

GH SPC Model Solutions

Spring 2022

1. Learning Objectives:

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

Learning Outcomes:

- (1b) Estimate savings, utilization rate changes and return on investment.

Sources:

Duncan, Ian G., 2nd Edition, 2014, Ch. 11: The Use of Propensity Scoring in Program Evaluation

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Calculate the propensity score for each member. Show your work.

Commentary on Question:

Most candidates performed well on this part of the question.

$$p = \exp [\alpha + \beta_{\text{age}} * X_{\text{age}} + \beta_{\text{gender}} * X_{\text{gender}} + \beta_{\text{plan}} * X_{\text{plan}}] / \{1 + \exp [a + \beta_{\text{age}} * X_{\text{age}} + \beta_{\text{gender}} * X_{\text{gender}} + \beta_{\text{plan}} * X_{\text{plan}}]\}$$

Member 1:

$$p = \exp [2 - 0.06 * 25 + 0.3 * 0 - 0.2 * 1] / \{1 + \exp [2 - 0.06 * 25 + 0.3 * 0 - 0.2 * 1]\}$$

$$p = \exp [0.3] / \{1 + \exp [0.3]\}$$

$$p = 1.3499 / \{1 + 1.3499\}$$

$$p = 0.5744$$

Member 2:

$$p = \exp [2 - 0.06 * 35 + 0.3 * 1 - 0.2 * 0] / \{1 + \exp [2 - 0.06 * 35 + 0.3 * 1 - 0.2 * 0]\}$$

$$p = \exp [0.2] / \{1 + \exp [0.2]\}$$

$$p = 1.2214 / \{1 + 1.2214\}$$

$$p = 0.5498$$

1. Continued

- (b) Interpret each member's propensity score.

Commentary on Question:

Most candidates received partial or full credit on this part of the question. Candidates who specified that the propensity score applies to a member of the same age, gender, and who has a similar benefit plan as stated in the problem received full credit.

A 25 year-old male in an HMO benefit plan has a 57.44% probability of being in the treatment group.

A 35 year-old female in a PPO benefit plan has a 54.98% (55%) probability of being in the treatment group.

- (c) Describe the limitations of applying the propensity score matching results from the DSME/T program to other populations.

Commentary on Question:

Most candidates were able to identify that PSM does not control for unobservable characteristics. Some candidates mentioned that the analysis was limited to commercial payers/members. Fewer candidates identified additional limitations.

Analysis limited to commercial payers/members, that is, it does not include Medicare and Medicaid populations.

Medicare and Medicaid have a lot of diabetic members, and they benefit from DSME/T services

By including these diabetic members, reduction in DSME/T services cost-sharing could result in higher compliance of recommended services, and lower hospitalizations.

Possible that non-users of DSME/T service used these services in prior years

PSM doesn't control for unobservable characteristics

Small sample size, i.e. low credibility

2. Learning Objectives:

2. The candidate will understand how to evaluate health insurance organization risk and mitigation strategies.

Learning Outcomes:

- (2a) Evaluate an enterprise risk management (ERM) system.

Sources:

Group Insurance, Skwire, Daniel D., 8th Edition, 2021 Ch. 41: Risk-Based Capital Formulas

Commentary on Question:

Most candidates performed well on parts (b) and (c) but struggled with parts (a) and (d).

Solution:

- (a) Describe business risk and its components as it relates to the Health Risk-Based Capital (RBC) formula.

Commentary on Question:

Most candidates did not include enough detail to receive full points. Because the question asks the candidate to describe rather than only list the components of business risk, candidates needed to provide a description in order to receive full points.

The business risk category of the Health RBC formula includes several miscellaneous types of general business risks not included elsewhere:

- Administrative Expense Risk:
 - Administrative expenses for health insurance are subject to misestimation, just like claim expenses.
 - Assumptions regarding both claims and administrative expenses drive premium rates and thus impact plan performance, but the degree of misestimation for administrative expenses should be somewhat less.
 - Thus, the risk factors applied to administrative expenses are somewhat less than the factors applied to claims.
 - The weighted average risk factor varies between 4% and 7% of annual administrative expenses, dependent on premium volume.
 - ASC and ASO revenues, expenses, and commissions are excluded from the administrative expense risk and are discussed below.

2. Continued

- Risks from ASC/ASO Business:
 - Administrative services contract (ASC) and administrative services only (ASO) are both contracts where the health insurer agrees to provide administrative services for a third party, typically a large employer, that is at risk for medical expenses.
 - The NAIC defines the distinction between the two as follows: under an ASC contract, benefits are paid from the health insurer's bank account and the health insurer receives reimbursement from the third party, while under an ASO contract, benefits are paid from a bank account owned or funded by the third party.
 - Alternatively, benefits under an ASO contract could be paid from the health insurer's bank account, but only after the health insurer has received funds from the third party to cover the benefit payments.
 - Under both types of contracts, there is a risk that the insurer may misestimate the amount that it charges the customer for administrative services. For this reason, a risk factor of 2% is applied against the annual administrative expenses for ASC/ASO contracts.
 - Under an ASC contract only, there is some additional risk since the insurer is fronting the cash for the benefit payments. If the third party goes bankrupt, the health insurer might not be able to collect these amounts. Accordingly, there is a 1% additional risk factor applied to annual benefit payments administered under ASC contracts.
- Guaranty Fund Assessment Risk:
 - A 0.5% risk factor is applied against premiums that are subject to guaranty fund assessments, reflecting the risk that future assessments will be higher than expected.
- Excessive Growth Risk:
 - The RBC requirement for excessive growth only applies if a health insurer's underwriting RBC increases from one year to the next by more than the "safe harbor" level.
 - The safe harbor level is calculated as the current year underwriting revenue, divided by the prior year underwriting revenue, plus 10%. The excessive growth RBC requirement is 50% of growth in underwriting RBC beyond this safe harbor amount.
 - Since the safe harbor includes the growth in revenue, this is really not just an adjustment for excessive growth in the amount of business a health insurer has, as the adjustment would apply if a health insurer changes to a significantly more risky mix of business or provider reimbursement arrangements.

2. Continued

- (b)
 - (i) Define underwriting risk as it relates to the Health RBC formula.
 - (ii) Describe how underwriting risk is calculated.
 - (iii) State exceptions for why underwriting risk factors may differ across health insurance companies.

Commentary on Question:

Most candidates performed well on this part of the question.

- (i) Underwriting Risk reflects the risk of underestimating the cost of insurance or having inadequate premium rates in the future.
- (ii) Underwriting risk is calculated separately for each health insurance product by applying a risk factor against some measure of the insurer's exposure. The exposure measure is usually either earned premium or incurred claims, measured on an annual basis and net of any ceded reinsurance.
- (iii) In some cases the factors are tiered by size, implying that a large company achieves a lower average risk per exposure unit than a small company.

Some risk factors are adjusted in order to reflect the nature of the insurer's provider reimbursement contracts.

- (c)
 - (i) Define the purpose of the Managed Care Risk Adjustment Factor.
 - (ii) Describe the categories used in the Managed Care Risk Adjustment Factor.
 - (iii) Describe how the Managed Care Risk Adjustment Factor is calculated.

Commentary on Question:

Most candidates performed well on this part of the question.

- (i) Reflect the fact that certain contractual reimbursement arrangements with providers lead to greater predictability of future claim levels, thus reducing the need for capital to support fluctuations in experience.

2. Continued

(ii) Category 0:

- a. This is the default category and includes claims payments in the following categories:
- Fee-for-service
 - Discounted fee for service
 - Usual, customary, and reasonable (UCR) schedules
 - Relative value scale (RVS)
 - Stop loss payments by a health entity to its providers
 - Retroactive payments to capitated providers or intermediaries whether by capitation or other payment method
 - Capitation paid to providers or intermediaries that have retroactive payments for previous years

Category 1:

- This category includes payments made based on such contractual arrangements as provider fee schedules; hospital per diems or case rates; non-adjustable professional case and global rates; RVS where the payment base and RV factor are fixed contracts; and ambulatory payment classifications.
- The common element here is that there are contractual protections to the insurer regarding the level of allowed charges.

Category 2:

- This category includes payments that would normally fall under Category 0 or Category 1, but that also fall under the scope of a withhold or bonus arrangement with the provider.
- Category 2 is divided between providers reimbursed under a UCR schedule (Category 2a) and those reimbursed on a provider fee schedule (Category 2b).

Category 3:

- This category includes capitation payments, so long as those payments are contractually fixed (either as a percentage of premium or as a dollar amount per member) for a period of at least 12 months.
- Arrangements that include a provision for prospective revision within 12 months or for retroactive revisions do not qualify and are classified as Category 1 or 0, respectively.
- Also, capitated payments to intermediaries that are not subject to state regulation and do not file the Health RBC with the state are subject to special limitation: if payments by the intermediary exceed 5% of total payments, then the excess is reported as Category 0 instead of Category 3.

2. Continued

Category 4:

- This category applies primarily to a staff model HMO and includes non-contingent salaries to persons directly providing care and facility-related medical expenses generated within a health facility that is owned and operated by the health entity.
- Since staff model HMOs have the most alignment between the practicing provider and the risk-taking party, and also should benefit from a natural dampening of financial risk due to the providers' salary arrangements, Category 4 has the highest discount factor.

- (iii) The insurer takes all of the claims paid over the previous twelve months and assigns those claims to one of five managed care categories.

The formula uses paid claims rather than incurred claims, in order to eliminate the risk of misestimated claim reserves, as well as due to the difficulty of estimating claim reserves by category.

- (d) Calculate the required increase in risk to achieve an \$800 marginal impact of RBC after covariance to underwriting risk. Show your work.

Commentary on Question:

Most candidates struggled on this part of the question. Credit was given whether candidates calculated the increase with or without operational risk.

$$\text{RBC After Covariance Before Operational Risk} = H_0 + \{H_1^2 + H_2^2 + H_3^2 + H_4^2\}^{1/2}$$

$$\text{RBCAC Before Operational Risk} = 0 + (40^2 + 100^2 + 25^2 + 30^2)^{1/2} = 115$$

The \$800 marginal impact is a multiplicative factor of 8 (800/100) on the RBC components added to the original component amount

$$H_1: 40 + (40 * 8) = \$360$$

$$H_2: 100 + (100 * 8) = \$900$$

$$H_3: 25 + (25 * 8) = \$225$$

$$H_4: 30 + (30 * 8) = \$270$$

$$\text{RBCAC Before Operational Risk} = 0 + (\$360^2 + \$900^2 + \$225^2 + \$270^2)^{1/2} = \$1,031$$

$$\text{Increase in RBC} = \$1,031 - \$115 = \$916$$

3. Learning Objectives:

3. The candidate will understand how to apply risk adjustment in actuarial work.

Learning Outcomes:

(3b) Apply risk adjustment to underwriting, pricing, claims and are management situations.

Sources:

Healthcare Risk Adjustment and Predictive Modeling, Duncan (2nd edition): Chapter 14

Healthcare Risk Adjustment and Predictive Modeling, Duncan (2nd edition): Chapter 22

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a)
- (i) Discuss considerations actuaries should account for in projecting risk scores for Medicare Advantage bids, other than those prescribed by the Center for Medicare and Medicaid Services (CMS).
 - (ii) Explain the consequences of projecting risk scores that are too high or too low.

Commentary on Question:

Most candidates received partial or full credit on part (i). For part (ii), the ultimate revenue from CMS is based on actual risk scores. Some candidates incorrectly stated that the revenue received from CMS is based on projected risk scores.

Model Solution for (a) i

- The expected trend in risk scores. This could be due to internal programs to ensure complete and correct diagnosis coding. Even with no programs, risk scores are likely to change. Historically risk scores have tended to drift upwards.
- The projection of the risk score must be appropriate for the *expected* population that will be enrolled in the contract year, not the base year or the middle year between the base year and the contract year. ***Must specify that the projection is for is two years from the base year.***
- The projection must be at the bid level.
- The actuary must estimate what the average risk scores of new entrants will be, unless it is a closed block or a stationary population.
- Population change must be estimated

3. Continued

- A mortality factor should be considered because it can be a significant factor for a Medicare population and claims of deceased patients are heavily skewed
- Most MAOs perform longitudinal analysis on their membership stratified into “stayers,” “leavers,” and “joiners”

Model Solution for (a) ii

- A risk score overstatement may result in an excessively generous benefit plan, causing the MAO to lose money.
- A risk score understatement may lead to an uncompetitive product or portfolio of products.

(b)

- (i) State the two models of accountable care organization (ACO) gainsharing as part of the Medicare Shared Savings Program (MSSP).
- (ii) Describe requirements an ACO must pass in order to be allowed to share savings with CMS.
- (iii) Explain how the provider group-based ACO is expected to generate savings through the MSSP.

Commentary on Question:

Almost all candidates identified the two models of ACO gainsharing. Most candidates performed well on the other two parts of the question.

Model Solution for (b) i The two models of ACO gainsharing:

1. One-sided: the ACO and CMS share 50/50 in any gains.
2. Two-sided: the ACO shares more of the gains, but is at risk for any losses.

Model Solution for (b) ii The two requirements for sharing savings with CMS:

1. Meet quality standards

- a. Must be able to report on quality in first year.
- b. Not required to meet or exceed standards in first year.
- c. Must meet standards thereafter.
- d. 31 individual measures in 2017 reporting year, used to be 33

2. The ACO must surpass a savings hurdle rate

- a. Hurdle ranges between 2% for large ACOs (60,000 or more members.) and 4% for small ACOs (500 members).
- b. The ACO must have 5,000 members for three years.

3. Continued

Model Solution to (b) iii: Savings generated by

- Care Coordination: to manage the care of patients who need additional services
- Reduce the need for tests by 1) integrated medical records and 2) consistent management by the providers
- Include efficient providers for referrals
- Limit the use of less efficient and more expensive providers.
- Focus on quality will also result in fewer unnecessary services
- Emphasize preventive services to improve future population health

(c) An ACO has three members, all of whom are of the same Medicare enrollment type. The following information is for one of the benchmark years.

Claims Type	ACO Participant	Member 1	Member 2	Member 3
Inpatient hospital	Yes	\$58,000	-	-
Hospital bad debt charge	Yes	\$100	-	-
Skilled nursing facility	Yes	\$5,000	-	-
Physician A	Yes	\$700	\$200	-
Physician B	No	-	\$800	-
Hospice	Yes	-	-	6,000
Durable medical equipment	Yes	\$1,300	-	-
Prescription drugs	-	\$500	-	-
Months Enrolled in ACO		12	12	6

- (i) Describe the separate Medicare enrollment types.
- (ii) Calculate the ACO's average per capita expenditure for the benchmark year. Show your work.

Commentary on Question:

For part (i), the question asks for the enrollment types for ACO members. Some candidates listed the enrollment types for Medicare Advantage plans.

For part (ii), although the question states that the ACO has three members, some candidates excluded member 2 in the calculation because that member did not have a plurality of their services with an ACO provider. However, members are attributed based on the plurality of their primary care services. The claims type stated in the question are from two physicians, not necessarily limited to primary care. Once members are attributed, all medical claims are included.

3. Continued

Model Solution for (c) i: The different enrollment types

- ESRD—eligibility for Medicare as a result of end stage renal disease.
- Disabled—eligibility for Medicare due to disability.
- Aged/dual-eligible Medicare and Medicaid beneficiaries—eligible for Medicare by age, and eligible for Medicaid.
- Aged/non-dual-eligible beneficiaries—eligible for Medicare by age, but not eligible for Medicaid

Model Solution for (c) ii:

Formula to Calculate Average Per Capita Expenses:

$$\text{Average per capita expenditure}_{ij} = \frac{\sum_k \text{claims}_{i,j,k} \times t_k}{\sum_k t_k} \text{ where:}$$

i = Medicare enrollment type

j = Year

k = individual beneficiary ($(k = 1, \dots, n)$ where n is the number of ACO beneficiaries of type i in year j .)

t_k = exposure period of the k^{th} beneficiary of type i in year j .

Eligible Expenses:

Member 1: \$65,000 = \$58,000 + \$5,000 + \$700 + \$1,300

Total claims:

Excluding bad debt

Excluding prescription drugs

Member 2: \$1,000 = \$200 + \$800

Total claims including Physician B (non-participating physician)

Member 3: \$6,000 Total claims

Claims weighted for member exposure

Member 1: Member exposure: $12/12 = 1$

Member 1: Claims weighted for member exposure $1 * \$65,000 = \$65,000$

Member 2: Member exposure: $12/12 = 1$

Member 2: Claims weighted for eligible member exposure $1 * \$1,000 = \$1,000$

Member 3: Member exposure: $6/12 = 0.5$

Member 3: Claims weighted for member exposure $0.5 * \$6,000 = \$3,000$

3. Continued

Total ACO Claims weighted for member exposure:

$$\$65,000 + \$1,000 + \$3,000 = \mathbf{\$69,000}$$

Average per Capita Eligible Expenditures for the ACO: Total eligible expenses divided by total membership exposure:

$$\$69,000 / 2.5 = \mathbf{\$27,600}$$

4. Learning Objectives:

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

Learning Outcomes:

- (1a) Describe, compare and evaluate programs.

Sources:

Managing and Evaluating Healthcare Intervention Programs, Duncan, Ian G., 2nd Edition, 2014, Ch. 9: Applying the Economic Model: The Example of Opportunity Analysis

Commentary on Question:

This question tests the candidate's knowledge of a care management approach known as opportunity analysis. The candidate needed a thorough understanding of the process and economics of the approach to provide a full response to the question.

Solution:

- (a) Describe opportunity analysis.

Commentary on Question:

Most candidates received partial or full credit on this part of the question. Candidates who were able to provide a more thorough description received full credit.

- Opportunity analysis is a data driven analytical process that matches opportunities identified in a population to care management programs and services
- The purpose of opportunity analysis is to demonstrate the potential clinical, financial, and humanistic improvements that could result from the application of an appropriate, evidence-based care management program or programs.
- Opportunity analysis focuses the attention of program sponsors on the idea that high-utilizing patients in a population represent an opportunity for simultaneously improving the quality of care while reducing net utilization.
- The requirements of an Opportunity Analysis include:
 - 2 or 3 years of eligibility and claims data
 - Knowledge of member benefit design
 - Information on evidence-based care management programs that currently exist or could reasonably be introduced
- Opportunity analysis is retrospective, but applied prospectively. This means that opportunities are identified using historical data, but applied to members in the current year that meet the same criteria

4. Continued

- The components of an Opportunity Analysis include:
 - Analytics – members are segmented by condition into subpopulations suitable to different types of interventions (episodic, chronic, mental and behavioral health, emerging). Utilization is compared to benchmark, and may require further drill downs into
 - Evidence – search the evidence base for knowledge of what works and what doesn't. Search for relevant publications that are efficacious, cost-effective, and generalizable

Economics – members of the population are risk ranked to determine at which point in the risk ranking it is economically feasible to intervene

- (b) Evaluate the accuracy of the following statements. Justify your response.
- (i) Traditional condition groupings, such as Hierarchical Condition Categories (HCCs), are a common grouping algorithm for segmenting membership when applying opportunity analysis.
 - (ii) Although a randomized controlled trial provides very robust evidence of efficacy, it can be subject to some biases.
 - (iii) Opportunity analysis recognizes and addresses the economics of program planning in a system which is resource constrained.
 - (iv) Information on any and all care management programs currently in place should be included when performing an opportunity analysis.
 - (v) A single intervention to target members with a mental health condition is a successful application of the opportunity analysis approach.
 - (vi) Segmentation of a population by cost and frequency is a useful application of the opportunity analysis approach.

Commentary on Question:

This part of the question required the candidate to evaluate the accuracy of a statement and provide justification. Candidates who knew the material well performed well on this part of the question. If a statement was true, candidates needed to provide justification beyond simply repeating the statement itself to receive full credit. Candidates who simply stated whether a statement was true or false without any justification received no credit.

4. Continued

- (i) Traditional condition groupings, such as Hierarchical Condition Categories (HCCs), are a common grouping algorithm for segmenting membership when applying opportunity analysis.

False – Opportunity analysis maintains the risk score stratification of prior care management models and favors common risk profiles, **but** the risk scores and condition groupings are NOT THE ONLY items considered in the Opportunity Care segmentation, which is why it is preferable. Opportunity analysis maintains the risk score stratification but favors those who are more intervenable and have a common risk profile.

- (ii) Although a randomized controlled trial provides very robust evidence of efficacy, it can be subject to some biases.

True – biases could stem from non-observable characteristics, like willingness to recover or cede hope or behavior changes simply as a function of being observed.

- (iii) Opportunity analysis recognizes and addresses the economics of program planning in a system which is resource constrained.

True – opportunity analysis emphasizes the need to have a plan, and apply the resources to the most intervenable patients that can have the most beneficial effect.

- (iv) Information on any and all care management programs currently in place should be included when performing an opportunity analysis.

False – Opportunity analysis focuses on evidence-based care management programs. One should search the evidence base, assess the quality of the evidence (some sources are more reputable, like peer reviewed journals), and determine the generalizability of the program. Good programs to consider are generalizable, cost-effective, and efficacious.

- (v) A single intervention to target members with a mental health condition is a successful application of the opportunity analysis approach.

False – mental health conditions can be hard to treat because they often have several comorbidities involved, which means managing a larger population and set of conditions than just mental health. Also, mental health data is much more protected and may be harder to obtain and analyze.

4. Continued

- (vi) Segmentation of a population by cost and frequency is a useful application of the opportunity analysis approach.

True-A further useful segmentation may be made by cost and frequency.

Examples of such sub-analyses are:

1. Conditions that are high cost regardless of frequency
2. Conditions that moderate in cost but high frequency
3. Treatments whose frequency varies greatly between different geographical areas or between different providers compared with national utilization benchmarks, having adjusted for age, sex, and comorbidities.

Segmentation by cost and frequency may present sub-populations that represent an opportunity to improve quality while reducing utilization and costs, e.g. end of life members.

The end-of-life subset of the population may exhibit materially higher admission rates than the rest of the population which may provide good evidence that this sub-population represents an opportunity to improve quality of life and reduce net utilization with no impact on the length of life.

- (c) List the steps for implementing a care management program using the opportunity analysis approach.

Commentary on Question:

Most candidates performed well on this part of the question.

1. Populate the population risk distribution using predictive analytics
2. Develop a production analysis and reporting unit
3. Determine the number of care managers needed
4. Develop a budget for the program
5. Train the care managers on the intervention program and techniques
6. Develop a plan on the number of members that will be targeted
7. Roll out the care management program
8. Monitor the program , compile result and modify as needed

5. Learning Objectives:

3. The candidate will understand how to apply risk adjustment in actuarial work.

Learning Outcomes:

- (3a) Describe and compare risk adjustments based on commonly used clinical data and grouping methods.
- (3b) Apply risk adjustment to underwriting, pricing, claims and care management situations.

Sources:

Changing with the Times: The Past and the Future of ACA Risk Adjustment

Healthcare Risk Adjustment and Predictive Modeling, Duncan (2nd edition): Chapter 13

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Identify notable changes in ACA Risk Adjustment over the life of the program.

Commentary on Question:

Most candidates were able to identify several notable changes in ACA Risk Adjustment over the life of the program. Candidates who were able to identify some of the changes, but not all, received partial credit.

- Annual Coefficient recalibrations to reflect more recent data
- Transition to a model assigning hierarchical condition categories (HCCs) through ICD10 codes (2015)
- Addition of duration factors reflecting the length of a member's enrollment with an issuer (2017)
- Addition of prescription drug classes (RxCs) to better account for claims costs for certain conditions (2018)
- Reduction of the statewide average premium by 14 percent to proxy issuer administrative costs and change transfers to a paid claims basis (2018)
- Addition of high-cost risk pool (HCRP) for members with annual paid claims over \$1M (2018)
- First adjustments from prior year risk adjustment data validation (RADV) audits (2018)
- Begin phase-in of External Data Gathering Environment (EDGE) data in coefficient calibration (2019)
- Update condition categories calibrated from data with ICD-10 codes

5. Continued

- (b) Calculate the risk adjusted capitation rates for ABC Insurance Company. Show your work.

Commentary on Question:

Most candidates were able to calculate the risk adjusted capitation rates. To receive full credit, candidates needed to calculate the risk adjusted capitation rates for TANF, SSI w/Medicare, SSI w/out Medicare, and non-Medicaid. Partial credit was given to candidates who were able to perform some of the following calculations, but were unable to correctly determine the final risk adjusted capitation rates.

$$\text{Imputed ERG Factor for Short Cohort} = 0.3910 \div 0.4000 \times 0.3500 = 0.3421$$

$$\text{Weighted Condition Factor} = 0.5 \times \text{Age/Sex Factor} + 0.5 \times \text{Imputed ERG} = 0.5 \times 0.35 + 0.5 \times 0.3421 = 0.3461$$

$$\text{Total Average Risk Score} = 0.82 \times 0.3910 + 0.18 \times \text{Short Cohort Weighted Condition Factor (0.3461)} = 0.3829$$

$$\text{Relative Risk Score} = 0.3829 \div 0.4028 = 0.9506$$

$$\text{Relative Risk Score with Phase-In: } 0.8 \times 0.9506 + 0.2 \times 1.0000 = 0.9605$$

$$\text{Risk Score Adjustment to Cap Rate} = 0.9605 \times 1.0 = 0.9605$$

$$\text{Cap Rate to be risk-adjusted (TANF)} = 100 - 2 - 8 - 2 = \$88$$

$$\text{Cap Rate to be risk-adjusted (SSI w/ Medicare)} = 150 - 3 - 12 - 3 = \$132$$

$$\text{Cap Rate to be risk-adjusted (SSI w/out Medicare)} = 700 - 14 - 56 - 14 = \$616$$

$$\text{Cap Rate to be risk-adjusted (non-Medicaid)} = 150 - 10 - 40 - 10 = \$90$$

$$\text{Risk Adjusted Cap Rate (TANF)} = 88 \times 0.9605 = \$84.52$$

$$\text{Risk Adjusted Cap Rate (SSI w/Medicare)} = 132 \times 1.0134 = \$133.77$$

$$\text{Risk Adjusted Cap Rate (SSI w/out Medicare)} = 616 \times 1.0009 = \$616.55$$

$$\text{Risk Adjusted Cap Rate (non-Medicaid)} = 90 \times 0.9974 = \$89.77$$

$$\text{Risk Adjusted Premium Tax PMPM (TANF)} = 2 \times 0.9605 = \$1.92$$

5. Continued

$$\text{Risk Adjusted Premium Tax PMPM (SSI w/Medicare)} = 3 \times 1.0134 = \$3.04$$

$$\text{Risk Adjusted Premium Tax PMPM (SSI w/out Medicare)} = 14 \times 1.009 = \$14.01$$

$$\text{Risk Adjusted Premium Tax PMPM (non-Medicaid)} = 10 \times 0.9974 = \$9.97$$

$$\text{Risk Adjusted Capitation Rate (TANF)} = 84.52 + 2 + 8 + 1.92 = \$96.45$$

$$\text{Risk Adjusted Capitation Rate (SSI w/Medicare)} = 133.77 + 3 + 12 + 3.04 = \\ \$151.81$$

$$\text{Risk Adjusted Capitation Rate (SSI w/out Medicare)} = 616.55 + 14 + 56 + 14.01 \\ = \$700.57$$

$$\text{Risk Adjusted Capitation Rate (non-Medicaid)} = 89.77 + 10 + 40 + 9.97 = \\ \$149.74$$

6. Learning Objectives:

2. The candidate will understand how to evaluate health insurance organization risk and mitigation strategies.

Learning Outcomes:

- (2a) Evaluate an enterprise risk management (ERM) system.

Sources:

GHS-132-22: ORSA Guide: Understanding Risk within the 'new normal'

Commentary on Question:

Commentary listed underneath question component.

Solution:

- (a) Describe underwriting considerations health insurers need to be aware of with respect to COVID-19.

Commentary on Question:

Candidates needed to describe rather than only list considerations to receive full credit.

- Companies need to consider and allow for changes in claims experience.
 - Insurers will likely have seen a reduction in non-COVID-19 claims as services have been delayed; however, these are likely to increase again as lockdown measures are eased, and, in some cases, delays in treatment may lead to more complex cases.
 - In addition, the average cost of treatment may rise significantly due to social distancing measures and additional protective equipment.
- Companies need to allow lapse experience worsening, as policyholders have not been able to access their benefits, although this is more likely among healthier lives, leading to adverse selection.
- Critical illness claims have been delayed by reduced primary care access due to social distancing and from an increased pressure on the healthcare system.
 - Similarly, policyholders may still be unable to see a doctor, which can cause challenges for insurers when underwriting new policies and can lead to a greater risk of anti-selection and fraud.

6. Continued

- (b)
- (i) Describe market consequences that should be considered when modeling market-related COVID-19 stress test scenarios.
 - (ii) Describe COVID-19 scenarios that could be tied to an insurer's morbidity experience.
 - (iii) Describe operational risk outcomes that could be attributed to adverse COVID-19 developments.
 - (iv) Describe a stress test scenario that could identify the impact of COVID-19 on medical expense inflation.

Commentary on Question:

For part (iv), candidates who reasonably described a scenario that demonstrated medical inflation received full credit. No credit was given for describing a stress test or providing a scenario that was not specific to medical inflation.

- (i)
- If a second wave of the virus materializes, there is the possibility that the economic recovery is W-shaped. A W-shaped recovery would occur if there was a short-lived recovery followed by a second economic downturn.
 - A valuable scenario to consider is an L-shaped economic recovery, where the return to pre-pandemic levels of economic activity takes significantly longer than the two years predicted by the OECD in their single-hit scenario.
 - Insurers could consider how such an economic recovery might affect assumptions for new business volumes, lapse rates, and renewal rates.
 - Insurers might consider modelling the impact of reduced business volumes and renewals over a longer period of time, say three to five years.
 - Insurers might model the impact of short-term claims and reserving trends continuing for a longer period.
 - The economic scenarios noted above could increase the possibility of a surge in companies entering insolvency proceedings, with elevated levels of corporate defaults.
 - Further downturns in the economy will not help to alleviate market uncertainties, by both businesses and consumers, dampening demand, which would lead to additional pressures on the GDP.
 - Loss of consumers' disposable income could lead to default on premium payments and higher claim costs under creditor insurance. Insurers might therefore consider credit defaults from policyholders, reinsurers, and other counterparties within their stress tests.

6. Continued

- Insurers could continue to carry out stress tests based on future inflation. As inflation may reduce further, central banks may respond with future reduced or negative interest rates, impacting insurer's investment returns and valuations of long-term liabilities.
- Insurers could consider the impact that adverse claims experience could have on their asset and liability management, particularly evaluating liability durations and determining if substantial rebalancing of their asset portfolio is required. The current depressed market prices and ongoing volatility should be reflected in longer-term assumptions.

(ii)

- Insurers could consider the long-term prevalence of COVID-19 along with an increase in overall morbidity.
 - Insurers could build a scenario factoring in a latent, severe long-term health condition that affects COVID-19 patients and increases morbidity rates many years after their initial recovery.
- As hospital consultations, operations, and treatments have been postponed, medical conditions will be identified and treated at a later stage in their development.
 - This has the potential to cause a severe morbidity burden. Health insurers that offer private medical insurance and critical illness policies might model a scenario with morbidity rates elevated for all ages.
- During lockdown, people may have developed poor habits, and the sustained impact of social isolation can impact both mental and physical health.
 - There is increasing evidence for a worsening of mental health, and insurers could model a scenario in which the burden of disease is exacerbated and, for example, income protection experience is worse.

(iii)

- Key person dependency risk is an area of potential concern. Senior members of executive leadership teams could become infected with COVID-19, and this temporary or permanent loss of employees in a leadership role will have an impact on business activities.
 - This could also affect staff morale and their productivity levels, and depending on the severity of the infection, may cause a delay to important business decisions.
 - However, as a result of the pandemic, firms may come out with a better understanding of their key person dependency risk, which will provide valuable information when they assess their operational resilience.

6. Continued

- A scenario might be considered wherein, during a return to work, there is an outbreak of the virus within an office building. Given the airborne nature of COVID-19 and the delayed onset of symptoms, there is likely to be widespread transmission before the outbreak has been identified.
 - This will lead to significant reductions in operational capacity as employees are absent on sick leave, and potential reputational damage if it becomes apparent that measures have not been put in place to ensure that employees are appropriately protected.
- Similarly, companies may be increasing their exposure to claims from their employees who may suffer physical injuries such as back pain or repetitive strain injury due to lack of proper office equipment, or claims linked to stress and mental health issues, which may become more difficult to manage when home-working.
- The move to home working increases the risk to cyber-attacks as staff use remote access to a greater extent. This will increase the vulnerability of companies, as most of their work force will now be remote, rather than a small percentage, which could lead a greater risk of ransomware or other similar attacks

(iv)

- With the interruption to, and now backlog of, medical treatments, medical expense inflation is likely to be very high as providers seek to recover additional costs and operate at a lower capacity going forward.
- A scenario that considers this increased inflation could be modelled to identify the impact that COVID-19 has had on affordability, which could impact private medical insurance demand.