the intervention:

Time Frame	Members	Risk Score	Claims Per Member Per Month (PMPM)	Adherent Members
1/1/2014 - 6/30/2014	40,000	0.85	\$1,200	45.7%
7/1/2014 - 12/31/2014	50,000	0.80	\$1,100	47.8%

(c) (3 points) Explain actuarial issues when evaluating this intervention program for each of the following:

- (i) Measurement Principles
- (ii) Study Design
- (iii) Risk Factors

7. Continued

- (d) (2 points) You have been tasked to improve the prior intervention program.
- (i) Define Opportunity Analysis and explain its importance.
 - (ii) Explain how Opportunity Analysis improves the outcome if the prior intervention had the following member stratification techniques:
 - Predictive score
 - Condition specific
 - Rules based approach

8. (5 points) You work for a small HMO that uses a simple capitation method to pay the primary care providers, and are given the following for the entire year:

- The capitation rate is \$100 per member per month (PMPM) before a 40% withhold
- The withhold is used to fund specialist visits and outpatient care of the members assigned to each primary care provider
- A separate withhold account is maintained for each primary care provider
- Any money left in the withhold account is returned to the primary care providers at the end of the year
- All members are present for the entire year

	Dr. Smith	Dr. Robinson	Dr. West
Number of members	150	100	175
Number of primary care office visits	350	375	400
Number of specialist office visits	30	35	40
Cost per specialist visit	\$250	\$250	\$250
Total outpatient costs	\$55,000	\$40,000	\$65,000

(a) (2 points) Calculate the payment to each primary care provider. Show your work.

One of the primary care physicians is complaining the capitation calculation is unfair.

(b) (1 point) Describe changes to the capitation method to alleviate the concern.

Your HMO is considering adopting a fee-for-service (FFS) payment system for the primary care physicians in the HMO.

(c) (2 points) Compare the advantages and disadvantages of FFS payment and capitation payment to:

- (i) The health plan.
- (ii) The primary care providers.

9. (5 points) You are a pricing actuary for Medicare Supplement insurance. Since you are new to Medicare Supplement insurance, you are reviewing the medical underwriting practices and procedures.

(a) (2 points) Describe the techniques an underwriter can use when medically underwriting a policy.

Assuming 15% of individuals account for 80% of claim cost on a typical block of business, the following is true:

	Number	Cost as a % of Average
Underwritten Individuals	850	24%
Non-Underwritten Individuals	150	533%
Total	1000	100%

(b) (2 points) Calculate how much claim costs change if twice as many non-underwritten individuals were present in your block. Show your work.

(c) (1 point) Explain the importance of managing this underwritten mix in your block.

- 10.** (3 points) You have been provided the following disease management (DM) data from a base year to the first year of the DM program:

Unadjusted non-chronic trend	7.0%
Risk adjusted non-chronic trend	6.0%
Unadjusted chronic trend	2.0%
Risk adjusted chronic trend	4.0%
Base year chronic claims per member per month (PMPM)	\$500

- (a) (1 point) Calculate the PMPM savings of the DM program. Show your work.
- (b) (1 point) Explain how trends can be misused when calculating DM savings.
- (c) (1 point)
- (i) Explain chronic prevalence creep and how to adjust for it.
- (ii) Explain how the adjustment impacts chronic and non-chronic trend.

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

USE THIS PAGE FOR YOUR SCRATCH WORK