GH ADV Model Solutions
Spring 2019

1. **Learning Objectives:**

2. The candidate will understand how to evaluate healthcare intervention programs.

Learning Outcomes:

(2a) Describe, compare and evaluate programs.

(2b) Estimate savings, utilization rate changes and return on investment.

Sources:

GHA-113-16: Population Health Alliance and HERO– Program Management and Evaluation Guide

Solution:

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

Commentary on Question:
*Candidates generally did well on this part of the question; the majority of candidates earned full credit. The question asks for a **list** of measurement domains so a description of the items is not required to earn full credit.*

Financial outcomes
Health impact
Participation
Satisfaction
Organizational support
Productivity and performance
Value on investment

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

Commentary on Question:
The question asks for a list and a description of leading and lagging indicators. Full credit is awarded for listing a majority of the items below along with a description. The majority of candidates received more than half of the exam points with a minority receiving full credit.

1. Continued

Leading indicators

Identification, stratification, and targeting (outreach)

- Count or percent of members with condition or risk factors

Program enrollment and use of tools

- Count or percent of members by type of program or tool

Engagement or program completion

- Count or percent of members who engaged and/or completed all steps of program

Behavior change (lifestyle risks)

- Physical activity, tobacco use, nutrition, stress

Behavior maintenance

- 6 or 12 month rates of low lifestyle risk

Processes of care

- Annual LDL testing, physical exam completion rates

Medication adherence

- % refilling prescriptions

Well-being

- Gallup-Healthways Well-Being Index

Satisfaction with EHM

- Could be measured through survey measuring experience and/or usefulness

Achieving clinical targets

- % of diabetics with LDL under 100, % diabetics completing regular Hba1c testing

Patient activation

- Patient activation measure or composite performance

Lagging indicators

Functional status

- Count or percent of members able to independently complete activities of daily living

Quality of life and well-being index scores

- Gallup-Healthways Well-Being index, CDC Health Days

Absenteeism and presenteeism rates

- Measure of health related absences and/or presences, CDC Healthy Days Survey

Morbidity

- Rates for ER visits, hospital admissions, and preference-sensitive procedures

Healthcare claims cost

- Paid or allowed trends in members' claims

1. Continued

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

Commentary on Question:
The majority of candidates received partial credit for the calculations. Candidates are not required to show every step of the calculations below to receive full credit, but are expected to show a reasonable amount of work to demonstrate how they arrived at the correct answer. Only a minority of candidates adjusted the PPH to reflect the difference in the population between the baseline and intervention period.

PPH = potentially preventable hospitalization

Number of PPH needed: 18.8 = 1.00 * 211,000 * 2 / $22,500
PPH in baseline period: 54.6 = 700 * 7.8%
PPH in intervention period: 47.95 = 685 * 7.0%
All-cause hospitalizations (except PPH) in baseline period: 645.40 = 700 – 54.60
All-cause hospitalizations (except PPH) in intervention period: 637.05 = 685 – 47.95

PPH in baseline period per 1,000 members: 3.12 = 54.60 / (210,000 / 12,000)
PPH in intervention period per 1,000 members: 2.73 = 47.95 / (211,000 / 12,000)
All-cause hospitalizations (except PPH) in baseline period per 1,000 members: 36.88 = 645.40 / (210,000 / 12,000)
All-cause hospitalizations (except PPH) in intervention period per 1,000 members: 36.23 = 637.05 / (211,000 / 12,000)

Saved PPH per 1,000 members = 3.12 * (36.23 / 36.88) – 2.73
Saved PPH: 5.94 = 0.34 * (211,000 / 12,000)
Saved PPH cost: $133,731 = 5.94 * $22,500

Program cost: $211,000 = $1.00 * 211,000

ROI: 0.63 = $133,731 / $211,000

The EHM program **did not** achieve its ROI target of 2:1

2. Learning Objectives:

3. The candidate will understand and apply valuation principles for insurance contracts.

Learning Outcomes:

(3c) Calculate appropriate claim reserves given data.

(3g) Apply applicable standards of practice related to reserving.

Sources:

AAA Premium Deficiency Reserves Discussion Reports Pg. 7, 10, and 11.

Commentary on Question:

This question gauged the candidate's understanding of Premium Deficiency Reserves (PDR) and how and when to appropriately apply them. While most could list descriptions of when to set up a PDR most could not appropriately apply the principle – how it affects the financials. Most would state that a PDR needed to be applied in the current year for a future loss but then in application would apply the PDR in the same year as the loss, thus double-counting the loss.

Solution:

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

Commentary on Question:

This was a straightforward question measuring the candidate's understanding of when to consider setting up a PDR. Full credit was given for listing when to apply the PDR (both for near term and long term loss), and for providing the descriptions of False Positives and False Negatives

Principle 1: Situations that result in a PDR being established include the following:
- A block of business will experience losses over the near term, either because of overall premium inadequacy for that block, or because the losses on a particular subset within the block will exceed the profits on the other subsets.
- A block of business will be profitable in the near term, but long-term guarantees will cause it to be unprofitable over the projection period.

Principle 2: The PDR should be determined to minimize "false positives." That is, no PDR should be required unless there is a meaningful potential for loss.
Principle 3: The PDR also should be determined to minimize "false negatives." That is, a PDR should be required whenever there is an expectation for loss.

2. Continued

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

Commentary on Question:
Credit was given for correctly identifying that a PDR was needed for both the Group line of business and the Individual line of business, and that in aggregate, a PDR was not needed. Most readily identified that a PDR of 2 needed to be set up for the Individual line of business but assumed that the gain for the Group line of business in 2019 would offset the loss in 2020. Surprisingly many candidates failed to identify whether a PDR needed to be established when combining the blocks.

Line of Business	2019	2020	Total
Group	10	-3	
Individual	-2	5	
PDR on Aggregate	0	0	0
PDR on Block by Block	-2	-3	-5

(c) Calculate the total:

(i) Underwriting gain for each year

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

Show your work.

Commentary on Question:
Full credit was given for correctly setting up an income statement with and without setting up a PDR. Most candidates successfully showed the income statement and identified the underwriting gain without setting up a PDR. In spite of identifying Principle 1 in part a. that a PDR should be set up to offset a future loss, candidates did not correctly show the PDR for the Individual and Group lines of business and the decrease in surplus and lower underwriting gain due to a PDR of 2 for Group and 3 for Individual.

2. Continued

Without PDR

Block by Block	2017		2018	
	Group	Individual	Group	Individual
Premium	100	200	110	210
Incurred Claims	80	160	100	170
Exp & comm	10	30	10	30
PDR	0	0	0	0
UW Gain	10	10	0	10
Total		**20**		**10**

With PDR

Block by Block	2017		2018	
	Group	Individual	Group	Individual
Premium	100	200	110	210
Incurred Claims	80	160	100	170
Exp & comm	10	30	10	30
PDR	2	3	2	3
UW Gain	8	7	-2	7
Total		**15**		**5**

(d) Calculate for each year the total:

(i) Liabilities with PDR

(ii) Resulting surplus without PDR

(iii) Resulting surplus with PDR

Show your work.

Commentary on Question:
Full credit was given for identifying parts (i), (ii), and (iii). This was the practical application of the PDR that most candidates applied incorrectly. Many stated that no PDR was needed and answered (ii) and (iii) with the same answer. Others applied the PDR in the year that the loss was expected which resulted in the loss being double-counted in 2019 and 2020.

2. Continued

Balance Sheet

	2017	2018	2019	2020
Assets	500	510	515	520
Liabilities	400	403	410	420
PDR	5	5	3	0
Liabilities w/ PDR	**405**	**408**	**413**	**420**
Surplus w/o PDR	**100**	**107**	**105**	**100**
Surplus w PDR	**95**	**102**	**102**	**100**

(e) Describe the impact of PDR on surplus.

Commentary on Question:
In spite of misapplying when the PDR needed to be set up in part d., most candidates readily identified the fact that the point of establishing a PDR was to reduce surplus in an earlier year to reserve for a loss in a later year. Full credit was given for stating that establishing a PDR reduced surplus as well as identifying that the purpose of a PDR is to decrease volatility in the underwriting gain from year to year.

Establishing a PDR reduces surplus in the year that it is set up to account for losses in later years. The purpose of a PDR is to decrease volatility in the underwriting gain from year to year.

3. Learning Objectives:

3. The candidate will understand and apply valuation principles for insurance contracts.

4. The candidate will understand how to apply principles of pricing, risk assessment and funding to an underwriting situation.

Learning Outcomes:

(3c) Calculate appropriate claim reserves given data.

(4a) Understand the risks and opportunities associated with a given coverage, eligibility requirement or funding mechanism.

(4d) Describe and apply approaches to claim credibility and pooling.

Sources:

Group Insurance, Chapter 27

Solution:

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

Commentary on Question:

- *In order to get full credit, candidates must have listed the major items below.*
- *The majority of candidates did well on this part of the question.*

- Group Size
  - Because a certain level of resource is needed to compile, analyze, and communicate the experience specific to a particular policyholder, there is a critical mass below which it is not cost effective for the insurer to apply such a formula.
  - Further, a minimum size is needed to obtain some degree of statistical credibility in the first place.

- Contract Provisions
  - Regarding the Funding Arrangement, the choice of funding methods will have an impact on whether a retrospective formula will apply.
  - A retrospective premium arrangement, for example, substantially changes the risks under an insurance contract and such an arrangement will replace the normal experience rating formula.

3. Continued

- Company Policies and Practices
  - Regardless of the theoretical reasoning, an insurer's policies and practices will be an overriding factor.
  - Nonprofit insurers will only provide refunds in special circumstances, while mutuals generally have a contract clause providing for participation by almost every policyholder.

- Company Financial Situation
  - Unless a specified refund formula is guaranteed by the terms of the contract, the insurer's overall financial health is an overriding factor in any refund situation.
  - This is a relatively small concern for insurers with substantial surplus, but can be a significant concern for those with little surplus (ex: some Blue Cross plans).

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

Commentary on Question:

- *In order to get full credit, candidates must have listed the major items below with appropriate descriptions.*
- *The majority of candidates did very well on this part of the question.*
-

- Catastrophic claim pooling
  - Removing the portion of individual claims above a certain limit.
  - An average charge is made to all groups participating in this pool, regardless of whether a particular group actually had a catastrophic claim.

- Loss Ratio/Rate Increase Limits
  - Puts an upper limit on the loss ratio, which will be used in setting future rates.
  - This is equivalent to 2 other mechanisms that are used far more often:
    - Setting an upper limit on the % rate increase that a group will be charged; and
    - Setting an upper limit on the aggregate claim dollars a group will be charged (called aggregate stop-loss).

3. Continued

- Credibility Weighting
  - Credibility weighting starts by attaching a credibility factor to groups in each of various size categories.
  - This factor can be zero, one, or some value in between.
  - Incurred Claims after Pooling = C x Incurred Claims before Pooling + (1 – C) x Expected Incurred Claims

- Multi-Year Averaging
  - Combine several years of experience to smooth out the statistical fluctuations inherent in the experience of a single year.
  - Pooled Loss Ratio in Year Z = {5 x (Z's unpooled ratio)) + 3 x (Z -1)'s + 1 x (Z-2)'s} / 9.

- Combination Methods
  - Most of the pooling methods described above are not mutually exclusive methods.
  - They can be, and often are, used simultaneously.

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

Commentary on Question:

- *In order to get full credit, candidates must have made the calculations as indicated below.*
- *The majority of candidates did very well on this part of the question.*
- *Candidates that did not score well are those who did not get the correct calculations.*

3. Continued

Incurred Month	Cumulative Payments as of June 30, 2018 (A)	% of Ultimate (B)	Ultimate Payment (C) = (A) / (B)	Unpaid Balance (D) = (C) – (A)
17-Jul	1,590	100%	1,590	0
17-Aug	1,730	100%	1,730	0
17-Sep	1,795	100%	1,795	0
17-Oct	1,240	99%	1,253	13
17-Nov	1,490	98%	1,520	30
17-Dec	1,320	97%	1,361	41
18-Jan	1,165	95%	1,226	61
18-Feb	1,230	93%	1,323	93
18-Mar	1,400	91%	1,538	138
18-Apr	1,090	78%	1,397	307
18-May	640	60%	1,067	427
18-Jun	30	25%	120	90
		Total	**15,920**	**1,200**

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

Commentary on Question:

- *In order to get full credit, candidates must have made the calculations as indicated below.*
- *Few candidates did well on this part of the question.*
- *Candidates who did not score well are those who did not get the correct calculations.*

	July 1, 2015 – June 30, 2016	**July 1, 2016 – June 30, 2017**	**July 1, 2017 – June 30, 2018**	**Total**
Paid Premiums (A)	12,450	13,500	15,225	41,175
Pooled Premiums (B)	875	925	925	2,725
Net Premiums (C) = (A) – (B)	11,575	12,575	14,300	38,450
Paid Claims (D)	10,075	10,525	13,900	34,500
Pooled Claims (E)	375	450	675	1,500
Net Claims (F) = (D) – (E)	9,700	10,075	13,225	33,000
Delta IBNR (G)	110	430 = 540 - 110	660 = 1200 - 540	1,200
Incurred claims (H) = (F) + (G)	9,810	10,505	13,885	34,200
Retention charges (I) = 14%*(A)	1,743	1,890	2,132	5,765
Surplus (J) = (C) – (H) – (I)	22	180	-1,717	-1,515

3. Continued

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

Commentary on Question:

- *In order to get full credit, candidates must have made the calculations as indicated below.*
- *Few candidates did well on this part of the question.*
- *With the overall information provided in the question, well prepared candidates were expected to consider the pooled premiums and claims, as well as IBNRs, when calculating the Multi-year Averaged Loss Ratio. Candidates who calculated the Multi-year Averaged Loss Ratio on an incurred basis and used pooled premiums and claims received full credit. Partial credit was given to candidates who calculated other forms of a Multi-year Averaged Loss Ratio (i.e. on a paid basis and/or before pooling). The way this part of the question was graded, almost all candidates received some credit for having calculated a Multi-Year Averaged Loss Ratio, but those who took the calculation one step further, by also considering the pooling information and/or IBNRs, received more credit.*

	July 1, 2015 – June 30, 2016	**July 1, 2016 – June 30, 2017**	**July 1, 2017 – June 30, 2018**
Net Premiums (C)	11,575	12,575	14,300
Incurred Claims (H)	9,810	10,505	13,885
Loss Ratio (K) = (H) / (C)	84.8%	83.5%	97.1%
Credibility (L)	7.1%	28.6%	64.3%
Multi-year averaged LR (M) = sumproduct [K,L]	92.3%		

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

Commentary on Question:

- *In order to get full credit, candidates must have made the correct calculations under one of the four methods as indicated below.*
- *Few candidates did well on this part of the question.*

3. Continued

	For year ending:			
Method 1:	**2016-06-30**	**2017-06-30**	**2018-06-30**	**Total**
Profit from account experience:	22	180	-1,717	-1,515
Profit from pooled experience:	500	475	250	1,225
3% Risk Charge embedded in premiums:	374	405	457	1,235
Total profit/loss for this account:	**896**	**1,060**	**-1,010**	**946**
% of total premium:	7.2%	7.9%	-6.6%	2.3%

	For year ending:			
Method 2:	**2016-06-30**	**2017-06-30**	**2018-06-30**	**Total**
Paid Premiums	12,450	13,500	15,225	41,175
Less Paid Claims	10,075	10,525	13,900	34,500
Less Change in Reserve (IBNR)	110	430	660	1,200
Less Expenses	1,370	1,485	1,675	4,529
Total profit/loss for this account:	**896**	**1,060**	**-1,010**	**946**
% of total premium:	7.2%	7.9%	-6.6%	2.3%

	For year ending:			
Method 3:	**2016-06-30**	**2017-06-30**	**2018-06-30**	**Total**
Company Loss Ratio	81.8%	81.1%	95.6%	86.7%
(1-Loss Ratio) * Premium	2,265	2,545	665	5,475
Less Expenses	1,370	1,485	1,675	4,529
Total profit/loss for this account:	**896**	**1,060**	**-1,010**	**946**
% of total premium:	7.2%	7.9%	-6.6%	2.3%

	For year ending:			
Method 4:	**2016-06-30**	**2017-06-30**	**2018-06-30**	**Total**
Client Loss Ratio	84.8%	83.5%	97.1%	
(1-Loss Ratio) * Net Premium	1,765	2,070	415	4,250
Less Expenses	1,370	1,485	1,675	4,529
Profit for pooled experience	500	475	250	1,225
Total profit/loss for this account:	**896**	**1,060**	**-1,010**	**946**
% of total premium:	7.2%	7.9%	-6.6%	2.3%

4. Learning Objectives:

2. The candidate will understand how to evaluate healthcare intervention programs.

Learning Outcomes:

(2b) Estimate savings, utilization rate changes and return on investment.

(2e) Apply the actuarially adjusted historical control methodology.

(2f) Calculate chronic and non-chronic trends in a manner that reflects patient risk.

Sources:

Managing and Evaluating Healthcare Intervention Programs, 2nd edition, Ian Duncan CH 8, 12, & 13

Commentary on Question:

This question was designed to test the candidate's understanding of methods to evaluate healthcare intervention programs including return on investment (ROI) calculations. Candidates were asked to describe the actuarially adjusted historical methodology and were asked to calculate ROI of the disease management program. Most candidates were able calculate the ROI correctly in part B but struggled to fully describe the actuarially adjusted historical methodology as well as recommending alternate financial measurements.

Solution:

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

Commentary on Question:

Most candidates scored well on this section. However, some candidates only mentioned how to evaluate DM programs without describing the Actuarial Adjusted Historical Control Methodology

The Actuarially-Adjusted Historical Control Methodology is used to evaluate DM programs. Key features of this method include:

1. Objective criteria are used to determine which members will be included in the reference and intervention populations
2. Equivalence between the reference and intervention period populations is assumed to result from the symmetric treatment of members in each period
3. Generally the intervention program begins before or simultaneously with, the measurement period, however, the periods need not be continuous; the measurement period may be adjacent to the baseline period, or not
4. Savings are not measured directly. Instead they are derived as the difference between an estimated statistic projected from the baseline period and the actual statistic from the intervention period
5. Trend factor that adjusts historical experience to an estimate of current period experience, absent intervention

4. Continued

6. This methodology is an open group method, since a comparable (but not identical) population is selected according to the same criteria in each period. Whereas, a closed group (or cohort) method uses the exact same population in both periods

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

Commentary on Question:
Many candidates scored well on this section. However, some candidates did not understand how to adjust for the change in population between terminating, continuously enrolled and new entrants. Additionally, candidates were supposed to trend the baseline utilization as well as adjust for changes in population before comparing to actual results.

Baseline Admits

	Baseline		Year 1	
Group	Annual Admit / 1000	Membership %	Annual Admit / 1000	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
- Year 1 Cost / Admin: $8,000

Estimated Baseline Admits / 1000 using Year 1 (intervention) membership distribution:

- 600*25% + 400*70% + 200*5% = 440 admits/1000

Expected Admits/1000 in Year 1 for Baseline population:

- 440 admits / 1000 * 1.05 (utilization trend) = 462 admits/1000

Actual Admits/1000 in Year 1:

- 610*25% + 380*70% + 180*5% = 427.5 admits/1000

Reduction in admits/1000 due to DM program:

- 427.5 admits / 1000 (actual) – 462 admits / expected (expected) = -34.5 admits/1000

Gross program savings = Reduction in Admits * Members * Cost Per Admit:

- -34.5 * 50,000 / 1000 * $8,000 per admit = $13,800,000

4. Continued

Cost of program:

- $8 * 50,000 * 12 = $4,800,000

ROI = Total Program Savings/Total cost of program:

- $13,800,000/$4,800,000 = 2.875 or 287.5%

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

Commentary on Question:
Most candidates provided a recommendation, but not many justified their recommendations.

An alternative measure to ROI is Total Savings and/or Net Savings either in an aggregate basis or on a PEPM/PCPM. For example: the benefit of net savings is that it illustrates how much the program is saving in absolute dollars after factoring in the cost of the program. These savings can be converted to a PEPM / PCPM that will provide an easier comparison to the total impact on the overall health care cost for the entire group / population. Whereas, with an ROI, it is difficult to tell if the ROI results are due to high savings, low cost, sub-optimal program design or random fluctuations. Additionally, a high ROI on minimal members managed will have negligible impact on overall trend.

5. Learning Objectives:

1. The candidate will understand how to evaluate the effectiveness of traditional and leading edge provider reimbursement methods from both a cost and quality view point.

Learning Outcomes:

(1a) Calculate provider payments under standard and leading edge reimbursement methods.

(1b) Evaluate standard contracting methods from a cost-effective & quality perspective.

Sources:

Milliman Report on Provider Risk Arrangements (Payment Models and Risk)
Group Insurance, Chapter 30

Commentary on Question:

Candidates generally did well on this question. Candidates who performed poorly didn't provide responses relevant to the questions asked, or demonstrated a poor understanding of how insurance or hospital systems view costs and risks.

Solution:

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

Commentary on Question:

Candidates in general did well on this part of the question; however, some candidates mistakenly calculated the discount relative to the allowed cost instead of the billed cost.

Current contract Billed Cost for Hospital A = $1,600/0.50 = $3,200
Revised discount if allowed cost equaled ASC= 1-$1,250/$3,200 = 60.9%

(b) 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."

Critique the sales team's statement.

5. Continued

Commentary on Question:
Candidates often missed the opportunity to highlight savings varying with the mix of services, and the group's own utilization and how that would (or wouldn't) be impacted by the new design. For this reason, candidates did not score as well on this part as they did on part (a).

There may or may not be premium savings. You need to know how much utilization the group has for hospitals and ASCs. Savings are most likely if the group has a lot of utilization at hospitals that could be steered to ASCs. The mix of services (along with location of the group) is an important underwriting consideration.

(c) 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

Commentary on Question:
Candidates generally did well on this part. To receive maximum credit, it was important to compare and contrast. Performance risk was the most commonly misunderstood risk by candidates

FFS
Utilization Risk
- As utilization increases, provider profit increases

Technical Risk
- Typically low risk, as it is easy to implement

Insurance Risk
- Little to no risk due to changes in population
- Provider profits higher if more expensive services are used

Performance Risk
- Performance risk occurs if claims administrators do not monitor nonspecific codes

5. Continued

Global Capitation

Utilization Risk

- Opposite impact of utilization risk as the FFS model
- I.E. As utilization increases, provider profit decreases

Technical Risk

- Technical risk high for global capitation compared to FFS
- Complex systems required to implement capitation

Insurance Risk

- Higher insurance risk in global capitation vs. FFS models
- Provider assumes risk when costs of members is higher than what was negotiated

Performance Risk

- Level of risk in FFS and global capitation models will vary based on specific contract provisions
- Provider has high risk due to financial responsibility for members

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

Commentary on Question:
Candidates generally did very well on this part. Common errors included not trending for two years, trending maternity and SNF utilization and not reporting the answer as PMPM. Partial credit was awarded to candidates with arithmetic errors when a clear response was provided.

Calculate Projected Utilization per 1,000 in 2019:

Hospital Inpatient	
Medical	62.4 days = 60.0 * 1.02 * 1.02
Surgical	52.0 days = 50.0 * 1.02 * 1.02
Alcohol & Drug Abuse	5.2 days = 5.0 * 1.02 * 1.02
Maternity	35.0 days
Skilled Nursing Facility	5.0 days
Hospital Outpatient	
Emergency Room	66.2 visits = 60.0 * 1.05 * 1.05
Surgery	19.2 visits = 20.0 * 0.98 * 0.98

5. Continued

Calculate Projected Average Cost per service in 2019:

Hospital Inpatient	
Medical	$3,183 = $3,000 * 1.03 * 1.03
Surgical	$5,305 = $5,000 * 1.03 * 1.03
Alcohol & Drug Abuse	$350
Maternity	$2,500
Skilled Nursing Facility	$430
Hospital Outpatient	
Emergency Room	$1,270
Surgery	$1,600

Calculate Projected PMPM Cost in 2019:

Hospital Inpatient	
Medical	$16.56 = $3,183 * 62.4 / 12,000
Surgical	$23.00 = $5,305 * 52.0 / 12,000
Alcohol & Drug Abuse	$0.15 = $350 * 5.2 / 12,000
Maternity	$7.29 = $2,500 * 35.0 / 12,000
Skilled Nursing Facility	$0.18 = $430 * 5.0 / 12,000
Hospital Outpatient	
Emergency Room	$7.00 = $1,270 * 66.2 / 12,000
Surgery	$2.56 = $1,600 * 19.2 / 12,000

The sum of these categories is the cap rate for Hospital A of $56.74

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

Commentary on Question:
Some candidates responded based on a list from the syllabus which did not pertain to the question asked. Credit was not awarded in this case.

- Hospital A may believe it can manage utilization of services and have an opportunity to gain financially.
- The population characteristics may be stable and predictable for projecting cost.
- May have reporting capability and system requirements to handle a capitation model.

5. Continued

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

(i) FFS

(ii) Global capitation

Commentary on Question:
Candidates struggled with mitigation for FFS but generally did well on the capitation response.

(i) FFS
- Ensure resources (IT systems, billing staff) are in place to ensure services are captured and billed correctly
- Ensure inflation provisions are appropriate and reflect the hospital's expected changes in costs

(ii) Global capitation
- Carve out specific high-cost services when determining a capitation rate
- Cost targets can be risk-adjusted to account for changes in the underlying population (demographics, morbidity, severity).
- A stop-loss provision may also be added to mitigate potential future losses.

6. Learning Objectives:

3. The candidate will understand and apply valuation principles for insurance contracts.

Learning Outcomes:

(3b) Explain the limitations and biases of the traditional valuation methods.

(3c) Calculate appropriate claim reserves given data.

(3d) Reflect environmental factors in reserve calculations (trend, seasonality, claims processing changes, etc.)

(3e) Evaluate data resources and appropriateness for calculating reserves.

Sources:

Group Insurance, Chapter 38, "Claim Reserves for Long-Term Benefits"

Solution:

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

Commentary on Question:

Candidates generally performed well on this part. Some candidates simply listed items and did not describe them, receiving only partial credit.

Periodic Benefits: Unlike most short-term health products, LTD and LTC plans typically have a benefit equal to a specified monthly or daily amount. LTD plans generally specify a monthly indemnity amount, often as a percentage of covered salary. LTC plans generally reimburse actual expenses up to a specified daily benefit amount.

Long-Term Benefit Periods: LTD and LTC plans have maximum benefit periods that are quite long relative to other health benefits. The maximum benefit period for LTD is often to age 65 or to the Social Security normal retirement age. LTC plans often specify a lifetime dollar maximum benefit, which determines the maximum length of time for which benefits may be paid.

Elimination Periods: The elimination period is the period of time after someone experiences the insured event under the policy, but before benefits begin to accrue. LTD and LTC plans offer a variety of elimination periods, often 90 days or more.

Optional Benefits: Both LTD and LTC plans offer a variety of optional benefits that may affect the timing or the amount of monthly payments. Examples of optional benefits include partial disability benefits (which pay an amount less than the monthly benefit if the person is able to work part-time while disabled) and cost of living adjustments (which increase a benefit by an inflation factor while a person is disabled).

6. Continued

Integration of Benefits: LTD plans often contain provisions that reduce the amount of benefits paid to reflect social insurance benefits received while disabled (such as Social Security or Worker's Compensation). LTC plans typically integrate with Medicare long-term care benefits.
Limitations and Exclusions: Certain types of claims, such as intentionally self-inflicted injuries, are excluded from coverage altogether, and need not be considered in claim reserves. Other types of claims may be subject to limited pay periods, which should be reflected in the reserving process. One common example consists of mental illness claims, which are often limited to a payment period of two years over the lifetime of the claimant for LTD policies.

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

Commentary on Question:
Candidate performance was varied on this part and in general not as strong as other parts of this question. Credit was given for a variety of approaches, as long as they were reasonable, since there was room for interpretation and the source material did not include a numerical example similar to this question. Specifically, if different variables/assumptions were used regarding interest discounting or persistency, full credit was given provided the candidate clearly documented his/her work.

(a) Time (years)	(b) Premium	(c) = (0.90 x 0.995)^(a) Persistency	(c) = 1.03^-(a) Interest	(d) = (a) x (b) x (c) Total Premium
0	1,500	1.00	1.00	1,500.00
1	1,500	0.90	0.97	1,304.13
2	1,500	0.80	0.94	1,133.83
3	1,500	0.72	0.92	985.77
4	1,500	0.64	0.89	857.05
			Total	**5,780.78**

Return of premium benefit = Present Value of Premium Returned x Probability of Returning Premium = 1,500 x 5 x 1.03^(-5) x 0.90^(4) x 0.995^(5) = 4,139.62

Return of Premium % = 4,139.62 / 5,780.78 = 71.6%

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

Commentary on Question:
Candidate performance was very strong on this part.

6. Continued

Month	(a) Reported Claims ($ millions)	(b) Completion Factor	(c) = (a) / (b) Estimated Ultimate Claims ($ millions)	(d) = (c) – (a) IBNR ($ millions)
Dec 2019	1	10%	10	9
Nov 2019	2	20%	10	8
Oct 2019	10	90%	11.11	1.11
Sep 2019	15	100%	15	0
Aug 2019	14	100%	14	0
			Total	**18.11**

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

Commentary on Question:
Candidates were generally able to describe at least one flaw, and full credit was given for describing two or more flaws. Answers were accepted in regards to either cancer or LTC/LTD products as both are referred to in other parts of this question. The sample solution uses the cancer product.

Because the product is a new product, there is not sufficient data to perform a study to use the percent of premium methodology, which would lead to results that are not credible or stable. The return of premium feature included with the product would also lead to additional complications in using the percent of premium methodology.

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

Commentary on Question:
Candidates generally did well on this part. Candidates who did not earn full credit tended to not provide justification for their recommendation or recommended an approach for disabled life reserves where information about the claimants is known, which is not the case for incurred but not reported reserves. Answers were accepted in regards to both cancer and LTC/LTD products, with the sample solution using the cancer product.

The loss ratio method is a better alternative because there is not a lot of historical data, and other reserving methods rely on historical data. The loss ratio method relies heavily on the pricing actuarial work and expectations. However, an adjustment to this method's loss ratio target and premium is needed since there are two benefits delivered, and a high proportion of the premium is for the return of premium benefit and will occur in the future.

6. Continued

Because of the low lag method completion factors in months 1 and 2, the most preferable method would be a combination method, which would use the lag method for month 3, but the adjusted loss ratio method for months 1 and 2.

7. Learning Objectives:

4. The candidate will understand how to apply principles of pricing, risk assessment and funding to an underwriting situation.

Learning Outcomes:

(4a) Understand the risks and opportunities associated with a given coverage, eligibility requirement or funding mechanism.

(4b) Understand, evaluate and apply various risk adjustment mechanisms.

(4c) Recommends strategies for minimizing or properly pricing for risks.

Sources:

Level Funding: An Alternative to ACA for Small Groups

Commentary on Question:

Candidates were asked to demonstrate knowledge of three types of funding arrangements for small groups, demonstrate a calculation of rates for the three groups, and make a recommendation on whether level funding should be offered to the healthy group.

Most candidates correctly answered the knowledge portion of the question, had difficulty with the calculation and made some recommendation. Few candidates addressed the full impact of their recommendation.

Solution:

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

Commentary on Question:

Candidates were given partial credit if they stated how experience was segregated (first bullet point), and full credit if six other bullet points were addressed.

7. Continued

	Fully Insured	Self-Funded	Level Premium
Rating	Experience is pooled with all other small groups	Experience of only the group can be used	Experience of only the group can be used
	Must follow ACA rating rules.	Not limited to small group rating rules	Not limited to small group rating rules
	Limited to 3:1 age rating and Area rating	Can use large group rating factors	Can use large group rating factors
	No Underwriting	Fully Underwritten	Fully Underwritten
	Group does not directly benefit from favorable claims	Group directly benefits from favorable claims	Group directly benefits from favorable claims.
Premium	Level Premium guaranteed for 12 months	Monthly Claims fluctuations can impact an employer's cash flows	Provides a level premium payment with potential refund after the year end
Insurer	Insurer takes the Risk that a group's experience will be worse than the projected pool	No risk to the insurer	Stop loss insurer at risk for excessive and large claims
Employer	No risk to employer	Employer at risk that claims will exceed projections	No risk to employer
Taxes and fees	Premiums include cost of state and federal mandates	Not required to include state mandates	Not required to include state mandates
	Premiums include premium taxes and ACA fees	No premium taxes or ACA fees	No premium taxes or ACA fees
Risk Adjustment	Insurer can receive payments if higher than average risk of group	No risk adjustment program	No risk adjustment program
Risk Charge	Included in the premium	No Risk Charge Payment	Risk Charge in stop loss

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

Commentary on Question:
Most candidates described the movement of healthy and unhealthy groups as well as the impact. Few addressed that carriers with higher risk were not adequately compensated for that risk.

Since small group transitional plans were allowed to continue rating and underwriting methods that existed prior to the implementation of the ACA, younger and healthier groups maintained these plans due to having lower premiums than the ACA plans. Older, less healthy groups moved to the ACA plans to obtain lower rates and/or richer benefits. The carriers that had higher than average risk in the ACA markets were not adequately compensated for that risk.

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

Commentary on Question:
The Risk Adjustment calculation was an approximation based on the information given. If the candidate stated that insufficient information was given for a Risk Adjustment calculation, full credit was given for this portion.

7. Continued

$$IC\ PMPM = \frac{45 * \$150 + 30 * \$400 + 45 * \$650}{120} = \$400$$

RA Receivable = (Group Risk Score -1.0) * ACA Market Avg Prem = $36.75

$$Required\ Premium = \frac{(Inc\ Claim - RA\ Receivable)}{(1 - admin)} = \$454.06$$

Group Rate = Req Prem * Mem Cal Factor / Group Cal Factor = 454.06 * 1.21 / 1.36 = $401.58 (ABC); $446.05 (LMN); $492.85 (XYZ)

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

Commentary on Question:
Candidates needed to give a brief description of each component to earn full credit.

ASO fee - Covers the administration and selling expenses associated with a group's health plan

Specific stop loss - Fee depends upon the level of the stop loss deductible

Aggregate Stop Loss - Fee covers the cost of claims that exceed a certain percentage above the projected claims cost

Paid Claims Fund - Product of the aggregate stop loss corridor and the group's projected paid claims below any specific stop loss deductible

Reserve Fund - Covers claims incurred during the projection period but paid afterwards

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

Commentary on Question:
As in part C, if a candidate stated that insufficient information was given for a risk adjustment calculation, full credit was given for this portion of the calculation.

7. Continued

$$IC\ PMPM\ =\ \frac{30 * \$400 + 45\ \ * \$650}{75} = \$550$$

Each Member Risk Score divided by 1.2. RA Receivable = (Group Risk Score - 1.0) * ACA Market Avg Prem = $78.00

$$Required\ \ Premium = \frac{(Inc\ Claim - RA\ Receivable)}{(1 - admin)} = \$590.00$$

Group Rate = Req Prem * Mem Cal Factor / Group Cal Factor = 590.00 * 1.344 / 1.442 = $549.93 (LMN); $607.63 (XYZ)

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

Commentary on Question:
Full credit was given to candidates as long as the impact of their recommendation (either to offer or not offer the level funding product) was accurately described.

I do not recommend offering the level funding product. Group ABC would benefit significantly from moving to level funding at the expense of the ACA pool. Since the insurance company would need to raise its ACA premiums significantly, this would mean they would be less competitive and their pool would start to spiral.

8. Learning Objectives:

2. The candidate will understand how to evaluate healthcare intervention programs.

Learning Outcomes:

(2a) Describe, compare and evaluate programs.

(2b) Estimate savings, utilization rate changes and return on investment.

Sources:

Managing and Evaluating Healthcare Intervention Programs, Duncan, Chapter 8

Commentary on Question:

Candidates who understood the general content of this chapter did well, however a large number of candidates struggled on part b, calculation of rate of return on investment (not ROI), and part c, explaining how the Pareto Principle relates to this care management program.

Solution:

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

Commentary on Question:

This question asked candidates for a specific list in the text; candidates who recalled the relevant material did well. Candidates who did not recall the list frequently ignored the improved clinical outcomes in their responses, instead focusing on adverse morbidity or on other issues that would likely have resulted in unfavorable clinical outcomes relative to expectations. Answers that were not consistent with improved clinical outcomes did not receive credit.

Reasons financial results may not be achieved despite improved clinical outcomes include:

- Measurement of financial outcomes is not stable or measurement techniques not sensitive enough;
- Programs were not focused on financial outcomes or were not structured to optimize financial outcomes;
- Program sponsors do not understand economics of DM program and therefore do not optimize program for financial return; and
- Improvements in quality of care do not always lead to lower cost. Some improvements may actually increase costs, but still be worth the investment on other grounds.

8. Continued

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

Commentary on Question:
This part of the question asked candidates for a rate of return on investment, and provided information necessary to calculate the internal rate of return. Some candidates made explicit assumptions about payment timing, such as costs being incurred at the beginning of the year and savings being obtained at the end of the year. As long as the candidate indicated these assumptions and correctly derived the accompanying rate of return, full credit was given.

The majority of candidates appear to have focused on the "return on investment" wording in the question, and proceeded along that path. The problem did not provide sufficient information to calculate return on investment for a multi-year program – specifically, there was no interest rate provided that could have been used for evaluating the time value of money. Additionally many students provided separate ROIs for both years of the program, ignoring its multi-year nature. Partial credit was given to candidates who calculated an ROI, however overall candidates who focused on ROI in part (b) did poorly.

The expected rate of return on investment is such that the present value of costs equals the present value of savings.

PV(Savings) = 500/(1+i) + 7,000/(1+i)^2
PV(Costs) = 2,000/(1+i) + 500/(1+i)^2
(or 2000 + 500/(1+i) - if assumes costs incurred at beginning of the year)

setting the two equal and solving for i gives 333%
(or 87.1% when costs are assumed to be incurred at the beginning of the year and savings at the end of the year)

(c) 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

8. Continued

Commentary on Question:
This part of the question required candidates to both recall the Pareto principle and then apply it to three separate scenarios. The Pareto principle is one of the core economic issues that complicates efforts to reduce health care costs, and as such this question is very relevant to the big picture of controlling and reducing health care costs.

Candidates struggled to recall the Pareto principle (this can be found on page 170 of Managing and Evaluating Healthcare in Chapter 8). As such, they often struggled to apply it. Partial credit was given when candidates provided answers that addressed implications of the majority of costs being concentrated in a relatively small subset of the population, even if no understanding of the Pareto principle itself was provided. Candidates who performed poorly on Part B often provided responses that had nothing to do with the Pareto principle. In particular, these students often assumed that year 1 was a bad year and year 2 was a good year, rather than identifying the costs in Year 1 as being more likely driven by high start-up costs for the program.

(i) The Pareto Principle states that a small percentage of any population accounts for a disproportionately high percentage of expenses. A program designed to manage high cost, complex, chronic members should focus on the most expensive members that have been persistently in the highest cost cohort in order avoid being potentially wasteful if high intensity resources are used on members who would not benefit from it.

(ii) The ROI of a program that is designed using the Pareto Principle should be inherently high. The risk management economic model illustrates decreasing returns to intervention program as the size of the population increases. It also shows there is an optimum level of penetration, given the availability and cost of resources.

(iii) The marginal cost of additional members or groups of members declines from the highest cost. Expanding the intervention program materially will add additional marginal costs without the benefit of the same high ROI.

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

Commentary on Question:
Many candidates focused on disease management programs in general rather than focusing on expansion of an existing multi-year program with both high up-front costs and high return over time. In order to receive full credit, the response needed to be specific to the care management program described in this question.

8. Continued

Risks:

- The ROI will likely decrease as the low hanging fruit of the highest cost members is no longer available.
- The insurer should be careful not to expand the intervention program too far beyond the initial scope, especially given the high upfront costs
- Given the multiyear timeline, members may not be with the insurance plan for the second year in order to realize and recoup expenses

Opportunities:

- Given the high starting ROI, the program will likely still be profitable with expansion
- The program will likely result in better outcomes for members, even if ROI isn't as high as the original program.

9. Learning Objectives:

4. The candidate will understand how to apply principles of pricing, risk assessment and funding to an underwriting situation.

Learning Outcomes:

(4a) Understand the risks and opportunities associated with a given coverage, eligibility requirement or funding mechanism.

(4c) Recommends strategies for minimizing or properly pricing for risks.

(4d) Describe and apply approaches to claim credibility and pooling.

Sources:

The Role of the Actuary in Self-Insurance, Sections 4.1, 4.2, 4.3, 4.6, 5.3

Group insurance Ch. 27 - page 479-481

Commentary on Question:

Overall, candidates did very well on this question. Most candidates were able to thoughtfully describe the topics being asked and calculate the math portion correctly.

Solution:

(a)

(i) Describe how each regulation applies to Moonraker.

(ii) Identify provisions of US regulations Moonraker would no longer have to comply with if self insured.

Commentary on Question:

Many candidates were able to correctly describe applicable regulations, but several candidates failed to identify the names of the regulations they were describing. The latter was needed to earn full credit on this question.

(i)

ERISA – significant reporting and disclosure requirements, fiduciary requirement for plan sponsors, non-discrimination requirements for self-funded plans

COBRA – requirement to offer continuation of coverage in case of certain qualifying events (terminated employees, dependents of employees losing coverage)

9. Continued

ACA - Mandates employers to provide minimum essential affordable health coverage that exceeds a minimum value, facing penalties otherwise, Establishes a 40 percent excise tax on the "high-cost" portion of employer-sponsored health plans, also known as the Cadillac tax, etc.

(ii)

State mandates
Rating variation restrictions of ACA
EHB mandates of ACA

(b) List advantages and disadvantages of self insurance for Moonraker.

Commentary on Question:
Candidates did extremely well on Part b. Nearly all candidates listed enough advantages and disadvantages to earn full credit.

Pros	**Cons**
Saves cost of state premium tax	Plan holds risk – no risk transfer
No requirement to comply with state benefit mandates	Financial risk
Avoids paying Health Insurer Fee (HIF) under ACA	Operational risk
Avoids paying insurer risk charge	Litigation risk

(c) Recommend two strategies to manage the additional risk associated with self insurance. Justify your response.

Commentary on Question:
Most candidates were able to identify at least two strategies. Candidates who did not provide any explanation or rationale behind their recommendations did not receive full credit.

- Stop Loss: Specific and/or aggregate
  Converts risk of large claims (size and/or quantity) into a 'known' stop loss premium
- Benefit Plan Design
  - > Implement another CDHP
  - > Implement a wellness program
  - > Implement a disease management program

  Adds member incentives to better manage health which will reduce the medical plan's trends and claims costs

9. Continued

(d) Compare and contrast the impacts on Moonraker of including the following features in the stop loss contract:

(i) Lasers

(ii) Aggregating specific deductible

Commentary on Question:
Candidates struggled to compare and contrast as the question asked. Most candidates described each of the two methods independently, but failed to connect the two to demonstrate an understanding of overlaps and differences.

Lasering & Agg Spec – Compare
- Both reduces SL premium
- Both reduces profit margin/admin paid to SL carrier

Lasering & Agg Spec - Contrast
- Lasering carriers a larger unknown risk burden – the risk associated with agg spec is finite and quantifiable
- Lasering creates a gap in coverage
- Agg Spec reduces stop loss premium $ for $, typically, while the value for lasering is usually less linear

(e) Calculate the claims reimbursement expected for each of the proposals. Show your work.

Commentary on Question:
Most candidates did very well on Part E and earned full credit.

Claimant	Total Claims	Prop A	Prop B	Prop C
Claimant J	$125,000	0	0	0
Claimant A	$500,000	$250K	$150K	0
Claimant M	$185,000	0	0	0
Claimant E	$135,000	0	0	0
Claimant S	$300,000	$50K	$50K	$50K
Claimant B	$150,000	0	0	0
Claimant O	$160,000	0	0	0
Claimant N	$275,000	$25K	$25K	$25K
Claimant D	$195,000	0	0	0
Total		**325K**	**225K**	**75K**

10. Learning Objectives:

4. The candidate will understand how to apply principles of pricing, risk assessment and funding to an underwriting situation.

Learning Outcomes:

(4d) Describe and apply approaches to claim credibility and pooling.

Sources:

A Practical Approach to Assigning Credibility for Group Medical Insurance Pricing;
Group Insurance Ch. 30;
Individual Health Insurance Ch. 4;

Commentary on Question:

Candidates performed well on this item.

Solution:

(a) Calculate the credibility of the two cohorts. Show your work.

Commentary on Question:

The credibility only needed to be calculated for 2018 to receive full credit. Most candidates correctly identified the formula, set n for each group, and calculated the resulting credibilities.

$z = [k1 + (n - 1)*k2] / [1 + (n-1)*k3]$

$n_{low + medium} = 8925 + 2600 = 11{,}525$
$n_{high} = 725$

$z_{low+medium} = [.25 + (11525 - 1) * .01] / [\ 1 + (11525 - 1) * .01\ ] = 99.35\%$
$z_{high} = [.25 + (725 - 1) * .01] / [\ 1 + (725 - 1) * .01\ ] = 90.9\%$

(b) Describe how factors, other than the number of members, could influence the credibility.

Commentary on Question:

Most candidates listed and described the impact of these factors.

10. Continued

At least two of the following, including a description of whether the factor increases or decreases credibility, were required for full credit.

- Turnover – higher turnover decreases credibility
- Demographics – younger members have fewer claims, so a younger population would be less credible compared to an older population
- Stop loss coverage – a lower pooling point would increase credibility by removing outlier claims
- Exposure period – multiple years of data would increase credibility, and a partial year of data would decrease credibility

(c) Evaluate whether or not Moonraker should stratify the rating groups by risk. Justify your response.

Commentary on Question:
Most candidates focused on providing detailed descriptions for only one or two of the aspects above, rather than demonstrating a more holistic view of considerations for their recommendation.

A clear recommendation and at least three of the considerations below were required for full credit.

- Anti-selection – separating high risk pools from low/ medium risk pools would set up the plan for anti-selection, especially in cases where choice is involved. This results in potential premium leakage and the buy-down effect, which would result in plans not being adequately funded.
- Regulatory – HIPAA does not allow contributions based on the relative health status of employees
- Changes in health status – health status is fluid and the high risk pool today may not be representative of the high risk pool in the future. As turnover increases, the credibility would decrease.
- Credibility – segregating the risk pools would reduce the credibility of each group.

Therefore, Moonraker should not stratify into different risk pools.

11. Learning Objectives:

1. The candidate will understand how to evaluate the effectiveness of traditional and leading edge provider reimbursement methods from both a cost and quality view point.

Learning Outcomes:

(1d) Understand accountable care organizations and medical patient home models and their impact on quality, utilization and costs.

Sources:

GHA-124-19: Medicare Shared Savings Program in the Quality Payment Program

Commentary on Question:

Overall, candidates performed moderately well on this question. The intent of the question was for candidates to demonstrate understanding of the quality payment programs under MACRA. Candidates generally performed well with the math portions of the question, while they struggled with definitions and recommendations.

Solution:

(a) Describe the Quality Payment Program under MACRA.

Commentary on Question:

Most candidates received partial credit for this part. Many candidates described quality improvement programs in general, but the intent of the question was to describe this specific program.

- The Quality Payment Program policy will reform Medicare Part B payments for more than 600,000 clinicians across the country, and is a major step in improving care across the entire health care delivery system.

- Clinicians will choose how they want to participate in the Quality Payment Program based on their practice size, specialty, location, or patient population.

- Two tracks to choose from:
  - Advanced Alternative Payment Models (APMs)
  - Merit-based Incentive Payment System (MIPS)

(b) Define Alternative Payment Models (APMs) under MACRA.

Commentary on Question:

Similar to part (a), many candidates described payment programs in general, while the intent of the question was to define this specific program under MACRA. Additionally, many candidates defined <u>Advanced</u> APMs, as opposed to APMs.

11. Continued

- An Alternative Payment Models (APM) is a payment approach, developed in partnership with the clinician community, that provides added incentives to clinicians to provide high-quality and cost-efficient care.
- APMs can apply to a specific clinical condition, a care episode, or a population.
- As defined by MACRA, APMs include:
  - CMS Innovation Center Model
  - MSSP
  - Demonstration under the Health Care Quality Demonstration Program
  - Demonstration required by federal law

(c) Determine whether or not SACO's clinicians would be considered Qualifying APM Participants for each year. Show your work.

Commentary on Question:
Candidates generally did well on this part. The most common error was not identifying that SACO's physicians were not eligible to be Qualified APM Participants in 2018 since Track 1 MSSP is not an Advanced APM. Additionally, some candidates only calculated the Percentage of Payments ratio or the Percentage of Patients ratio, when both were required.

SACO's clinicians are not eligible to be Qualifying APM Participants in 2018 since they only had payments through Track 1, which is not an Advanced APM.

For 2019-2021, calculate the Percentage of Payments and Percentage of Patients ratios. Compare to the thresholds provided in the case study (SACO Email 2). For each year, if the providers meet at least one of the two thresholds, then they would be considered Qualifying APM Participants for that year.

	Performance Year	2019	2020	2021
A	Part B Payments through Track 1 MSSP	0	0	0
B	Part B Payments through Track 3 MSSP	310,000	340,000	540,000
C	Total Part B Payments	690,000	700,000	710,000
D = B ÷ C	**Percentage of Payments through an Advanced APM**	**44.9%**	**48.6%**	**76.1%**
E	Attributed Beneficiaries through Track 1 MSSP	0	0	0
F	Attributed Beneficiaries through Track 3 MSSP	60	65	100
G	Attribution-Eligible Beneficiaries	160	200	210
H = F ÷ G	**Percentage of Patients through an Advanced APM**	**37.5%**	**32.5%**	**47.6%**

11. Continued

	2019	2020	2021
Threshold for Percentage of Payments	50%	50%	75%
Threshold for Percentage of Patients	35%	35%	50%

2019: meets the Threshold based on Percentage of Patients
2020: does not meet either criteria; not a qualifying APM
2021: meets the Threshold based on Percentage of payments

(d) Design a strategy for SACO to increase its Threshold Score. Justify your response.

Commentary on Question:
Most candidates received partial credit for this part. Full credit responses included specific strategies to increase the Threshold Score.

In order to increase its Threshold Score, SACO could implement a marketing campaign in their service area to increase awareness with attribution-eligible beneficiaries with the intention to increase utilization of SACO providers.

SACO could refine their list of providers participating in the MSSP to increase the number of providers that provide a high proportion of Part B services.

SACO could consider participating in additional Advanced APMs to increase the amount of attributed beneficiaries and Part B payments. In addition to their current participation in Shared Saving Program Track 3, they could participate in:

- Comprehensive End State Renal Disease Care Model
- Comprehensive Primary Care Plus (CPC+)
- Oncology Care Model

12. Learning Objectives:

3. The candidate will understand and apply valuation principles for insurance contracts.

Learning Outcomes:

(3c) Calculate appropriate claim reserves given data.

(3e) Evaluate data resources and appropriateness for calculating reserves.

(3g) Apply applicable standards of practice related to reserving.

Sources:

GHA-103-16: Health Reserves (Lloyd)
ASOP 23

Commentary on Question:

This question was trying to evaluate the candidate's ability to understand reserving processes and ASOP 23, and be able to translate that knowledge into realistic recommendations.

Solution:

(a) Describe considerations and limitations to your review of Quantum's data.

Commentary on Question:

In general, candidates did fairly well on this section. Several candidates only listed considerations and not limitations. Partial credit was given in this case.

Considerations

- Actuaries are assumed to have sought and used data appropriate to the work being performed. Actuarial communications regarding such work will address any material imperfections in the data of which the actuary is aware at the time communication is prepared.
- To the extent possible, an actuary should review the data for general reasonableness and consistency. The nature and extent of such review is based upon the circumstances and scope of the assignment.
- The actuary should disclose any reliance upon others for a review, reconciliation, or audit of the data. Such disclosure is particularly important if it involves review by an outside vendor.
- In situations in which it is impossible or impracticable to perform sufficient review of the data, the actuary should disclose such a situation and the impact or limitations it may place on the use of the work product.

12. Continued

- The actuary should consider whether data that is incomplete, inaccurate, or otherwise inappropriate might create a material bias in the work product. It may be possible that the data are so inadequate that the data cannot be used to satisfy the purpose of the work being undertaken. If, in the course of the review, the actuary finds the data to be materially flawed, it may not be possible to rely on this data and disclosures are required.
- An actuary should maintain adequate documentation to support the use of specific data for a work product. This documentation should address the level of the review performed on the underlying data and should be maintained for a period of time consistent with the purpose of the work product, the needs of the client, and requirements of any applicable regulation.
- For claim reserves, review and documentation should address the reconciliation of paid claims to check registers or general ledgers. Proper reserve estimates should include some attempt to account for all paid claims related to a line of business.

Limitations – the actuary is not required to:

- Determine whether data or other information supplied by others are falsified or intentionally misleading;
- Compile additional data solely for the purpose of searching for questionable or inconsistent data; or
- Perform an audit of the data.

(b) Create a chart for the various types of claims liabilities and reserves that provides for each:

- Definition
- Examples
- Estimation methods

Commentary on Question:
Candidates did very well on this part, demonstrating that they had a fairly good understanding of the types of claims liabilities and reserves. It was not necessary to include all items below to receive full credit. Full details are shown below, however less detail was needed to receive full credit.

Due and Unpaid (D&U) Liabilities

Definition - Liabilities for claims that have been reported, adjudicated, and processed, but for which final payment has not been recorded as of the valuation date.

12. Continued

Examples -Claims which have been adjudicated but as of the valuation date are being held until the next date on which the insurer processes claims checks.

Estimation – By the nature of current processing systems, D&U amounts are typically fairly small in relation to overall reserves. They may be estimated using historical averages or may be individually itemized if small in volume or financial summaries are readily available. Claims payment systems may record adjudicated amounts and change their status to paid amounts when a check cycle has been completed. This would allow direct systems enumeration by totaling all such claims in that status.

In Course of Settlement (ICOS) Claims

Definition - Liabilities for claims reported and received but not yet adjudicated and paid as of the valuation date.

Examples - Claims sitting in claims operations waiting for verification of eligibility or additional information required to determine the amount owed.

Estimation

- Sophisticated claims systems will often establish a claim record when the claim is received and produce a report based on the current recorded status of such claims. For smaller volumes, ICOS estimates may also be compiled using a claim count enumeration in the claims shop. An estimated claim amount may be assigned, or averages based on typical submitted-to-paid outcomes may be applied to each claim. This is particularly common when the nature of the benefits and claims adjudication is such that significant time may elapse between notification of claims and their final resolution.
- Large claims may be added on a seriatim basis. This is not uncommon, since such claims often remain ICOS longer and usually fall outside the normal payment patterns. Some of these may also fall into the "resisted" category below.
- For situations lacking systematic data or in which the split may not be material, it is not uncommon to see an experience-based percentage allocation of the total unpaid claims estimate between In Course of Settlement and Incurred But Not Reported.

Incurred But Not Reported (IBNR)

Definition - Liabilities for claims that are anticipated but have not been reported to the carrier as of the valuation date.

Examples - This is typically a very large accrual for health insurance operations, representing the amount related to claims for medical services which have already been provided to covered individuals but which have not yet been billed to the carrier by the providers of service.

12. Continued

Estimation - Probably the widest range of estimation techniques can be applied to estimate this liability. Most methods attempt to project liabilities by using existing payment data to develop average expected claims or claims payment patterns. Once the estimation process has projected fully incurred claims, paid claims are subtracted to estimate the unpaid claims liability.

Loss Adjustment Expenses (LAE)

Definition – Liabilities for the administrative costs associated with the adjudication of unpaid claims.

Examples - This liability is developed under the assumption that the administrative expense associated with adjudicating a claim is incurred at the same time as the claim is incurred.

Estimation - Usually this is developed as a percentage of the unpaid claims liability. The percentage is based on the carrier's average cost of processing claims. There may also be situations in which the carrier has contracted and paid for these services and will incur no additional costs as long as the service contract can be considered to be enforceable.

Present Value of Amounts Not Yet Due

Definition - This reserve covers claims that were incurred on or before the valuation date which have not accrued as of the valuation date.

Examples - The most clear-cut example would be a disability claim of $500 per month incurred on December 1st with a 14-day elimination period. On a December 31st valuation date, a claim would have $250 accrued and the balance of $250 held "unaccrued" as an "amount not yet due". To complete the example, if the claim had been reported the $250 accrued portion would fall under In Course of Settlement or Due and Unpaid – depending upon payment status. If unreported, the accrued portion would be "Incurred But Not Reported".

Estimation - These are most commonly done on a seriatim basis. The nature of benefits creating these reserves causes most of the reserve to be generated by claims that have been filed and benefits adjudicated. Tabular reserve methods discussed below are applied based on the likelihood benefits will be paid – becoming more reliant on contingencies as the benefit period increases. Estimating amounts not yet due for an IBNR claim is obviously a less sophisticated estimation process, since there would be less claim-specific information. For coverages that are not particularly suited to tabular methods, any one of a number of the other techniques discussed below may be applied.

12. Continued

Resisted Claims

Definition - Claims included in this category vary from carrier to carrier. At a minimum they should include claims for which a known litigation situation exists.

Examples - Claims for which a lawsuit is currently pending.

Estimation - Given their nature they are usually valued on a seriatim basis. Amounts assigned for each claim usually assume full expected benefits. Full recognition of liabilities may also involve a judgment call as to likely legal settlements if such claims are the subject of additional damage claims.

Outstanding Accounting Feeds

Definition - Amounts which have been acknowledged as payments, but for which no check has yet been cut as of the valuation date. Often overlaps with Due and Unpaid definitions, the distinction possibly being a system-to-system interface or batch processing of claims versus payments made directly to a claimant.

Examples - The most common current example might be the payments carriers have agreed to make to Pharmacy Benefit Managers who process pharmacy claims at the point of sale and then bill the carrier monthly or bi-monthly for the claims. In this situation, it may be common for the carrier to owe a month or one-half month's reimbursement to the vendor as of the valuation date.

Estimation - Many of these are actually recorded amounts from accounts payable systems or from the billing notices of the vendors. They are usually known based on reported values, but may also be estimated using average payments for prior reimbursements.

(c) Calculate the reserve as of December 31, 2018. Show your work.

Commentary on Question:
Full credit was given for both the solution below and for responses that smoothed the completion factors by averaging them.

12. Continued

Cumulative paids are given already, but shown below.

Cumulative (GIVEN)	Incurred							
Paid	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18		
Jul-18	43	-	-	-	-	-		
Aug-18	392	42	-	-	-	-		
Sep-18	767	493	73	-	-	-		
Oct-18	1,050	946	600	29	-	-		
Nov-18	1,126	1,146	1,168	333	49	-		
Dec-18	1,166	1,230	1,400	778	640	299		
Age-to-Age Completion Ratios	Incurred							
Paid	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18		
Jul-18	0.110							
Aug-18	0.511	0.085						
Sep-18	0.730	0.521	0.122					
Oct-18	0.933	0.825	0.514	0.087				
Nov-18	0.966	0.932	0.834	0.428	0.077			
Dec-18	1.000	na	na	na	na	na		
Completion Factors Final (product of Age-to-Age factors)	Incurred							
Paid	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18		
Jul-18	0.037							
Aug-18	0.336	0.033						

Sep-18	0.658	0.387	0.047					
Oct-18	0.901	0.743	0.386	0.028				
Nov-18	0.966	0.900	0.751	0.321	0.025			
Dec-18	1.000	0.966	0.900	0.751	0.321	0.025		
Cumulative and Ultimate Paid Claims	Incurred							
Paid	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18	Sum	
Dec-18	1,166	1,230	1,400	778	640	299	5,513	Final Reserve
Ultimate	1,166	1,274	1,556	1,036	1,992	12,155	19,179	13,666

(d) Describe regulatory concerns regarding conservatism in reserve estimates.

Commentary on Question:
Most candidates earned at least partial credit on this section. However several candidates omitted the need to balance sufficiency with concerns of overly conservative estimates and how they could distort reported earnings.

Health actuarial practice recognizes both the inherent nature of the actuarial models employed and regulatory requirements calling upon estimates to meet a standard of "sufficiency" in covering anticipated liabilities. Furthermore, in accordance with Actuarial Standards of Practice, the Valuation Actuary is provided guidance as follows: "In addition to meeting appropriate regulatory requirements, the appointed actuary should use professional judgment to be satisfied that the assets supporting the reserves and related items, plus related future revenues, are adequate to cover obligations under moderately adverse conditions."

Conservatism in estimates can be held on an explicit or implicit basis. Historically, explicit margins were often added as percentage loads to reserves developed under assumptions presumably held near the mean value of the estimated outcomes. Employing conservative assumptions in the process of determining the liability is the most common approach to developing implicit margins. Recently, however, pressure has been placed on health actuaries to balance the need for sufficiency against concerns that overly conservative estimates can distort reported earnings and tax liabilities. These concerns have resulted in an understanding that a given explicit margin may not be appropriate, or even consistent, when taken in context of the current operational environment and paid claims levels.

12. Continued

The estimation process and variability in assumptions employed by health actuaries, combined with the underlying variability in the contracts being offered, makes it difficult for regulators to provide guidance via the application of a mechanical formula or a single universally applicable standard. For a regulator to specify a fixed level of conservatism as sufficient, the process of estimation would have to produce common "base estimates" and similar ranges of more conservative outcomes. As discussed, this is not an inherent outcome of processes across multiple carriers, or indeed in outcomes from a single carrier over multiple periods. Regulation therefore suggests that the actuary produce an estimate that recognizes the need for conservatism without providing a set of specifics as to how that is to be obtained.

(e) Recommend an action you could take in response to the lead actuary's concern. Justify your answer.

Commentary on Question:
Candidates did fairly well coming up with an appropriate recommendation. However numerous candidates failed to justify their answers. Several examples are listed below, however full credit was given for any recommendation with a well thought out justification.

Recommendations for Agreeing

- Agree that they are too aggressive, and add margin
- Add explicit margin as a percent load to the reserves
- Add implicit margin by using more conservative assumptions in the reserve development process for the liabilities

Justifications

- This will help ensure sufficiency to cover liabilities
- It is common practice to add conservatism
- Insurance Actuary has a responsibility to ensure that they can handle moderately adverse deviations

Recommendations for disagreeing that they are too aggressive

- Do not add margin

12. Continued

Justifications

- Discuss how the methodology you applied is consistent with actuarial standards of practice
- Adding margin for conservatism may not be appropriate when taking into context the operational environment and paid claims levels
- This could distort reported earnings or tax liabilities
- Given this is a legacy product, it could have a higher degree of stability
- Also the last lag reserve value is very high

13. Learning Objectives:

1. The candidate will understand how to evaluate the effectiveness of traditional and leading edge provider reimbursement methods from both a cost and quality view point.

Learning Outcomes:

(1c) Understand contracts between providers and insurers.

Sources:

Essentials of Managed Care, Kongstvedt, Chapter 4;

GHA-123-19: Physician Cost Profiling – Reliability and Risk of Misclassification;

GHA-122-19: Episode-Based Physician Profiling: A Guide to the Perplexing

Solution:

(a) List types of physician contracting situations.

Commentary on Question:
Candidates generally performed well.

- Individual Physicians
- Medical Groups
- Independent Practice Associations
- Faculty Practice Plans
- Physicians in Integrated Delivery Systems
- Patient Centered Medical Home Organizations
- Specialty Management Companies

(b) Describe the steps to construct an episode-based physician cost profile.

Commentary on Question:
Many candidates did not follow the order of the steps listed in the model solution below, however credit was given for complete descriptions of: grouping claims into episodes, calculating average cost of episodes, and defining expected cost as risk-adjusted episode cost by specialty as well as the process described below.

Step 1:

- group claims and services into meaningful clinical categories (eg use a commercial grouper)
- construct patient-specific risk scores based on mix of episodes, age, sex
- adjust expected cost by risk score

13. Continued

Step 2
- determine episode cost by calculating the average allowed amount
- multiply # units with average price unit cost and sum them up
- remove extreme values, e.g. remove values below the 2.5th percentile, remove values above the 97.5th percentile

Step 3
- assign each episode to the physician with the highest proportion of the total professional cost
- drop the cases in which a physician cannot be assigned

Step 4
- construct a physician's summary cost profile
- the sum of the risk adjusted amounts is the "expected cost"
- sum up the observed costs for all assigned episodes and divide by the sum of expected costs for those episodes
- a value of 1 indicates that a physician's cost is at the average of his peers whereas a value below or above 1 indicates that a physicians' costs are lower or higher, respectively, than those of his peers

(c) Calculate the reliability score for each physician. Show your work.

Commentary on Question:
Most candidates did well on this section but some did not use the variance (i.e. failed to square the standard deviations).

The formula for reliability is: reliability MD = (physician-to-physician standard deviation)^2 / [(physician-to-physician standard deviation)^2 + (physician error standard deviation)^2]

Physician	Standard deviation physician-to-physician	Standard deviation physician error	Reliability MD
A	0.36	0.18	0.800
B	0.36	0.05	0.981
C	0.36	0.32	0.559
D	0.36	0.19	0.782

13. Continued

(d) Describe the strengths and limitations of episode-based profiling.

Commentary on Question:
Full credit was given for describing strengths, limitations, and associated implications rather than mere lists.

Episode based-profiling has some advantages/strengths –

- It is administratively feasible with minimum burden on administration for data collection
- It allows comparison of performance against defined quality standards
- It allows comparison of performance within certain geographies and/or pre-defined cohorts
- The method can be viewed as more "patient-centered"

Key limitations include:

- Variation in detail and comprehensiveness of claims across providers can introduce bias
- Requires accurate attribution of responsibility for each episode
- Outliers could distort results
- Minimum numbers of episodes are required for reliable profiles
- Definitive information and standards may not be available
- When it comes to quality performance measurements, the principal issue is that only a limited number of quality criteria is available

(e) Construct alternative classification criteria such that Physician D will be categorized as low cost. Justify your response.

Commentary on Question:
In order to achieve full credit, candidates were required to construct new criteria along with proper justification.

The cost profile score for both physician A and D are below 1. The physician standard error is similar – however, physician D's resulting reliability score (0.782) is lower than physician A's (0.800). If we lowered the reliability score threshold to below 0.78 (e.g lower it to 0.7), we could categorize Physician D into the low cost tier.

NOTE: Comparisons between physicians D and A, referencing commonly used thresholds from the syllabus materials, and descriptions of limitations of the methodology were considered to be adequate justifications.

13. Continued

(f) Evaluate whether or not Physician D's dispute is justified. Justify your response.

Commentary on Question:
To receive full credit, candidates needed to compare Physician A to Physician D, but may have referenced their response to part e.

Given the limitations in the methodology, closeness of the results between physicians D and A (as noted in part e), and the reliability scores, Physician D's complaint can be viewed as justified.

14. Learning Objectives:

2. The candidate will understand how to evaluate healthcare intervention programs.

Learning Outcomes:

(2b) Estimate savings, utilization rate changes and return on investment.

(2c) Apply the actuarially adjusted historical control methodology.

Sources:

Duncan, Managing and Evaluating Healthcare Intervention Programs, Chapter 13

Solution:

(a) Describe factors that should be considered when comparing the baseline population to the intervention population to ensure equivalence.

Commentary on Question:
In general, candidates were able to list items. In order to receive full credit, candidates had to describe the factors in addition to listing. Other reasonable answers received credit.

1) Change in the mix of new, continuing, and terminating members. The average costs of different subgroups can vary significantly from the overall average.
2) Changes in condition and co-morbidities. The change in mix of subgroups within the overall population can affect the overall average cost PMPM.

(b)

(i) Calculate:

- Savings PMPM
- ROI

Show your work.

(ii) Evaluate the program effectiveness. Justify your response.

Commentary on Question:
Most candidates performed well on this part. Some candidates failed to provide PMPM savings.

Baseline PMPM: 120x 5000 /12000 = $50
Actual PMPM: 116 x 5500/12000=$53.17
Trended Baseline: 120 x 1.02 x 5500/12000=$56.10
Savings: **$2.93 PMPM**
ROI: $2.93 / $1.50 = **1.96**

ii. The program is effective because the savings are greater than the costs.

14. Continued

(c)

(i) Calculate:

- The risk adjusted savings
- ROI

Show your work.

(ii) Evaluate the program effectiveness. Justify your response.

Commentary on Question:
Most candidates performed well on this question.

Baseline Cost: 20% x 5000 + 80% x 500 = 1400
Intervention year Prevalence:

- High: 0.2*0.35+0.8*0.15 = 0.19
- Low: 1.00-0.19=0.81

Year 1 prevalence with baseline costs = 19% x 5000 + 81% x 500 = 1355
Mix impact: 1355/1400-1= -3.2%
Adjusted Baseline = 1400 x (1+7%) = 1498
Adjusted for Mix = 1498 * (1-0.032) = 1449.85
Year 1 cost = 19% x 5200 + 81% x 500 = 1393
Risk adjusted savings = 1393 – 1449.85 = **$56.85**
ROI = 56.85 / 50 - 1 = **1.14**

ii. The ROI is not high, but the program results in slight savings, so yes the program is effective.

(d) Recommend one of the programs to keep in the following year. Justify your recommendation.

Commentary on Question:
Most candidates performed well on this part. Some candidates erroneously compared PMPMs to PMPYs. Other candidates did not address management's concerns in their recommendation and justification.

Annual cost program A: 1.5 x 12 = $18
Annual savings program A: 2.93 x 12 = $35.20

Annual costs program B: $50
Annual savings program B: $56.85

14. Continued

Given that management is concerned with costs, I recommend keeping program A. This program has lower program costs and also has higher ROI and net savings.

(e) Management proposes to use the savings from eliminating one program to expand the remaining program.

Critique management's proposal.

Commentary on Question:
Below is an example of a response that would receive full credit. Other reasonable responses would also receive full credit.

Management will likely not see the same savings level and ROI as the company experienced in the first year if they expand the program. The proposal to expand the remaining program will need to consider the number and risk-intensity of additional members to be targeted. In order to be beneficial, the marginal savings from the additional members targeted must exceed the marginal program costs.