GH ADV Model Solutions
Fall 2018

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:
Commonwealth Fund – Road to Accountable Care

Duncan Chapter 8

Commentary on Question:
Candidates generally did well on this question. Parts a and b were recall questions; and part c was a relatively straightforward math problem.

Solution:

(a) Describe the purpose and function of creating an Accountable Care Organization (ACO).

Commentary on Question:
Information for this response comes from Page 1 of the Road to Accountable Care Study Note. Candidates could get full credit without mentioning all of the specifics in the response below. A moderate amount of candidates based their response off of the GHA-110-15 study note (The Final Rule for MSSP) which generally resulted in partial credit.

Developing accountable care systems are meant to improve the quality and reduce the costs of care, and ultimately improve the health of populations of patients insured by Medicare, Medicaid, and commercial health plans. They employ a constellation of strategies to identify and address unmet medical needs, improve care transitions, and reduce inefficiencies and unnecessary variation in care.

1. Continued

(b)

(i) Describe areas of improvement targeted by ACOs.

(ii) Identify an example of an approach or intervention for each area.

Commentary on Question:
Information for this response comes from the Road to Accountable Care Study Note. Candidates performed similarly on Parts a and b in terms of percentage of points earned. In addition to the responses below, credit was given for identifying and providing an example of payment models and financial incentives.

- Care redesign to improve the delivery and coordination of care.
  - A hospital discharge practice being established to connect inpatient and outpatient care managers.
- Care management of patients with costly, complex needs.
  - Virtual care teams made up of a variety of experts help PCPs manage the clinical and non-clinical needs of their patients
- Patient and family engagement and patient activation initiatives.
  - Patient activation measures used to asses patients' self-management capacities and determine necessary support levels
- Integrated data and analytics.
  - Risk stratification data from external sources combined with in-house data to predict patient care management needs.

(c) Calculate:

(i) Savings for each category

(ii) Overall program savings

Show your work.

Commentary on Question:
Candidates often did well on part c. Full credit was given if candidates rounded within reason, responded with annualized figures, or with total PMPMs. Some candidates did not divide the readmissions by 1,000 or assumed that negative savings didn't factor in to total savings. Small deductions from full credit were applied. Similarly, if work was not shown, deductions were made as well.

1. Continued

- Calculate reference population utilization trends
  - Office Visits
    - 2.05/2.0 – 1 = 2.5%
  - Prescriptions
    - 1.0/.95 – 1 = 5.3%
  - Readmissions
    - 5.15/5 – 1 = 3%

- Apply trend to targeted population base period trends
  - Office Visits
    - 3.0 * (1.025) = 3.075 Expected
  - Prescriptions
    - 3.5 * (1.053) = 3.69 Expected
  - Readmissions
    - 6.0 * (1.03) = 6.18 Expected

- Utilization saved
  - Office Visits = 3.02 – 3.075 = 0.055 Saved
  - Prescriptions = 3.69 – 3.75 = -0.06 Saved
  - Readmissions = 6.18 – 6.1 = 0.08 Saved

- Apply costs and total members to get savings
  - 0.055 * 80 * 10,000 = 44,000
  - -0.06 * 50 * 10,000 = - 30,000
  - 0.08 * 25,000 * 10,000/1000 = 20,000
  - Total = 34,000

2. 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.

Sources:

GHA-104-15, Actuarial Aspects of Employer Stop Loss

Group Insurance Ch. 27, 33

Duncan Ch. 8

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) Describe advantages and disadvantages of self-insured and fully-insured arrangements.

Commentary on Question:

This question was designed to test candidates on their ability to evaluate the pros and cons of different funding arrangements (beyond just pricing considerations). Candidates who did well described advantages and disadvantages in both self- and fully-insured arrangements, and could comment on a wide variety of factors outside of just pricing or cash flow concerns.

Self-insured Advantages

- Do not have to pay premium taxes, some ACA fees or risk and profit charges to insurer
- Do not have to meet state mandates on plan designs, can customize plans
- Can select TPA and how claims are managed
- Get to hold reserves, improving cash flow
- Can earn interest and investment income on held reserves
- Can benefit from good claims experience

Self-insured Disadvantages

- Absorb poor experience or higher than expected claims
- Need to coordinate complex administration and compliance, usually by hiring a consultant
- Retains legal liability for claims, could have employee relations issues or get sued by employees

2. Continued

Fully-insured Advantages

- Stable premiums create a predictable cash flow
- Absorbs the risk of high claims
- Handles all administration and compliance issues
- Provides third-party buffer when dealing with employees

Fully-insured Disadvantages

- Typically more expensive due to profit/risk charges and premium tax
- Plan designs limited by insurer offerings

(b) Sketch and describe graphs to illustrate how each option may limit the plan's volatility.

Commentary on Question:
The focus of this question was on a candidate's ability to discuss how to use stop loss to control an employer's risk. While there were a wide variety of graphs candidates could use to respond to this question and receive full credit, they had to illustrate how claims volatility was reduced and they had to describe what the coverage did in terms of risk or volatility to receive full credit.

Aggregate Stop Loss

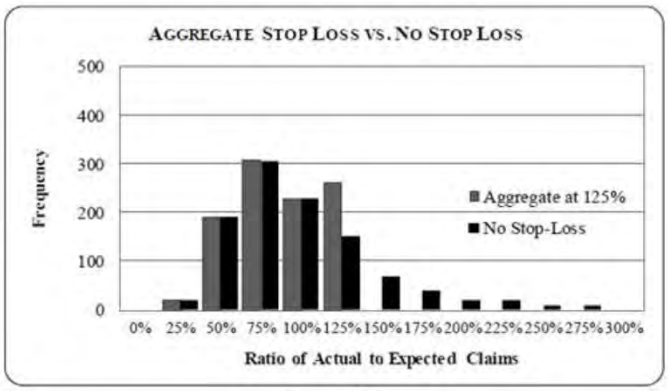


Figure 27.5

In this graph, aggregate stop loss caps employer claims costs at 125% of expected, limiting the employers maximum liability. This helps guard against higher frequency years or when populations as a whole are unhealthy.

2. Continued

Specific Stop Loss

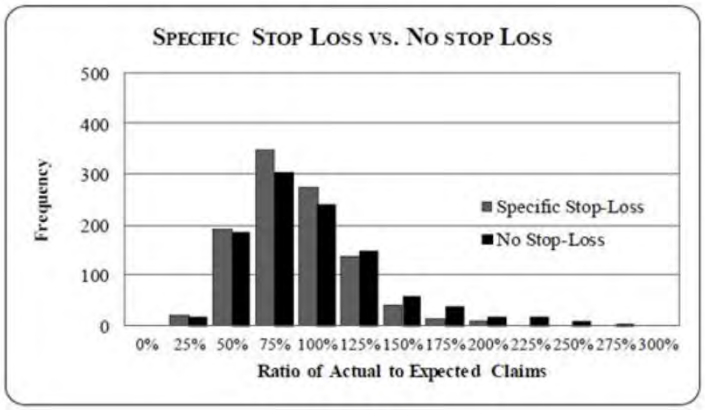


Figure 27.4

The graph above shows how large claims are removed. This limits the risk from any individual claimant, and reduces the volatility that comes from severe claims skewing total costs higher. This does not protect against high frequency of claims.

(c)

(i) Calculate XYZ's risk factor adjustment to apply to claims. Show your work.

(ii) Interpret the results for management.

Commentary on Question:
Most candidates understood the basics of calculating risk scores, but to receive full credit they needed to calculate an adjustment factor to apply to the parent company's experience.
Commentary to management should have either described the procedure and explained the results, or made a recommendation to management.

(i) Parent company group risk factor: (10,000 x 0.444 + 8,000 x 1.21 + 1,500 x 6.47)/(10,000 + 8,000 + 1,500) = 1.22

XYZ group risk factor: (150 x 0.44 + 120 x 1.21 + 15 x 6.47)/(150 + 120 + 15) = 1.08

Risk factor adjustment: 1.08 / 1.22 = 0.89 or 0.89 – 1 = -11%

(ii) While XYZ's risk factor is above average, it is still lower than the parent company's. This is due to a higher proportion of low and medium risk members than the parent company. As a result, XYZ would need to adjust the parent company's claim costs by -11% when setting their own rates.

3. 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:

(1e) Evaluate the effectiveness of various methods of controlling costs and providing quality care-within pharmacy benefits.

Sources:

Essentials of Managed Health Care, Kongstvedt, 6th Edition, 2013 – Chapter 11

Solution:

(a) List financial performance metrics for Pharmacy Benefit Managers (PBMs).

Commentary on Question:
Most candidates did well and were able to list at least 6 metrics (required for full credit) that should be considered.

Prescription utilization and trends
Admin and claim processing fees
Discounts and rebates
Generic dispensing rate
Formulary conformance
Drug utilization review (DUR) exception reports

(b) Compare and contrast a PBM's role when providing prescription drug benefits:

(i) Through a health plan

(ii) Directly to plan sponsors (carved-out benefits)

Commentary on Question:
This part requested that candidates compare and contrast the role of the pharmacy benefit manager in each type of benefit. However, candidates typically described the difference between a carve-out pharmacy benefit and a pharmacy benefit integrated with a health plan. As a result, few candidates described similarities and differences in cash flows to and from PBMs

3. Continued

	PBM Health Plan	PBM Carve-out
Source of Plan Sponsor (purchaser) premiums	Employers, Medicaid, Medicare via health plan	Employers pay premium directly to PBM
Rebates	Rebates are returned to health plan	Rebates are returned to employer
PBM Pharma Company relationship	Pharma companies offer discounts and rebates to PBM as consideration for favorable formulary access	
Patient PBM relationship	Patients pay a copayment or coinsurance whenever they need access	

(c) Calculate the impact of the program on DEF's prescription drug spending. Show your work.

Commentary on Question:
Many candidates correctly calculated the answer to this question. Candidate answers varied to small degrees when savings were calculated using total dollars instead of PMPMs, but both approaches earned full credit. Several candidates only calculated rebates as if rebates were part of the program, while the directions do not state that rebates are modified by the program. Candidates who explicitly noted their assumption regarding rebates received more partial credit than those who did not.

	Scripts per 1,000 members per year	Scripts per 1,000 members per year after program	Average Allowed Amount
Generic-Retail	4,000	=4,000 + 5%*400 = 4,020	30
Generic – Mail Order	200	=200 + 5%*270 = 213.5	70
Brand – Retail – Formulary	400	=95% * 400 = 380	300
Brand – Retail – Non-Formulary	150	150	430
Brand – Mail Order – Formulary	270	=270 * 95% = 256.5	750
Brand – Mail Order – Non-Formulary	300	300	1,200

3. Continued

	Allowed PMPM				Rebate PMPM	
	Before Program	After Program	Rebate Qualifier	Average Rebate per Script	Before Program	After Program
Generic-Retail	=30*4,000/12k = 10.00	=30*4020/12k = 10.05	No	n/a	n/a	n/a
Generic – Mail Order	=70*200/12k = 1.17	=70*213.5/12k = 1.25	No	n/a	n/a	n/a
Brand – Retail – Formulary	=300*400/12k = 10.00	=300*380/12k = 9.50	Yes	=10%*300 = 30.00	1.00	0.95
Brand – Retail – Non-Formulary	=430*150/12k = 5.38	5.38	No	n/a	n/a	n/a
Brand – Mail Order – Formulary	=750*270/12k = 16.88	=750*256.5/12k = 16.03	Yes	=10%*750 = 75.00	1.69	1.60
Brand – Mail Order – Non-Formulary	=1200*300/12k = 30.00	30.00	No	n/a	n/a	n/a
Total	73.43	72.21			2.69	2.55

Rebate Impact: (2.55 – 2.69) * 12 * 1,000 = -1,680

Cost Impact: (72.21 – 73.43) * 12 * 1,000 = -14,640

Cost Impact net of Rebate: -14,640 + 1,680 = -12,960 ($12,960 reduction in Rx spending)

(d) Recommend whether or not DEF should implement the program. Justify your response.

Commentary on Question:
Nearly all candidates made a recommendation, however those who simply said "I recommend implementing the program because it saves money" did not receive full credit. To receive full credit, candidates needed to list additional considerations beyond just the projected savings.

The program is only expected to save $960 after taking the $12,000 cost into consideration. Given the relatively small ROI and potential disruption to patient satisfaction by changing prescriptions, I would not recommend moving forward with implementation of the drug management program.

4. 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 (Pg 5, bottom)

Commentary on Question:

Most candidates were able to answer some portion of the question. Many candidates misapplied the turnover adjustment for parts C & D. Parts E & F proved to be most challenging with few candidates getting significant points for this section.

Solution:

(a) State the basic formula and describe the variables for assigning credibility for group medical by size of group.

Commentary on Question:

Candidates were required to state the formula and identify the variables. Most candidates stated the formula. Some candidates misidentified the variables, especially k_3.

$$z = \frac{k_1 + (n-1)\,k_2}{1 + (n-1)k_3}$$

n = number of individuals in the group

k_1 = regression coefficient of an individual's claim in the current year based on the prior year

k_2 = regression coefficient of claims for individuals in the current year based on claims of others in the same group in the prior year

k3 = measure of how the in-group variance is less than the total variance of individual claims

4. Continued

(b) Calculate the credibility for the following group sizes:

- 10
- 100
- 1000

Show your work.

Commentary on Question:
Show Your Work! Most candidates handled the calculations well. Partial credit was given if the preceding formula was wrong.

$$z = \frac{k_1 + (n-1)\,k_2}{1 + (n-1)k_3}$$

n=10: z = [0.25+(10-1)*0.01]/[1+(10-1)*0.01] = 0.34/1.09 = **0.312**
n=100: z = [0.25+(100-1)*0.01]/[1+(100-1)*0.01] = 1.24/1.99 = **0.623**
n=1,000: z = [0.25+(1000-1)*0.01]/[1+(1000-1)*0.01] = 10.24/10.99 = **0.932**

(c) Describe the adjustments to the basic formula for turnover of employees.

Commentary on Question:
This formula proved more challenging. Some students didn't define "p". Some students defined "p" as the probability of leaving the group, a reverse of what is actually true.

$$z = \frac{pk_1 + (n-p)\,k_2}{1 + (n-1)k_3}$$

Where p = probability individual will stay with group.

(d) Calculate the credibility for a 10 member group using the following values for p:

- 70%
- 80%
- 90%

Show your work.

4. Continued

Commentary on Question:
Show Your Work! Getting the formula correct in part C is crucial to successfully performing the requested calculations.

$$z = \frac{pk_1 + (n-p)\,k_2}{1 + (n-1)k_3}$$

p=70%: z = [0.70*0.25+(10-0.70)*0.01]/[1+(10-1)*0.01] = [0.175+0.093]/1.09 = 0.268/1.09 = **0.246**
p=80%: z = [0.80*0.25+(10-0.80)*0.01]/[1+(10-1)*0.01] = [0.200+0.092]/1.09 = 0.292/1.09 = **0.268**
p=90%: z = [0.90*0.25+(10-0.90)*0.01]/[1+(10-1)*0.01] = [0.225+0.091]/1.09 = 0.316/1.09 = **0.290**

(e) Describe limits on individual claims amounts that may be utilized in assigning credibility.

Commentary on Question:
The solution can be recalled from the study note.

- Credibility of claims projection is increased by limiting the amount of claims.
- Optimum Pooling Point Concept – Initially, as the pooling point decreases the predictability increases due to the reduction in variance of underlying claims.
- Optimum Pooling Point increases with group size
- Use of pooling at some point is significantly better than not using pooling at all
- Rule of thumb: pooling point should be between 5%-15% of projected annual claims

(f) Describe specific stop loss arrangements that may be utilized in assigning credibility.

Commentary on Question:
The solution can be recalled from the study note.

- Method 1 - Tabular rates that take into account age, sex, industry, specific level, etc. The group's own experience is ignored
- Method 2 - applies a percentage, which varies only by the specific level, to the group's estimated total claims
- Methods 1 & 2 lead to different results. There is some controversy as to which is superior
- Credibility model can be used to yield a blend of the two methods

4. Continued

(g) State the basic formula for stop loss credibility

Commentary on Question:
Most candidates received 75% of the available points on this part. Some candidates answered "G" as part of "E" or "F". The starting formula is the same as part "A".

$$z = \frac{k_1 + (n-1)\,k_2}{1 + (n-1)k_3}$$

- z = weight given to Method II
- k2 = sk3 or alternatively s = k2/k3
- s = 100% - 10%*(Attachment Point)/ $50,000 (author recommendation)

(h) Describe the impact of utilizing different time periods for assigning credibility. Include applicable formulas.

Commentary on Question:
This section required knowledge of credibility formulas for the fractional years of experience and multiple years of experience.

Fractional Years of Experience - Older experience is just as relevant as newer

$$z_f = \frac{f\,z_1}{1 + (f-1)\,z_1}$$

$$z_f = credibility\ based\ on\ experience\ period\ of\ f\ years$$

Multiple Years of Experience – Different regression levels for more recent vs. preceding years.

$$z_f = \left(1 - \sum_{r=1}^{t-1} z_r\right) z_{t-1}\ for\ each\ t > 1$$

$$z_t = credibility\ of\ the\ experience\ for\ year\ t$$

5. 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.

Sources:

Level Funding: An Alternative to ACA for Small Groups (Health Watch, May 2016)

Actuarial Aspects of Stop Loss

Commentary on Question:

The majority of students did well on this question. Commentary is provided in each section of the question below.

Solution:

(a) Describe issues insurers need to consider when deciding to offer Level-Funded Products (LFPs).

Commentary on Question:

Most students did well on this section. Full credit was given if the student provided at least 5 distinct, valid considerations. Page 44 of the Health Watch article "Level Funding: An Alternative to the ACA for Small Groups" *describes the considerations.*

- Ability to sell to better risk groups –
  - Eventually, good-risk small groups will seek alternatives to the ACA's small group community rating rules, and one or more insurance carriers will offer alternatives to those groups including level-funding-type products.
- Ability to Price and Administer
  - It is vital that insurance carriers offering a level funding product develop the resources and skills to properly project the expected claims costs of individual small groups.
- Experience with Stop Loss Coverage
  - Another issue with pricing level funding plans is offering stop-loss coverage. A significant number of insurers do not currently offer stop-loss coverage and/or have very little experience offering stop-loss coverage to smaller groups. For these insurers it may be necessary to develop a stop-loss rating model and hire actuaries and underwriters familiar with pricing stop-loss insurance.

5. Continued

- Need to create a simple plan
  - Level funding products should be designed, administered and priced to closely resemble the fully insured products that they are replacing.
- Expected profit
  - Insurers that offer level funding products should also price the product in such a way that the expected profit is similar to what they would have received from a fully insured group than from a traditional (i.e., larger) self-funding group.
- Ability of sales staff to help small groups understand LFP
  - Most of the small groups that would potentially benefit from a level funding product will not have much, if any, familiarity with self-funding or stop loss. It is, therefore, important that insurers train their sales staff and develop marketing efforts to help small groups understand level funding.

(b) Create a chart that provides the following:

Advantages of Self-Funding for the Employer	Applicability to LFP	Justification for Applicability
…	…	…
Disadvantages of Self-Funding for the Employer	Applicability to LFP	Justification for Applicability
…	…	…

Commentary on Question:
Most students did well on this section. The most common mistake was to not clearly distinguish between the traditional self-funded and LFP products. Students that did not demonstrate understanding of the differences between the two products did not do well. This material is covered on Page 41 of LFP article, section on "Self-funding Basics", *as well as page 1 of* "Actuarial Aspects of Stop Loss"

5. Continued

Advantages of Self-Funding	Apply to LFP?	Justification
Avoid state mandates, and certain ACA fees	Yes	Not considered fully insured, so not subject to ACA mandates
Can benefit from favorable claims experience	Yes	Allows for underwriting, so price levels are lower for healthiest groups. Also allows groups to receive a refund of surplus.
Forgo paying insurance company risk charges	No	Still pay risk charges on the Stop Loss portions
Plan design flexibility	No	LFP plans will typically have simple plan designs that mirror fully insured plans. Insurers will not generally customize plan designs for small groups.
Cash Flow may be improved due to employer holding the reserve	No	The employer does not hold the reserve, the insurer holds the funds.
ability to choose claims administrator	No	Administration is included as part of the LFP
Disadvantages	**Apply to LFP?**	**Justification**
Less predictable cash flows	No	LFP is designed to make cash flows predictable
Need to obtain and pay for advice from insurance professionals	No	The LFP product comes from an insurance company
Risk Assumption	No	The risk is absorbed by the stop loss component
Employer must arrange for services needed by the employee benefit plan	No	Administration is included as part of the LFP
Potential need to buy stop loss	No	Stop loss already included in the LFP

(c) Calculate the maximum liability PMPM for the group. Show your work.

Commentary on Question:
Most students got full credit for this section

5. Continued

First determine the expected paid claims below the SSL deductible:
192.65 – 21.49 = 171.16

Maximum liability is 125% of 171.16, or **$213.95**

(d) Calculate the paid claims surplus PMPM for the group assuming:

(i) Total PMPM claim costs are 15% higher than expected

(ii) Total PMPM claim costs are 35% higher than expected

Show your work.

Commentary on Question:
Most students did well on this section. The most common mistake was to apply the 15% and 35% to both the expected PMPM and the expected stop loss PMPM, however the question specified that the stop loss experience was exactly as expected, so it should not have been adjusted.

(i) Paid claims surplus with experience 15% higher:
Actual experience:
1.15 * 192.65 = 221.55
Less claims above SSL:
221.55 – 21.49 = 200.06
Surplus = 213.95 – 200.06 = **$13.89**

(ii) Paid claims surplus with experience 35% higher:

Since experience is higher than the aggregate stop loss corridor, no surplus

(e) Recommend whether or not to purchase the LFP. Justify your answer.

Commentary on Question:
Several students justified the decision to purchase LFP or not by comparing LFP to self-funded. However, for small groups self-funded is not really an appropriate option. To receive full credit, the student needed to make reference to the group's expected experience relative to the community rated ACA plans.

I recommend purchasing the LFP for the group, since their expected claims appear to be lower than what would generally be seen in the community rated ACA plans.

6. Learning Objectives:

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

Learning Outcomes:

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

Sources:

Duncan Ch 13

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) List sources of change in chronic population risk-mix in Disease Management (DM) programs.

Commentary on Question:

Candidates did fairly well on this part of the question. Candidates failed to score full points for not relating sources of change as it relates to a chronic population.

- Changes in the distribution of chronic conditions and co-morbidities in the chronic population
- Change in the mix of new, continuing and terminating members in the chronic population

(b) Describe how adjusting for changes in the population risk-mix can impact the evaluation of DM program savings.

Commentary on Question:

Candidates made general observations about changes in population risk mix. In order to receive full credit, candidates needed to describe the impact on the evaluation of the program.

- Equivalence is necessary to compare the baseline and intervention years, which requires adjustment for changes in population risk-mix.
- Failure to adjust for changes in population risk-mix can attribute savings to the DM program that are not a product of the program's performance
- Alternatively, failure to adjust could also result in understated savings and discontinuation of a DM program that is actually producing results
- Adjusting for risk-mix can also understate the savings of a DM program if improvement in the risk-mix (or risk score) is a product of the program. Adjustment should consider whether or not the impact of the program is being partially nullified.

6. Continued

(c) Calculate the DM program savings. Show your work.

Commentary on Question:
The question required candidates to adjust the population risk mix to calculate savings. Most candidates re-weighted baseline year cost with intervention period prevalence instead of using the baseline prevalence in the savings calculations.

- Baseline year cost – the product of the prevalence and the baseline period cost: ($35,000 x 10% + $10,000 x 30% + $5,000 x 60%) = $9,500
- Trended baseline year cost: $9,500 x (1 + 11% [trend]) = $10,545
- Intervention year prevalence – the product of the transition probabilities and the baseline year prevalence:
  - High: 10% x 30% + 30% x 8% + 60% x 6% = 9%
  - Moderate: 10% x 40% + 30% x 40% + 60% x 30% = 34%
  - Low: 10% x 30% + 30% x 52% + 60% x 64% = 57%
- Intervention year cost – the product of the intervention year prevalence and the intervention year cost: ($40,000 x 9% + $10,800 x 34% + $5,350 x 57%) = $10,321.50
- Implied savings from the DM program: $10,545 - $10,321.50 = $223.50 PMPY (not adjusted for change in risk).
- Intervention year cost with no change in risk (intervention year cost multiplied by baseline year prevalence): 10% x $40,000 + 30% x $10,800 + 60% x $5,350 = $10,450
- Impact of the change in population risk: $10,321.50 - $10,450 = ($128.50) PMPY
- Reduction in cost due to the program: $223.50 + ($128.50) = $95.00 PMPY savings

7. Learning Objectives:

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

Learning Outcomes:

(3f) Describe, calculate and evaluate non-claim reserves and explain when each is required.

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

Sources:

Individual Health Insurance Chapter 6

Commentary on Question:

This question was testing whether candidates understood the purpose & how to calculate non-claim reserves

Solution:

(a) Explain:

(i) when policy reserves are needed

(ii) why a company would implement a preliminary term reserve

Commentary on Question:

For i, candidates needed to indicate that reserves allow early duration excess premiums to offset excess claims in later durations
For ii, some candidates incorrectly indicated that FPT reserves are used to offset a timing mismatch in premium vs claims, rather than offset high acquisition expenses

(i) Policy reserves are needed when future claims are higher than future premiums. Reserves allow for excess dollars in early years to prefund claims in later years.

(ii) Preliminary term reserves allow a company to delay setting up policy reserves so as to offset high acquisition costs in the first couple years of a policy.

(b) Explain the major differences between how statutory accounting and GAAP accounting reflect expenses in policy reserves.

Commentary on Question:

Many candidates gave general comments on the differences between statutory & GAAP rather than differences in how expenses are reflected in policy reserves

7. Continued

For statutory, expenses are recognized implicitly in reserves via the preliminary term method.
For GAAP, expenses are recognized explicitly in reserves by setting up a DAC asset.

(c)

(i) Construct a chart of the reserve stream under prospective and retrospective reserve methods:

- Per original policy
- Per in force policy

Show your work.

(ii) Explain why the reserve streams differ.

Commentary on Question:
In order to receive full credit, candidates had to "show their work" in some fashion for each of the 4 calculations; this needed to be more than a simple PV(claims) – PV(prem) since it was important to show which years of persistency & claims were used in each calc; candidates also needed to show calculations for both retrospective & prospective – simply indicating that retro = prospective would not receive full credit
Some candidates did not show that reserves for time 0 & time 3 should be $0 under all 4 methods
Candidates had to show some form of a table(s)/chart with 4 sets of values
Many candidates did not understand that there are "per original" & "per in force" calculations for both prospective & retrospective methods. Thus instead of showing 4 calculations, they only showed 2
Some candidates did not label which calculation(s) they were showing. Thus even if they had the right answer, they may not have received full credit if it could not be determined that they understood the methods. Methods should be clear on each page in case pages get out of order (or number pages)
Some common errors in calculating the Net Level Premium: did not take the present value, including persistency, of both premium & claims; calculated different NLPs for "per original" & "per inforce"; did not use 3 years of both premium & claims; did not use persistency for years 0-2 for premium and years 1-3 for claims (latter 2 were also errors made in the reserve calculations)
Several candidates flipped per in force & per original
Some candidates incorrectly assumed the question wanted them to use a 2-yr preliminary term method
For part ii, some candidates addressed the "difference" between retro & prosp rather than "per original" & "per in force"

7. Continued

Some candidates only indicated that the difference was due to a different basis without referencing persistency
In order to receive full credit for ii, candidates had to relate the 2 bases in i

Net Level Premium = (0.6498*92.28 + 0.4482*116.51 + 0.3316*136.7) / (1 + 0.6498 + 0.4482) = 157.51 / 2.098 = $75.08

Prospective Method:
Per orig V1 = 0.4482*(116.51 – 75.08) + 0.3316*136.7 – 0.6498*75.08 = 15.11
Per orig V2 = 0.3316*136.70 – 0.4482*75.08 = 11.68

Per in force = per original / persistency
Per inf V1 = 15.11 / 0.6498 = 23.26
Per inf V2 = 11.68 / 0.4482 = 26.06

Retrospective Method:
Per orig V1 = 75.08 – 0.6498*92.28 = 15.11
Per orig V2 = 75.08*(1 + 0.6498) – 0.6498*92.28 – 0.4482*116.51 = 11.68

Per in force = per original / persistency
Per inf V1 = 15.11 / 0.6498 = 23.26
Per inf V2 = 11.68 / 0.4482 = 26.06

Chart:

	Prospective		Retrospective	
	Orig	Inf	Orig	Inf
T0	$0	$0	$0	$0
T1	$15.11	$23.26	$15.11	$23.26
T2	$11.68	$26.06	$11.68	$26.06
T3	$0	$0	$0	$0

ii) Per original & per in force reserves differ because in force is based on policies remaining at that time, applies persistency. Per in force = Per original / persistency

(d)

(i) Describe the minimum valuation standards for LTC preliminary term on a policy reserve.

(ii) Recommend an alternative to the CFO. Justify your response.

7. Continued

Commentary on Question:
This question was referring to a book that started 5 years ago & is still being issued today and the CFO was asking about a method for the policies; many candidates answered 2 or 1 year prelim term doesn't matter, because the policy already issued 5 years, this is misunderstanding how prelim term works.
In order to receive full credit, candidates had to make a recommendation of 1-year preliminary term
Most candidates did not know the date when 1-yr FPT started to be required

Minimum valuation standards since 1/1/1992 for LTC are 1-yr FPT
Since 2-yr FPT is no longer allowed for LTC, I recommend using 1-yr FPT for this block

8. Learning Objectives:

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

Learning Outcomes:

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

Sources:

Group Insurance, 7th Edition 2016, Ch. 33, PG 572

Level Funding: An Alternative to ACA for Small Groups (Health Watch, May 2016)

Commentary on Question:

In general, candidates did fairly well on this question. Most candidates did very well on parts A and B. Some struggled with a justification for part C.

Solution:

(a) Describe the need for health risk adjustment.

Commentary on Question:

Candidates performed very well on this part and provided numerous valid reasons for why health risk adjustment is needed. These various reasons can be found below.

- Incentivize insurers to compete on efficiency and quality rather than selection
- Allow consumers to have choices and pay appropriate prices
- Create equitable payments to insurers
- Enable fair comparisons of insurers
- Health status varies significantly between insurer/provider
- Stabilize premiums in guarantee issues products

(b) Calculate the premiums for each company for:

(i) Small group transitional

(ii) Small group ACA

Show your work.

Commentary on Question:

Candidates did fairly well on these calculations. Common mistakes include: not including admin costs on transitional premium or not understanding allowable rating factors for ACA premiums.

8. Continued

Company A's 2017 SG Transitional Premium =

(280.50 * 0.96 * 0.86 * 0.90 * 1.02) + 60.12 = 272.71

Company B's 2017 SG Transitional Premium =

(280.50 * 1.65 * 1.15 * 1.1 * 1.05) + 90.60 = 705.35

ACA does not allow gender or industry factors

Company A's 2017 SG ACA Premium =

386.54 * 0.96 * 1.02 = 378.50

Company B's 2017 SG ACA Premium =

386.54 * 1.65 * 1.05 = 669.68

(c) Recommend which product XYZ should offer to each company.
Justify your answer.

Commentary on Question:
Generally, candidates struggled in justifying their answers. Many did not make a recommendation from the perspective of the insurer, but rather what each company should choose. Full credit was given to various applicable recommendations that were supported with valid justifications.

Company A options:

In 2019 after transitional period has ended, offer the level funding product. Ideally you'd want them in your ACA block where they are more profitable and would help to keep your ACA rates low, however doing this would risk losing the better risk group to your competition.

OR

Offer the ACA plan. This will be more profitable for the company and level funding products come with a number of concerns that XYZ may not be prepared to handle.

8. Continued

Company B options:

Offer the ACA product because this is the lowest premium to offer the member and XYZ wants to keep them. Also risk adjustment should help to offset their higher costs.

OR

The ACA does not account for all risk factors and therefor underprices the higher risk company B, so XYZ should offer them the level funded product as it is the most closely aligned with their higher claim cost expectation.

9. **Learning Objectives:**

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

Learning Outcomes:

(2a) Describe, compare and evaluate programs.

Sources:

Duncan, Chapter 3, page 79

Duncan, Chapter 8, pages 168-169

Commentary on Question:

This question tested candidates' knowledge of care management programs and the evaluation of care management economics

Solution:

(a) Describe types of care management programs and interventions.

Commentary on Question:

Candidates need to list and give a brief description of most care management programs. Candidates did not need to list all of the below for full credit but need to list most.

- Pre-Authorization - used on certain services to confirm medical necessity of service prior to the service being performed.
- Concurrent Review – monitors health while in acute hospital or nursing home to better manage care
- Case management – manages serious disease patients
- Demand Management – offers advice over phone when decision about care needs to be made. Example is nurse hot line
- Disease management – a system of coordinated health care interventions and communications for diseases where self-care is important. (e.g. diabetes)
- Specialty Care Management – performed by a care manager who specializes in a specific area such as organ transplants.
- Population Health Management – this focuses on a broad intervention for the whole population rather than certain diseases
- Patient Centered Medical Home – Each patient has an ongoing relationship with a personal physician who helps manage care and track medical services and care.
- Accountable Care Organizations – Provider is accountable for providing quality cared, reducing utilization, and convincing the patient not to seek care outside of the ACO network.
- Non-Traditional forms include Medication Therapy Management and Drug Utilization Review programs.

9. Continued

- Clinics – Retail Clinics, Employer Worksite clinics, Urgent Care Clinics, and Federally Qualified Health Clinics allow for lower cost options compared to hospitals
- Gaps in care – these programs aim to improve clinical quality by identifying gaps in care and closing those gaps
- Telemedicine – fosters connectivity between providers and improves efficiency,
- Bundled Payment Initiatives – there is one payment for a bundle of services. This incents providers to be more efficient with these services.

(b) Describe common features of care management programs.

Commentary on Question:
Many candidates were not familiar with this part of the syllabus. Credit was given for similar answers that may have come from different source material than the Duncan book.

- All rely heavily on identification of at-risk members
- All rely on some form of standardized treatment or are evidence-based
- All rely on clinical resources to perform evaluation of the patient's conditions
- All rely on participation by the member or patient in the member's own care
- All have proven difficult to assess and justify financially
- All aim to improve the member's health or quality of care

(c)

(i) Evaluate the economics of the two care management programs. Show your work.

(ii) Identify which program provides more economic value. Justify your answer.

Commentary on Question:
Candidates need to measure ROI and Net Savings per Member for both programs. Partial credit was given for marginal savings calculations. For (ii), candidates need to pick one program to recommend with justification. For full credit, candidates need to explain that Net Savings is a better financial measure than ROI.

ROI Program 1 = $300,000/$100,000 = 3.0 or 300%
ROI Program 2 = $700,000/$300,000 = 2.3 or 233%
Net Savings PMPM Program 1 = ($300,000 - $100,000)/10,000 = $20 PMPY (PMPM also acceptable)

9. Continued

Net Savings PMPM Program 2 = (700,000 - $300,000)/10,000 = $40 PMPY (PMPM also acceptable)

Program 2 has more economic value because it has a higher net savings. This is true even though Program 1 has a higher ROI.

ROI doesn't give perspective on whether the high ROI is from high savings or low costs.

Net savings PMPM does a better job of showing overall value of the program.

10. Learning Objectives:

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

Learning Outcomes:

(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:

ASOP 5

GHA-103-16: Health Reserves

Group Insurance, Chp 37, pg 647-648

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) Describe considerations for establishing reserve cells.

Commentary on Question:

Most candidates were able to describe some of the considerations for establishing reserving cells

Reserving cells should be established with the following considerations:

- Separate cells for hospital, professional and pharmacy claims as these claims complete at different rates.
- Cells should be divided by demographics such as Individual, over 65, and group size.
- Cells should be set up for different products, benefit designs and/or networks.
- Cells should be set based on the payment speed of the claims (lags)
- The size of the population needs to be considered for credibility.

(b) Recommend reserving cells for Quantum. Justify your answer.

Commentary on Question:

Most candidates provided a recommendation, but many did not justify their answer.

10. Continued

I recommend that Quantum establish separate reserve cells for small group and Individual, and then within those separate cells for ACA, HMO and legacy products. The size of the blocks needs to be considered to ensure they are large enough to be credible.
Individual and small group have different risk pools and selection within them. Legacy products are closed blocks and have different benefits than the ACA plans. HMO plans have different benefits and referring patterns which will cause different payment patterns than the ACA plans.

(c) Calculate the total reserves needed for October 2017 through December 2017 using the Projection Method Per Member Per Month (PMPM) as of December 31, 2017. Show your work.

Commentary on Question:
Many candidates calculated a PMPM for each month of July-Dec 2016 separately and then either averaged those PMPMs or trended them separately. The correct method is to take a member weighted average for the entire experience period and then trend the PMPM forward.
Many candidates did not trend the experience period forward correctly or at all. Since it was open to interpretation on what to use for the experience period as the base claims, there are several acceptable responses of which only one is shown below.

Month	Claims	Enrollment
Jul-16	409,000	1,980
Aug-16	491,000	1,980
Sep-16	382,000	1,860
Oct-16	294,000	1,620
Nov-16	362,000	1,620
Dec-16	347,000	1,620
Total	2,285,000	10,680
	Base PMPM	213.95

Trend from Midpoint 10/1/2016 to midpoint of each month						
Month	Enrolllment (A)	Number of Months(B)	Projected PMPM (C)	Paid PMPM (D)	Reserve PMPM (E)	Reserve $ (F)
			(C) = 213.95 * 1.12 ^(B/12)		(E) = C - D	(F) = E * A
Oct-17	2,280	12.5	240.76	107.89	132.87	302,942.83
Nov-17	2,400	13.5	243.04	84.58	158.46	380,314.03
Dec-17	2,640	14.5	245.35	38.64	206.71	545,715.39
					Total Reserve for Oct-Dec 2017	**1,228,972.26**

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-120-18: Avoiding Unintended Consequences in ACO Payment Model

GHA-110-15: Commonwealth Fund Paper – The Final Rule for the Medicare Shared Savings Program

Commentary on Question:

To receive full credit, candidates needed to clearly recommend when each of the initiatives should be implemented for part i. Justifications in section ii need to support the recommendation from part i. To receive maximum credit for responses, candidates needed to identify and justify the most optimal time for beginning an initiative, even though there could have been other dates that would have been beneficial for SACO, but less optimal. If appropriately justified within the context of the question, multiple timelines were acceptable to optimize profit in regards to the MSSP.

Some candidates waivered on recommending one implementation time for each initiative or did not address the question in regards to shared savings under the MSSP, as was requested. These candidates received partial or no credit.

Solution:

(a)

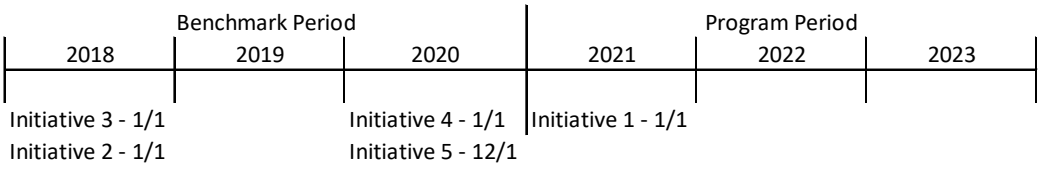
(i) Construct a timeline illustrating when SACO should implement each initiative to maximize profit.

(ii) Justify the recommended implementation date for each initiative. Include a qualitative evaluation of how the recommendation will maximize SACO's profitability.

Commentary on Question:

The model solution below received full credit. Partial credit could be awarded for candidates who were slightly off on the timing of initiatives so as long as their timing and justification supported an implementation that would have optimized profit in regards to the MSSP.

11. Continued



Initiative 1 (disease management program)
2021 is optimal to increase quality scores and reduce costs relative to the benchmark. Due to the program reducing cost and increasing quality scores, the most advantageous timing would be in the first program year.

Initiative 2 (hiring additional nurses)
2018 is optimal since the 2% will be persistent across all years and therefore won't affect the benchmark calculations for the program years.

Initiative 3 (training and IT support to increase risk scores)
Implementing in the first year (2018) is the most advantageous. Risk scores only affect the benchmark setting calculations and not the actual program years. Age/Sex factors are used for the program year calculations. Implementing the first benchmark year will have the most impact on increasing the benchmark. The benchmark compares Y1 and Y2 to Y3 risk scores.

Initiative 4 (new medical procedure)
By implementing in benchmark year 3 (2020), it will have a spike in cost which will increase the benchmark for all of the program years while reducing costs during the program period.

Initiative 5 (improved clerical and IT support, reducing wait times by one month)
Implement December of 2020. In doing so, services that would have been performed in 2021 are performed in 2020, increasing services in the final year of the benchmark period. Implementing at this time would also result in quality improvements during the program year due to the decreased wait times. Improved quality scores during the program years increase the revenue from the MSSP.

(b) Recommend when SACO should implement each initiative given continued participation in the MSSP. Justify your response.

Commentary on Question:
Some candidates failed to recognize the program's continuation from part a. Many candidates did not justify the timing of implementation in regards to the continued MSSP participation.

11. Continued

Initiative 1
No change from part a (2021). The weights of 0.1 and 0.3 in benchmark years 1 and 2 make it the optimal time to implement the program still. 2021 is optimal to increase quality scores and reduce costs relative to the benchmark.

Initiative 2
No change from part a since it's for all subsequent years, the timing and reasoning above still hold.

Initiative 3
No change from part a (2018) since the risk scores only change in the first 3 years.

Initiative 4
Because the $50K in savings are stated to be annual, SACO could benefit through the second program period by implementing at the same time as discussed in part a (2020).

Initiative 5
No change to recommendation from part a (December of 2020). The new benchmark period will have the full effect of the initiative included and there will be no impact to the new performance period.

12. 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.

(2g) Apply methodologies to reduce random fluctuation and maintain validity for program effectiveness studies.

Sources:

Duncan, Chapter 12

Duncan, Chapter 14, page 274

Commentary on Question:

Most candidates performed well on part (a) of the question however performance on the remaining parts of the question was not as strong. Parts (b) through (e) tested syllabus material differently than had been tested in the past, and candidates struggled with this change.

Solution:

(a) Calculate the savings from averted readmissions to Royale Health for the all chronic cohort using the actuarially adjusted historical control methodology. Show your work.

*Baseline Admissions/1,000 * Utilization Trend*
=14,000 / (200,000 / 1,000) * 1.06
74.20

Reduced Admissions/1,000 = Baseline Admissions/1,000 – Actual Admissions/1,000
=74.20 - [15,500 / (225,000 / 1,000)]
5.31

*Total Reduced Admissions = Reduced Admissions/1,000 * Members in Measurement Period/1,000*
=5.31 * (225,000 / 1,000)
1,195

*Total Savings due to Averted Admissions = Reduced Admissions * Unit Cost/Admission*
=1,195 * $330 * 225,000 / 15,500
=$5,724,435

(b) Verify whether the different sample sizes for the indexed population follow a normal distribution. Show your work.

12. Continued

Commentary on Question:
This part of the question tested the candidate's understanding of the relationship between sample size and standard deviation, and many candidates struggled to correctly answer this question. Some candidates attempted to reference the graph provided in the question to verify whether the different sample sizes followed a normal distribution, although the graph was not needed to respond to this part of the question.

A sample size of 5,000 is 10 times a sample size of 500, so the standard deviation should be roughly 1/sqrt(10) or 0.316 times as large. The standard deviation for a sample size of 5,000 is 0.34 times as large as a sample size of 500, suggesting that these samples follow a normal distribution.

Note: Candidates could have also used other sample sizes to make comparisons.

(c) Calculate the predicted standard deviation in the trend for the all chronic cohort in Royale Health's DM program. Show your work.

Commentary on Question:
Most candidates who were unable to correctly answer part (b) appeared to struggle with part (c) as well. Candidates received full credit for part (c) if they used member months or member count in their response. Candidates also received full credit if they used member data from the baseline or intervention period as long as the candidate demonstrated an understanding of the material being tested.

standard deviation of 40,000 / sqrt(200,000 / 40,000) = 3.6% / sqrt(5) = 1.61%

(d) Evaluate whether the sample size for the all chronic cohort is large enough to observe a 5% DM effect with 95% confidence.

Commentary on Question:
Most candidates performed well on this part of the question and were able to correctly interpret the graphical data provided in the question.

A population size of roughly 20,000 is needed to observe a 5% DM effect with 95% confidence. The sample size of the all chronic cohort is 225,000 member months or 18,750 members. This sample size is not large enough to observe 5% DM effect with 95% confidence.

(e) Describe alternative methods for measuring the fluctuations in calculated DM savings.

12. Continued

Commentary on Question:
This part of the question was testing the candidate's knowledge of measuring trend fluctuations in DM program evaluation. Few candidates performed well on this part of the question. Candidates who only listed alternative methods but did not provide a description received partial credit.

- Population trend adjustment
  - Where a larger population (such as a health plan) is available, use of a trend based on the whole population may be appropriate
  - Trend calculated from entire population and used in each sample
- Truncation
  - Large claims can cause significant fluctuations in costs from year-to-year, so truncating claims can help stabilize these fluctuations
  - Various methods of truncation are available
    - Claim truncation at a threshold, e.g. $100,000 is common
    - Truncation at a level equal to the mean annual claim, plus two standard deviations
    - Truncation at a level equal to the 90^{th} percentile of the claims distribution
  - Truncation at a threshold, e.g. $100,000 does not dampen fluctuation very much in small groups
  - Truncation is effective at limiting random fluctuations only if the disease management program is confident of reducing chronic costs by 10% or more
- Utilization measurement
  - Reduction in inpatient admissions or other admissions as a measure of DM effectiveness

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.

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

Learning Outcomes:

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

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

(1c) Understand contracts between providers and insurers.

(2a) Describe, compare and evaluate programs.

Sources:

Managing and Evaluating Healthcare Intervention Programs, Duncan, Ian G., 2nd Edition, 2014, Chapter 3, pages 77-79

Provider Payment Arrangements, Provider Risk, and Their Relationship with Cost of Healthcare

Solution:

(a) Define relative value units (RVUs).

Commentary on Question:
Most candidates received credit for stating the payment components, but failed to explain that RVUs are intended to estimate intensity and duration of medical services.

Medicare reimburses different non-inpatient procedures according to RVUs. There are 3 components: work/practice cost, facility/equipment, and malpractice cost. RVUs are also adjusted for geography.

(b) Describe changes to bundled payment initiatives under the Affordable Care Act.

Commentary on Question:
The majority of candidates did not mention the development of the models of care by CMS. Most got partial credit for including the intent of bundled payments, such as cost control and quality/readmission improvement.
No credit was provided for mentioning Affordable Care Act provisions that do not relate to bundled-payments, such as Essential Health Benefits, Guaranteed Issue, and prohibitions on annual and lifetime maximums.

13. Continued

As part of the Affordable Care Act, CMS will bundle or link payment of those services not currently included in the DRG (such as surgeon's fees, rehabilitation facility and skilled nursing facility charges) for multiple services that patients receive across a single episode of care.
CMS will work in partnership with providers to develop four broadly defined models of care.

- Three models will involve a retrospective bundled payment arrangement, with a target payment amount for a defined episode of care.
- A fourth model will make a single, prospectively determined bundled payment (or episode of care payment) to the hospital that would include all services furnished during the inpatient stay by the hospital, physicians, and other practitioners.

(c) Recommend which hospitals, if any, Quantum should terminate from its network based on 2017 experience using Quantum's methodology. Justify your response. Show your work.

Commentary on Question:
Given the question wording, candidates were unclear as to whether they should use billed charges or allowed amounts when comparing industry costs to each hospital. Credit was given regardless of the approach a candidate used in the calculations. The illustrative solution shown below uses allowed amounts in the calculation, but using billed charges would have received full credit.
Under Industry cost, each service is calculated as the sum of facility, medical supplies and equipment and professional and trended at 2%.
Each hospital's costs are calculated as the product of the ALOS and the average allowed per day. The weighted average cost for each hospital is calculated using the corresponding weights as given in the question.
Every hospital's weighted average cost is below the industry average. Therefore, Quantum should not terminate any of the hospitals. However, if a candidate used hospital billed charges instead, the result would support terminating Hospital C. Additionally, if a candidate used just facility for the industry costs and used allowed costs for the hospitals, the result would support terminating Hospitals A and C.
Common errors included not using the case study exhibits to answer the question, such as using the costs of the three hospitals to calculate industry values, and using industry allowed amounts for each hospital with given hospital service mixes.

13. Continued

	Industry	Hospital A	Hospital B	Hospital C
Knee Replacement		5,515	5,600	5,755
		3.1	3.5	3.2
	38,199.00	17,096.50	19,600.00	18,416.00
Hip Replacement		4,600	4,900	4,400
		3.1	3	3.3
	30,753.00	14,260.00	14,700.00	14,520.00
Cesarean Section		2,400	2,500	2,000
		3.2	3.1	3.4
	13,005.00	7,680.00	7,750.00	6,800.00
Colonoscopy		1,200	900	1,100
		1	1	1
	2,142.00	1,200.00	900.00	1,100.00
Appendectomy		4,100	4,400	5,100
		1.5	1.9	1.8
	11,057.00	6,150.00	8,360.00	9,180.00
Cardiac Stent		3,500	3,900	3,700
		3.5	2.9	3.2
	23,460.00	12,250.00	11,310.00	11,840.00
Weighted Average	17,382.35	9,097.48	8,375.00	9,504.40

Quantum should not terminate any hospital because the costs for each are well below the industry average.

(d) Describe issues with applying this methodology for determining which hospitals to terminate from the network.

Commentary on Question:
Most candidates received partial credit for describing various types of procedure mix differences as an issue with the methodology, but did not mention low volume or potentially not meeting minimum network access requirements.

There is a small volume of admissions and visits across each service category, increasing potential variability in results.
Removing hospitals may lead to Quantum not meeting minimum access requirements for the minimum number of providers required in a service area.
This methodology does not consider intensity, quality, or complication mix differences across hospitals.

(e) Recommend which procedures at Hospital A, if any, Quantum should adopt a bundled contract for in 2018. Justify your response. Show your work.

13. Continued

Commentary on Question:
As in part (c), we accepted the use of allowed or billed amounts when comparing each procedure's cost vs. the bundled payment. Below is the comparison using allowed amounts. Since each cost is below the bundled payment, Quantum should not adopt a bundled contract for any procedure. If a candidate used billed amounts, the recommendation would be to bundle hip replacements and cesarean sections.
Many candidates took the hospital allowed amounts and added in the industry professional services and medical supplies and equipment. This was not appropriate since the question specifically says that the hospital cost includes professional services and supplies.

	Hospital A	Bundled Payment	Bundle?
Knee Replacement	17,096.50	38,200	No
Hip Replacement	14,260.00	31,000	No
Cesarean Section	7,680.00	15,000	No
Colonoscopy	1,200.00	2,100	No
Appendectomy	6,150.00	11,000	No
Cardiac Stent	12,250.00	23,000	No

Since each cost is below the bundled payment, Quantum should not adopt a bundled contract for any of the procedures.

(f) Recommend whether or not Quantum should pursue a bundled contract with Hospital A for 2018. Justify your response. Show your work.

Commentary on Question:
Most candidates received full credit if they used the numbers calculated in (e) to do the comparison and make the recommendation.

	Hospital A	Bundled Payment	Bundle?
Knee Replacement	17,096.50	38,200	
Hip Replacement	14,260.00	31,000	
Cesarean Section	7,680.00	15,000	
Colonoscopy	1,200.00	2,100	
Appendectomy	6,150.00	11,000	
Cardiac Stent	12,250.00	23,000	
Weighted Average	9,097.48	19,010.00	No

Since the weighted average for Hospital A is below the weighted average of the bundled payment (using Hospital A mix), Quantum should not pursue a single bundled contract covering all six procedures.

14. 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:

ASOP 23

Health Reserves by Lloyd

ASOP 41

Commentary on Question:

Commentary listed underneath question component.

Solution:

(a) Describe recommended actuarial standards of practice regarding:

(i) Selection of data

(ii) Review of data

(iii) Use of data

Commentary on Question:

- *In order to get the maximum points allowed on this question, candidates must have listed the major items of the model solution.*
- *The vast majority of candidates did very well in part (i), very few did well in part (ii) and some candidates did well in par (iii).*
- *Candidates that did not score well are those that did not list the major items of the model solution.*

14. Continued

- (i) Selection of Data
  - Consider the data elements that are desired and possible alternative data elements.
  - select the data for the analysis with consideration of the following:
    - whether the data constitute appropriate data, including whether the data are sufficiently current
    - whether the data are reasonable with particular attention to internal consistency
    - whether the data are reasonable given relevant external information that is readily available and known to the actuary
    - the degree to which the data are sufficient
    - any known significant limitations of the data
    - the availability of additional or alternative data and the benefit to be gained from such additional or alternative data
    - sampling methods

- (ii) Review of Data
  - The actuary should perform a review, unless, in the actuary's professional judgment, such review is not necessary or not practical.
  - If, in the actuary's professional judgment, it is not appropriate to perform a review of the data, the actuary should disclose that the actuary has not performed such a review, the reason the actuary has not performed such a review, and any resulting limitations on the use of the actuarial work product.
  - If the actuary performs a review, the actuary should make a reasonable effort to determine the definition of each data element used in the analysis and make a reasonable effort to identify data values that are questionable or relationships that are significantly inconsistent.
  - If the actuary performs a review, the actuary should also consider comparing current data with the data used in the prior analysis for consistency, if similar work has been previously performed for the same or recent periods and if such consistency can reasonably be expected.

- (iii) Use of Data
  - Because appropriate data that are accurate and complete may not be available, the actuary should make a professional judgment about which of the following are applicable:
    - the data are of acceptable quality to perform the analysis
    - the data require enhancement before the analysis can be performed, and it is practical to obtain additional or corrected data that will allow the analysis to be performed
    - Disclose any judgmental adjustments to data or assumptions that allow the actuary to perform the analysis

14. Continued

- if, in the actuary's professional judgment, the data are so inadequate that the data cannot be used to satisfy the purpose of the assignment, then the actuary should 1) obtain different data, 2) complete, with the consent of the principal, any parts of the assignment for which the actuary determines the data are suitable, or 3) decline to complete the assignment.

(b) Calculate the IBNR reserve for the incurral months October 2017 – December 2017 as of 12/31/2017 using the Sum of Digits averaging technique. Show your work.

Commentary on Question:

- *In order to get the maximum points allowed, candidates must have made the calculations as indicated below.*
- *The vast majority of candidates did very well in that part of the question.*
- *Candidates that did not score well in that part of the question are those that did not get the correct calculations. Some candidates did not understand the sum-of-the-digit methodology or used less than 11 months.*

14. Continued

Incurred Month	Weights	*** LAG MONTH ***		
		1	2	3
July 2016	1.5%	12,039	1,655	1,299
Aug 2016	3.0%	12,231	2,112	1,199
Sept 2016	4.5%	23,283	1,894	1,191
Oct 2016	6.1%	5,845	1,593	1,171
Nov 2016	7.6%	11,674	2,469	1,806
Dec 2016	9.1%	12,605	1,516	1,163
Jan 2017	10.6%	14,917	1,581	1,121
Feb 2017	12.1%	17,92	1,936	1,173
March 2017	13.6%	42,812	1,94	1,152
April 2017	15.2%	7,14	2,985	1,104
May 2017	16.7%	5,167	1,936	1,301
Total		15,531	2,038	1,226

Completion Factor	= 30.1%/15.506 1.9%	= 61.4%/2.039 30.1%	= 75.3%/1.226 61.4%
Cumulative Payments	98,000	1,260,000	1,612,000
Ultimate Payment	= 98,000/1.9% = 5,051,196	= 1,260,000/30.1% = 4,181,537	= 1,612,000/61.4% = 2,624,455
Unpaid Balance	= 5,044,872 - 98,000 = 4,953,196	= 4,183,014 - 1,260,000 = 2,921,537	= 2,624,747 - 1,612,000 = 1,012,455

8,887,188

14. Continued

(c) Using actuarial standards of practice:

(i) Describe requirements for actuarial communications.

(ii) List disclosures in actuarial reports.

Commentary on Question:

- *In order to get the maximum points allowed on this question, candidates must have listed the major items of the model solution.*
- *Few candidates did well in part (i), but the majority of candidates did very well in part (ii).*
- *Candidates that did not score well are those that did not list the major items of the model solution.*

(i) Describe Requirements for Actuarial Communications:

- Form and Content
  - The actuary should take appropriate steps to ensure that the form and content of each actuarial communication are appropriate to the particular circumstances, taking into account the intended users.
- Clarity
  - The actuary should take appropriate steps to ensure that each actuarial communication is clear and uses language appropriate to the particular circumstances, taking into account the intended users.
- Timing of Communication
  - The actuary should issue each actuarial communication within a reasonable time period, unless other arrangements as to timing have been made.
- Identification of Responsible Actuary
  - An actuarial communication should clearly identify the actuary responsible for it.
  - The name of an organization with which each actuary is affiliated also may be included in the communication, but the actuary's responsibilities are not affected by such identification.

14. Continued

(ii) List the disclosures in actuarial reports:

- the intended users of the actuarial report
- the scope and intended purpose of the engagement or assignment
- the acknowledgement of qualification
- any cautions about risk and uncertainty
- any limitations or constraints on the use or applicability of the actuarial findings
- any conflict of interest
- any information on which the actuary relied
- the information date

15. Learning Objectives:

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

Learning Outcomes:

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

Sources:

Duncan, Chapter 11 pages 211-212

Duncan, Chapter 11 pages 214-215

Duncan, Chapter 11 pages 222-224

Commentary on Question:

Candidates did fairly well in parts A and B of the question, which were verbal answers and explanations of concepts in the book. For part C most candidates knew the key words they were supposed to use, however many made statements like 'the low p-score showed that the propensity score was significant' when they should have said that the intervention being evaluated was significant. They memorized the terms but didn't comprehend the purpose.

Solution:

(a) Describe propensity score matching and its value for program evaluation.

Commentary on Question:

Most candidates were able to answer a few of the points in this question.

The general purpose is to estimate what would have happened absent the program.
Randomized control studies are not always available.
Propensity score matching involves running a logistic regression using characteristics such as age, sex, area, health status to assign a score to members
Then, using a method such as nearest neighbor or caliper matching, members of a control population are matched to members of a reference population.
Only observable characteristics are available.
Member experience is compared to measure impact of intervention.
It is valuable because it provides for a method of comparing participants to non-participants of similar characteristics.

(b) Compare and contrast propensity scores with risk adjustment.

Commentary on Question:

Candidates did well on this part.

15. Continued

Risk adjustment uses more detailed diagnosis information; propensity scores use a wide range of observable variables.
Both methods assign one number to an individual.
Risk Adjustment is often used by payers (government or private) to adjust payments; propensity scoring is more common for health researchers.
Risk adjustment uses the whole population; prop scores eliminate those who aren't matched in the study

(c) Evaluate the propensity score results in Exhibit 9 of the case study.

Commentary on Question:
Many candidates didn't describe the case study (disease management), they were evaluating the propensity scoring method. The point isn't whether the p-scores are significant, the point is if the disease management program is effective and if we can be confident that the results are not coincidental.

The propensity matched results indicate that the disease management program was successful.
Improvement in admit rates, cost per admit, admits/1000, cost per HF admit, and heart med compliance are all shown to be statistically significant by the matched table.
If we only had the unmatched data we would not be able to see that admits/1000 and compliance w/meds was improving with the program; using propensity matching these improvements are shown to be statistically significant.