SOCIETY OF ACTUARIES®

Group & Health Design and Pricing Exam

Exam GHDP

Date: Tuesday, November 1, 2022

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has 13 questions numbered 1 through 13 with a total of 100 points.

   The points for each question are indicated at the beginning of the question. Questions 8 - 13 pertain to the Case Study.

2. 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 provided in this document.

Written-Answer Instructions

1. Each question part or subpart should be answered either in the Word document or the Excel file as directed. Graders will only look at work in the indicated file.

   a) In the Word document, answers should be entered in the box marked ANSWER. The box will expand as lines of text are added. There is no need to use special characters or subscripts (though they may be used). For example, β_1 can be typed as beta_1 (and ^ used to indicate a superscript).

   b) In the Excel document formulas should be entered. Performing calculations on scratch paper or with a calculator and then entering the answer in the cell will not earn full credit. Formatting of cells or rounding is not required for credit, as long as your work and assumptions are clear to an individual with average Excel experience reviewing the submitted file.

   c) Individual exams may provide additional directions that apply throughout the exam or to individual items.

2. The answer should be confined to the question as set.

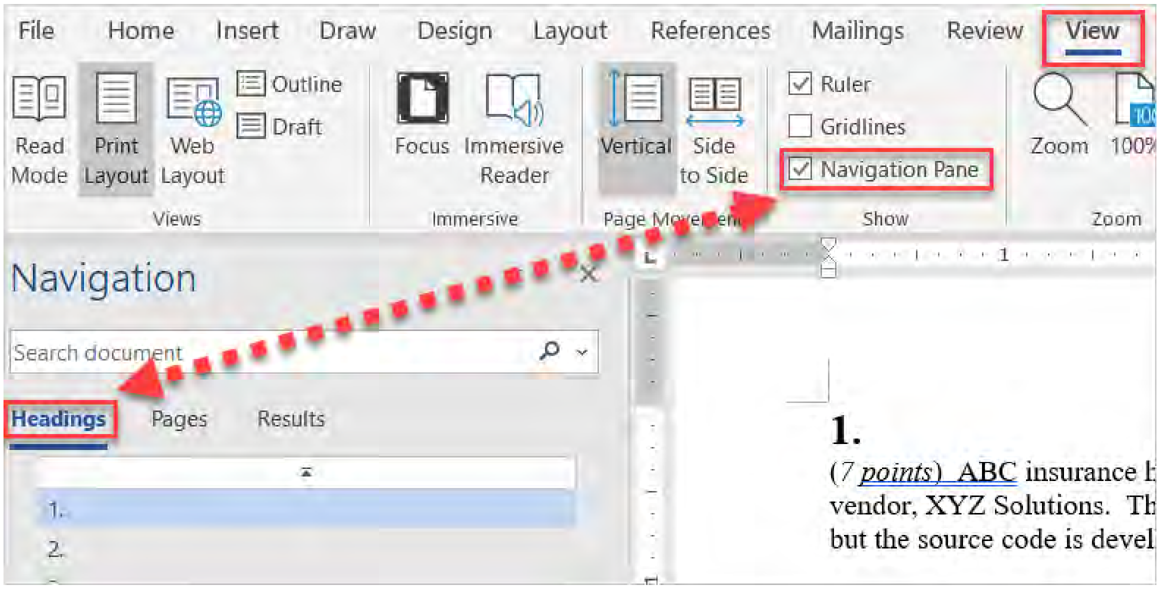
3. Prior to uploading your Word and Excel files, each file should be saved and renamed with your five-digit candidate number in the filename.

4. The Word and Excel files that contain your answers must be uploaded before the five-minute upload period expires.

Navigation Instructions

Open the Navigation Pane to jump to questions.

Press Ctrl+F, or click View > Navigation Pane:



CASE STUDY INSTRUCTIONS

The case study will be used as a basis for some examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked for advantages of a particular plan design to a company referenced in the case study, your response should be limited to that company. Other advantages should not be listed, as they are extraneous to the question and will result in no additional credit. Further, if they conflict with the applicable advantages, no credit will be given.

1.
(*5 points*)

(a) (*1 point*) Describe the need for a functional approach in designing an employee benefits plan.

ANSWER:

(b) (*2 points*)

(i) Compare and contrast the features of Health Savings Accounts (HSA) and Health Reimbursement Accounts (HRA).

ANSWER:

(ii) Describe the impact of these features on an employee.

ANSWER:

Company X is an employer of less than 50 white-collar employees, several of whom are very highly compensated. Predictable costs and cost containment are important to X.

The CEO feels it is easier and cheaper to self-insure X's Short-Term Disability (STD) benefit. Given the cost of Long-Term Disability (LTD) insurance, X can only afford a minimum coverage amount.

(c) (*2 points*)

(i) Critique the CEO's approach.

ANSWER:

(ii) Propose revisions to the CEO's approach. Justify your response.

ANSWER:

2.

(*8 points*) You are the individual medical pricing actuary for Insurer M.

(a) (*1 point*) Describe ways insurers manage antiselection.

ANSWER:

(b) (*2 points*) Insurer M wants to reduce expenses for performing routine underwriting tasks.

(i) Identify four types of underwriting tools that would best serve Insurer M's needs.

ANSWER:

(ii) Identify four types of underwriting tools that would not address Insurer M's needs.

ANSWER:

2. **Continued**

You are given:

- Company N has traditionally offered Plan A.
- A large rate increase for Plan A has been approved for 2021.
- Company N will begin to offer a new higher-deductible plan, Plan B, in 2021.

	Plan A	Plan B
2020 Annual Premium	$9,000	n/a
2020 Low risk members	500	n/a
2020 High risk members	700	n/a
2021 Low risk members	100	400
2021 High risk members	630	70

2020 loss ratio	90%
Annual Trend	0%
Annual Lapse	0%
Annual change in enrollment	0%
Benefit buy-down from Plan A to Plan B	5% for low-risk members 20% for high-risk members
2021 Average Annual Premium	$8,000

- Low-risk members in each plan had 10% lower claim costs than high-risk members.

(c) (*3 points*) Calculate the amount of buydown effect that occurs in 2021. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

You are given:

- Lapse is 0%
- No new entrants to the plan

(d) (*2 points*) Evaluate the effectiveness that different ACA-prohibited techniques would have at addressing premium leakage.

ANSWER:

3.

(*7 points*) Broad Medical participates in an Accountable Care Organization (ACO) contract which resembles the Medicare Shared Savings Program (MSSP). The ACO contract began in 2016 for an initial period of three years and was renewed for an additional three years in 2019.

You are given:

Initial Contract (2016-2018)	Renewal Contract (2019-2021)
• One-sided model with 50% upside risk. • Benchmark is \$100M, from past yearly spending for attributed beneficiaries of \$100M. • Savings are adjusted by the quality score. • Minimum savings threshold is 2%.	• Two-sided model with 60% upside risk and 50% downside risk. • Benchmark is calculated from the previous three years with these weights: 10% (2016), 30% (2017), 60% (2018). • Savings are adjusted by the quality score. • Minimum savings threshold is 2%. • Minimum loss threshold is 2%.

- Spending for attributed beneficiaries:
  - \$96M per year for 2016-2018
  - \$94M per year for 2019-2020
  - \$98M for 2021
- Quality score:
  - 90% for 2016-2018
  - 80% for 2019-2021
- The annual benchmark inflation factor for all years is 0%.
- No change in the case-mix of patients.

(a) (*3 points*) Calculate the shared savings or loss that Broad Medical receives or pays for each contract year. Show your work. State your assumptions.

The response for this part is to be provided in the Excel spreadsheet.

3. **Continued**

Broad Medical suggests that providing an additional $1M in services during its first ACO contract would have been beneficial.

(b) (*2 points*) Calculate the cumulative marginal revenue for 2016 – 2021 if the additional services are provided during:

(i) 2016

(ii) 2017

(iii) 2018

Show your work. State your assumptions.

The response for this part is to be provided in the Excel spreadsheet.

(c) (*2 points*) Describe two strategies for improving ACO incentives and the advantages and disadvantages of each strategy.

ANSWER:

4.

(*10 points*) ABC is a mid-sized employer in an industry with a competitive labor market. ABC is evaluating its employee benefit program and strategy as it prepares to renew its fully insured health plans for 2023.

(a) (*1 point*) Describe reasons why an employee benefit program is of strategic importance to ABC from the perspective of:

(i) Human resources

ANSWER:

(ii) Risk management

ANSWER:

(b) (*2 points*) List and describe factors ABC should consider when determining its level of contributions to employee benefit premiums.

ANSWER:

ABC offers two medical plans: PPO and PPO with HSA. ABC pays a portion of the medical premium, varying by employee salary and coverage tier.

You are given:

2022 PEPM Medical Premium by Plan and Coverage Tier

Plan	Employee Only	Employee + Spouse	Employee + Family
PPO with HSA	$498.55	$1,022.03	$1,371.01
PPO	$605.38	$1,241.03	$1,664.80

Portion of Medical Premium Paid by ABC

Employee Salary	Employee Only	Employee + Spouse	Employee + Family
Less than $50K	80%	80%	80%
$50K to $75K	80%	75%	75%
$75K to $100K	80%	75%	75%
$100K to $150K	75%	65%	65%
$150K or more	75%	65%	65%

4. **Continued**

ABC's Employee Census All Years

Plan	Coverage Tier	Salary Tier	Employee Count
PPO	Employee Only	Less than $50K	1
PPO	Employee Only	$50K to $75K	1
PPO	Employee Only	$150K or more	1
PPO	Employee + Spouse	$50K to $75K	2
PPO	Employee + Spouse	$75K to $100K	1
PPO	Employee + Family	Less than $50K	1
PPO	Employee + Family	$50K to $75K	2
PPO	Employee + Family	$75K to $100K	2
PPO with HSA	Employee Only	Less than $50K	3
PPO with HSA	Employee Only	$50K to $75K	2
PPO with HSA	Employee Only	$75K to $100K	7
PPO with HSA	Employee Only	$100K to $150K	1
PPO with HSA	Employee + Spouse	Less than $50K	4
PPO with HSA	Employee + Spouse	$50K to $75K	3
PPO with HSA	Employee + Spouse	$75K to $100K	1
PPO with HSA	Employee + Family	$150K or more	1

(c) (*3 points*) Calculate ABC's total monthly contribution to employees' premiums in 2022. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

4. Continued

ABC has received the following 2023 PEPM renewal rates for its medical plan offerings:

Plan Type	Employee Only	Employee + Spouse	Employee + Family
PPO with HSA	$530.96	$1,088.46	$1,460.13
PPO	$635.65	$1,303.08	$1,748.04

You are examining benefit plan and contribution strategies for ABC in 2023. You are given the following scenarios:

(i) ABC uses the same contribution strategy as 2022.

(ii) ABC changes its contribution to 85% of the Employee-only premium for each plan, plus 50% of the additional premium for any dependent coverage.

(iii) ABC moves to a defined contribution strategy, with a fixed contribution for all employees equal to 80% of the lowest premium plan type.

(iv) ABC eliminates the PPO plan offering, and all employees enroll in the PPO with HSA.

(d) (*3 points*) Calculate the percentage change in ABC's total contributions, compared to 2022, for each of the above scenarios. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(e) (*1 point*) Recommend a 2023 medical benefit contribution strategy for ABC. Justify your response.

ANSWER:

5.

(*5 points*) You are an actuary for PQR Insurance and are evaluating the introduction of benefit choice at XYZ Company.

You are given:

- XYZ is fully-insured by PQR.
- XYZ offers three health plans to its employees:

Health Plan	Benefits	Monthly Insurer Premium Rates
A	Lean	$500
B	Moderate	$600
C	Rich	$700

- Year 1 premiums are not adjusted for anticipated selection.
- XYZ will contribute $400 per month.
- XYZ's employee census:

Risk Group	# of Employees	Relative Health Status (Morbidity)	Year 1 Plan
1	600	50%	A
2	200	70%	B
3	300	100%	B
4	200	225%	C
5	50	320%	C

- PQR increases premium rates by 5% in Year 2.

The CEO of XYZ is concerned about expenses and is considering the following strategies for Year 2:

Strategy 1

- XYZ reduces premium contributions by $50 per month.
- Risk Groups 3 and 5 are expected to stay in their current plan.
- Risk Groups 2 and 4 are expected to move to the next lower-priced option.

Strategy 2

- XYZ adds another lean benefit option, with a premium rate of $450.
- Risk Group 2 is expected to move to the new plan.
- Half of the employees in Risk Group 1 are expected to move to the new plan.

(a) (*2 points*) Calculate the selection load needed in Year 2 for PQR to break even under Strategy 1. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

5. **Continued**

(b) (*2 points*) Calculate the selection load needed in Year 2 for PQR to break even under Strategy 2. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(c) (*1 point*) Evaluate each strategy from the perspective of:

(i) Employees at XYZ

ANSWER:

(ii) PQR Insurance

ANSWER:

(iii) XYZ Company's CEO

ANSWER:

Justify your response.

6.

(*8 points*)

(a) (*2 points*) Explain how variances from the following pricing assumptions may result in the need for a rate increase on a block of long term care (LTC) policies:

(i) Morbidity

ANSWER:

(ii) Persistency

ANSWER:

(iii) Interest

ANSWER:

You are an actuary at DEF Insurance Company tasked with completing an experience review for a block of LTC policies issued 10 years ago and priced at a lifetime loss ratio of 63%. You find:

- 10,000 policies originally sold
- 5,900 policies currently in force
- 4,100 policies were assumed to remain in force after 10 years based on original pricing assumptions
- No changes required to morbidity or interest rate assumptions
- Cumulative actual historical loss ratio of 20% equals the projected loss ratio over the first 10 years based on original pricing assumptions.

(b) (*2 points*) Assess whether the block needs a rate increase. Justify your response.

ANSWER:

6. **Continued**

You are given:

- 20% rate increase was implemented four years ago
- Current active life reserve balance is $210M
- The following present value (PV) data:

($ Millions)	Incurred Claims	Original Earned Premium	Rate Increase Earned Premium
PV Historical	$69.5	$384.5	$23.0
PV Future	$558.5	$263.0	$52.5

(c) (*2 points*) Calculate the maximum rate increase permitted under the 2014 NAIC LTC Model Regulations. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(d) (*2 points*)

(i) Describe the impact of shock lapses from a rate increase.

ANSWER:

(ii) Explain the impact shock lapses have on projected future experience.

ANSWER:

7.

(*5 points*)

(a) (*1 point*) Describe how health plans use episode-based profiling to improve quality of care and cost efficiency.

ANSWER:

(b) (*1 point*) Describe considerations when implementing an episode-based profiling program for physicians.

ANSWER:

7. Continued

You are a consulting actuary supporting physician group LMN. LMN proposes the following bonus program for its physicians:

- The benchmark is equal to the average cost per episode for all physicians.
- The physician bonus will be calculated as:

Physician's per Episode Cost	Bonus
< Benchmark	5% of difference between the benchmark and physician's per episode cost
>= Benchmark	None

You are given:

Physician	Per Episode Cost	Number of Episodes
A	\$500	40
B	\$600	30
C	\$800	50
D	\$700	100
E	\$550	100
F	\$700	60
G	\$800	70
H	\$600	80
I	\$800	60
J	\$900	40

(c) (*2 points*) Calculate the total expected bonus payment to these physicians. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(d) (*1 point*) Recommend changes to the bonus program that would further incentivize cost efficiencies. Justify your response.

ANSWER:

Question 8 pertains to the Case Study.

8.

(*9 points*)

(a) (*2 points*) Describe the following layers of the pharmacy distribution channel and the typical payment mechanism used in each layer:

(i) Manufacturer

ANSWER:

(ii) Wholesaler

ANSWER:

(iii) Retailer

ANSWER:

(iv) Consumer

ANSWER:

(b) (*1 point*) Describe ways the Affordable Care Act (ACA) impacted pharmacy benefits.

ANSWER:

8. **Continued**

You are an actuary responsible for pricing Quantum's individual pharmacy coverage.

You are given:

- Exhibit 8
- The same discounts apply to retail 30 day and mail 90 day supply
- $0 dispensing fee for mail order
- 0% Sales tax
- $0 Vaccination fee
- Quantum's Year 4 claim frequency and benefit design:

Supply	Drug Type	Claim Frequency	Rebates as % of Allowed	Member Cost Sharing
Retail 30 days	Generic	50%	0%	$5
Retail 30 days	Preferred Brand	20%	20%	$20
Retail 30 days	Non-Preferred Brand	10%	0%	45%
Retail 30 days	Specialty	5%	10%	25%
Mail 90 Days	Generic	10%	0%	$10
Mail 90 Days	Preferred Brand	3%	20%	$40
Mail 90 Days	Non-Preferred Brand	2%	0%	45%

(c) (*3 points*) Calculate the Year 4 average per-script:

(i) Net plan liability

(ii) Member liability

Show your work.

The response for this part is to be provided in the Excel spreadsheet.

8. Continued

You are given the following for Year 5:

- 10% of retail 30 day non-specialty prescriptions shift to mail order, evenly distributed across drug type
- 25% rebate for preferred drug types
- 0% utilization trend
- Cost trend is calculated using Year 2 to Year 4 data

(d) (*3 points*) Calculate the Year 5 average per-script:

(i) Net plan liability

(ii) Member liability

State your assumptions. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

Question 9 pertains to the Case Study.

9.

(*10 points*) You are an actuary for Quantum. You are evaluating experience for Company REF, a client of Quantum with 90 employees. At this year's renewal, Quantum is considering whether to keep Company REF on their ACA small group HMO block of business or offer them Quantum's new level funding products.

Company REF incurred the following medical and Rx claims cost for the past two years:

- Year 3: $350 PMPM
- Year 4: $300 PMPM

You decide to use Quantum's small group HMO experience as manual rates. Credibility factors for REF are:

- k1=0.25
- k2=k3=0.01

(a) (*2 points*) Calculate the credibility of Company REF's experience. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

You are given Exhibit 7 – HMO Small Group.

(b) (*2 points*) Calculate the credibility-weighted claims costs for REF. State your assumptions. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(c) (*1 point*) Describe the underwriting considerations applicable to a level funding product.

ANSWER:

9. Continued

(d) (*1 point*) Describe ways that Quantum can mitigate the risk of high cost claims if the group selects a:

(i) Fully insured small group HMO product

ANSWER:

(ii) Level funding product

ANSWER:

(iii) Self-funded product

ANSWER:

9. **Continued**

Company REF's high cost claim experience is:

- Year 3
  - Employee A $75,000
  - Employee B $100,000
  - Employee C $80,000
- Year 4
  - Employee A $80,000
  - Employee B $30,000
  - Employee D $100,000

You are given:

Quality Improvement Expense (QIE):	$20 PMPM
General Administrative Expense (excluding QIE):	$100 PMPM
Pharmacy Rebates:	$5 PMPM
State Risk Adjustment Transfer Payment:	$15 PMPM
Broker Commission:	2% of premium
Premium Tax:	3% of premium
Trend	0% per year
Aggregate Stop Loss Corridor:	120%
Specific Stop Loss Deductible:	$75,000

- Quantum will incur the same level of administrative costs for the small group HMO and the level funding product

(e) (*3 points*) Calculate the base premium for Company REF in their Year 5 renewal under:

(i) Fully insured ACA small group HMO product

(ii) Level funding product

State your assumptions. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(f) (*1 point*) Recommend a product offering to Quantum. Justify your recommendation.

ANSWER:

Question 10 pertains to the Case Study.

10.

(*8 points*)

(a) (*1 point*) Describe rating variables to consider when normalizing historical data to estimate medical claim costs.

ANSWER:

(b) (*1 point*) Describe recommended practices for credibility procedures according to ASOP 25.

ANSWER:

Quantum's CEO reviewed the Year 3 and Year 4 Small Group HMO and PPO experience (excluding Legacy III). She does not think the PPO plan is fully credible. She proposes combining the PPO and HMO experience to estimate future claim costs for the PPO plan. She expects this will lower cost projections for the PPO plan.

You are given:

- Exhibit 7

Plan	PPO		HMO	
Year	Year 3	Year 4	Year 3	Year 4
Trend	4.5% per year			
Age/Gender	0.99	0.98	1.03	1.03
Area	0.99	1.00	0.98	0.99
Plan	1.00	1.00	0.98	0.99
Provider Reimbursement	1.00	1.00	1.05	1.05
Current Credibility	40%	60%	n/a	n/a
Proposed Credibility	30%	40%	15%	15%

(c) (*3 points*) Calculate the projected Year 6 PMPM cost for the PPO plan using the current credibility assumptions. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

10. Continued

(d) (*2 points*) Calculate the projected Year 6 PMPM cost for the PPO plan using the proposed credibility assumptions. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(e) (*1 point*) Evaluate the CEO's proposal. Justify your response.

ANSWER:

Question 11 pertains to the Case Study.

11.

(8 *points*)

(a) (*1 point*) List methods used by health plans to control physician medical costs.

ANSWER:

(b) (*1 point*) List and describe the key considerations in bundled payment contracting.

ANSWER:

Quantum reaches out to Skyfall during Year 5 to discuss Year 6 unit cost trend assumptions. Quantum provides Skyfall with Exhibit 10A.

Skyfall estimates the following procedure level trends:

	Year 6 Change in Allowed Cost per Service		
Procedure	Hospital A	Hospital B	Hospital C
Knee Replacement	2%	2%	4%
Hip Replacement	5%	5%	10%
Cesarean Section	7%	7%	10%
Colonoscopy	3%	3%	6%
Appendectomy	4%	4%	8%
Cardiac Stent	1%	1%	2%

(c) (*2 points*) Calculate Quantum's combined unit cost trend for Hospitals A, B, and C. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

Hospital A and Quantum agree to adopt the bundled payment rates presented in Exhibit 10C in Year 6.

(d) (*3 points*) Calculate the impact of the change on Quantum's unit cost trend. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

11. Continued

Hospital B expresses interest in adopting a bundled payment structure similar to Hospital A.

(e) (*1 point*) Assess the implications and options for Quantum to mitigate the effects of this change.

ANSWER:

Question 12 pertains to the Case Study.

12.

(*9 points*)

(a) (*1 point*) Describe cost share and benefit plan provisions used to limit financial and selection risk in dental plans.

ANSWER:

You are an actuary working at Your Eyes and Smiles Insurance Company. You are analyzing claims experience for a PPO50 Plan renewal. You are given:

- Exhibits 1 - 4
- All members have met the waiting period for Class III services

(b) (*4 points*) Calculate the Year 4 member cost and plan liability. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(c) (*2 points*) Compare and contrast dental preferred provider organizations (PPO) and dental health maintenance organizations (DHMO) by completing the chart below:

	PPO	DHMO
Cost Management		
Fraud Potential		
Provider Contracting		
Benefit Richness		
Utilization		

12. Continued

Your Eyes wants to reduce its benefit expenses 10% by moving all members from the PPO to a DHMO with the following attributes:

- $0 deductible
- Preferred providers only
- Tight network only
- No impact to billed charges

(d) (*2 points*)

(i) Calculate the expected difference in plan liability. Show your work.

The response for this part is to be provided in the Excel spreadsheet.

(ii) Assess whether Your Eyes will be able to achieve its benefit expense reduction target. Justify your response.

ANSWER:

Question 13 pertains to the Case Study.

13.

(*8 points*)

(a) (*1 point*) List and describe the steps of the disability claim process.

ANSWER:

(b) (*1 point*) Describe tools used in the disability claim process to reduce risk for the insurer.

ANSWER:

(c) (*1 point*) Describe the two significant reserves in disability income insurance.

ANSWER:

(d) (*1 point*) Describe risks and considerations when reviewing group long term disability insurance industry morbidity data.

ANSWER:

13. Continued

You are an actuary evaluating Thunderball's long term disability book of business.

You are given:

- Exhibit 1
- All members are Males age 40-49
- 6-month elimination period

Year	Paid Claims	Change in Claim Reserves for all Incurral Years Combined	Present Value (PV) Claims Made to Date Discounted to the Year of Incurral	Present Value (PV) of Current Claim Reserve Discounted to the Year of Incurral	Earned Premium	Incident Rate
Year 3	$200,000	$7,000,000	$344,500	$9,225,000	$12,500,000	1.1
Year 4	$350,000	$8,808,400	$435,000	$8,362,500	$11,500,000	2.3
Year 5	$600,000	$10,005,500	$760,000	$7,800,000	$11,000,000	2.8
Year 6	$820,000	$6,450,000	$732,000	$7,260,000	$10,500,000	3.4
Year 7	$850,000	$7,050,000	$900,000	$7,050,000	$10,250,000	3.6

(e) (*2 points*) Evaluate the experience for Years 3 - 7 using:

(i) Calendar year loss ratio study

(ii) Incurral year loss ratio study

(iii) Actual-to-expected claim incident rate study

Show your work.

The response for this part is to be provided in the Excel spreadsheet.

Management wants to understand historical trends to use in financial forecasts.

(f) (*1 point*) Recommend one of the study approaches from part (e) to share with management. Justify your response.

ANSWER:

13. Continued

Thunderball management is concerned about the emerging experience compared to the incident rate pricing assumptions. The CEO recommends using the latest Canadian LTD study instead of company experience for rate development.

(g) (*1 point*) Critique the CEO's recommendation. Justify your response.

ANSWER:

****END OF EXAMINATION****