

# GH SPC Model Solutions

## Spring 2016

### 1. Learning Objectives:

1. The candidate will understand pricing, risk management, and reserving for individual long duration health contracts such as Disability Income, Long Term Care, Critical Illness, and Medicare Supplement.

### Learning Outcomes:

- (1a) Identify differences between short-duration contracts and long-duration contracts, from the standpoints of pricing and reserving

### Sources:

SOA GH Specialty Study Note, "Pricing Medicare Supplement Products" GHS-101-14.

### Commentary on Question:

*This question tested candidates' knowledge of Medicare Supplement pricing and refund calculations.*

### Solution:

- (a) Explain the key requirements for Medicare Supplement plans under NAIC Model Regulations.

### Commentary on Question:

*Candidates did relatively well on this section.*

Policy Standardization – Medicare Supplement plans can only be offered in prescribed plan designs with standardized benefits (A, B, C, etc.)

Open Enrollment – Newly Medicare eligible members are guaranteed to be issued a Medicare Supplement plan if they enroll during their Open Enrollment period.

Commissions – The first year commission on a policy may not be more than twice the amount of commission for the second through sixth years.

Loss Ratio Standards – minimum loss ratio is 65% for individual policies, 75% for group policies.

Annual Rate Filings – rates must be filed annually with the Department of Insurance.

## 1. Continued

Rate Refund Calculations – must be filed annually to ensure that policies are meeting loss ratio standards.

- (b) Identify and describe the primary state-by-state variations that can exist in Medicare Supplement policy regulations.

**Commentary on Question:**

*Candidates did poorly on this section.*

Rating Structure – requirements regarding whether rates are attained age, issue age, or community rated.

Sales to Disabled – some states require policies to be offered to Medicare eligibles under 65, others do not. Different states also have different rate requirements for disabled offerings – some may require the age 65 rate, others may have no restrictions.

Commission Structure – might be further commission restrictions

Use of rate classes at issue age 65 – some states allow but some don't.

- (c) Calculate the 2014 aggregate rate refunds, if any, to the policyholders under both the individual and group blocks. Show your work.

**Commentary on Question:**

*Most candidates got full points on this part of the question.*

Minimum loss ratio is 65% for individual, 75% for group.

Rate refunds based on minimum MLR thresholds for MedSupp, differs for individual and group with individual having a threshold of 65% and group 75%.

For individual:

Base period MLR =  $82.50/150 = 55\% < 65\%$ ,

Must give back rate refund of additional 10% of \$150 PMPM which is \$15 PMPM,

$\$15 * 5,000 \text{ member months} = \$225,000.$

For group, base period MLR =  $152.50/175.00 = 87.1\% > 75\%$ ,

No rate refund is necessary.

## 1. Continued

- (d) Recommend rate increases for 2016 for both individual and group policies that are in full compliance with state regulations. Justify your answer.

**Commentary on Question:**

*Candidates did well on this section.*

$$\text{Individual Base Rate} = (82.50 \times 1.06^2 + 22.00) / 95\% = \$120.73$$

$$\text{Group Base Rate} = (152.50 \times 1.06^2 + 47.00) / 95\% = \$229.84$$

$$\text{Individual Claims Projection with MLR Applied} = 82.50 \times 1.06^2 / 65\% = \$142.61$$

$$\text{Group Claim Projection with MLR Applied} = 152.50 \times 1.06^2 / 75\% = \$228.46$$

For individual, required rate of \$120.73 is below max allowed rate based on MLR, so can proceed with that rate. However, it also acceptable to accept any other rate between \$120.73 and the \$142.61 maximum allowed rate.

For group, calculated rate is above max allowed by MLR, so must go down to the \$228.46 allowed by the MLR process.

## 2. Learning Objectives:

2. The candidate will understand and evaluate the risk associated with health insurance and plan sponsorship and recommend strategies for mitigating the risk.

### Learning Outcomes:

- (2b) Complete a capital needs assessment.
  - Calculate capital needs for a given insurer.
  - Determine actions needed to address issues identified by assessment.
  - Describe components of an Economic Capital model.

### Sources:

Study Note: GHS-107-14 MCCSR Guideline 2013. Sections 1 (excluding 1.2.6) 2.1 3.1 4.1-4.4 5.1 5.2 10.1-10.4 and 10.6

Specifically: Part A - page 4; Part B – pages 43-47 of study not; Part C – pages 43-47 of study not; Part D – page 154

### Commentary on Question:

*The question was testing the students knowledge of Risk Based Capital requirements, specifically the components, and the calculations included in the some of those components.*

### Solution:

- (a) Identify and describe the risk components that determine a Canadian life insurer's minimum capital requirement.

#### Commentary on Question:

*The vast majority of students received all credit for this section. Full credit was granted for accurately identifying each component and giving a brief overview of the particular component.*

- Asset default (C-1) risk:  
Risk of loss resulting from on-balance sheet asset default and from contingencies in respect of off-balance sheet exposure and related loss of income; and the loss of market value of equities and related reduction of income
- Mortality/morbidity/lapse risks:  
Risk that assumptions about mortality, morbidity and lapse will be wrong
- Changes in interest rate environment (C-3) risk:  
Risk of loss resulting from changes in the interest rate environment
- Segregated funds risk:  
Risk of loss arising from guarantees embedded in segregated funds)

## 2. Continued

- Foreign exchange risk:  
Risk of loss resulting from fluctuations in currency exchange rates)

(b) Calculate the total C-1 risk component for Company XYZ. Show your work.

**Commentary on Question:**

*Many students did not appropriately determine the C-1 Risk Component using the combined rating agencies, in which the greater of each asset rating was to be used in calculating the C-1 Risk. Many students simply calculated the total C-1 Risk component for each rating agency separately, which is needed in part C. Those students that approached the question, still received some credit in this section, however.*

	Value	Amount Required	Dollar Amount
Cash	\$500	0%	\$0
Short-term asset 1	\$1,200	0.50%	\$6
Short-term asset 2	\$2,000	0.50%	\$10
Long-term asset 1	\$3,000	8.00%	\$240
Long-term asset 2	\$5,000	16.00%	\$800
		Total C-1	\$1,056

(c) XYZ's management is concerned about the overall level of C-1 due to the wide variation in ratings between the rating agencies. Describe the key pros and cons of switching to a single rating agency and recommend a strategy. Justify your answer.

**Commentary on Question:**

*Many students were able to calculate the separate C-1 Risk Component for the separate rating agencies and get the majority of points for this section. Some students failed to use the results in illustrating the pro's and con's of using a single rating agency. Lastly, some students failed to CLREARLY recommend an action, in which case would receive no points for the last portion of the question.*

## 2. Continued

*There is no correct recommendation, we were simply looking for a clear recommendation (1 vs 2 agencies) and a couple supporting statements to back up the recommendation.*

Using Goody's  
Rating

	Value	Amount Required	Dollar Amount
Cash	\$500	0%	\$0
Short-term asset 1	\$1,200	0.25%	\$3
Short-term asset 2	\$2,000	0.50%	\$10
Long-term asset 1	\$3,000	8.00%	\$240
Long-term asset 2	\$5,000	1.00%	\$50
		Total C-1	\$303

Using P&Q  
Rating

	Value	Amount Required	Dollar Amount
Cash	\$500	0%	\$0
Short-term asset 1	\$1,200	0.50%	\$6

## 2. Continued

Short-term asset 2	\$2,000	0.25%	\$5
Long-term asset 1	\$3,000	0.25%	\$8
Long-term asset 2	\$5,000	16.00%	\$800
		Total C-1	\$819

### Pros of using a single agency

- Using Goody's would provide substantial savings on the C-1 component (\$303 vs. \$819)
- There would be less administrative difficulty than would be in using two agencies,
- There would be financial savings by switching to one agency, as it would be one less agency to pay for the rating

### Cons of using a single agency

- As illustrated in the two ratings, there is a high variability in the asset ratings so a single agency may not be reasonable,
- Moving to one agency will create an additional change in process that may throw off regulators or be viewed unfavorably.

### Recommendation

- I recommend switching to one rating agency, specifically Goody's, as it frees up significant required holdings, and is far less difficult to administer

- (d) Identify and describe alternative strategies that management could employ to reduce its MCCR requirements.

### **Commentary on Question:**

*Many students did not spend adequate time formulating a response for part D as most students only had one or two suggested strategies identified*

- Purchase reinsurance to reduce mortality, morbidity, lapse, C-3 and segregated fund guarantee components
- Use guarantees and credit derivatives to reduce C-1 component for fixed-income and reinsurance assets

## **2. Continued**

- Use other derivatives serving as hedges to reduce C-1 component for equities, and foreign exchange component.
- Asset securitization to reduce the C-1 component.



### 3. Learning Objectives:

3. The candidate will understand an actuarial appraisal.

#### Learning Outcomes:

- (3a) Differentiate the components of an actuarial appraisal versus an embedded value.

#### Sources:

GHS-110-14

#### Commentary on Question:

*Commentary listed underneath question component.*

#### Solution:

- (a) Calculate the overall valuation amount using both the method you recommended and the method the DEF consulting actuary recommended. Show your work.

#### Commentary on Question:

*Most candidates received full credit for calculating the trends. Some candidates trended 2015 claims and expenses beyond one year. Many candidates did not recognize the value of business being negative. For the candidates who overly complicated their solution with estimates for premium, trended interest, etc. – credit was given.*

1<sup>st</sup> Year Claims Trend = 2013 Claims / 2012 Claims = 35 / 30 = 16.7% increase.  
2<sup>nd</sup> Year Claims Trend = 2014 Claims / 2013 Claims = 40 / 35 = 14.3% increase.  
1<sup>st</sup> Year Exp. Trend = 2013 Exp. / 2012 Exp. = 4 / 3 = 33.3% increase.  
2<sup>nd</sup> Year Exp. Trend = 2014 Exp. / 2013 Exp. = 5 / 4 = 25.0% increase.

ABC (Your) Claims Trend = Average of 1<sup>st</sup> Year and 2<sup>nd</sup> Year = (16.7% + 14.3%) / 2 = 15.5%  
DEF (Other) Claims Trend = 2<sup>nd</sup> Year Only = 14.3%.

ABC (Your) Claims Trend = Average of 1<sup>st</sup> Year and 2<sup>nd</sup> Year = (33.3% + 25.0%) / 2 = 29.2%  
DEF (Other) Claims Trend = 2<sup>nd</sup> Year Only = 25.0%.

A geometric average was also accepted for ABC.

ABC 2015 Claims Estimate = \$40 \* 1.155 = \$46.19.  
DEF 2015 Claims Estimate = \$40 \* 1.143 = \$45.71.  
ABC 2015 Administrative Expense Estimate = \$5 \* 1.292 = \$6.46.  
DEF 2015 Administrative Expense Estimate = \$5 \* 1.25 = \$6.25.

Value of Business = Premium – Expenses – Claims + Investment Income – Taxes  
(No Info is provided for Premium or Taxes ... so assumed to be zero.)

Value of Business was calculated using \$2 (constant) below.

Trended Investment Income and other assumptions for premium and taxes were given full credit.

### 3. Continued

Using Values Above

$$\text{ABC Value of Business} = - \$46.19 - \$6.46 + \$2 = -\$50.65$$

$$\text{DEF Value of Business} = - \$45.71 - \$6.25 + \$2 = -\$49.96$$

- (b) Calculate the range of the estimated values of the block. Show your work.

**Commentary on Question:**

*The vast majority of candidates calculated the claim, admin expense, and investment income ranges appropriately. A handful of candidates rounded at a level that would have showed no difference in expense range. Most candidates did not recognize that the value of business range depended upon claims and expenses being treated differently to calculate value of business than investment income.*

$$\text{Claims} + 7\% = \$40 * 1.07 = \$42.80$$

$$\text{Claims} + 9\% = \$40 * 1.09 = \$43.60$$

$$\text{Expenses} + 3.5\% = \$5 * 1.035 = \$5.18$$

$$\text{Expenses} + 4.5\% = \$5 * 1.045 = \$5.23$$

$$\text{Investment Income} + 4\% = \$2 * 1.04 = \$2.08$$

$$\text{Investment Income} + 8\% = \$2 * 1.08 = \$2.16$$

The Value of Business = Investment Income – Claims – Expenses.

Thus, the bottom of the range would use the low end of the investment income and high end of expenses and claims.

$$\$2.08 - \$43.60 - \$5.23 = -\$46.75.$$

The high end of the range would use the high end of the investment income and low end of expenses and claims.

$$\$2.16 - \$42.80 - \$5.18 = -\$45.82.$$

#### 4. Learning Objectives:

4. The candidate will understand and apply risk adjustment in the context of predictive modeling.

#### Learning Outcomes:

- (4a) Develop and evaluate risk adjustments based on commonly used clinical data and grouping methods.
- (4b) Apply risk adjustment to underwriting, pricing, claims and are management situations.

#### Sources:

Healthcare Risk Adjustment and Predictive Modeling, Duncan  
Chapter 15, Risk Adjustment and Health Care Reform: The Example of Massachusetts  
Pages 243 – 247

#### Commentary on Question:

*The question is testing the candidates' knowledge of risk adjustment. Demonstrating knowledge of the formulas results in most of the grading points.*

#### Solution:

- (a) Calculate the Authority's initial payment to RHP in First Quarter of Fiscal Year 2013. Show your work. (2 points)

Low End of the Actuarially-Sound Rate Range FY 2013		\$417.50
4Q 2012 Average Total Rating Factor	x	1.015
Admin Fee	+	\$30.00
Initial Payment to RHP	=	\$453.76

- (b) Determine the difference in the revised 1Q Fiscal Year 2013 payment to RHP (that would be paid in 2Q 2012) compared to the above initial 1Q 2013 payment. Show your work. (4 points)

<u>Member</u>	<u>Plan</u>				<u>Plan</u>		<u>Risk</u>	<u>Total</u>
	<u>Type</u>	<u>Region</u>	<u>Age</u>	<u>Gender</u>	<u>Type</u>	<u>Geographic</u>		
1	A	North	27	Female	1.06	0.95	0.87	0.8761
2	A	North	52	Female	1.06	0.95	1.23	1.2386
3	B	North	35	Male	0.95	0.95	0.91	0.8213
4	B	Central	44	Female	0.95	1.16	1.03	1.1351
5	C	Central	54	Male	0.89	1.16	1.25	<u>1.2905</u>
						Average		1.0723

#### 4. Continued

Payment to RHP for 1Q FY 2013 would be paid the following in 2Q 2013:

Low End of the Actuarially-Sound Rate Range FY 2013		\$417.50
4Q 2012 Average Total Rating Factor	x	1.0723
Admin Fee	+	\$30.00
Revised Payment to RHP in 1Q 2013	=	\$477.69
Difference in Payment for 1Q 2013 = \$477.69 - \$453.76	=	\$23.93

- (c) Determine RHP's Payment in 2Q Fiscal Year 2013 and 3Q Fiscal Year 2013. Show your work. (4 points)

2Q payment is the same as 1Q 2013 Revised Payment of \$477.69, as 2Q payment is based on 1Q enrollment.

Need to apply 2Q membership mix to calculate 3Q 2013 payment.

<u>Member</u>	<u>Plan</u>	<u>Region</u>	<u>Age</u>	<u>Gender</u>	<u>Plan</u>	<u>Geographic</u>	<u>Risk</u>	<u>Total</u>
1	A	North	27	Female	1.06	0.95	0.87	0.8761
2	A	North	52	Female	1.06	0.95	1.23	1.2386
3	B	North	35	Male	0.95	0.95	0.91	0.8213
4	B	Central	45	Female	0.95	1.16	1.23	1.3555
5	C	Central	55	Male	0.89	1.16	1.50	1.5486
							Average	1.1680

Payment to RHP for 2Q FY 2013 would be the following in 3Q 2013:

Low End of the Actuarially-Sound Rate Range FY 2013		\$417.50
Total Average Rating Factor	x	1.1680
Admin Fee	+	\$30.00
Revised Payment to RHP for 1Q 2013	=	\$517.64

- (d) In addition to risk adjustment, there are other risk mitigation arrangements within the Commonwealth Care Program. Describe these arrangements and explain why risk adjustment alone may not be sufficient.

## 4. Continued

The risk adjustment methodology that applies to the medical capitation rate is a form of risk sharing between MHP and the Connector, ensuring that plans that attract riskier members receive higher payments. Risk adjustment is an important factor in risk mitigation, but there are other risks that risk adjustment does not address (particularly at the inception of the program). RA moves revenue between participating plans but does not allocation additional revenue that may be necessary to offset overall poor experience (e.g., initial claims level exceed initial pricing).

1. An aggregate risk sharing corridor, and
2. A stop-loss arrangement.

Aggregate risk sharing corridors apply to all Health Plans

- aggregate risk sharing corridors of 2% apply above and below the medical capitation revenue ("Health Plan Full Risk Corridor")
- the Connector Authority shares 50% above and below the Health Plan Full Risk Corridor, and
- Health Plans return to 100% full risk at 50% above and below the medical capitation revenue (closed end risk sharing)

Connector operates a specific outlier stop-loss pool, funded by the Health Plans at 1.25% of the capitation rate.

- The pool will pay for 75% of specific catastrophic claims above a \$150,000 threshold
- The pool is experienced rated, that is, when the pooled premiums are less than claims, Health Plans are assessed an additional charge, proportional to their premiums.
- when experience in the pool is favorable, the excess is returned to Health Plan in proportion to their premiums