# GH ADV Model Solutions
# Spring 2018

## 1. 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:**

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

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

**Sources:**

Essentials of Managed Health Care, ch 12, p. 285-287

**Commentary on Question:**

*Commentary listed underneath question component.*

**Solution:**

(a) Describe the impact of the following legislation on behavioral health care:

(i) The Mental Health Parity and Addiction Equity Act

(ii) The Affordable Care Act

**Commentary on Question**:

*The majority of the candidates were not very familiar with the specified legislation as it relates to behavioral health care. Prior to the MHPAEA, most health plans had carve-out of behavioral health care. MEPAEA established both coverage and benefit richness standards for behavioral health care. On the ACA, few candidates understood the Medicaid expansion and the large population impacted. Most ACO-aligned beneficiaries are non-duals, therefore ACOs are not designed to manage dual eligibles with significant mental health issues.*

## 1. Continued

The Mental Health Parity and Addiction Equity Act

The impact of The Mental Health Parity and Addiction Equity Act (MHPAEA) on behavioral health care is as follows:

- The Act ensures coverage for behavioral health conditions is on par with coverage for physical health maladies.
- The Act ensures benefit equivalence as well as parity in the manner in which care is managed.
- There is a broad impact to all types of health insurance plans, including commercial (group and individual), Medicare managed care, and Medicaid.

The Affordable Care Act

The impact of The Affordable Care Act (ACA) on behavioral health care is as follows:

- ACA includes Medicaid expansion to approximately 14 million recipients who tend to be low-income, single males for whom substance use disorders are prominent.
- ACA creates opportunities to pilot new programs to promote an integrated approach to clinical management. Examples include integrated health homes and Dual Demonstration program.
- Target population is serious mentally ill (SMI), aged blind and disabled (ABD) and dual eligibles
- ACA's health insurance exchange will ensure coverage of uninsured populations who may have mental health managed care needs; in addition to providing essential health benefits, eliminating pre-existing conditions and requiring guaranteed issue.

(b) Describe the following service delivery systems and list the key success factors in managing physical and behavioral health care:

(i) Accountable Care Organizations

(ii) Patient Centered Medical Homes

**Commentary on Question**:

*Most candidates were able to list the key success factors for both ACO and PCMH. The descriptions of the ACO and PCMH rarely focused on the coverage of physical and behavioral health care. Few candidates pointed out that PCMH was created for the patients with serious mental illness and/or chronic comorbid conditions.*

## 1. Continued

Description of Accountable Care Organizations (ACO)

- An ACO is responsible for all care to the members, including both behavioral and physical health managed care.
- An ACO typically consists of medical physicians, behavioral health physicians, hospitals and a health plan or governmental payer.
- The main objectives of an ACO are to improve quality of care, lower medical costs and improve patient satisfaction.

Key Success Factors in managing physical and behavioral health care

1) Ability to identify the population to manage
2) Ability to understand and manage cost
3) Ability to manage quality
4) Ability to integrate care

Description of Patient Centered Medical Homes (PCMH)

- A PCMH is a type of clinical practice, where a doctor, either a behavioral health doctor or medical doctor, coordinates primary care for patients.
- The focus is primarily on patients with serious mental illness and/or chronic comorbid conditions.
- Common members of a medical home team include a physician, medical assistant, registered nurse/coach, behavioral health team member and a health plan case manager.
- The practice team shares information and integrates both physical and behavioral health care for the patients through health information exchange technology, electronic medical records and e-solutions.

Key Success Factors in managing physical and behavioral health care

1) Improved quality of care
2) Improved status of comorbid conditions
3) Increased satisfaction of patients
4) Reduction of inpatient admissions
5) Reduction of long-term care admissions

## 2. Learning Objectives:

2. Evaluate and apply techniques for claim utilization management, care management, and population health management.

**Learning Outcomes:**

(2a) Describe, compare and evaluate care management and population health programs and interventions.

**Sources:**

Duncan Chapter 3, 6, and 9.

**Commentary on Question:**

*Most candidates successfully scored full points on parts (a) and (b), indicating mastery of basic principles of care intervention techniques, as outlined within the source. Parts (c) and (d) tested a more thorough understanding of the value chain concept, and its application.*

**Solution:**

(a) Describe potential care management programs your client could implement.

**Commentary on Question**:

*The section tested the candidates' knowledge of care intervention techniques. Listing and a basic description of each technique was sufficient for full credit.*

*Duncan Chapter 3*

- Preauthorization –
  - Program that requires a physician or hospital to obtain approval from managed care organization before performing procedures
- Concurrent Review – Monitoring health plan members' care while they are still receiving care in an acute hospital or nursing home.
- Case Management –
  - Involves health care professional who coordinates the care of a patient with a serious disease or illness.
  - Includes specialty case management, performed by a care manager with expertise in a particular area.
- Demand Management –
  - Informational intervention
  - Provided by clinical staff over the phone
- Disease Management –
  - System of coordinated health care interventions and communications for populations with conditions
  - Patient self-care efforts are significant.

## 2. Continued

- Population Health Management –
  - Broad set of medical conditions addressed for the whole population - not on a specific condition.
- Accountable Care Organizations –
  - Groups of doctors, hospitals, and other health care providers,
  - Voluntary participation
  - Coordinated high quality care

(b) Describe the components of applying the value chain method to planning a disease management program.

**Commentary on Question**:
*The section tested the candidates' knowledge of the value chain method. Listing and a basic description of each technique was sufficient for full credit. Most candidates scored full points for part (b).*

*Duncan Chapter 6*

- Data Warehousing – create warehouse of administrative and eligibility data.
  - Create and maintain electronic patient record,
  - Identify member conditions, and
  - Target populations for intervention.
- Predictive Modeling –
  - Apply predictive models/target for intervention;
  - Rank in terms of risk.
  - Identify gaps in care and provider patterns.
- Intervention Development –
  - Actual development of the program and intervention,
  - Campaigns to deliver the intervention
- Outreach/Enrollment –
  - Deploy members to campaigns,
  - Assess the staff and case load assignment,
  - Reach and enroll the members targeted
- Member Coaching/Assessment –
  - Perform assessments of the programs,
  - Maintaining member enrollment in the program,
  - Coaching members while enrolled, and
  - Graduate members from the maintenance program.
- Outcomes Assessment –
  - Measure the outcome:
    - Clinical, financial, operational results;
    - Member experience to improve future programs.

## 2. Continued

(c) Describe considerations for insourcing or outsourcing the components of the value chain method.

**Commentary on Question**:
*The section tested the candidates' understanding of the value chain method. Most candidates limited their answer to only one or two of the reasons to outsource, with the most common answer being vendor experience with coordination of each component.*

*Duncan Chapter 6*

Reasons to outsource:

- Vendor experience with coordination of each component
- Challenge to obtain, train, and coordinate resources within the health plan;
- Challenge to obtaining services from different vendors for each component;
- Challenge to integrating and coordinating services from multiple vendors;
- Important to review the internal and external costs and benefits for each piece. Compare to applicable benchmarks, if available.

(d) Describe opportunity analysis and its role within the value chain method.

**Commentary on Question**:
*The section tested the candidates' understanding of opportunity analysis. Most candidates understood the relationship with predictive modeling and matching opportunities from within the population, however few candidates successfully identified the additional knowledge points.*

*Duncan Chapter 9*

Opportunity analysis:

- Data driven analytical process that extends traditional predictive modeling;
- Utilizes prospective data to prospectively predict future outcomes;
- Matches opportunities within the client's population to care management programs;
- Demonstrates the potential clinical, financial, and humanistic improvements that could result from care management program.
- Utilizes –
    - Knowledge of member benefit designs,
    - Information on any evidence-based care management programs in place or that could be implemented, and
    - Eligibility and claims data for 2-3 years.

## 3. Learning Objectives:

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

**Learning Outcomes:**

(3b) Explain the limitations and applications of the various valuation methods.

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

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

**Sources:**

AAA PDR Discussion Reports

**Commentary on Question:**

*Commentary listed underneath question component.*

**Solution:**

(a)

(i) Describe the testing level of a Premium Deficiency Reserve (PDR).

(ii) List factors that affect how grouping is accomplished at the testing level of a PDR.

**Commentary on Question**:

- *In order to get the maximum points allowed on this question, candidates must have listed the major items indicated below.*
- *Some candidates did well in this part of the question.*

(i) Testing level of a PDR:

- This is the minimum level at which financial projections are performed.
- At this level the focus is how to group contracts so that projections will provide meaningful results based on reasonable and credible assumptions.
- The actuary should review each grouping, and testing should be performed to determine the need for a PDR.
- Different issues will affect how a reporting entity decides to group its business.

## 3. Continued

(ii) Factors that affect how grouping is accomplished at the testing level of a PDR:

- Materiality of a group relative to size of the whole reporting entity
- Similarity of product types
- Differences in marketing methods
- Potential rate restrictions
- Geographical rating areas
- Length of rate guarantee periods
- Regulatory requirements
- Line of business

(b) Describe considerations for contract groupings at the reporting level of a PDR.

**Commentary on Question**:

- *In order to get the maximum points allowed on this question, candidates must have described the major items indicated below.*
- *Few candidates scored well in this part of the question.*

- Accounting
  - When summed across all the aggregated groups at reporting level, the sum should contain all the health business.
  - How these characteristics are defined can vary from company to company.
    - GAAP issues relating to reporting results for PDR should be discussed with the company's auditors.
- Marketing
  - The marketing aspect can be looked at in several ways:
    - In terms of marketing technique (e.g., direct mail)
    - From a competitive standpoint (e.g. what "markets" are you in?)
  - One approach could be grouping contracts into the following categories:
    - Comprehensive medical and dental products are marketed to customers as a means to provide for services and products that treat adverse health-related conditions.
    - DI products are marketed as a means to replace income lost when, because of physical or mental disability, an individual loses some or all of his/her capacity to engage in remunerative employment.
    - LTC products are marketed as a means of providing for essentially custodial services that are necessitated by some medical (physical or mental) condition.

## 3. Continued

- Servicing
  - The servicing of categories of business defined in the marketing section above differs significantly from category to category:
    - how proof of loss is submitted
    - how eligibility for benefits is determined and confirmed
    - to whom payment is made.

- Measurement
  - "Measured" is in some ways both the easiest to deal with and the most difficult, simply because it has the least clear meaning.
  - A subgroup of the NAIC Life and Health Actuarial Task Force agreed to a change in the Health Reserves Guidance Manual (HRGM) reported on a statutory basis.
    - The HRGM guidelines specify that all of a company's health business must fit into one of these 4 lines of business:
      - Comprehensive major medical (e.g. medical-type coverage, Medicare supplement, dental and vision)
      - LTC insurance
      - DI insurance
      - Limited benefit plans
    - If any of the 4 specific lines above is not material by itself, then it should be combined with the most similar other line for reporting purposes.
      - Otherwise, deficiencies in one of the aggregate groups must not be offset with sufficiencies from another aggregate group.
  - Another issue at this level is how the aggregated results from the testing level will be illustrated in the appropriate statutory financial format (i.e. blue blank or orange blank).
  - The issue of grouping can be a challenge to the valuation actuary.
    - During discussions with the company's external auditors, domiciled state regulators and internal management, the valuation actuary will need to address various questions

(c)

(i) Calculate the PDR at the testing level. Show your work.

(ii) Recommend a grouping for the reporting level of PDR. Justify your answer.

(iii) Calculate the PDR at the reporting level. Show your work.

## 3. Continued

**Commentary on Question**:

- *In order to get the maximum points allowed in this question, the candidate must have shown the correct calculations as well as recommended a grouping with an appropriate justification.*
- *Many candidates scored well in this part of the question.*
- *Candidates that did not score well did not calculate correctly the PDR at the testing and reporting levels and/or did not recommend a grouping for the reporting level with an appropriate justification.*

(i) PDR at the testing level:

Sum negative cash flows across years for each testing group, then sum the PDR for each testing group; total PDR is $61,000.

| Testing Group | Projected Underwriting Cash Flows by Year ($000) | | | | | PDR at the testing Level |
|---|---|---|---|---|---|---|
| | 2018 | 2019 | 2020 | 2021 | 2022 | |
| Group LTD | -14 | 2 | 3 | 5 | 7 | 14 |
| Group LTC | 19 | 20 | 22 | 24 | 26 | 0 |
| Individual Major Medical | -22 | 0 | 4 | 5 | 6 | 22 |
| Group Dental | 13 | 11 | 9 | 7 | 5 | 0 |
| State Mandated Pool | -9 | -7 | -5 | -4 | 0 | 25 |
| Total | -13 | 26 | 33 | 37 | 44 | 61 |

(ii) Recommended grouping for the reporting level of PDR

- Group LTD would need to be reported alone
- Group LTC would need to be reported alone
- Individual Major Medical, Group Dental and State Mandated Pool would need to be combined together for reporting purposes
- Justification:
  - This is the grouping recommended by the HRGM.
  - This is also in line with how those products are marketed.
  - Gains in a grouping cannot offset losses in another grouping.

(iii) PDR at the reporting level:

Similar calculation as part i but using the revised Health grouping from part ii; total PDR is now $32,000.

| Testing Group | Projected Underwriting Cash Flows by Year ($000) | | | | |
|---|---|---|---|---|---|
| | 2018 | 2019 | 2020 | 2021 | 2022 |

| | | | | | |
|---|---|---|---|---|---|
| Individual Major Medical | -22 | 0 | 4 | 5 | 6 |
| Group Dental | 13 | 11 | 9 | 7 | 5 |
| State Mandated Pool | -9 | -7 | -5 | -4 | 0 |
| Health Business - Total | -18 | 4 | 8 | 8 | 11 |

## 3. Continued

| Grouping | PDR at the Testing Level |
|---|---|
| Group LTD | 14 |
| Group LTC | 0 |
| Health Business | 18 |
| Totals | 32 |

(d)

(i) Recommend a method to allocate the resulting PDR for reporting purposes. Justify your answer.

(ii) Calculate the resulting allocated PDR at the reporting level. Show your work.

**Commentary on Question**:

- *In order to get the maximum points allowed in this question, the candidates must have recommended a method to allocate the resulting PDR for reporting purposes and then calculated the resulting PDR based on this method.*
- *Some candidates scored well in this part of the question.*
- *Candidates that did not score well did not recommend a method to allocate the resulting PDR for reporting purposes and/or did not calculate correctly the resulting PDR based on this method.*

(i) Allocation method for the resulting PDR at the reporting level:

- I recommend allocating the resulting PDR for reporting purposes based on earned premium.
  - This would be a good approximation of the relative size of the groupings, i.e. a larger groupings would have a greater portion of the PDR allocated to it.
  - Another allocation approach would be based on the resulting PDR generated at the testing level.
  - Regardless of the approach chosen, consistency from year to year should be maintained.

(ii) Calculated values of the resulting PDR at the reporting level based on earned premium:

- Group LTD = 14.0
- Group LTD = 0.0
- Individual Major Medical = [362.0 / (362.0 + 47.0)] x 18.0 = 15.9
- Group Dental = 0.0
- State Mandated Pool = [47.0 / (362.0 + 47.0)] x 18.0 = 2.1

## 3. Continued

Calculated values of the resulting PDR at the reporting level based on PDR at the testing level:

- Group LTD = 14.0
- Group LTD = 0.0
- Individual Major Medical = [22.0 / (22.0 + 25.0)] x 18.0 = 8.4
- Group Dental = 0.0
- State Mandated Pool = [25.0 / (22.0 + 25.0)] x 18.0 = 9.6

## 4. Learning Objectives:

2. Evaluate and apply techniques for claim utilization management, care management, and population health management.

**Learning Outcomes:**

(2b) Estimate savings, utilization rate changes and return on investment as it applies to program evaluation.

(2c) Describe the considerations in the design, implementation and evaluation of a care management program.

**Sources:**

Duncan, Chapter 4 pages 83

Duncan, Chapter 10 pages 214-215

Duncan, Chapter 10 pages 200

**Commentary on Question:**

*Commentary listed underneath question component.*

**Solution:**

(a) Describe measurement principles an actuary should address when constructing a study of a care management intervention.

**Commentary on Question**:

*Candidates who provided a list without a description received partial credit only. The majority of candidates got partial credit and a small percentage of candidates received full credit.*

Reference Population – a reference population is needed to compare to the intervention population

Equivalence – the reference population should be equivalent to the intervention population.

Consistent Statistics – need to measure the same outcome variables in the same way for both the reference and intervention populations

Appropriate Measurement – The analysis should avoid extraneous or irrelevant variables; the population should be defined as narrowly as possible to reduce the use of confounding variables

Exposure – an accurate exposure is very important in the study and requires explicit definition and categories of members and time periods.

## 4. Continued

Reconcile the results – the actuary should be able to reconcile the outcomes of the smaller population and the entire health plan in terms of what factors are driving the trends of both segments.

(b)

(i) Define a randomized control trial.

(ii) Describe the pros, cons, and challenges of a randomized control trial.

**Commentary on Question**:
*Part B was graded as i) & ii) as a whole.*

*Candidates received partial credit for providing a subset of the list shown below. Most candidates were able to describe randomized control trial.*

*Most candidates listed "Gold Standard" as a pro with this approach. However, the majority of candidates missed the need for sufficient members and the need for incurred claims result.*

A randomized control trial requires a randomized control group that is not subject to the intervention being studied

The metric of the control group (not subject to intervention) is compared to the intervention group – the difference is attributed to the intervention

Pros
This type of trial is highly valid and scientific
It is considered the "Gold Standard" method
The method is widely accepted and familiar in the marketplace

Cons/Challenges
A need for incurred claims delays the evaluation
Requires a sufficient number of members
Health plans consider this type of trial difficult to implement; is also seen as unethical to withhold intervention efforts
Randomization must occur at the population level
Encountered more in academics
Equivalence between the intervention group and the control group is not guaranteed and needs to be demonstrated

## 4. Continued

(c)

(i) Calculate the savings of the intervention. Show your work.

(ii) Describe limitations of this savings calculation approach.

**Commentary on Question**:
*The candidates performed well on the calculation portion of the question and received full credit.*

*Most candidates received only partial credit for the second part of the question. The majority of candidates noted the need to adjust for risk but only a small percentage of candidates noted potential claim issues.*

The savings is calculated as the difference between the expected cost and actual cost.

Actual Cost = $105

Expected Cost = (Reference Population Intervention Period Cost) x (Reference Population Baseline Period Cost) / (Intervention Population Baseline Period Cost) = $100 x $100 / $90 = $111 (rounded to the nearest dollar)

Savings = $111 - $105 = $6 PMPM

Limitations:
The savings may be attributable to other factors that impact the intervention population differently (e.g., plan design, trend, etc.)

The cost of the intervention group may be regressing to the mean

There is a potential for patient selection bias of the intervention population

There are potential claim issues
- Fixed time periods
- Enrollment issues
- Claims run out
- Outlier claims

## 4. Continued

The analysis needs to consider changes in the risk of the underlying population

- Demographic factors
- Exclusionary conditions
- Persistency
- Chronic prevalence in risk classification
- Severity of illness
- Ability to contact the intervention population
- Operational issues

Program costs

## 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.

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

**Sources:**

Health Affairs: Avoiding Unintended Incentives in ACO Payment Models

**Commentary on Question:**

*Commentary listed underneath question component.*

**Solution:**

(a) Calculate the cumulative marginal revenue over the two MSSP contract periods (2017 through 2022) under the following scenarios:

(i) The surgery occurs in 2018

(ii) The surgery occurs in 2019

Show your work.

**Commentary on Question**:

*Most candidates applied the appropriate weights, depending on the year of the surgery. However, most missed the fact that the surgery is considered revenue to the ACO. They generally applied it as a cost. Another common mistake was the revenue in the second contract period – they either didn't apply to each year or they forgot to apply the 60% shared savings weight.*

## 5. Continued

| | Annual Base | First Contract Period | | | | Second Contract Period | | | Cumulative Marginal Return |
|---|---|---|---|---|---|---|---|---|---|
| | Spending | 2017 | 2018 | 2019 | Benchmark | 2020 | 2021 | 2022 | 2017 - 2022 |
| Weights | | 0.1 | 0.3 | 0.6 | | 0.1 | 0.3 | 0.6 | |
| Revenue before shared savings/losses | | | | | | | | | |
| Surgery in 2018 | 2,000,000 | | 50,000 | | 2,015,000 | | | | |
| Surgery in 2019 | 2,000,000 | | | 50,000 | 2,030,000 | | | | |
| Marginal Revenue after shared savings/losses | | | | | | | | | |
| Surgery in 2018 | 2,000,000 | | 20,000 | | 2,015,000 | 9,000 | 9,000 | 9,000 | 47,000 |
| Surgery in 2019 | 2,000,000 | | | 20,000 | 2,030,000 | 18,000 | 18,000 | 18,000 | 74,000 |

Marginal revenue equals the charge for the surgery plus any shared savings/losses. A higher benchmark also increases shared savings in future years. As illustrated above, the marginal revenue (charge for the surgery plus change in shared savings/losses for the year the surgery is performed and for the following MSSP contract period) totals:

(i) $47,000 for the surgery if performed in 2018

(ii) $74,000 for the surgery if performed in 2019

(b) Propose weights to use in determining the benchmark such that the cumulative marginal revenue does not exceed net payments for the surgery. Justify your response. Show your work.

**Commentary on Question**:
*Many candidates understood that by using equal weights, the cumulative marginal revenue would equal the FFS payments. However, they failed to justify their response with the needed calculation.*
*Equal weights is not the only solution, as the question asks that the cumulative marginal revenue not exceed the surgery cost. In justifying alternate weights, candidates made the same error that was made in part a.*

## 5. Continued

Equal weights should be used. The following illustrates how this produces marginal revenue equal to the charge for the surgery.

| | Annual Base Spending | First Contract Period | | | Benchmark | Second Contract Period | | | Cumulative Marginal Return 2017 - 2022 |
|---|---|---|---|---|---|---|---|---|---|
| | | 2017 | 2018 | 2019 | | 2020 | 2021 | 2022 | |
| Weights | | 33.3% | 33.3% | 33.3% | | 33.3% | 33.3% | 33.3% | |
| Revenue before shared savings/losses | | | | | | | | | |
| Surgery in 2018 | 2,000,000 | | 50,000 | | 2,016,667 | | | | |
| Surgery in 2019 | 2,000,000 | | | 50,000 | 2,016,667 | | | | |
| Marginal Revenue after shared savings/losses | | | | | | | | | |
| Surgery in 2018 | 2,000,000 | | 20,000 | | 2,016,667 | 10,000 | 10,000 | 10,000 | 50,000 |
| Surgery in 2019 | 2,000,000 | | | 20,000 | 2,016,667 | 10,000 | 10,000 | 10,000 | 50,000 |

(c) Recommend other changes to the MSSP structure to best align incentives to ensure that the ACO and the Centers for Medicare and Medicaid Services (CMS) both realize savings. Justify your response.

**Commentary on Question**:
*Candidates generally did well on this part of the question. Candidates who did not receive full credit either only justified one change or listed changes without justification*

Extend the benchmarking period to 5 years with equal weights

This will penalize cost savings less heavily, adding an incentive for the ACO to reduce costs while limiting the ability for short-term gaming of the MSSP sharing formula

Blend an ACOs benchmark with local benchmarks such as the traditional FFS Medicare spending average in the ACO's market.

Recognizes local characteristics and best practices – ensuring both CMS and the ACO consider the relative costs of care in the applicable area and base compensation accordingly.

## 6. 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.

**Sources:**

Level Funding (Healthwatch 2016)

**Commentary on Question:**

*This question tested the candidate's understanding of level funding plans with a focus on the pros and cons of both an insurer administering a level funded plan and a group choosing a level funded plan.*

**Solution:**

(a) Describe advantages and disadvantages to Company ABC of entering a self-funded agreement.

**Commentary on Question**:

*Most candidates received at least partial credit for this part and in general did well.*

Advantages:

- Group will avoid premium taxes and ACA-related fees
- Group will avoid state health coverage mandates
- Group will benefit directly from favorable claims experience
- Group will forgo paying insurance risk

Disadvantages:

- Group will have less predictable cash flows
- Group will bear financial responsibility for unfavorable claims experience
- Group will need to obtain and pay for the advice of insurance professionals to manage plans
- Group may need to buy stop loss

(b) Explain how a level funded option can provide a less costly alternative to an ACA compliant plan.

**Commentary on Question**:

*Many candidates were able to identify at least one reason they were less costly than an ACA plan. Some candidates described in detail how a level funding plan works without explaining why it was less costly.*

## 6. Continued

A level funded option can provide a less costly alternative because:

- ACA community rating results in premiums for healthy groups that contain a subsidy to offset claims cost of more costly groups in small group markets.
- ACA community rating rules provide relatively few price levers to differentiate costs of small groups.
- Level funding does not have restrictions on pricing small groups based on risk.
- Level funding allows opportunity to receive surplus from favorable experience.

(c) Describe two reasons Insurer JKL may not want to offer a level funded product to Company ABC.

**Commentary on Question**:
*Many candidates were able to identify at least one reason for the insurer to not offer a level funding product.*

1. Insurer may want better risk on ACA block to lower average cost in order to make ACA block more competitive
2. Not easy to price, sell, and administer level funding products and stop loss for small groups.

(d) Calculate the surplus or liability for Company ABC under each scenario. Show your work.

**Commentary on Question**:
*Many students struggled to calculate the proper surplus after calculating the paid claims fund. For scenario 1, candidate should recognize that while actual claims equaled projected claims under SSL, the surplus is the amount under the maximum liability.*

Total $ claim cost below SSL = $325 x 12 x 30 = $117,000
Paid claims fund maximum liability = $117,000 x 1.2 = $140,400

Scenario 1
Actual paid below SSL deductible = $133,200 - $16,200 = $117,000
Surplus = $140,400-$117,00=$23,400

Scenario 2
Actual paid below SSL deductible = $75,000
Surplus = $140,400 - $75,000 = $65,400

## 6. Continued

Scenario 3
Actual Paid below SSL deductible = $105,000
Surplus = $140,400 – $105,000 = $35,400

(e) Recommend whether or not Company ABC should pursue the level funded product. Justify your answer.

**Commentary on Question**:
*Candidates should have provided justification for the recommendation, considering both scenarios in part (d) as well as components from the earlier sections.*

I recommend that Company ABC should pursue the level funded product. ABC expects relatively healthy members and would realize a refund in the scenarios tested. Additionally, since employees are healthy, the cost for a level funded product will likely be less than an ACA compliant product, given experience rating. They would be able to benefit from avoiding premium taxes, ACA fees, and forgoing paying insurance risk.

## 7. Learning Objectives:

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

**Learning Outcomes:**

(3a) Describe the types of claim reserves (e.g., due and unpaid, ICOS, IBNR, LAE, PVANYD).

(3c) Calculate appropriate claim reserves given data.

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

**Sources:**

GHA-103-16: Health Reserves

**Commentary on Question:**

*Overall, candidates performed well on this question, although few candidates were able to answer the question completely. Many candidates understood various methods of claim reserves and the calculation of claim reserve estimates, and received full credit for their responses to these parts of the question.*

*One part of the question asked candidates to describe practices to ensure sufficient claim reserve estimates. This part of the question required candidates to apply their knowledge of the readings to the claim reserve estimate example to meet a standard of "sufficiency" in covering anticipated liabilities. Many candidates struggled to provide complete responses.*

**Solution:**

(a) Describe methods of estimation for health claims reserves.

**Commentary on Question**:

*The candidates generally did well on this part of the question and earned most of the points. The question required candidates to describe methods of estimation. Many candidates did not earn full credit due to incomplete descriptions.*

Claims reserves are typically calculated as total projected incurred claims less claims paid to date. Methods vary primarily in terms of how they estimate total projected incurred claims.

- Examiner's method
  Under the examiner's method, ultimate claims are estimated on a case-by-case basis by a qualified examiner. It is most often used for catastrophic and litigated claims that are not suited to other methods.

**7. Continued**

- Average size claim method
  Under the average claim size method, reserves are estimated using expected average claim sizes and the number of reported claims. This method is not well-suited to claims with high volatility. Expected claims sizes are typically based on historical experience and adjusted for differences between the experience period and the reserving period.

- Projection method
  The projection method uses exposure, typically member-months, to estimate reserve based on projected incurred claims PMPM. The projection method is well-suited for lines of business with low incidence rates or immature data.

- Loss ratio method
  The loss ratio method uses a projected loss ratio and total earned premiums to estimate the total incurred claims. The loss ratio can be based on prior experience or pricing expectations. This method is well-suited for new products, and is often used as a check of other methods.

- Tabular method
  The tabular method uses continuance tables and other industry standard data along with interest rates to estimate the present value of amounts not yet due. It is typically used in long duration products such as critical illness or long-term disability insurance.

- Development method
  The development method utilizes claims by paid and incurred dates to estimate a completion factor that can be applied to paid claims as of the reserve date to estimate total incurred claims. Completion factors can be developed using several months of data to minimize the effect of month-to-month volatility. This method is suited to claims that develop over time in a similar pattern from period to period.

- Factor method
  The factor method is a generalization of several methods above, where some factor is applied to experience (often a percentage of premium). The loss ratio method, projection method, and development method are all examples of factor methods.

## 7. Continued

(b)

(i) Calculate the December 2017 claim reserve estimate using XYZ Health's assumptions. Show your work.

(ii) Critique the CEO's assumptions.

**Commentary on Question**:
*For part (i), candidates were asked to calculate the December 2017 claim reserve using two assumptions: claims are complete after four months, and factors should incorporate two months of smoothing. Full credit was given to candidates who successfully calculated age-to-age factors, appropriately applied the two month smoothing requirement, and calculated total incurred claims and the reserve accurately. Candidates who made a computational mistake in one part of this process were not penalized in later parts as long as the results were consistent with prior answers and steps were clearly documented. The most common candidate errors included incorrect selection of months for smoothing and incorrect application of the completion assumption. Candidates were much more successful in calculating total incurred claims and reserves based on the completion factors produced in earlier parts of the question.*
*Part (ii) required candidates to critique these assumptions. Candidates who were able to explain the drawbacks of these assumptions received full credit for this part of the question. The majority of the candidates received full credit for this part of the question.*

(i) Calculate the December 2017 claim reserve estimate:

- Step 1: Calculate Age-To-Age factors using 2 Months of data for each lag.

Since the CFO has asked you to assume claims are complete after 4 months, only need to calculate age-to-age factors for lag 1 thru 3 (since the fourth month is assumed to be complete).

| **Lag 1 Months** | **Age-to-Age Factor** |
|---|---|
| November 2017 Incurrals | 36,000/3,900 = 9.2308 |
| October 2017 Incurrals | 37,000/5,200 = 7.1154 |

| **Lag 2 Months** | **Age-to-Age Factor** |
|---|---|
| October 2017 Incurrals | 48,000/37,000 = 1.2973 |
| September 2017 Incurrals | 47,000/40,000 = 1.1750 |

| **Lag 3 Months** | **Age-to-Age Factor** |
|---|---|
| September 2017 Incurrals | 50,000/47,000 = 1.0638 |
| August 2017 Incurrals | 50,000/49,000 = 1.0204 |

## 7. Continued

- Step 2: To smooth the age-to-age factors, use the average of the two months' age-to-age factors
  - Lag1 smoothed factor = (9.2308+7.1154)/2 = 8.1731
  - Lag2 smoothed factor = (1.2973+1.1750)/2 = 1.2362
  - Lag3 smoothed factor = (1.0638+1.0204)/2 = 1.0421

- Step 3: Calculate completion factors

Since claims are assumed to be complete after 4 months, the lag 4 completion factor is 1.0000.

Completion factor (n) = Completion factor (n+1) / Smoothed age-to-age factor (n)

- Completion factor for lag 4 = 1.0000
- Completion factor for lag 3 = 1.0000 / 1.0421 = 0.9596
- Completion factor for lag 2 = 0.9596 / 1.2362 = 0.7763
- Completion factor for lag 1 = 0.7763 / 8.1731 = 0.0950

- Step 4: Calculate the December incurred claims estimate

December 2017 Incurred claims = Claims paid to date / Completion factor for Lag 1

= \$6,700/0.0950
= \$70,526

- Step 5: Subtract December 2017 paid claims from the December incurred claims estimate to determine the reserve

December 2017 Reserve = December 2017 Incurred Claims – December 2017 Claims Paid to Date

= \$70,526 - \$6,700
= \$63,174

(ii) Critique the CEO's assumptions:

- The CEO should not assume that claims are complete after four months since experience indicates that this is not the case in practice. All months of incurred claims with more than four months of paid claims show additional completion.
- Using two months of smoothing is better than using unsmoothed factors, but still can be affected by seasonality and outlier months. Using more months of data when calculating the smoothed factors and / or excluding outlier factors may serve to create a reserve that is more predictable.

## 7. Continued

(c) Describe practices to ensure claim reserve estimates are sufficient to cover anticipated liabilities.

**Commentary on Question**:
*The majority of candidates did not receive many points for this part of the question. Most candidates focused on retrospective analysis of reserve adequacy and did not focus on practices that ensure reserve sufficiency. Most of the credit for this part was reserved for a discussion of conservatism and how actuaries can include conservatism in reserve estimates, and few candidates described those practices.*

- Ensuring sufficiency of reserves is a key job function for actuaries, and is primarily assured through conservatism in estimates. Conservatism in estimates can be held on an explicit or implicit basis
  - Actuaries should explore the various averaging and smoothing techniques to understand variability of the claims estimate
  - Implicit margin can be created through conservatism in the choice of completion and projection factors
  - Alternatively, the actuary can develop "most likely" assumptions and add an explicit margin to this "average" reserve
- Runoff Studies or/and Actual to Expected Studies can be performed to evaluate reserve adequacy and ensure that previously calculated reserve estimates remain sufficient for remaining incurred liabilities.

## 8. 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.

**Sources:**

Individual Health Ins Ch.4 (109-140)

**Commentary on Question:**

*Candidates did fairly well on this problem. Issues arose when understanding the difference between premium leakage and buy down effect. Many candidates were unclear on the difference. Partial credit was given in most cases if candidates were able to communicate pieces of each.*

**Solution:**

(a) Describe the three faces of anti-selection.

**Commentary on Question**:

*In general, candidates did fairly well on this section.*

- External
  - Anti-selection which happens when an impaired risk initially seeks coverage. The member knows more about their own health status than the insurer.
- Internal
  - Insureds are internal to the insurance plan. During rate increase, healthy members will seek to buy down coverage; while unhealthy will stay with current coverage.
- Durational
  - When a block of insureds who have all had their coverage for a while are faced with a rate increase. Higher cost insureds will tend to keep their coverage in force more often than lower cost insureds, implying they find it of greater value compared to the cost. Insureds that would have more trouble finding coverage elsewhere are more likely to stay in force.

## 8. Continued

(b) Describe

(i) Premium Leakage

(ii) Buy Down Effect

**Commentary on Question**:
*Candidates struggled with the difference between these two concepts. A common mistake was not understanding that these both occur as a rate increase happens.*

- Premium Leakage
  - This usually occurs at rate increase time, when most insurers will allow policyholders to choose higher deductibles at will, and without underwriting. Higher risk policyholders will generally seek, and even more so *keep,* high coverage levels, while lower risk policyholders are much more flexible in their choices. Premium leakage is defined as the difference between the expected pure premium if a random sample of the population migrated to the leaner plan and the actual pure premium that results from internal anti-selection.
- Buy Down Effect
  - This effect is most common with coverages that experience high or frequent rate increases. Suppose an insurer calculates a needed premium rate increase of X%. If that X% rate increase is implemented by raising rate schedules by X%, the company will often discover that the average premium rate per policy actually goes up *less* than X%. A minor part of this may be due to older policyholders reaching Medicare and dropping their coverage. The major part of this effect, however, is caused by policyholders who, faced with a rate increase, look for a way to reduce their premium, and do so by switching to lower cost (higher deductible or copay) plans. If there were no anti-selection, and if the pricing were done correctly, the premium buy-downs would be matched by proportional and corresponding benefit buy-downs, and the premium level *relative to claims* would still go up by X%. Because of the leakage effect, however, claims generally do not drop as much as the premium does, so there is an anti-selective jump in the loss ratio.

(c) Calculate:

(i) Premium Leakage

(ii) Buy Down Effect

Show your work.

## 8. Continued

**Commentary on Question**:
*A fair number of candidates correctly provided the calculation for the buy down effect but struggled with how to calculate the premium leakage. Partial credit was given for identifying the correct formulas.*

(i) Current high deductible plan premium = 150 * (1-0.07) = 139.50
Average expected claims = (150*0.7) + (250*0.3) = 180.00
New high deductible plan premium = 139.50 * (1+0.20) = 167.40
New plan premium = 150 * (1 + 0.20) = 180.00
New actual average premium = (167.40 * 0.7) + (180 * 0.30) = 171.18
New healthy expected claims = 150 * (1-0.07) = 139.50
New unhealthy expected claims = 250
New expected average premium = (139.50 * 0.70) + (250 * 0.30) = 172.65

Premium Leakage = 172.65 – 171.18 = 1.47

(ii) Relative premium increase = 171.18/150 = 14.1%
Buy down effect = 180-171.18 = 8.82 or 20%-14.1% = 5.9%

(d) Describe underwriting actions that can be taken when deciding to offer unhealthy members new coverage.

**Commentary on Question**:
*Several candidates listed actions when the question required descriptions. Partial credit was given. Also numerous candidates described group underwriting considerations instead of individual considerations.*

- Offer full coverage with no restrictions
- Decline coverage
- Offer coverage at a higher premium
  - The added premium load can be either temporary or permanent, depending on the nature of the condition. Most carriers will consider removing the substandard load at a later date if the insured can demonstrate (through underwriting) a better risk profile at that time.
- Offer standard coverage, but exclude coverage for that condition or affected body system
  - This is accomplished by use of a “waiver,” “impairment,” or “exclusion” rider. These riders are often used for recurrent or chronic illnesses. They are useful if the condition can be well defined and isolated, but are less useful for systemic sorts of medical conditions (like obesity) that might impact multiple body systems. This solution is viewed negatively by some regulators, because it excludes coverage for the condition for which the insured has the greatest need. On the other hand, it might provide an opportunity for insurance that might not otherwise be available at all.

## 8. Continued

- *Offer a different policy or plan than the one applied for.*
  - Some carriers have separate pools used for substandard risks, and may decline to issue unless the applicant is willing to be part of that pool. This has historically been a solution offered by Blue Cross/Blue Shield plans in certain states. Other carriers have had limited benefit plans (with relatively low inside limits or benefit maximums) which they would offer in lieu of the CMM benefit applied for, particularly where the condition carried a risk of catastrophic claim.
- *Offer a different plan of benefits than the one applied for.*
  - This option is useful when, for example, the applicant might have a chronic condition that is unlikely to become high cost, but will likely continue at a low cost. This is particularly useful in DI or LTC coverage, when existing conditions (asthma, for instance) can be addressed by a longer elimination period or shorter benefit period, while still providing full benefits.

(e) Recommend which underwriting actions GHI should take to mitigate the risk of anti-selection. Justify your answer.

**Commentary on Question**:
*The question asked for two items, a recommendation and a justification of that recommendation. Numerous candidates provided a recommendation with no justification. Partial credit was given. Below are a few examples of possible recommendations and justifications.*

Possible Options:

- Offer coverage at a higher premium
  - The unhealthy members have a considerably higher claims cost, offering them a product at a higher premium could help cover unfavorable claims
- Offer standard coverage, but exclude coverage for that condition or affected body system.
  - If the unhealthy member has a particular condition, it would be beneficial to exclude that preexisting condition and thus control the known costs
- Offer a different policy or plan than the one applied for
  - It may make sense to offer a different policy that might be better suited for this member group
- Offer a different plan of benefits than the one applied for
  - Could help to manage a chronic condition

## 9. Learning Objectives:

2. Evaluate and apply techniques for claim utilization management, care management, and population health management.

**Learning Outcomes:**

(2c) Describe the considerations in the design, implementation and evaluation of a care management program.

**Sources:**

Program Measurement and Evaluation Guide for EHM p. 7, 19, and 24

**Commentary on Question:**

*This question was testing the candidate's knowledge about what it would take to implement an EHM program for a specific employer group. Two parts of the question dealt with information explicitly taken from the reading material that required memory recall. The third part dealt with practical application of the reading material by calculating the potential savings to the group by implementing the program. The most common error was made by candidates applying the incorrect list – answering Disease Management implementation, for instance, rather than an Employee Health Management program.*

**Solution:**

(a) Describe the steps involved in implementing and evaluating an Employee Health Management (EHM) Program.

**Commentary on Question**:

*This question referred to the ability to develop and assign a value to the Employee Health Management programs put in place by an employer. This question was seen by many candidates in the same light as questions raised about implementing a Disease Management Program. Though both programs share common elements, they are not all the same (for instance, there is no mention of hiring staffing and nurses in this question). The answer to this question comes directly from the reading, Program Measurement and Evaluation Guide for EHM pages 6 and 7.*

- Find individuals in the population with potential health improvement opportunities
- Engage enough of them with effective programs
- Continue for enough time and intensity to be an effective engagement
- Results in improved clinical outcomes
- Results in improved utilization outcomes (e.g. reduced ER visits or hospitalizations)
- Results in improved financial outcomes

## 9. Continued

(b)

(i) Calculate the PMPM savings that XYZ Airlines would expect if it had implemented the same program as ABC Airlines at the beginning of 2016.

Show your work.

(ii) Explain why XYZ Airlines may not realize the same degree of savings as ABC Airlines.

**Commentary on Question**:
*Many candidates understood this part of the question. The two shortcomings in answers the candidates provided were that many calculated the difference in trends by subtraction (e.g. 1.08 – 1.05 = .03), rather than appropriately dividing (e.g. 1- 1.05/1.08), and that they measured the impact relative to ABC rather than XYZ.*

The calculation involves reviewing the trend for ABC ($315/$300-1=5%) and the industry average of 8%. The peer industry trend is the expected trend to which ABC's trend is compared. The savings are equal to 1-(1.05/1.08) = 2.78%. This percentage is multiplied by XYZ's 2016 PMPM of $313 (using 8% above 2015) resulting in $8.69 PMPM.

In establishing the peer industry trend there are two assumptions that take place:
1. That the peer industry groups did not also implement an EHM program (otherwise their trend would also be lower).
2. That other items that drive trend are similar to each other but still impact trend differently – items such as demographics, health status of the members, size of the group, or geography.

(c) Describe information needed to select appropriate financial metrics for an EHM Program.

**Commentary on Question**:
*This question required candidates to recall the various points, outlined and described in the reading, needed to select the appropriate financial metrics. Most could list one or two points. To receive full credit candidates needed to include similar descriptions to the bullet points listed below.*

- Do we have enough baseline claims data?
- Do we have fully adjudicated claims?
- Is membership more than 25,000?
- Do we have analytical resources available to do the study?
- Which EHM components are we implementing?

## 9. Continued

- Is the structure of the EHM program reasonably close to those in published savings literature?
- Is there a large benchmarking database that includes employers in our industry?
- Are the leading indicators showing a sizeable enough savings to demonstrate sufficient ROI?

**10.** **Learning Objectives:**

2. Evaluate and apply techniques for claim utilization management, care management, and population health management.

**Learning Outcomes:**

(2b) Estimate savings, utilization rate changes and return on investment as it applies to program evaluation.

(2c) Describe the considerations in the design, implementation and evaluation of a care management program.

(2d) Describe value chain analysis as it applies to the planning and management of disease management and other intervention analysis.

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

**Sources:**

GHA-113-16

Duncan, Chapter 8, 11, and 12

**Commentary on Question:**

*This question tested candidates' understanding of propensity score matching and application of the actuarial historical control methodology for calculating savings and return on investment. Overall, candidates performed well on this question, with many receiving full or partial credit for their responses.*

*For parts c, d, and e, which required the candidate to use a value calculated in a previous part of the question, candidates who calculated a value incorrectly in an earlier part of the question were not penalized in subsequent parts for carrying forward an incorrect value, as long as the candidate demonstrated an understanding of the calculation in the subsequent parts of the question.*

**Solution:**

(a) List the steps of the Employee Health Management (EHM) value proposition.

- Assess all individuals in the population across the health continuum to identify opportunities to maintain or improve health, or to reduce the risk for future illness.
- Engage individuals with programs and tools through which they can successfully address these opportunities.
- Continue engagement long enough for them to acquire and sustain health behaviors.
- This sustained "effective engagement" results in preventing or reducing lifestyle-related risk factors, e.g. excess weight, high blood pressure, unhealthy cholesterol, etc.

## 10. Continued

- Sustained healthy behaviors and clinical outcomes result in fewer ER visits, hospitalizations, and procedures related to lifestyle-related risk factors and poor clinical outcomes.
- Sustained health behaviors may also directly improve employee productivity and performance.
- Fewer ER visits, hospitalizations, and procedures yield medical, absenteeism, worker's compensation, and disability cost-savings and increased productivity and performance.
- Improved employee productivity and performance contribute to improved financial outcomes for individuals and organizations.

(b) Describe different matching methods for applying propensity score matching.

- Nearest neighbor matching
  - First member of the comparison population with the "closest" propensity score is selected
  - Selection should be done randomly; otherwise, the order in which matching is done can affect the outcome
  - Matching can either be with or without replacement
- Caliper Matching
  - Match is made if the member and match's propensity scores are within a fixed distance
- Mahalanobis Metric Matching
  - Mahalanobis distance is a metric used to measure the dissimilarity between two vectors
- Stratification Matching
  - Uses coarsened exact matching, in which observations are stratified and then matched by stratum

(c) Calculate the gross savings from averted readmissions in Year 1 for the following chronic illnesses:

(i) HIV

(ii) Cancer

Show your work.

## 10. Continued

(i) HIV

Baseline Admissions/1,000 x Utilization Trend = 560 / (14,000 / 1,000) * 1.06 = 42.40
Actual Admissions/1,000 = 610 / (16,200 / 1,000) = 37.65
Reduced Admissions/1,000 = 42.40 – 37.65 = 4.75
Total Reduced Admissions = 4.75 * (16,200 / 1,000) = 76.95
Estimated Savings due to Averted Admissions = 76.95 * $728 * 16,200 / 610 = $1,487,734

(ii) Cancer

Baseline Admissions/1,000 x Utilization Trend = 1,890 / (6,000 / 1,000) * 1.06 = 333.9
Actual Admissions/1,000 = 1,820 / (6,075 / 1,000) = 299.59
Reduced Admissions/1,000 = 333.9 – 299.59 = 34.31
Total Reduced Admissions = 34.31 * (6,075 / 1,000) = 208.44
Estimated Savings due to Averted Admissions = 208.44 * $2,280 * 6,075 / 1,820 = $1,586,339

(d) Calculate the gross return on investment in Year 1 for the following chronic illnesses:

(i) HIV

(ii) Cancer

Show your work.

(i) HIV

Total Costs = $50 * 16,200 = $810,000
ROI = $1,487,734 / $810,000 = 1.84

(ii) Cancer

Total Costs = $50 * 6,075 = $303,750
ROI = $1,586,339 / $303,750 = 5.22

## 10. Continued

(e) Evaluate whether or not the DM program for the HIV and Cancer illnesses meets the required pre-tax hurdle rate. Show your work.

Pre-tax hurdle rate = 0.13 / (1 – 0.35) = 0.20

The DM program for both the HIV and Cancer illnesses has a ROI greater than 1.20, so the program for both of these illnesses meets the required pre-tax hurdle rate.

(f) Describe how propensity score matching could be used to improve the measurement of a DM program.

- A propensity score is developed that summarizes multiple characteristics into a single value, allowing for matching members on a single score rather than directly on multiple characteristics.
- Members of a reference population are matched with members of the intervention population having a similar propensity score, creating equivalent populations for measuring the effect due to the DM program.
- Members are matched on baseline characteristics, e.g. age, gender, diagnoses, etc., prior to the intervention period.
- PSM reduces selection bias inherent in a member's propensity to participate in a DM program.

## 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:**

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

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

(1c) Describe the credentialing and contracting process for providers.

**Sources:**

GHA-102-13 Evaluating Bundled Payment Contracting

**Commentary on Question:**

*Commentary listed underneath question component.*

**Solution:**

(a) Describe reasons health insurers use bundled payment arrangements.

**Commentary on Question**:

*In general, candidates performed well on this part of the question. Candidates received credit only for speaking to advantages from Quantum's perspective rather than the advantages for the members or providers.*

Bundled payments are used by payors to:

- Lower overall costs by encouraging patients to use lower-cost or higher quality providers
- Align provider incentives by motivating them to be more efficient since the provider's payment is fixed regardless of the intensity/quantity of services provided within the bundle

(b) Describe the following considerations for developing a bundled payment arrangement:

(i) Defining the episode

(ii) Evaluating catastrophic risk

(iii) Quality outcome requirements

(iv) Potential for increased utilization

## 11. Continued

**Commentary on Question**:
*Candidates tended to either do very well on this section or not fully understand the considerations of a bundled payment.*

Defining the episode. – Contract must answer the following questions:

- What is the trigger?
- When does the case end?
- Which services are included?

Evaluate catastrophic risk:

- An outlier analysis can help in evaluating financial risk to the sponsor.
- Variations in stay length and probability of serious complications.
- Probability of outliers.
- Consider stop-loss protections either from payor or stop-loss carrier

Quality outcomes:

- Minimum quality outcomes and patient satisfaction thresholds, specifying rewards or penalties if not met
- Needed to ensure providers don't cut corners to be more profitable.

Potential for increased utilization:

- May incent providers to increase utilization within a bundle – especially on any services/costs not included in the bundle
- May incent providers to create more bundles.

(c) Recommend contract terms for each of the following considerations that a health insurer should include in a bundled payment arrangement. Justify your response.

(i) Defining the episode

(ii) Evaluating catastrophic risk

(iii) Quality outcome requirements

(iv) Potential for increased utilization

**Commentary on Question**:
*Many candidates failed to recommend example contract terms for this section but instead restated responses from part B. Full credit was only given to those responses that provided recommended contract terms with good justification.*

## 11. Continued

Defining the episode:

Anchor stay using a routine knee replacement as an example: episode covers knee replacement operation and all post-operative physician, rehabilitation, and medications within 30 days of operation. This is needed so the provider cannot debate what services were intended to be covered by the bundle.

Evaluating catastrophic risk:

Include a stop-loss provision beginning when fee-for-service fees exceed 150% of the bundled rate. This is needed to prevent shifting too much risk to the provider and putting provider practices at risk of insolvency.

Quality outcomes:

The contract should tie a portion of the bundled payment to quality outcomes. A score in excess of 100% of a reasonable quality target equates to full payment, while a score below 50% of the target could result in a 20% reduction to payment. These terms are needed to ensure the provider does not skimp on care that is not separately reimbursed.

Potential for increased utilization

To prevent providers from artificially creating more bundles, limit bundles to the number of bundles evaluated in the base experience period, plus 10%.

To prevent providers increasing utilization to obtain a larger portion of the bundle, a provider's share within the bundle should be capped as a percentage of the bundle payment proportionate to the percentages found during the creation of the bundle. Services in excess of the capped percentage are not reimbursed.

These both ensure payments to the provider are consistent with the original bundling agreement.

(d) Calculate the expected total cost under the 2019 fee-for-service arrangement for all knee replacements performed at:

(i) Hospital A

(ii) Hospital B

Show your work.

**Commentary on Question**:
*Many candidates did not include the medical and equipment procedure costs or the professional service costs as part of the fee for service calculation in part d, but included them in part e. Partial credit was given when medical and equipment procedure costs or professional service costs were only included in part e. Many candidates failed to calculate the total cost for all knee replacements and instead calculated on a per bundle basis.*

## 11. Continued

2019 admissions = [2018 admissions] x (1 + [utilization trend])
Facility 2018 allowed cost = [2018 Average Length of Stay] x [2018 Average allowed per day]
2019 medical supplies and equipment procedure cost = [2017 cost] x (1 + [unit cost trend])^2
2019 professional services procedure cost = [2017 cost] x (1 + [unit cost trend])^2
Total cost = [2019 admits] x [2019 unit cost]

Hospital A:
Hospital A 2018 facility procedure cost = 3.1 x $5,515 = $17,097

| Type of Service | 2018 Admits | Utilization Trend | 2019 Admits | Experience Procedure Cost | Unit Cost Trend | 2019 Unit Cost | 2019 Total Cost |
|---|---|---|---|---|---|---|---|
| Facility | 13 | 1.010 | 13.13 | $17,097 | 1.0100 | $17,267.47 | $226,721.82 |
| Medical supplies & equip. | 13 | 1.010 | 13.13 | $9,000 | 1.0404 | $9,363.60 | $122,944.07 |
| Professional Services | 13 | 1.010 | 13.13 | $10,000 | 1.0404 | $10,404.00 | $136,604.52 |
| | | | | | | $37,035.07 | **$486,270.41** |

Hospital B:
Hospital B facility procedure cost = 3.5 x $5,600 = $19,600

| Type of Service | 2018 Admits | Utilization Trend | 2019 Admits | Experience Procedure Cost | Unit Cost Trend | 2019 Unit Cost | 2019 Total Cost |
|---|---|---|---|---|---|---|---|
| Facility | 16 | 1.030 | 16.48 | $19,600 | 1.0500 | $20,580.00 | $339,158.40 |
| Medical supplies & equip. | 16 | 1.030 | 16.48 | $9,000 | 1.0404 | $9,363.60 | $154,312.13 |
| Professional Services | 16 | 1.030 | 16.48 | $10,000 | 1.0404 | $10,404.00 | $171,457.92 |
| | | | | | | $40,347.60 | **$664,928.45** |

(e) Recommend whether or not Quantum should adopt the bundled payment arrangement for each hospital. Justify your recommendation. Show your work.

**Commentary on Question**:
*Some candidates made recommendations from the hospitals' perspectives whereas the question is asking to evaluate from Quantum's perspective. Other candidates did not evaluate for each hospital and instead blended the two hospital costs. Evaluating at the per-bundle rate (instead of using total costs) was acceptable.*

## 11. Continued

Expected 2019 costs with bundled payment = [2019 bundled payment rate] x [expected admits]

Hospital A:

$38,200 x 13.13 = $501,566

Recommendation: Because expected 2019 FFS costs are less than the proposed bundle payment, I recommend that a bundled payment is NOT adopted by Quantum.

Hospital B:

$38,200 x 16.48 = $629,536

Recommendation: Because expected 2019 FFS costs are greater than the proposed bundle payment, I recommend that a bundled payment is adopted by Quantum.

## 12. 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:**

Group Insurance Ch. 37

ASOPs: 5, 11, 18, 21, 22, 23, 25, 28, 41, 42

**Commentary on Question:**

*Commentary listed underneath question component.*

**Solution:**

(a) Calculate the IBNR of Quantum Legacy III - Individual block of business as of December 31, 2017. Show your work.

**Commentary on Question**:

*Candidates performed generally well on this question.*

First, calculate the completion factors for all paid months with an incurred date of 12/31/2016. A completion factor is equal to the cumulated paid amount to-date divided by total paid amount.

| Inc-Date | Paid-Date | Paid Amount | Cumulative Paid | Completion Factor (C.F.) | |
|---|---|---|---|---|---|
| 12/31/2016 | 12/31/2016 | 44,000 | 44,000 | 0.0261 | *=44,000/1,683,000* |
| 12/31/2016 | 1/31/2017 | 685,000 | 729,000 | 0.4332 | *=729,000/1,683,000* |
| 12/31/2016 | 2/29/2017 | 631,000 | 1,360,000 | 0.8081 | … |
| 12/31/2016 | 3/31/2017 | 204,000 | 1,564,000 | 0.9293 | … |
| 12/31/2016 | 4/30/2017 | 71,000 | 1,635,000 | 0.9715 | … |
| 12/31/2016 | 5/31/2017 | 15,000 | 1,650,000 | 0.9804 | … |
| 12/31/2016 | 6/30/2017 | 10,000 | 1,660,000 | 0.9863 | … |
| 12/31/2016 | 7/31/2017 | 1,000 | 1,661,000 | 0.9869 | … |
| 12/31/2016 | 8/31/2017 | 5,000 | 1,666,000 | 0.9899 | … |
| 12/31/2016 | 9/30/2017 | 5,000 | 1,671,000 | 0.9929 | … |
| 12/31/2016 | 10/31/2017 | 10,000 | 1,681,000 | 0.9988 | … |

Next, divide the Total Paid Claims for each month by the calculated completion factors. This results in the estimated ultimate claims for each month. Then, calculate the IBNR for each month as IBNR = Estimated Ultimate claims – Paid claims.

## 12. Continued

| Incurred Date | Total Paid Claims | Assumed C.F. | Estimated Ultimate claims | | IBNR | |
|---|---|---|---|---|---|---|
| 2/29/2017 | $2,132,000 | 0.9988 | $2,134,561 | … | $2,561 | … |
| 3/31/2017 | $1,629,000 | 0.9929 | $1,640,649 | … | $11,649 | … |
| 4/30/2017 | $1,252,000 | 0.9899 | $1,264,774 | … | $12,774 | … |
| 5/31/2017 | $1,489,000 | 0.9869 | $1,508,765 | … | $19,765 | … |
| 6/30/2017 | $1,321,000 | 0.9863 | $1,339,349 | … | $18,349 | … |
| 7/31/2017 | $1,166,000 | 0.9804 | $1,189,310 | … | $23,310 | … |
| 8/31/2017 | $1,230,000 | 0.9715 | $1,266,083 | … | $36,083 | … |
| 9/30/2017 | $1,400,000 | 0.9293 | $1,506,510 | … | $106,510 | … |
| 10/31/2017 | $778,000 | 0.8081 | $962,752 | *=778,000/0.808* | $184,752 | *=962,752-778,000* |
| 11/30/2017 | $640,000 | 0.4332 | $1,477,378 | *=640,000/0.433* | $837,378 | *=1,477,378-640,000* |
| 12/31/2017 | $299,000 | 0.0261 | $11,455,939 | *=299,000/0.026* | $11,156,939 | *=11,455,939-299,000* |
| | | | | | $12,410,071 | |

Finally, the 12/31/2017 IBNR is the sum of the claim liability for all months, or $12,410,071

(b)

(i) Identify the Actuarial Standards of Practice (ASOPs) applicable to preparing an actuarial opinion to support an annual statement. Justify your answer.

(ii) Describe Provision for Adverse Deviation (PfAD).

(iii) Describe considerations for including a PfAD according to the ASOPs.

**Commentary on Question**:
*For part (i), most candidates identified appropriate ASOPs. Full credit was granted for identifying 5 or more applicable ASOPs. Similarly for part (ii), most candidates provided an appropriate explanation for Provision for Adverse Deviation. However, candidates generally struggled with part (iii).*

(i)

- No. 5, "Incurred Health and Disability Claims"
- No. 23 "Data Quality"
- No. 28 "Statements of Actuarial Opinion Regarding Health Insurance Liabilities and Assets"
- No. 41 "Actuarial Communications"
- No. 42 "Determining Health and Disability Liabilities Other Than Liabilities for Incurred Claims"

## 12. Continued

(ii) Provision for Adverse Deviation is an increase to reserves to add conservatism so that reserves would be sufficient under moderately adverse conditions.

(iii) Candidates received credit for providing the following considerations:

- When the actuary opines that the liabilities make good and sufficient provision, the actuary should include a provision for adverse deviation.
- The provision should cover moderately adverse conditions.
- In general, when establishing a provision for adverse deviation, the provision should increase as the level of uncertainty increases.
- Provision should be appropriate for intended use
- Provision could vary based on credibility of data
- Provision could vary based on stability of claim payment patterns

(c) Recommend the level of PfAD to include in Quantum's statutory claims reserves. Justify your answer.

**Commentary on Question**:
*Candidates took a few different approaches in making a recommendation, and so long as they were accompanied by thoughtful justifications, they received full credit.*

I would recommend a Provision for Adverse Deviation of 6% be included in the IBNR calculated in Part (A) above. If a Provision for Adverse Deviation of 6% had been included as of the five valuation dates listed above, all of the liabilities would have been sufficient (i.e. recorded IBNR+ Provision for Adverse Deviation >= current run-out level).

## 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:**

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

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

(1c) Describe the credentialing and contracting process for providers.

**Sources:**

Essentials of Managed Health Care, Kongstvedt, 6th Edition, 2013 – Chapter 4

Essentials of Managed Health Care, Kongstvedt, 6th Edition, 2013 – Chapter 10

**Commentary on Question:**

*Commentary listed underneath question component.*

**Solution:**

(a) Describe:

(i) Rental networks

(ii) Types of fees associated with rental networks

(iii) Methods used to communicate to providers which network applies at point of service

**Commentary on Question**:

*Candidates in general performed well on this part. Full points were awarded to answers that provided a description in addition to a list. Tautological answers to (i) did not receive credits.*

(i) A rental network is a commercial PPO that builds and maintains a network of contracted physicians, hospital and ancillary services and makes it available to payers or self-funded employers for a fee.

(ii) Access fee, UM fee, claims based fee as a % of the difference between discount and full billed charges

(iii) Payers that use a rental network put the rental network's logo on the member's ID card.

## 13. Continued

(b) Describe:

(i) Considerations for the creation of provider profiling reports

(ii) Benchmarks for provider profiling reports

**Commentary on Question**:
*Candidates in general performed well on this question. The solution below only reflects a fraction of eligible answers. Full credit was awarded to answers that described and explained the considerations.*

Considerations for Provider profiling:

- Identify high-volume and costly clinical areas to profile
- Involve appropriate internal and external customers in the development and implementation of the profile.
- Involve providers in the development and implementation of the profile
- Compare results with the published performance (external vs internal norms)
- Present comparative performance using clinically relevant risk stratification
- Require measures of statistical significance for comparisons and establish thresholds for minimum sample size
- Revise performance measurements using formal severity adjustment instruments

Provider Benchmarking

- IPA or PPO – only compare average results for providers within the associated subgroups
- Specialty specific or peer groups – compares practice to its own specialty
- Peer group adjusted for age/sex/case mix and severity of illnesses – most complicated, but most meaningful data
- Budget – compares against budgeted cost and utilization
- Advanced and statistically based comparison methods – coupled with confidence intervals so physicians know which measures are statistically significant

(c) Calculate:

(i) The billed charge per day for admission A

(ii) The billed charge per day for admission B

Show your work.

## 13. Continued

**Commentary on Question**:
*Candidates struggled with this part of the question. The challenge of this question was to interpret the stop-loss contracting language in the case study and back out billed charges, instead of applying the contract to calculate allowed amounts.*

*Candidates performed better on part (ii) to calculate billed charges per day for Montenegro.*

*Part (i), if approached correctly will lead to a quadratic equation that would need to be solved. The model solution below describes a direct algebraic approach to solving the problem. However, full credit was awarded independent of the method of solving. Some candidates used an iterative approach or a guessing method with their calculators.*

Define the following abbreviations:

TA: Total Allowed
DBT: Number of days before hitting the stop-loss threshold
PD: Per diem rate
DAT: Number of days after hitting the stop-loss threshold
CPD: Charges per day
SLT: Stop-loss threshold

(i) Lynd Hospital:
Per the contract language, the total allowed amount for Lynd Hospital is calculated as:

*(1)* $TA = DBT \times PD + DAT \times CPD \times 60\%$

We also know that the total charge amount needs to equal the stop loss threshold for the time-period until the threshold is met:

*(2)* $SLT = DBT \times CPD \rightarrow DBT = SLT/CPD$
Substituting (2) in (1) yields:
*(3)* $TA = (SLT/CPD) \times PD + DAT \times CPD \times 60\%$

$\rightarrow CPD \times TA = SLT \times PD + CPD^2 \times DAT \times 60\%$

Reordering the equation yields:
*(4)* $CPD^2 - CPD \times TA / (DAT \times 60\%) + (SLT \times PD)/(DAT \times 60\%) = 0$

This is a quadratic equation and we can solve for CDP as follows:

## 13. Continued

(5) $CPD = TA/ (2 \times DAT \times 60\%) \pm [(TA/(2 \times DAT \times 60\%))^2 - (( SLT \times PD)/(DAT \times 60))]^{1/2}$

Substituting the following

(6) *TA = 276,875*
*DAT = 21*
*SLT = 250,000 (case study)*
*PD = 5,000 (case study)*

yields two possible solutions:

(7) *CPD = 15,625* or *CPD = 6,349.2*

Only 15,625 meets the requirement that the discount would be greater than 50% before the stop-loss threshold would be met. Thus, **15,625** is the charge per day.

(ii) Montenegro Hospital:

Per the contract language, the total allowed amount for Lynd Hospital is calculated as:

(1) $TA = DBT \times CPD \times 50\% + DAT \times CPD \times 50\%$

We also know that the total charge amount needs the equal the stop loss threshold for the time-period until the threshold is met:

(2) $SLT = DBT \times CPD$

(3) Substituting (2) in (1) yields:

(4) $TA = SLT \times 50\% + DAT \times CPD \times 50\%$

Solving for CPD yields:

(5) $CPD = [TA - (SLT \times 50\%)]/(DAT \times 50\%)$

Substituting the following
*TA = 178,125*
*DAT = 11*
*SLT = 150,000 (case study)*

Yields:
*CDP =* ***18,750***

## 14. 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.

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

**Sources:**

Group Insurance Ch 27 p 466, 467, 471 and 654

**Commentary on Question:**

*Commentary listed underneath question component.*

**Solution:**

(a) Describe items to consider when a rate guarantee exists.

**Commentary on Question**:

*Most candidates failed to describe the biggest risks of rate guarantees, which are mis-estimation risk and trend risk. Candidates described many different items to consider, but full points were only awarded to candidates who described mis-estimation and trend risks.*

Mis-estimation risk: Since the insurer is locked into rates for a longer period, the potential impact of mis-estimation of any of the costs under the contract is relatively greater than it is for the standard one-year guarantee for any given group.

Trend Risk: The longer a trend must be estimated into the future, the more risk there is of inaccuracy due to changing conditions. Should exercise caution in the use of long-term rate guarantees for trend-sensitive coverages.

## 14. Continued

(b) Calculate the gross prospective premium for calendar year 2017. Show your work.

You are given:
- Expense load: 10%
- Profit charge: 4%
- Explicit margin: 2%
- Incurred but not reported claims for January – December 2016: $0
- All other retention items are 0%.
- Exhibit 18

**Commentary on Question**:
*Most candidates were able to answer this part correctly. The most common error was multiplying the 2016 claims by (1+10%+4%+2%) rather than dividing as shown in the solution below.*

Step 1 is to calculate the 2016 claim costs from Exhibit 18:

$84,621,250 / 142,500 member months = $593.83 PMPM

Step 2 is to apply the administrative loads:

$593.83 / (1-10%-4%-2%) = $706.94

(c) Describe the elements of the experience refund formula.

**Commentary on Question**:
*Most candidates were able to list most of the elements of the formula, but many candidates failed to describe the elements. To receive full credit, candidates needed to describe the elements of the formula.*

Balance =

Prior year balance carried forward:
Amount held from the prior period
+ Investments earned on money held:
Income earned on premium and/or prior balance during the year
- Claims charged:
Paid claims + change in reserve – pooled claims + pooling charge
- Expenses
Fixed and variable expenses, other than margin, associated with this product

## 14. Continued

- Risk charge:
  Explicit margin for mis-estimation risk, trend risk, and other uncertainty
- Premium stabilization fund:
  Reserve held to mitigate annual fluctuations in experience
- Profit
  Margin for profit for this product

(d) Calculate the IBNR for January 2017 - March 2017 using the loss ratio method based upon 2016 Q1 experience. Show your work.

You are given:

- Prior Year Formula Balance = $0
- Premium Stabilization Reserve Change = $0
- All claims are fully paid within 3 months.
- The gross premium PMPM for 2017 is the same as 2016.

**Commentary on Question**:
*Most candidates were able to answer this question correctly. Candidates who incorrectly calculated the premium in Part b were awarded full credit in this part if they did all other aspects of the calculation correctly.*

Step 1: Calculate the 1Q16 loss ratio

Loss ratio = claims PMPM / premium PMPM = $640.00 / $706.94 = 90.5%

Step 2: Apply loss ratio from Step 1 to the 2017 premium to calculate the projected ultimate claims

Expected claims = $706.94 x 90.5% = $640 PMPM

Step 3: Subtract claims paid-to-date from the estimated ultimate claims
$640 PMPM - $591.67 PMPM = $48.33 PMPM, or $1,776,250

(e) Calculate the experience refund for Moonraker for January 2017 – March 2017. Show your work.

**Commentary on Question**:
*Most candidates were able to answer this question correctly. The most common mistake was not including the IBNR from Part d in the calculation.*

## 14. Continued

Prior year balance carried forward: $0
+ Investments earned on money held: $0
- Claims charged: $23,520,000
- Expenses: $2,598,021
- Risk charge: $519,604
- Premium stabilization fund: $0
- Profit: $1,039,208

= -($1,696,625), no refund

(f) Assess whether Moonraker should continue the experience refund arrangement in 2018.

**Commentary on Question**:
*To earn full credit for this part, candidate needed to make a recommendation and support it using information gleaned from the prior parts of this question. Many candidates made a recommendation without providing sufficient rationale for their decision*

I recommend Moonraker does NOT continue with the current rate guarantee arrangement based on the emerging experience. Experience has not been favorable and the deficit for 1Q17 may grow over the year as premium stays fixed but claims continue to trend upwards.