# DP-GH Complete Illustrative Solutions
# Fall 2010

## 1. Learning Objectives:

1. Understand and evaluate the effectiveness of the various types of Single Employer group coverage typically offered under:
   - Group health plan, including Consumer driven plans, etc.
   - Prescription Drug
   - Group dental plan
   - STD or LTD plan (incl. mention of coverage within other plans)
   - Group life plan
   - Other miscellaneous benefits
   - Multi-employer groups (Taft-Hartley, etc)

**Learning Outcomes:**

(1a) Describe the various coverages, including typical benefit provisions, eligibility requirements, cost-sharing provisions, limits and funding mechanisms.

(1b) Identify the potential gaps in needed or desired coverages.

(1c) Identify which participants would find each coverage a valued benefit and why.

(1d) Assess the advantages and disadvantages to a sponsor of offering a given coverage/benefit

**Sources:**

GH-D100-07: Specialty Accident and Health Products

GH-D106-07: EBRI Fundamentals of Employee Benefit Programs, Ch. 14, Multi-Employer Plans

**Solution:**

(a) Identify requirements and steps in setting up a multiemployer plan.

**Governed by Taft-Hartley Act**
**At least 2 companies and 2 employees**

**<u>Steps:</u>**

- Negotiate contributions between employers and employees
- Adopt trust agreement and establish board
  - Assisted by lawyer and accountant or fund manager

**1.** Continued

- Work out plan details and supportable benefit levels
- May need to hire plan administrator
- May need formal plan document and booklet to describe benefits

(b) Describe the types of cancer products typically available and the associated pricing challenges for the insurer.

1. **Uncapped Plans**
   Pay unlimited charges for specific treatments
   - Pricing Challenges: Moving away from it because can't keep up with increasing costs
     - Specifically inflation of medical technology of research and treatment

2. **Indemnity**
   Pay fixed daily amount for any of a number of treatments
   Currently the more popular product
   - Pricing Challenges: More rate stable over time
     - More control over inflation risk
     - Initial benefit amounts may ultimately provide sufficient coverage over time

3. **Hybrid**
   Pay some benefits as indemnity and other based on actual charges
   - Pricing Challenges: Some protection to insurer from rapid claims escalation

4. **First Occurrence**
   Pay lump sum benefit for cancer occurrence
   Typically exclude cancer in situ and skin cancer
   Most policies consist of a handful of core benefits:
   - Hospitalization
   - Radiation
   - Surgery
   - Blood/Plasma

   Usually single rate used for all ages
   Potential for anti-selection basis of heredity, age and tobacco use
   Difficult to estimate probabilities for benefits
   Difficult to estimate cost of medical inflation for uncapped or hybrid benefits
   Difficult to estimate incidence and continuance rates
   Quantifying impact of tobacco use
   Marketing and underwriting

## 2. Learning Objectives:

(8) Evaluate the process and be able to develop a medical manual rate for both ASO and insured business.

**Learning Outcomes:**

(8a) Identify and evaluate sources of data needed for pricing and underwriting including the quality, appropriateness, and limitations of each data source.

(8c) Develop experience analysis (claims cost and expenses)
- (i) Construct the appropriate models
- (ii) Develop the appropriate assumption, including trend, anti-selection, etc.

**Sources:**

SOA Session 57 The Actuary and Provider Contracting: Mastering the Contract Analysis Process

**Solution:**

(a) List types of contract analyses and items to consider when performing these analyses.

**Commentary on Question:**

Many candidates received points for listing the considerations in (a).
We found that candidates had difficulty demonstrating how these considerations are applied in the calculations in (b).

<u>What considerations must we take into account when we are analyzing provider contracts</u>

What are we measuring

What data/methods to use

How should we interpret the results

Specific details such as reimbursement methods, type of product offered, changes in enrollment type

<u>What types of analysis should we be doing?</u>

It depends on what we are measuring and what we will be doing with it.

Impact of contract change on the year-over-year unit cost trend

The point in time impact of contract change

Comparisons to external benchmarks

- Medicare allowable
- Competitor reimbursement

**2.** Continued

(b) Calculate the error in your original 2011 claims projection that was based on the midpoint approach. Show your work.

**Commentary on Question:**
Acceptable solutions included pictures showing this with important dates pointed out. Some candidates chose to use an index based on a $100 number, which was also acceptable (e.g., $100 for three months, then $104 for 6 months, then $100 × 1.04 × 1.08 for 5 months). We were surprised by the number of candidates who compounded the charge master increases.

**Index Approach**

| Month | Increase | Index | Period |
|---|---|---|---|
| Jan-2008 | | 1.000 | Data |
| Feb-2008 | | 1.000 | Data |
| Mar-2008 | | 1.000 | Data |
| Apr-2008 | 1.04 | 1.040 | Data |
| May-2008 | | 1.040 | Data |
| Jun-2008 | | 1.040 | Data |
| Jul-2008 | | 1.040 | Data |
| Aug-2008 | | 1.040 | Data |
| Sep-2008 | | 1.040 | Data |
| Oct-2008 | 1.08 | 1.123 | Data |
| Nov-2008 | | 1.123 | Data |
| Dec-2008 | | 1.123 | Data |
| Jan-2009 | | 1.123 | Current |
| Feb-2009 | | 1.123 | Current |
| Mar-2009 | 1.03 | 1.157 | Current |
| Apr-2009 | | 1.157 | Current |
| May-2009 | | 1.157 | Current |
| Jun-2009 | | 1.157 | Current |
| Jul-2009 | | 1.157 | Current |
| Aug-2009 | | 1.157 | Current |
| Sep-2009 | 1.06 | 1.226 | Current |
| Oct-2009 | | 1.226 | Current |
| Nov-2009 | | 1.226 | Current |
| Dec-2009 | | 1.226 | Current |
| Jan-2010 | 1.05 | 1.288 | |
| Feb-2010 | | 1.288 | |
| Mar-2010 | | 1.288 | |
| Apr-2010 | | 1.288 | |

**2.** Continued

| | | | |
|---|---|---|---|
| May-2010 | | 1.288 | |
| Jun-2010 | | 1.288 | |
| Jul-2010 | 1.03 | 1.326 | |
| Aug-2010 | | 1.326 | |
| Sep-2010 | | 1.326 | |
| Oct-2010 | | 1.326 | |
| Nov-2010 | | 1.326 | |
| Dec-2010 | | 1.326 | |
| Jan-2011 | | 1.326 | Proposed |
| Feb-2011 | | 1.326 | Proposed |
| Mar-2011 | | 1.326 | Proposed |
| Apr-2011 | | 1.326 | Proposed |
| May-2011 | | 1.326 | Proposed |
| Jun-2011 | | 1.326 | Proposed |
| Jul-2011 | | 1.326 | Proposed |
| Aug-2011 | | 1.326 | Proposed |
| Sep-2011 | | 1.326 | Proposed |
| Oct-2011 | | 1.326 | Proposed |
| Nov-2011 | | 1.326 | Proposed |
| Dec-2011 | | 1.326 | Proposed |

| Period | Average Index |
|---|---|
| Data | 1.051 |
| Current | 1.174 |
| Projected | 1.326 |

Projected Period Trend Factor **1.262** = 1.326 ÷ 1.051

**Midpoint Approach**

| Period | From | To | Midpoint |
|---|---|---|---|
| Data | 01/01/2008 | 12/31/2008 | 07/01/2008 |
| Contract | 01/01/2009 | 12/31/2009 | 07/01/2009 |
| Projected | 01/01/2011 | 12/31/2011 | 07/01/2011 |

**2.** Continued

| | |
|---|---|
| Months of Trend from Data Period to Projection Period | 36 |
| Annual Trend Assumption | 5.50% |
| Projected Period Trend Factor | **1.174** = $(1.055)^3$ |

Error - Claims are <u>understated</u> by using the midpoint approach trends by **7.0%** (1– 1.174 ÷ 1.262). (1.262 ÷ 1.174 was also accepted as answer). The key here was to understand that the comparison was on a projection using an index method vs. an estimate using a trend factor.

## 3. Learning Objectives:

8. Evaluate the process and be able to develop a medical manual rate for both ASO and insured business.

**Learning Outcomes:**

(8a) Identify and evaluate sources of data needed for pricing and underwriting including the quality, appropriateness, and limitations of each data source.

(8b) Identify and evaluate the rating parameters needed to evaluate and manage a book-of-business.

(8d) Recommend appropriate actions following the study including:
- (i) Areas for further study;
- (ii) Changes in coverage, eligibility requirements or funding strategy.

(8e) Evaluate the impact of changing economic conditions on pricing.

(8i) Construct a rating model to be used for rating individual customers or plan designs.

**Sources:**

2009 SOA Health Meeting, Session 64 (LTC and Disability Insurance: Learning from the Past)

GH-D103-07 (Pricing Long Term Care)

Case Study

**Commentary on Question:**

The purpose of this question was to test candidates' ability to understand the similarities and differences in the basic actuarial characteristics of LTC and IDI products, as well as test whether they read and absorbed the assigned reading material.

This question contained elements of recall, synthesis, and calculation.

Besides the points made below, to receive full credit, candidates should answer the question as asked rather than only writing down long lists from recall. Also, for example, when a chart is asked for, candidates should make a chart. When pricing assumptions are asked for, candidates should list pricing assumptions, not benefit features or underwriting practices.

Most candidates did well on part (c), given that it was a simple calculation using a formula and data contained in the case study, which was readily available during the exam.

**3.** Continued

**Solution:**

(a) Build a chart to compare and contrast IDI with LTC with respect to pricing assumptions, economic pressures, and their impact on recent industry experience.

**Commentary on Question:**
One common mistake candidates made in answering part (a) is that instead of providing pricing assumptions, they provided a long list of benefit options and coverage characteristics. Also, surprisingly few followed the instructions to build a comparison chart.

| Pricing Assumptions | LTC | IDI |
|---|---|---|
| Morbidity | • Initial morbidity rates based on public studies<br>• Now – Based on company experience<br>• Relevant insured data hard to get but starting to accumulate it. | • Most companies relying on their own experience<br>• IDEC studied claim experience of 1990s – Preliminary tables released in 2005<br>• Huge losses in 1990s have impacted assumed morbidity<br>• Statutory industry morbidity table (85 CIDA) is obsolete |
| Lapses | • Initially, used ultimate rates of 7-8%<br>• Now – Using ultimate rates of 0.5-1.5%.<br>• Each 1% off translated to 10% off on premium | • Not as sensitive to lapse as LTC |
| Mortality | • Initially used population mortality, then ’83 GAM<br>• Now – ’94 GAM or Annuity 2000 Table, with selection<br>• Mortality may still be off and lower mortality also means higher rates | • [Nothing in assigned material on mortality assumptions for IDI] |

**3.** Continued

| | | |
|---|---|---|
| Investment Income | • Investment income has come down from 7-8% in 1990s to 5-6% today<br>• Huge surplus strain, huge ALR | • [Nothing in assigned material on investment income assumptions for IDI] |
| Rating Structures | • Rates are generally nationwide<br>• Unisex rates (for marketing)<br>• Level rates after 65 (by law)<br>• Small multi-life (marital) discounts | • Sex-distinct rates (except sponsored)<br>• Expanded occupation classes for doctors<br>• Discounts for nonsmokers |

| Economic Pressure | LTC | IDI |
|---|---|---|
| Market Size | • Market went from 100 companies down to 40s | • Market went from 70 companies down to 20 |
| Population Targeted | • Focused on upper middle class/upper class market<br>• Trying to make inroads to lower and middle income market | • Focus is on professional, executive and medical occupations<br>• SSDI dried up market for blue collar DI<br>• Higher maximum issue and participation limits including doctors<br>• Issue limits 20-30k/mo for top occ classes, 15-25k again for doctors<br>• After-tax replacement ratios are up to 85-95% in ER-sponsored market |
| Rates | • Benefits and risk classes not standardized, so rates hard to compare<br>• New entrants feel pressure to meet or beat rates of established carriers<br>• Brokers “spreadsheet” companies to find the lowest rate for clients | • Getting more rate competition in top occ classes<br>• Unemployment tends to drive up claim incidence and may be poised to do so again |

**3.** Continued

(b) Recommend changes to Great Expectations' claims management process in order to improve the LTC experience.

**Commentary on Question:**
A common mistake on part (b) was that many candidates recommended changes to underwriting practices, which occur prior to issue, rather than changes in the claim management process that would be relevant once a claim has been filed.

- Older generation policies may not have policy language to enable company to appropriately manage claims.
- Newer policies: carrot approach, to encourage use of case management and appropriate care.
- Since LTC adjudicated on a pool of money basis, there is incentive to use efficient care, make money last longer.
- Certification of need for care must be made by licensed health practitioner (and often confirmed by company).
- Plan of care must be developed either by nurse assigned by company or by person's doctor.
- Plan of care should outline site and level of assistance needed, number of hours of services needed per week and for how long.
- Re-certification required at least annually (or more often for claim that is expected to have changing needs).

(c) Using the tables available in the case study, calculate the total 2011 LTC premium for the group shown above. Show your work.

**Commentary on Question:**
Most candidates did very well on part (c), getting full credit. Two common mistakes were a failure to show the total premium (not adding the premiums for the 3 employees) and not showing the work (e.g., not showing what formula was being used), both of which were asked for in the question.

Rate = base rate × # units × class × spouse factor × elimination period factor × cash benefit factor

$381.95 = $215 × 2.0 × 0.95 × 0.85 × 1.00 × 1.10
$1,067.60 = $314 × 4.0 × 0.85 × 1.00 × 1.00 × 1.00
$268.84 = $193 × 1.5 × 1.15 × 0.85 × 0.95 × 1.00

Total = $1,718.38

**4.** **Learning Objectives:**

1. Understand and evaluate the effectiveness of the various types of Single Employer group coverage typically offered under:
   - Group health plan, including Consumer driven plans, etc.
   - Prescription Drug
   - Group dental plan
   - STD or LTD plan (incl. mention of coverage within other plans)
   - Group life plan
   - Other miscellaneous benefits
   - Multi-employer groups (Taft-Hartley, etc)

5. Apply U.S. and Canadian nation-specific regulation to product design and pricing.

8. Evaluate the process and be able to develop a medical manual rate for both ASO and insured business.

**Learning Outcomes:**

(1c) Identify which participants would find each coverage a valued benefit and why.

(1e) Evaluate potential financial, legal and moral risks associated with each coverage.

(5d) Determine the potential impact on the cost of complying with the regulation.

(8a) Identify and evaluate sources of data needed for pricing and underwriting including the quality, appropriateness, and limitations of each data source.

(8b) Identify and evaluate the rating parameters needed to evaluate and manage a book-of-business.

(8c) Develop experience analysis (claims cost and expenses)
   (i) Construct the appropriate models
   (ii) Develop the appropriate assumption, including trend, anti-selection, etc.

(8d) Recommend appropriate actions following the study including:
   (i) Areas for further study;
   (ii) Changes in coverage, eligibility requirements or funding strategy;

(8h) Modify manual rates to reflect specific plan values including benefits for which little or no data is available;

(8i) Construct a rating model to be used for rating individual customers or plan designs;

**4.** Continued

**Sources:**
Group Insurance, Chapter 31 – Estimating Claim Costs for Disability Benefits

GH-D101-07: Group Disability Insurance

GH-D113-07: Group Long Term Disability – Improving Actuarial Analysis through Understanding the Benefits Process

**Solution:**
(a) Calculate the LTD premium rate for the new combined company, assuming that S&D's LTD plan is adopted. Show your work.

Total life years: 220 + 210 + 240 + 285 + 270 + 65 +75 +90+105+110 = 1670
Bayesian credibility: n/(n+k) , k = 5000 z = 1670/6670 = 25% credible

Combined experience
Trend everything to 7/1/2010, use 4%, assume all cashflows at mid year
cost = claims paid + reserves

| Year | Amt of Trend | S & D Trended | Fagin Trended |
|---|---|---|---|
| 2005 | 5 | 546,034 | 275,207 |
| 2006 | 4 | 515,908 | 284,276 |
| 2007 | 3 | 664,120 | 321,936 |
| 2008 | 2 | 684,328 | 374,774 |
| 2009 | 1 | 673,920 | 384,384 |
| Total | | 3,084,310 | 1,640,577 |
| | | | * 0.85 (ben adjustment) |
| | | | 1,394,490 |
| | | Total = | 4,478,800 |
| | | Life Years = | 1670 |
| | | Cost Per Life Yr | 2682 per life year |

Manual Rate

| Sex | Age | #FTE | Monthly Ben ($100) [1] | Rate | Reserve | Premium [2] |
|---|---|---|---|---|---|---|
| F | 25 - 29 | 75 | 10 | 1 | 4180 | 3,135 |
| F | 35 - 39 | 115 | 15 | 1.8 | 5460 | 16,953 |
| F | 40 - 44 | 40 | 16 | 2.3 | 5320 | 7,831 |
| M | 40 - 44 | 100 | 19 | 2.4 | 5190 | 23,666 |
| M | 45 - 49 | 80 | 20 | 2.7 | 6440 | 27,821 |
| M | 55 - 59 | 10 | 30 | 3.7 | 7160 | 7,948 |
| | | 420 | | | Total | 87,354 |

**4.** Continued

Notes:
[1] Monthly benefit ($100) = salary x 50% ¸ 12 ¸ $100
[2] Premium = # FTE's / 1,000 x rate x benefit x reserve

Weighted Rates
Manual rate = 87,353.9 / 420 = 207.99 per month
Experience = 2082 /12 = 223.5 per month

So, cred weighted: 207.99 (.75) + 223.5 (.25)
= 211.87
pmpm
14% retention
**$246.36 total**

(b) Compare the replacement ratio under each plan for an employee earning $72,000 per year. Show your work.

$72,000/12 =
$6,000

| | Salary | Tax Rate | After Tax | Ben | Tax Rate | Ben total | Ratio |
|---|---|---|---|---|---|---|---|
| Sikes | 6,000 | 0.3 | = 4,200 | 50% | 20% | 2,400 | 57% |
| Fagin * | 6,000 | 0.3 | = 4,200 | 70% | 0% | 4,200 | 100% |

* 0% used since EE pay all; assumption that ee pays using after tax dollars, so ben doesn't get taxed (if 20%, the ratio = 80% instead of 100%)

(c) Assess each of S&D's and Fagin's plan designs based on the CEO's statement and describe what other provisions you would also review.

| | S & D | Fagin |
|---|---|---|
| Benefit Amount | Low | High |
| Monthly Maximum | $4,000 is reasonable | $15,000 is too high (leaves no incentives for employees to return to work) |
| Elimination Period | Small | Reasonable |
| Cost of Living Adjustment | Fails the objective of providing reasonable coverage for those expected to remain disabled for a long time | 6% is too high. Inflation is about 3% to 4% |

**4.** Continued

Following provisions need to be reviewed:

1. Survivor Benefits – Pays lump sum or annuity equal to 3 to 6 months of benefit payments

2. Amount of Benefit – Usually 50% to 70%, see comparison chart above

3. Minimum Benefit – If the claimant's benefit is reduced by offsets to nothing this provision ensures some payment

4. Pension Contribution – Usually 3% to 15% of salary

5. Limitations and Exclusions – Exclusions: Conditions if commit a felony, war, self-inflicted; Limitations: Pre-existing conditions, mental/nervous disorders, etc.

6. Elimination Period: For LTD: 30 to 189 days, can be up to 2 years

7. Maximum Benefits: For LTD: $4,000 to $6,000 per month (Fagin's is too high)

8. Maximum Benefit Period – For LTD: 2 years to up to age 65 (retirement age)

9. Eligibility – Should have actively at work and minimum hours worked requirements

10. Definition of Disability – Specialty occupation is most expensive, own occupation less expensive and any occupation the cheapest; if includes occupation and non-occupational disabilities, then need to coordinate with worker's compensation

11. Integration of Benefits – Directing integration: Deduct the total amount of other income; All sources integration: Pay the less of 70% of pay (for other income), 60% of pay or maximum benefit

12. Cost of Living Adjustment – Can be fixed or indexed

13. Conversion to Individual Policy: Gives the individual right to guaranteed renewable individual policy, anti-selection high here

14. Pension Contribution Benefit – Monthly payment to DC plan for as long as receiving benefits

## 5. Learning Objectives:

3. Evaluates employer strategies for designing and funding benefit plans for:
   (i) Active employees
   (ii) Dependents
   (iii) Pre-65 retirees
   (iv) Post-65 retirees
   (v) Disabled (short and long-term)

**Learning Outcomes:**

(3e) Describe opportunities to encourage employees to be more health and cost conscious and to return to work early.

**Sources:**

Chapter 7, The Handbook of Employee Benefits – Understanding Managed Care Health Plans: Understanding Costs and Evaluating Plans

**Commentary on Question:**

Candidates were asked to provide a recommendation in (d), very few did.

**Solution:**

(a) List reasons for offering a health promotion program, and describe the associated organizational benefits.

1. Attract good employees: Better employees can be more productive, improve quality, etc.
2. Retain good employees: Keeping quality employees reduces turnover, new training costs, allows employees to become more effective
3. Keep workers healthy: Less sick time, more productivity at work, less benefit costs
4. Improve morale: Happier employees are shown to be more efficient and produce higher quality work
5. Increase productivity: Reduce costs, improve quality
6. Reduce health care spending: Lower insurance rates, less spending on self-insured benefits

(b) Describe the steps to be followed in developing a wellness program.

1. Preparation: Understand goals and the current situation
2. Research: Both design and cost
   - Organisational motives: Expected outcome, specific goal, etc
   - Employee and management support: Everyone needs to be on board for it to be effective
   - Cost-benefit analysis:
     - Identify areas impacted
     - Quantify impact
     - Determine level of savings needed to meet cost

**5.** Continued

- Determine if level of savings is reasonable
- Add other non-quantifiable benefits
- Compare to other current expenditures
- decide if it is a good investment

- Organizational capabilities: Budget, staffing levels, extent of the program, etc.

3. Program design: Use the above information to develop a program best suited for the employer including: Benefits offered, funding, eligibility, goals, staffing levels, budget, etc.

(c) Calculate the expected savings and ROI from the proposed employee wellness pilot program. Show your work.

**Savings**

| | | Annual Savings/ Employee in Program | | | | |
|---|---|---|---|---|---|---|
| Rate Category | No. of Employees in Program | Medical Care | + Absenteeism | + Disability | **= Savings** | Expected Savings |
| Chronic Disease | 5000 × .06 × .15 = **45** | 20000 × .08 = 1600 | 2000 × .10 = 200 | 750 × .2 = 150 | **1,950.00** | **$87,750** |
| Unhealthy Habits | 5000 × .10 × .20 = **100** | 6000 × .15 = 900 | 800 × .15 = 120 | 300 × .2= 60 | **1,080.00** | **108,000.00** |
| Mean Well | 5000 × .79 × .10 = **395** | 4000 × .12 = 480 | 500 × .2 = 100 | 175 × .1 = 17.5 | **597.50** | **236,012.50** |
| Healthy | 5000 × .05 × .15 = **38** | 1000 × .01 = 10 | 125 × .01 = 1.25 | 50 × .01 = .5 | **11.75** | **446.50** |
| Total | 578 | | | | | **$432,209** |

**ROI**

| | No. of Employees in Program | Cost Per Employee | No. Months in Year | Aggregate Costs |
|---|---|---|---|---|
| Variable Costs | 578 | x $75 | x 12 = | 520,200 |
| | No. Coordinators | Cost/Coordinator | | Total |
| Fixed Costs | 578 ÷ 175 = 3.3 | $85,000 | | 280,743 |
| | | | Total Annual Cost | 800,943 |
| | | | Evaluation Budget | 4.0% |
| | | | Total Expected Costs | **$832,981** |

**Expected ROI**

| | | | |
|---|---|---|---|
| Total Expected Costs | $ | 832,981 | |
| Tax Deduction | 35% $ | (291,543) | = 35% × 832,981 |
| After-Tax Costs | $ | 541,437 | |
| Savings | $ | 432,209 | |
| ROI = Savings / After-Tax Costs, Rounded | | | 80% = 432,209 ÷ 541,437 |

**5.** Continued

(d) Identify potential changes in the wellness program to improve financial outcomes.

1. Offer program only to members with potential high cost savings i.e. chronically ill and unhealthy habits group
2. Eliminate programs that don't offer good rating of savings vs. costs
3. Get better participation from management to increase participation of members

## 6. Learning Objectives:

1. Understand and evaluate the effectiveness of the various types of Single Employer group coverage typically offered under:
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   - STD or LTD plan (incl. mention of coverage within other plans)
   - Group life plan
   - Other miscellaneous benefits
   - Multi-employer groups (Taft-Hartley, etc)

5. Apply U.S. and Canadian nation-specific regulation to product design and pricing.

8. Evaluate the process and be able to develop a medical manual rate for both ASO and insured business.

**Learning Outcomes:**

(1c) Identify which participants would find each coverage a valued benefit and why.

(1e) Evaluate potential financial, legal and moral risks associated with each coverage.

(5d) Determine the potential impact on the cost of complying with the regulation.

(8a) Identify and evaluate sources of data needed for pricing and underwriting including the quality, appropriateness and limitations of each data source.

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(8c) Develop experience analysis (claims cost and expenses)
   (i) Construct the appropriate models
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   (i) Areas for further study;
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(8h) Modify manual rates to reflect specific plan values including benefits for which little or no data is available.

(8i) Construct a rating model to be used for rating individual customers or plan designs.

**6.** Continued

**Sources:**
Catastrophic Source: Group Insurance, Chapter 30, pg. 619: "Since the incidence of low claim dollars can be different by age or gender than the incidence of high claim dollars, it can be worthwhile to develop separate age/gender factors for high deductible plans."

Credibility Source: Group Insurance, Chapter 30, pg. 616: "Movement to [CDHP] options compound the issue. In situations of significant change, or if the volume of the company's own claims data is not sufficient to be credible, it must be supplemented with other data."

Pharmacy Source: Group Insurance, Chapter 30, pg. 620-621 and CDH emerging data monograph page 11-12

Revenue PMPM Source: CDH emerging data monograph page 8-9

Target Loss Ratio Source: Group Insurance 34, page 700 (admin costs)

Trend Factor Source: CDH emerging data monograph page 8-9

Selection Source: CDH emerging data monograph page 5, 10

Other Risks Source: Group Insurance, Chapter 30, pg. 616: "Movement to [CDHP] options compound the issue. In situations of significant change, or if the volume of the company's own claims data is not sufficient to be credible, it must be supplemented with other data."

**Commentary on Question:**
Simply put, this was not a "list question." Candidates who provided answers using only recall cognitive skills did not do well on the question.

A higher level of cognitive skills was required. Candidates were expected to synthesize information provided from the case study with the readings in order to answer the question.

Candidates sometimes tried to fit concepts learned from lists into the solution, which were not all that helpful.

**6.** Continued

**Solution:**

(a) List and explain how the evidence in Exhibit 1.a. supports Jacob Marley's assertion.

**Commentary on Question:**
For part (a), it should be recognized that it is highly likely that the information in Exhibit 1.a. is flawed (one would generally expect HSA rates to be significantly lower than PPO and HMO type-products).

Candidates were expected to analyze the data, explain areas where the data appears to be incorrect and justify why that is the case. Many candidates did not recognize that the work product could be flawed. A word of advice: since the case study is available ahead of the exam, candidates should consider reviewing the case study and looking for obvious ways this information could be tested.

Rates are too high.
The exhibit supports a rate decrease. However, in addition there are some potential issues with the exhibit.

Loss Ratio is very low.
Revenue PMPM is the second highest. For the high deductible plan, revenue should be closer to the HRA.

Catastrophic claims are lower than expected.
The expected amount is the same for all plans. For an HSA, large claims should be lower.

Pharmacy rate is the same for all plans.
For a high deductible plan, pharmacy rates should be lower.

Trend factor is the same for all plans.

(b) Explain three of the greatest risks to Great Expectations in transitioning to substantially lower rates. Justify your response.

Selection – If we lower rates too much, healthy members will leave the other plans to join the HSA. Experience in the other plans will worsen and overall profits will drop.

Regulatory – Might not allow the needed corrections.

Pricing – Due to the credibility of the information and/or potentially incomplete data, these new rates may be priced too low. Future experience could worsen and cause profitability or solvency issues.

**6.** Continued

(c) Outline a message to Jacob Marley explaining the expected timing and process required to roll out a major small group HSA rate change.

Jacob,

Thank you for your call regarding the pricing of the small group HSA rate for the Old London Market. The following process applies to the potential rate change:

- Review of rate decrease and potential impact on our other products
- Understand regulatory issues with a rate decrease
- New rate filing and actuarial certification
- Updated marketing materials

We will get back to you in the coming weeks to discuss next steps.

With kindest regards

## 7. Learning Objectives:

(8) Evaluate the process and be able to develop a medical manual rate for both ASO and insured business.

**Learning Outcomes:**

(8c) Develop experience analysis (claims cost and expenses)
- (i) Construct the appropriate models
- (ii) Develop the appropriate assumption, including trend, anti-selection, etc.

(8h) Modify manual rates to reflect specific plan values including benefits for which little or no data is available.

(8i) Construct a rating model to be used for rating individual customers or plan designs.

**Sources:**

Group Insurance, Ch. 36 Medical Claim Cost Trend Analysis

GH-D112-07: Monitoring and Projecting Pricing Trends in a Managed Care Environment

**Solution:**

(a) Explain common problems encountered in performing trend analysis.

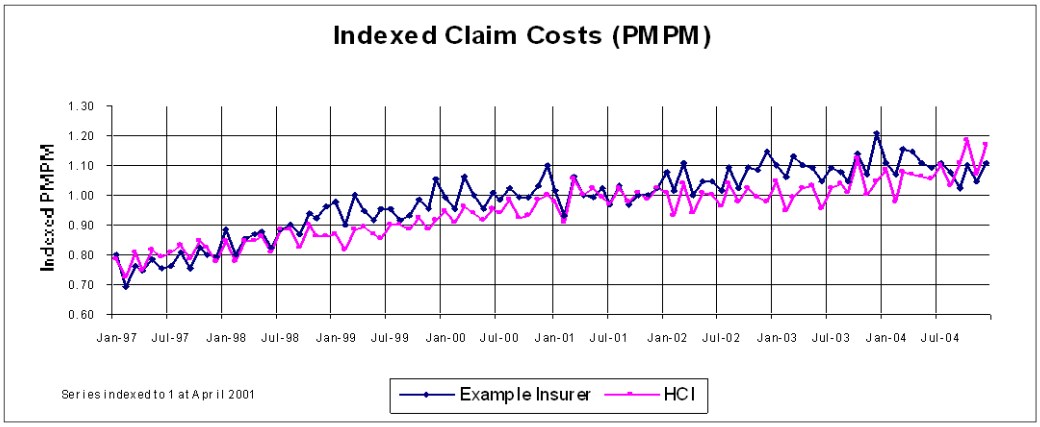
Changes in claim processing and payment patterns
Change in benefit mix between experience periods (ex: sale or termination of insured groups)
For statistical analysis - Pulse outlier and level shifts (discontinuities)
Define level shift - An abrupt step either up or down in a series of monthly claim costs; these can be either temporary or permanent

(b) Describe how you would perform regression analysis utilizing an external index to complete a detailed trend study.

Trend analysis using External Data
Statistical techniques e.g. Multiple Regression Analysis or Box-Jenkins transfer function models
Use leading indicators to model past experience
Or use a coincident indicator like the Health Cost Index (HCI) as proxy for market force of trend

**7.** Continued

Step 1. Graph insurer's claim cost vs. an external index such as the HCI
This can be by detailed benefit category (IP, OP, ER…) or in total
Index to 1.0 at a common time period
Draw a sample graph:




Step 2. Observe graph; note whether trend slopes are similar
Step 3. Consider how to handle periods of discontinuity
Build alternate models to determine appropriate approach
Step 4. Build a multiple regression model relating claim costs to HCI
Use seasonal dummy variables, such as monthly
For any discontinuities use dummy variables to appropriately model
Step 5. Determine appropriateness of model as it projects future time periods
Run model with several different choices for dummy variables if desired
Step 6. Residual diagnostic checks should be performed
Step 7. Graph the actual and the fitted/forecast claim values for easy review of historical and projected claim cost

(c) Calculate the paid trend and allowed trend for 2009 for this group. Show your work.

Actual "Paid" Trend

| | Incurred | Members |
|---|---|---|
| Jan-08 | $48,100 | 937 |
| Feb-08 | $44,100 | 940 |
| Mar-08 | $48,800 | 942 |
| Apr-08 | $48,900 | 942 |
| May-08 | $46,800 | 940 |
| Jun-08 | $49,500 | 939 |
| Jul-08 | $50,700 | 943 |

**7.** Continued

| | | | | |
|---|---|---|---|---|
| Aug-08 | $48,533 | | 939 | |
| Sep-08 | $49,550 | | 937 | |
| Oct-08 | $52,324 | | 945 | |
| Nov-08 | $50,370 | | 945 | |
| Dec-08 | $54,575 | | 945 | |
| | $592,252 | ÷ | 11,294 = | $52.44 |

| | Incurred | | Members | |
|---|---|---|---|---|
| Jan-09 | $51,526 | | 945 | |
| Feb-09 | $50,147 | | 966 | |
| Mar-09 | $58,305 | | 964 | |
| Apr-09 | $55,046 | | 968 | |
| May-09 | $53,628 | | 967 | |
| Jun-09 | $56,601 | | 968 | |
| Jul-09 | $57,934 | | 969 | |
| Aug-09 | $59,439 | | 974 | |
| Sep-09 | $60,365 | | 974 | |
| Oct-09 | $61,457 | | 976 | |
| Nov-09 | $66,057 | | 980 | |
| Dec-09 | $106,725 | | 979 | |
| | $737,233 | ÷ | 11630 = | $63.39 |

Actual "Paid" Trend = $63.39 ÷ $52.44 - 1 = 20.9%
Add Copayment ($63.39 +**15.00**) ÷ ($52.44 + **12.50**)
Allowed Trend = $78.39 ÷ $64.94 - 1 = 20.7%

(d) Assuming the allowed trend calculated in part (c) continues into 2010, calculate the 2010 projected paid trend if:
(i) The 2010 co-payment stays at $15; and
(ii) The 2010 co-payment changes to $20.
Show your work.

Projected Paid Trend @ $15

| | | |
|---|---|---|
| | $78.39 | |
| Trended | × 120.7% | |
| | $94.63 | |
| - Copay | ($15.00) | |
| | $79.63/$63.39 | 25.6% |

**7.** Continued

Projected Paid Trend @ $20

| | | |
|---|---|---|
| | $78.39 | |
| Trended | × 120.7% | |
| | $94.63 | |
| - Copay | ($20.00) | |
| | $74.63 ÷ $63.39 | 17.7% |

(e) Explain factors that cause paid trend to differ from allowed trend.

Paid Trend: Trend in PMPM incurred medical costs after application of network discount and member cost sharing.

Accurate reflection of actual changes in plan costs may need to account for other changing factors.

Allowed trend doesn't reflect benefit buydown so does not need to be adjusted.

Allowed trend must still be adjusted for other items.

## 8. Learning Objectives:

2. Understand and evaluate the effectiveness of the various types of Individual and multi-life coverage typically offered under:
   - Individual health plan
   - LTC (including group and individual)
   - Individual DI plan
   - Medicare Supplement

4. Evaluate the various types of coverages typically offered under a government health plan (e.g., Medicare, Medicaid, Canadian health plan, Social Security Disability Income, states' Temporary Disability Income programs, Workers Compensation, etc.).

**Sources:**
Group Insurance, Chapter 46 – Management of Provider Networks

Handbook of Employee Benefits, Chapter 7 - Understanding Managed Care Health Plans: Understanding Costs and Evaluating Plans

**Commentary on Question:**
The goal of the question was to allow candidates to evaluate provider networks. It was important for the candidate to not only understand the criteria for evaluating networks but to be able to apply it when developing a recommendation.

**Solution:**
(a) List:

(i) The goals of provider networks;

1. Lower health care costs
2. Increase quality of health care
3. Increase member satisfaction

(ii) Factors to be considered when establishing a provider network.

1. Population to be served
2. Type of product
3. Accessibility of providers
4. Trade off between the size of the network and level of discounts
5. Trade off between the size of the network and medical efficiency
6. Entities with which to contract
7. Target reimbursement levels and methodology
8. Current referral patterns
9. Specialty networks

**8.** Continued

(b) Describe the measures for evaluating network performance.

1. Cost Measures
   - Price Level Measures
     - % discount, cost per service
   - Utilization Measures
     - Unit / 1000 Members
     - Average LOS
   - Claim Cost Measures
     - Per Member Per Month
2. Quality Measures
   - Structure
     - Qualifications for Hospitals or Physicians
   - Process
     - Following Standard Protocols
   - Outcomes
     - Administrative Measures
     - Clinical Quality Measures
       - Morbidity
       - Mortality
       - Sense of Well-Being
       - HEDIS, JCAHO
3. Member Satisfaction
   - How Members Feel
     - Access to Care
     - Friendliness
     - Perceived Quality
   - Behavioral Indicators
     - Disenrollment

(c) Describe the advantages and disadvantages of common hospital reimbursement strategies from the insurer's perspective.

**Commentary on Question:**
For each reimbursement listed, candidates were expected to describe the strategy, as well as the advantages and disadvantages listed. Whether it was an advantage or disadvantage needs to be explicitly stated. Some candidates failed to recognize that the question was specific to hospital reimbursement, not physician reimbursement.

**8.** Continued

1. Straight Discount – Negotiated percentage off billed charges
   - Disadvantages:
     - Does not protect against inflation
     - Does not control utilization

2. DRG – Pay prenegotiated amount per diagnosis
   - Advantages:
     - Hospital has incentive to manage costs
     - Hospital needs to manage LOS and intensity of services
   - Disadvantages:
     - Number of admissions are not limited; the patient could be discharged and readmitted.
     - "Code creep" – Hospital changes the classification of illness to get a higher reimbursement
3. Case Rate – Flat prenegotiated rate based on the type of service
   - Advantages:
     - Hospital has incentive to manage costs
   - Disadvantage:
     - Hospital is not at risk for managing the number of services.
4. Per Diem – Prenegotiated rate per day
   - Advantages:
     - Gives hospital incentive to manage the cost per day
   - Disadvantage:
     - Hospital has no incentive to manage LOS.
5. Global Rates – per a flat fee for a major episode of care
   - Advantages:
     - Includes all professional, ancillary and facility fees associated with the episode
     - Hospital has incentive to manage costs
   - Disadvantage:
     - Typically restricted to high cost, catastrophic types of care

(d) Recommend a network for each product from the choices above and explain the considerations and potential shortfalls associated with each recommendation.

**Commentary on Question:**
The expectation on this question was to use the list from part (a)(ii) to discuss the considerations and shortfalls of each network.

Medicaid HMO – Network C
The Medicaid population is usually the urban poor. The providers need to be accessible from public transit and their needs tend to be maternity and behavior health services.

**8.** Continued

Price Conscious PPO – Network B
For a commercial PPO product, the providers should be geographically dispersed and a broad range of services provided. In order to keep cost down, a smaller network should be used so better discounts can be negotiated.

Worker's Comp – Network D
Worker's Comp members are injured and disabled. Rehab and Orthopedic services are required.

(e) Identify additional types of information needed to help you finalize your decision.

In order to make my final recommendation for each network choice, I would also need to know quality measures and member satisfaction for each facility.

## 9. Learning Objectives:

2. Understand and evaluate the effectiveness of the various types of Individual and multi-life coverage typically offered under:
   - Individual health plan
   - LTC (including group and individual)
   - Individual DI plan
   - Medicare Supplement

4. Evaluate the various types of coverages typically offered under a government health plan (e.g., Medicare, Medicaid, Canadian health plan, Social Security Disability Income, states' Temporary Disability Income programs, Workers Compensation, etc.).

**Sources:**
Individual Health Insurance, Chapter 2, The Products, pages 21 to 30

Health Reform in the 21st Century, AAA.

Health Watch, January 2008 - Update on Massachusetts Health Care Financing Review

**Commentary on Question:**
This question was testing the candidate's ability to identify and describe the products and features available to individuals in the current health insurance (medical) market. Also it required the candidate to identify and explain principles of health care reform and apply those principles in evaluating the Massachusetts health care reform.
To receive the maximum points for the question, the candidate needed to:

- Identify all of the products in the individual health insurance market as well as provide 1 or 2 descriptive details, plus identify cost-sharing plan design features with descriptive details.
- Identify principles of health care reform and provide 2 or 3 explanatory details as well as implications for the individual market.
- Identify key features of the Massachusetts health care reform and explain how those features align with the principles of health care reform.
- Candidates generally did well in identifying products in the individual health insurance market and the principles of successful health care market reform. However, candidates generally did not:
  - Identify plan design features and provide descriptive details,
  - Provide implications of health care reform on the individual health market, and
  - Identify and provide detailed descriptions of how the Massachusetts law connects to the principles of health care reform.

**9.** Continued

A common deficiency was to simply comment on whether the Massachusetts reforms are consistent with the principles of health care reform without identifying the specific features and their connection to the principles.

**Solution:**

(a) Describe products and plan design features available in the current individual health insurance market.

Comprehensive Major Medical
- Covers most of medically necessary services

Catastrophic Medical
- High deductible (over $25,000)
- May wrap around another policy

Short Term Medical
- Limited term (< 1 year)
- Pre-existing condition apply for entire term

High Risk Pool Plans
- May be offered by State

Consumer directed Plans
- High deductible with personal spending account
- Medical Savings Accounts
- Health Savings Accounts

Network/PPO products
- Use networks and have a dual set of benefit provisions

Plan Design Features

Deductible
- Can apply to all services or selected categories

Coinsurance
- Applied after deductible

Out of Pocket limits
- Maximum applied to insured's cost sharing

Maximum limits
- Applied annually or lifetime

Internal Limits

Copays
- Usually fixed dollar amount per service

**9.** Continued

(b) Describe basic principles that determine the potential success of health care reform and how they apply to the individual health market.

Must attract a broad cross section of risks
- Adverse selection exists in a voluntary market
- Can mandate coverage
- Use of risk adjustment can encourage insurers to consider all risks

Must have a level playing field
- All plans in a market must operate under the same rules
- Premiums must be actuarially sound

Health care inflation must be reduced
- Needed for long-term viability
- Alignment of incentives for providers in order to maximize quality and value

Implications for individual market
- Individual market is susceptible to adverse selection so reform must address
- Reform proposes rewarding quality rather than quantity in order to control costs
- Reform proposes to include risk adjustment mechanisms

(c) Determine whether the health care financing reforms implemented in Massachusetts are consistent with these principles. Justify your response.

Massachusetts reform did the following:
- Created new subsidized insurance program
- Introduced insurance market reform
- Established Health Insurance Connector
- Developed new health insurance products

Broad cross-section of risks
- Subsidize people without insurance up to 300% FPL
- Specially designed plans for young adults

Level playing field
- Connector provides marketplace for 42 products
- Small group used to subsidize individual – May lead to unlevel playing field
- May work in MA because individual is < 10% of market

Control spending growth
- Young adult plan would impact costs for older insureds
- Addresses health spending but not cost of health care

## 10. Learning Objectives:

8. Evaluate the process and be able to develop a medical manual rate for both ASO and insured business.

**Learning Outcomes:**

(8i) Construct a rating model to be used for rating individual customers or plan designs.

**Sources:**

SOA 08 Annual Meeting Session 123, Technological Solutions to Pricing Health Coverage

**Commentary on Question:**

Explain the different rating systems that can be used to get a quote and describe what is important to consider when designing a rating system.

**Solution:**

(a) Describe the types of quoting technology available and list the advantages and disadvantages of each.

1. **Free Standing Disk**

   Advantages

   Ability to mass distribute
   Can run on any pc
   No dependencies on main system being "up"

   Disadvantages

   No control over field force
   No feedback on quote activity – Can't determine close ratios
   Potential issues matching initial billing
   Hard to make sure proper rates are quoted
   High expense

2. **Disconnected With Upload to In House System**

   Advantages

   Slightly more control than disk
   Partial capability to review quote activity
   Rates should match
   Update rates with most current changes at connection
   No expense to distribute disk

   Disadvantages

   Dependent on connection to house system

**10.** Continued

**3. Web Based**

Advantages

Control over who quotes and what's quoted
Instant feedback on who, what and when quoted/reporting
Exact match of rates/guarantees most current rates are used

Disadvantages

Dependent on internet connection
Dependent on in house system availability

**4. In House – Controlled Via Telesales or Sales Consultant**

Advantages

Control over who quotes and what's quoted
Instant feedback with addition of why we lost the sale
Guarantees right rates used
Agent quote activity and loss ratio available to sales
Quoting includes flexibility for loads and discounts – Controlled by security access

Disadvantages

Dependent on hours of operation

(b) Describe the considerations to be taken into account when designing a quoting system.

General Function

1. Allow census upload capability
2. Highly edited for fewer mistakes or accuracy
3. Quick response time/real-time
4. Capture quote history for updates and reporting or tracking
5. Flexible delivery method – Fax, email or print
6. Dynamic output generation – PDF, all pages or just rates

System Considerations

1. Small case and individual – Consider underwriting/group size
2. Edits and controls by product, state, county, zip, SIC, case size, etc.
3. Capability to enter loads and discounts – Security controlled by user's role
4. Automated communication between sales and UW
5. Web access to UW status for field
6. Ability to import sold quote for case installation for accuracy

**10.** Continued

Things That Work Well

1. Rates are table driven to market
2. Controlled by business not IT – Facilitating speed
3. Automated tool to test new rates and rate changes
4. Rating system capable of producing composite, step rates or tiered rates (2 to 4 tiers)
5. Renewal at individual case level or block level
   - Small group renewals are block level with factors
   - Large group renewals are experience-rated with census analysis on renewal

## 11. Learning Objectives:

8. Evaluate the process and be able to develop a medical manual rate for both ASO and insured business.

**Sources:**

An Introduction to Predictive Modeling for Disease Management Risk Stratification
Assessing Predictive Modeling Tools for Pricing and Underwriting

GH-D114-07: Actuarial Issues in a FFS/Prepaid Medical Group (Sutton and Sorbo)

**Commentary on Question:**

The question was meant to test the candidate's knowledge of developing capitation rates given the base inputs of an HMO company. There are several ways to arrive at the same answers as shown below, but these shown are the most straightforward. Candidates chose a variety of routes to get to these answers. Also, in (a) candidates were given credit if they trended to other points within the 2nd quarter instead of the one shown below. Candidates had difficulty with part (c). Many did not use the ratios from the indemnity rates to develop the rates but instead used 1, 2 and 3 as the ratios.

**Solution:**

(a) Calculate the HMO capitation rate for contracts renewing in the second quarter of Year 1, using the PMPM costs given above. Show your work.

| | | Year 1 | Year 2 |
|---|---|---|---|
| Total Allowed Charges | 8% Trend | $265.00 | $286.20 |
| Value of Copayments | 0% Trend | -$30.00 | -$30.00 |
| Total Expected Costs | Subtotal | $235.00 | $256.20 |

Gross up expected costs with administrative, tax and profit amounts

| | | |
|---|---|---|
| Admin | 12% | $235.00/(1-17%)=$283.13 |
| Taxes | 0% | |
| Profit | 5% | $256.20/(1-17%)=$308.67 |
| Total | 17% | |

Create capitation rate per member that spans the 2nd, 3rd and 4th quarter of year 1 and the 1st quarter of Year 2.

$(8\times\$283.13+4\times\$308.67)/12=$ **$291.65**

**11.** Continued

(b) Calculate the 4-tier HMO premium rates using the distribution of employees above and results from (a). Show your work.

By definition the capitation rate is the average premium revenue per member.

Conversion Factor to change capitation rate from (a) to a Single Premium =

| | | | |
|---|---|---|---|
| # of Members | $0.45\times1+0.2\times2+0.25\times2.1+0.1\times3.5=$ | $1.725=$ | 1.026786 |
| Adult to Member Ratio | $0.45\times1+0.2\times2.1+0.25\times1.8+0.1\times3.6=$ | $1.680$ | |

| | | |
|---|---|---|
| Single Premium | $\$29.65\times1.0268=$ | **$229.46** |
| Couple Premium | $\$299.46\times2.1=$ | **$628.86** |
| Employee-Child Premium | $\$299.46\times1.8=$ | **$539.03** |
| Family Premium | $\$299.46\times3.6=$ | **$1,078.05** |

(c) Calculate 3-tier HMO premium rates to produce the same revenue per contract determined in (b) using the ratio of indemnity rates. Show your work.

Calculate the Revenue per Contract using the results form (b).
$(\$299.46\times0.45)+(\$628.86\times0.20)+(\$539.03\times0.25)+(\$1,078.05\times0.10)=\$503.09$

Using the given Indemnity Rates, calculate the rate ratios.
$425.0/$425.0 = 1.00
$765.0/$425.0 = 1.80
$1,062.5/$425.0 = 2.50

Using distribution of members in 3-tier rates and revenue per contract, solve for the 3-tier Single Rate.

$$\text{Single Rate}\times45\%+1.8\times\text{Single Rate}\times42\%+2.5\times\text{Single Rate}\times13\%=503.09$$

| | |
|---|---|
| Single Rate = | **$328.60** |
| 2 Person Rate = Single Rate $\times$ 1.8 = $328.60 $\times$ 1.8 = | **$591.48** |
| 3 or More (Family) Rate = Single Rate $\times$ 2.5 = $328.60 $\times$ 2.5 = | **$821.51** |

Check Results
$(\$328.60\times0.45+\$591.48\times0.42+\$821.51\times0.13)=\$503.09$

## 12. Learning Objectives:

1. Understand and evaluate the effectiveness of the various types of Single Employer group coverage typically offered under:
   - Group health plan, including Consumer driven plans, etc.
   - Prescription Drug
   - Group dental plan
   - STD or LTD plan (incl. mention of coverage within other plans)
   - Group life plan
   - Other miscellaneous benefits
   - Multi-employer groups (Taft-Hartley, etc)

9. Applies principles of pricing, benefit design and funding to an underwriting situation

**Learning Outcomes:**

(1a) Describe the various coverages, including typical benefit provisions, eligibility requirements, cost-sharing provisions, limits and funding mechanisms.

(1d) Assess the advantages and disadvantages to a sponsor of offering a given coverage/benefit.

(9b) Evaluates the criteria for classifying risks.

(9c) Recommends strategies for minimizing or properly pricing for risks.

**Sources:**

Group Insurance, Chapter 8 – Dental Benefits in the United States

Canadian Handbook of Flexible Benefits, Chapter 16 – Adverse Selection

**Solution:**

(a) Explain the types of delivery systems for dental plans including key differences.

<u>Types of dental delivery systems</u>

- Indemnity plans
  - Scheduled - Cover services up to a maximum per procedure
    - All dentists eligible to provide care
    - Patient may be balance billed
  - Usual Customary and Reasonable (UCR) plans
    - Typical fee for service plans
    - Services covered to UCR limit subject to deductibles, coinsurance, maximums

**12.** Continued

- PPO plans
  - Managed Indemnity Plans
    - Plan design same in vs. out of network
    - Only difference is lower out of pocket expenses for in network
  - Discounted fee for service (FFS) plans
    - In network provider payment discounts are larger
    - Member incentives to seek care in network through better benefit coverage in network
  - Fee schedule plans
    - Same as discounted FFS except in network dentists reimbursed at a fee schedule
  - Discount card plans
    - Not insurance
    - Member receives discounts on services from in network providers
  - Exclusive provider organization (EPO) plans
    - In network benefits covered only
    - More steerage, better discounts in contracting
  - Point of service plans (POS)
    - Hybrid of indemnity, PPO and DHMO concepts
    - Patient picks by choosing a dentist (once a year)
    - Different levels of benefit
- DHMO Plans
  - Independent provider association (IPA) plans
    - Panels constructed from dentists who accept capitation reimbursement
    - Specialists for referrals compensated on a discounted fee for service basis
  - Staff model DHMO plans
    - Organization employs own dentists

Key Differences

- Premium: DHMO cheapest, then PPO, Indemnity most expensive
- Patient Access: Indemnity offers most, DHMO has most restrictions
- Benefit Richness: DHMO plans have lowest out of pocket for same services covered by PPO and indemnity plans
- Cost Management: DHMO typically has best programs through provider credentialing and cost effective payment techniques
- Utilization: Indemnity and PPO plans tend to overuse services because of provider FFS reimbursements, DHMO accused of under using services due to predetermination and claim review programs
- Quality Assurance: HMOs and PPOs offer most assurance of quality care with provider screening process
- Fraud Potential: HMO minimizes the most with capitation payment arrangements

**12.** Continued

(b) Develop talking points to illustrate current and expected future market trends in dental insurance.

Current trends

- High medical cost increases put pressure on dental plans to offer low cost dental plans to employers. Employees' contribution percentage growing.

Future trends

- Voluntary plans expected to grow in popularity.
- Consumer driven tools becoming more popular.
  - Use of treatment cost estimators for members to estimate out of pocket costs and compare fees of providers.
  - Defined contribution plans offer opportunities to manage member costs through flexible spending accounts, medical reimbursement accounts and health reimbursement arrangements. Employees can buy a core benefit or buy up additional coverage with their own money.
- More online self service to employees and employers to access data about providers and claims payment information.
- Shortages of dentists will put pressure on building and maintaining networks.

(c) Discuss underwriting and product provisions typically found in dental plans to limit costs and control anti-selection.

Underwriting Provisions:

- Eligibility: Offered to active employees and dependents, retirees sometimes covered.
- Participation: Generally higher (75%) participation requirements required. Sometimes combine dental with medical. Voluntary plans may have a lower (25%) requirement
- Employer Contributions: Helps to meet participation standard. Discounts may be offered if employer pays all.
- Packaging with other coverage (such as medical) reduces chances of anti-selection.
- Demographics: Age, gender— Similar slopes as medical; costs increase with age, but not as much.
- Group Size: Generally larger groups have lower risk. Minimum size (5) generally required.

**12.** Continued

Product Provisions:

- Exclusions: Exclude services that are elective, non essential (cosmetic) or covered by other plans.
- Pre existing Limitations: Do not cover charges incurred before person insured. Most common is a missing tooth.
- Waiting and Deferral Periods: New employees become eligible after X months from date of hire. May also contain limit on certain Type II or Type III services. These are important due to highly elective nature of benefits and tendency for persons to postpone treatment.
- Incentive Coinsurance: For plans with little prior coverage, phase in coverage (coinsurance %) for Type II and Type III services each year until full coverage.
- Transfer Business: Groups with prior coverage limit payment for services under prior plan to lesser of prior plan payment and new plan benefit less any payments made by prior plan.
- Benefits After Insurance Ends: Limit the set of extended benefits after coverage ends.

(d) Calculate:

(i) The DHMO Net/Allowed claims cost ratio needed to produce the same net claim costs as the indemnity plan and comment on the DHMO plan richness compared to the indemnity plan.

To find net and allowed claims for indemnity plan:

2009 Indemnity net claims = \$239.85 = (\$0×40% + \$175×35% + \$1125×8%) (Using continuance table) or \$19.99 PMPM (\$239.25÷12)

2009 Indemnity allowed =\$31.26 = \$28.92 × 1.05 × 1.03 (after trending 2008 for utilization (5%) and unit cost (3%))

2009 DHMO net claims = 19.99 PMPM (same as indemnity – assumed from question)

To find 2009 DHMO allowed claims, must find unit cost for Type I and II services

Formula: Unit Cost x Utilization ÷ 12000 = PMPM Cost
Or Unit Cost = PMPM cost × 12000 ÷ Utilization

Type I unit cost = \$80 = \$15 × 12000 ÷ 2250
Type II unit cost = \$256.62 = \$13.90 × 12000 ÷ 650

**12.** Continued

2009 DHMO Allowed PMPM for Type I and II = DHMO Utilization × DHMO Unit Cost÷12000

Type I = \$15.41 = 2250 × 1.03 × \$80 × 1.05 × .95 ÷ 12000 after trending utilization (3%), actual cost (5%) and adjusting for DHMO Type 1 discount from UCR (5%)

Type II = \$13.41 = 650 × 1.01 × \$256.62 × 1.05 × .91 ÷ 12000 after trending for net utilization (1% = 3% trend – 2% utilization mgt savings), actual cost (5%) and adjusting for DHMO Type 1 discount from UCR (9%)

Total allowed = Type I PMPM + Type II PMPM = \$15.41 + \$13.41 =\$ 28.82

DHMO Net to Allowed Ratio = .69 = \$19.99 ÷ \$28.82

Indemnity Net to Allowed = .64 = \$19.99 ÷ \$31.26

Higher Net to allowed ratio for DHMO plan suggests that benefits are richer as DHMO covers about 5% more of relative costs.

(ii) Calculate: Additional claim reductions needed in 2011 to meet the goal of having a DMHO premium equal to 95% of the indemnity premium.

Comment: Expected premium for Indemnity in 2011— Trend allowed indemnity claims to 2011 and use net to allowed ratio calculated in (i) to get net claims. (Note: this will work since plan benefit is only coinsurance and there would be no deductible leveraging and same net allowed ratio will continue to apply). Calculate indemnity premium from net claims.

Type I 2011 DHMO PMPM Allowed = \$17.52 = $2250 \times (1.03)^3 \times \$80 \times (1.04)^3 \times .95 / 12000$ after trending for future utilization (3%) and cost (4%) and applying additional UCR discount (5%)

Type II 2011 DHMO PMPM Allowed = \$15.25 = $650 \times (1.03)^2 \times 1.01 \times \$256.62 \times (1.04)^3 \times .91 / 12000$ after trending for future utilization (3%), utilization management savings (-2% for one year) and cost (4%) and applying additional UCR discount 95%).

Total DHMO Allowed = \$32.77 = \$17.52 + \$15.25
2011 Indemnity Allowed PMPM Claims = \$35.87 = $\$31.26 \times (1.04)^2 \times (1.03)^2$ after taking 2009 Allowed of \$31.26 calculated in (i) and trending it 2 years for future cost (4%) and utilization (3%)

**12.** Continued

2011 Indemnity Net PMPM Claims = $22.96 = $35.87 × .64 = Allowed × Net / Allowed Ratio

2011 Indemnity Premium = $31.14 = ($22.96 + $6) / (1- 5% - 2%) after adding expenses to net PMPM claims

2011 DHMO Premium = $29.58 = $31.14 × .95 since question requires DHMO premium to be 5% less than indemnity premium

Net Claims needed to produce this DHMO premium = $20.81 = $29.58 × (1- 4% - 2%) - $7 after solving for net claims when given gross premium and expenses

Comment: Calculate Net expected DHMO Claims (under status quo scenario) when trending 2009 costs. Get this from trending DHMO allowed claims and determine net by applying net/allowed ratio.

2011 DHMO Net Claims = $22.61 = $32.77 × .69 (Allowed × Net/Allowed ratio determined from (i)

Compare net claims needed to make premium equal to 95% of indemnity ($20.81) to status quo scenario net claims ($22.61). Additional savings of 8% = 1 – (20.81 / 22.61) is needed to make this happen.

(iii) Calculate: The 2011 loss ratio for the indemnity and DHMO products assuming the DHMO claim goal from (ii) is met

From (ii) above

2011 Indemnity Net Claims = $ 22.96
2011 Indemnity Net Premium = $31.14

Therefore 2011 Indemnity Loss Ratio = 73.7% (net claims / premium) = $22.96 /$ 31.14

If goal is met (from (ii))

2011 DHMO Net claims = $20.81
2011 DHMO Premium = $29.58
And 2011 DHMO Loss Ratio = 70.3% = $20.81 / $29.58

## 13. Learning Objectives:

3. Evaluates employer strategies for designing and funding benefit plans for:
   (i) Active employees
   (ii) Dependents
   (iii) Pre-65 retirees
   (iv) Post-65 retirees
   (v) Disabled (short and long-term)

8. Evaluate the process and be able to develop a medical manual rate for both ASO and insured business.

**Learning Outcomes:**

(3a) Describe typical strategies used by employers to fund and design benefit plans, including contribution strategies.

(8c) Develop experience analysis (claims cost and expenses)
   (i) Construct the appropriate models
   (ii) Develop the appropriate assumption, including trend, anti-selection, etc.

**Sources:**

Fundamentals of Retiree Group Benefits, Yamamoto Ch. 4 (Retiree Benefit Design) and Ch. 5 (Funding)

Actuarial Issues in Fee-For-Service/Prepaid Medical Group, Sutton & Sorbo.

**Solution:**

(a) Explain the advantages and disadvantages to NRG of maintaining its retiree benefit program.

**Commentary on Question:**

It appeared some candidates misread the question and provided an explanation of the advantages and disadvantages of prefunding benefits.

Advantages:

- Tax free benefits
- Benefits are valuable for those currently receiving coverage or near retirement
- Benefits can support workforce planning and growth opportunities
- Providing benefits is viewed as a social responsibility of the employer
- Helps provide a competitive package of total compensation

Disadvantages:

- Not receiving full "credit" because of the hidden costs of their subsidies to the plans
- Not valuable to those not near retirement

**13.** Continued

- Long term careers with a single employer is vanishing
- Sense of social responsibility is quickly evaporating
- Competition is more global and these competitors are not offering retiree benefits

(b) Describe ideal funding vehicle characteristics.

**Commentary on Question:**
Students did generally well on this part, although some students only commented on part of the descriptions. For example, better candidate responses included "Assets revocable if the obligation to the plan changes" instead of simply "Assets revocable."

- Current company tax deduction
- Tax free/deferred savings for employees
- Tax sheltered investment earnings
- Tax free benefits to retirees
- No impact on plan design provisions
- Funds count as an asset under FAS 106
- Assets revocable if the obligation to the plan changes

(c) Describe the possible funding vehicles that NRG could use and the main advantages and disadvantages of each.

**Commentary on Question:**
A fair number of students listed a chart from the reading that only gave a + (advantages) or a – (disadvantages) instead of actually describing the advantages and disadvantages. Students should note that point value here and the verb "describe" warrant a response that is sufficiently detailed (see below). Responses that listed only the various funding vehicles did not receive very many points.

*Welfare benefit funds*

- e.g. IRC 501(c)( 9) trusts (VEBAs) and insurance company continuance funds

<u>Advantages:</u>

- A current federal income tax deduction is allowed, up to the DEFRA limits
- Contributions made in excess of the DEFRA limitation may be carried forward to future years
- No restrictions on the tax carry-forwards
- Excess contributions may eventually be taken as a tax deduction
- Benefits not taxable

**13.** Continued

Disadvantages:
- Investment income may be taxable
- DEFRA limitations prevent "full accrual" of liabilities on a tax-deductible basis
- Subject to nondiscrimination requirements

*Qualified retirement plan (IRC 401(h) account)*
- Allows plan sponsors to fund certain retiree health benefits in the same trust fund as a pension plan

Advantages:
- Higher tax-deductible contribution relative to other vehicles
- Tax free investment income
- Tax-free benefits
- Considered a FAS 106 asset

Disadvantages:
- Not utilized much => may lead to higher IRS scrutiny
- Nondiscrimination requirements not well-defined

*Profit sharing plan "incidental" account*
- Mechanism by which experts have interpreted a 1961 IRS revenue ruling to use profit sharing plans to provide "incidental life or accident or health insurance"

Advantages:
- Easy to communicate and sell to employees
- Employer contributions are tax deductible

Disadvantages:
- Few companies have adopted these
- 25% incidental limit restricts "full accrual" of costs

*Employee-purchased group annuities*
- Employee uses after-tax pay to buy an annuity and use funds for cash (taxable) or medical expenses (non-taxable)

Advantages:
- Tax sheltered/deferred investment income
- Tax free benefits
- Discrimination requirements avoided since product is insured

**13.** Continued

Disadvantages:
- Legal uncertainty of the advantages

*Money purchase plans*
- Considered a qualified pension plan, where it is allowable to use for retiree health care

Advantages:
- Tax deductible contributions
- Tax free investment earnings
- Considered a FAS 106 asset

Disadvantages:
- Many accounts have to be created (instead of pooling them)

*Supplemental pension and/or retirement accounts*
- e.g. 401(k)

Advantages:
- Tax deductible employer contributions
- Tax free investment income

Disadvantages:
- Creates another set of vested retiree benefits

*Health savings accounts*
- Employee may participate if they have HDHP

Advantages:
- Tax deductible contributions
- Tax-sheltered earnings
- Tax free distributions (for medical expenses only)

Disadvantages:
- Few individuals are able to save enough money

**13.** Continued

(d) Calculate the PMPM cost savings that NRG is projected to realize by making the proposed benefit changes. Show your work.

**Commentary on Question:**
Some would get the right answer, but not show enough work. Students need to show formulas and substitute actual numbers to get full credit for calculation questions such as these. Common mistakes includes application of the wrong (or no) utilization trend when calculating the PMPM cost savings.

| | | | Rating Year Util = Base Year Util * Trend Factor | Benefit Cost = Cost * New Util/12,000 | | | |
|---|---|---|---|---|---|---|---|
| Services | Base Year Util | Trend Factor | Rating Year Util | Cost Per Unit | 2010 PMPM | Cost Per Unit | Rating Period Benefit Cost |
| IP | 1,800 | 1.05 | 1,800*1.05 = 1,890 | 200 | 1,890*200/12000 =$31.50 | 250 | 1,890*250/12000 =$39.38 |
| OP | 3,200 | 1.05 | 3,360 | 75 | $21.00 | 100 | $28.00 |
| Lab | 300 | 1.05 | 315 | 50 | $1.31 | 50 | $1.31 |
| Rx | 24,000 | 1.09 | 26,160 | 25 | $54.50 | 30 | $65.40 |
| | | | | Total = | $108.31 | Total = | $134.09 |

PMPM Impact of Benefit Changes = Rating Period PMPM – 2010 PMPM

**= $25.78**

(e) Describe additional strategies NRG can consider to reduce the cost of its retiree benefit program.

**Commentary on Question:**
Students did well on this part of the question. Responses which received the most points provided relevant detail to at least some of the recommended strategies.

- Implement large case management (avoided large claims leads to savings)
- Implement utilization review to evaluate appropriateness of treatment before it is provided
- Educate retirees on Medicare balanced billing limits
- Establish R&C limits to limit payments to a percentile of costs
- Implement spousal initiatives to encourage spouses to elect other coverage
- Incorporate more dynamic plan provisions
- Introduce enhanced quality initiatives (e.g. Centers of Excellence)
- Implement consumer awareness initiatives (e.g. decision making tools)
- Also, consider:
  - Redefining eligibility (e.g. 55 + 10)
  - Introducing service-related benefits (e.g. cost sharing that varies by year of service)
  - Adjusting retiree contributions based on age at retirement
  - Having a fixed employer subsidy

## 14. Learning Objectives:

7. Understand predictive modeling techniques.

**Learning Outcomes:**

(7a) Describe how predictive modeling techniques are used in underwriting, pricing and claims management.

(7b) Describe typical predictive modeling techniques.

(7c) Evaluate the advantages and disadvantages of each technique.

**Sources:**

Assessing Predictive Modeling Tools for Pricing and Underwriting, Health Watch, Jan, 2006

Predictive Modeling Applications, RSA 31, #2, session 3PD

Predictive Modeling: Considerations for Care Management Applications, Health Section News, 4/2004

GH-D111-07: Predictive Modeling and Finding and Intervening with the High-Cost Healthcare Consumer, Haelan Group Whitepaper

**Solution:**

(a) List reasons why you would install a predictive model tool.

Is the data necessary for input easily available and timely?
Does the model make sense when compared with the underwriting experience?
Are the R-squared results relative to other underwriting methods?
Are large claims truncated?
Are groups in analysis similar to real customers?
Can you evaluate the impact on business metrics (close ratio, profit margin, etc.)?
How does the model use credibility?
How does the model use traditional rating factors without double counting these?
How does the model handle new members or members with no claim history?
How does the model account for incomplete incurred claims?
How does the model account for the lag between the experience claim period and the underwriting year?
Does the model predict well for low and high cost members and low and high cost risk groups?
Does the model produce a credible risk score that can be inexpensively applied?
Does the model reflect real cost differences from area contracting and treatment patterns?
Does the model integrate with the current underwriting processes?
Will the model reduce administrative costs and by how much?
How explainable are rate impacts to the sales force?

**14.** Continued

How will regulatory limits be applied?
Can you use the model across products and benefit designs?
Can the model be linked with current systems?
Is the software compatible with your IT environment?
Implementation time?
Can you see inside the model or is it a black box?
Does the model reduce variation in performance between underwriters?

(b) Develop questions to evaluate the vendor's capabilities related to your underwriting process, risk evaluation and case management identification.

How does the model use historical data to predict the future?
How does the model improve pricing accuracy leading to higher earnings?
How does the model improve underwriting accuracy?
How does the model identify members for case management prior to having a high cost incident?
How does the model risk stratify members to efficiently allocate resources?
How does the model focus patient counseling and education efforts and identify members most likely to benefit from case management?
How does the model improve the health of members?
Can the model separate those members whose high costs are driven by chronic conditions versus random elements?
Can the model be a low cost tool?
Can the model be more intuitive than some common rating factors like SIC Codes?
Can the model find specific people who want and need intervention?
Can the model target healthcare delivery?
Can the model automate the renewal process?
Can the model level the playing field?
Can the model identify fraud?

## 15. Learning Objectives:

4. Evaluate the various types of coverages typically offered under a government health plan (e.g., Medicare, Medicaid, Canadian health plan, Social Security Disability Income, states' Temporary Disability Income programs, Workers Compensation, etc.).

6. Apply U.S. and Canadian taxation rules to employer and individual health plan.

9. Applies principles of pricing, benefit design and funding to an underwriting situation

**Learning Outcomes:**

(4a) Describe the various coverages, including typical qualifications for benefits, coverage eligibility, cost-sharing provisions, limits, taxation and funding mechanisms.

(6a) Recommend strategy for legally minimizing taxes for both employer and employee.

(6b) Describe key provisions of major regulation.

(6c) Assess pricing impact of taxation on employer, employee or policy holder.

(9c) Recommends strategies for minimizing or properly pricing for risks

**Sources:**

Group Insurance, Chapter 7 – Health Benefits in Canada

Canadian Handbook of Flexible Benefits,

- Chapter 4 – Plan Structure and Eligibility
- Chapter 12 – Taxation of Flexible Benefits
- Chapter 16 – Adverse Selection

**Solution:**

(a) Outline the principles of the Canada Health Act and services generally covered by provincial Medicare plans in Canada.

**Commentary on Question:**

Candidates performed well on this portion of the question. Many, however, did not offer any details for the principles of the Canada Health Act. Some students failed to address the second part of the question.

Principles of the Canada Health Act:

- Comprehensiveness
  - All medically required hospital and physician services must be covered

**15.** Continued

- Universality
  - All residents must be entitled to benefits on uniform terms and conditions
- Accessibility
  - Reasonable access to services and not impeded by charges
- Portability
  - Coverage must be maintained when moving between provinces or temporarily out of province
- Public administration
  - Operated on a non-profit basis by public authority

Services generally covered include:

- Hospital services
  - Public ward room and board
- Physician services
- Prescription drugs
  - Cover social assistance recipients or those over age 65 in most provinces
- Prostheses
- Lab tests
- X-rays
- Dental care for children or medically required
- Out of province coverage at rates consistent with coverage in home province

(b) Describe total compensation flex plans and explain the advantages and disadvantages of these types of plans.

**Commentary on Question:**
Many candidates offered a valid description of total compensation flex plans. Most, however, failed to offer valid advantages and disadvantages specific to these types of plans.

Total compensation flex plans are a total compensation package in which benefits and salary are interchangeable. The employee chooses what portion to take as pay and benefits.

Advantages:

- Maximize tax effectiveness
- Gives employees flexibility in choosing benefits
- Employer is better able to manage benefit cost increases
- Employee sees total value of all compensation and benefits
- Design benefits that reflect organizational values and goals

**15.** Continued

Disadvantages:

- Administratively difficult
- Canada tax rules restrict reducing salary in order to enhance benefits
- Potential anti-selection
- Careful design planning required

(c) In relation to taxation:

**Commentary on Question:**
Most students did a good job of explaining benefit and premium taxation in part (i). Students did not seem to understand what was being asked in part (ii) of the question.

(i) For each benefit offered under the new flex plan, describe the tax treatment of the premiums paid and the benefits payable from the employees' view.

| | **Taxation of** | |
|---|---|---|
| **Benefit** | **Premium** | **Benefits** |
| Life Insurance | Employer paid - Taxable | Non-taxable - Depending on the structure the benefit may not equal the price tag |
| AD&D | Non-taxable (except in Quebec) | Non-taxable |
| Medical | Non-taxable (except in Quebec) | Non-taxable for qualified benefits under the Income Tax Act |
| Dental | Non-taxable (except in Quebec) | Non-taxable for qualified benefits under the Income Tax Act |
| Disability | Benefits are non-taxable if employee covers full cost of the benefit. Benefits are taxable if employer covers any portion of the cost, premiums are non-taxable. | |
| HAS | May be provided on a non-taxable basis if certain guidelines are followed (except in Quebec) for qualified benefits under the Income Tax Act. | |

(ii) Describe principles that need to be considered in setting up the new flex plan structure tax effectively.

- Consider sources of funds
- Benefits will be taxed as if they were offered in a traditional benefit program
- Benefit elections must be made prospectively before the start of the plan year; these benefit elections are irrevocable unless a major life event occurs (e.g., birth or death of a dependent)

**15.** Continued

(d) Define anti-selection and describe how the cost of anti-selection can be taken into account in the pricing of the new flex plan.

**Commentary on Question:**
Candidates performed well on this part of the question. Many candidates addressed how to manage anti-selection in general, instead of offering specific ways to account for it in pricing.

Anti-selection is the result of a member having advanced knowledge of a potential claim and choosing benefits that are financially in his/her best interest.

The cost of anti-selection can be taken into account by:

- Loading the prices for the lesser-valued options so that more employees will remain in the current rich plan;
- Loading the highest valued option to drive employees to the lesser-valued options;
- Spread the cost of anti-selection equally over all options;
- Leaving pricing unchanged the first year.

(e) Recommend a set of price tags for the proposed medical plan and justify your recommendation. Show your work.

**Commentary on Question:**
Many candidates made an assumption that the weighted average cost of all options for the proposed flex plan needed to equal the $120 cost of the current medical plan offering. This was not stated as a requirement for HABS' future flex plan.

In order to get full credit, candidates were required to provide an explicit recommendation with a reasonable justification, as indicated in the statement of the question.

**Example:**
I recommend spreading the cost of anti-selection across all options. This will maintain the relativity of costs and minimize membership migration between the options.

| Option | Actuarial value | Anticipated new cost |
|---|---|---|
| A | 78 (120 × .65) | 80.34 (120 × .65 × 1.03) |
| B | 126 (120 × 1.05) | 129.78 (120 × 1.05 × 1.03) |
| C | 150 (120 × 1.25) | 154.50 (120 × 1.25 × 1.03) |
| Weighted average | | 118.65 |

## 16. Learning Objectives:

9. Applies principles of pricing, benefit design and funding to an underwriting situation.

**Sources:**
Individual Health Insurance, Chapter 4, Managing Anti-Selection

2009 Annual Meeting, Section 82, Managing Anti-selection and Optimal Pricing of Individual Medical and Small Group Insurance

**Commentary on Question:**
Question was designed to test ability of candidates to define various types of anti-selection, calculate lapse rates and profits for different rate increases for different blocks of business, recommend rate increases that maximized profits, and describe implications and characteristics of sustainable blocks.
Comments about each part are included below.

**Solution:**
(a) Define the following types of selection and their impact on claim experience:

**Commentary on Question:**
Most students were able to correctly define various types of anti-selection, but fewer students went on to describe their impact on claim experience.

(i) External anti-selection

Potential insured knows more about own health when applying for insurance. Potential insured who anticipates poor health is more likely to seek insurance. Insurer who accepts more policyholders in poor health has worse claims experience. This can be controlled with underwriting.

(ii) Internal anti-selection

After getting insurance, insureds will select benefits with highest value to them. Higher risk insureds are more likely to select higher deductible plans and vice versa. This premium leakage from benefit buydowns causes higher loss ratios to increase because the reduction in claims is smaller than the corresponding reduction in premium.

**16.** Continued

(iii) Durational anti-selection

Healthy insureds lapse more than sicker insureds. Over time, insurer will have higher percentage of sicker insureds. This is cumulative anti-selection and leads to increased claims experience over time. Size of anti-selection goes up with size of rate increase.

(b) Determine the aggregate lapse rate and profits for different rate increases of 25% and 50% for each block. Show your work.

**Commentary on Question:**
Most students did very well here and received full credit. It was not necessary to show all of the below calculations since students earned the vast majority of points by showing the lapse rates and profits for each block under each premium increase. However, when students showed their work it was easier to give partial credit if a math mistake was made. Some students did not split out lapse rates and profits for each block and minor points were deducted if this was the case. Most students presented their calculations in a table format to save time, which was a great approach.

Premium after 25% increase: $500 \times 1.25 = 750$.
Premium after 50% increase: $500 \times 1.50 = 900$.

With 25% increase, no cells lapse.
With 50% increase, 1a (100) lapse and 2a (50) lapse.

Policy count for block 1, 25% increase = 100 + 50 + 10 = 160
Policy count for block 1, 50% increase = 50 + 50 + 50 = 150

Policy count for block 2, 25% increase = 0 + 50 + 10 = 60
Policy count for block 2, 50% increase = 0 + 50 + 50 = 100

Lapse rate with 25% increase for block 1 is $0 \div 160 = 0\%$.
Lapse rate with 25% increase for block 2 is $0 \div 150 = 0\%$.

Lapse rate with 50% increase for block 1 is $100 \div 160 = 62.5\%$.
Lapse rate with 50% increase for block 2 is $50 \div 150 = 33.3\%$.

Premium with 25% increase for block 1 is $160 \times 750 = 120{,}000$
Premium with 25% increase for block 2 is $150 \times 750 = 112{,}500$

Premium with 50% increase for block 1 is $60 \times 900 = 54{,}000$
Premium with 50% increase for block 2 is $100 \times 900 = 90{,}000$

**16.** Continued

Claims with 25% increase for block 1 is 100×500 + 50×750 + 10×1,000 = 97,500
Claims with 25% increase for block 2 is 50×500 + 50×750 + 50×1,000 = 112,500

Claims with 50% increase for block 1 is 0×500 + 50×750 + 10×1,000 = 47,500
Claims with 50% increase for block 2 is 0×500 + 50×750 + 50×1,000 = 87,500

Profit with 25% increase for block 1 is 120,000 - 97,500 = 22,500
Profit with 25% increase for block 2 is 112,500 - 112,500 = 0

Profit with 50% increase for block 1 is 54,000 - 47,500 = 6,500
Profit with 50% increase for block 2 is 90,000 - 87,500 = 2,500

(c) Recommend rate increases that maximize profits separately for blocks 1 and 2. Justify your answer.

**Commentary on Question:**
Students for the most part did a good job determining the correct rate increase that maximized profits. However, most students did not fully justify their answers.

Recommend 25% rate increase for block 1 and 50% rate increase for block 2 to maximize profits, as shown in part (b).

Rate increases when lapse occurs is:
For 1a and 2a: 750 ÷ 600 = 25%
For 1b and 2b: 1125 ÷ 600 = 88%
For 1c and 2c: 1500 ÷ 600 = 150%

There is no lapse if rate increase is less than 25%, but 1a and 2a lapse when rate increase is 25%. There is no lapse above 25% for remaining cells because increase is limited to 50%.

If premiums are increased 25%, premium revenue increases and there are no lapses. Therefore, premiums should be increased by at least 25%.
If premiums are increased by more than 25%, the lapses are the same all the way up to a premium increase of 50%. That means that such premium increases bring additional revenue, but they don't change costs. Therefore, we don't need to test premium increases between 25% and 50%.

Based on the calculations from part (b), max profit for block 1 is with a rate increase of 25% and for block 2 is with a rate increase of 50%.

**16.** Continued

(d) Describe characteristics of a sustainable block and the implications of sustainable blocks for the IM market.

**Commentary on Question:**
Most students did not do very well here. Relatively few students described the characteristics, and even fewer mentioned the implications.

Characteristics:

- High proportion of healthy lives
- Profit is maximized when premium increase makes premium equal to market price
- Price-induced lapse rate is zero when rate increase is optimal

Implications: To maximize profit, insurer should limit premium rate increase to market price trend which minimizes the lapse rate. This creates a stable block which is good for insurer and insureds.

## 17. Learning Objectives:

9. Applies principles of pricing, benefit design and funding to an underwriting situation.

**Learning Outcomes:**

(9a) Understand the risks and opportunities associated with a given coverage, eligibility requirement or funding mechanism

(9b) Evaluates the criteria for classifying risks.

(9c) Recommends strategies for minimizing or properly pricing for risks.

**Sources:**

Group Insurance, Chapter 21 - Small Group Rate Filings and Certifications

Group Insurance, Chapter 25 - Underwriting Small Groups

Ross Winkelman, "Optimal Small Group Renewal Methods."

**Commentary on Question:**

These learning outcomes must not have been covered in the packaged study materials because most candidates simply provided lists that were not germane to the question.

**Solution:**

Examples of issues cited by actuarial staff:

- Regulations for small groups are strict and may not lead to a useful application of risk adjusters
- Cannot deny coverage for high risk or pre-existing conditions
- There are limits on allowable case characteristics (age/sex/family/geography)
- Rates limited by industry (15% high/low) group size
- Rate increases limited too – 15% for inflation, change in characteristics or new business
- Rate approval needed, may be difficult to obtain, state may not even approve
- Must weigh costs and time associated with updating internal systems, developing risk scores or picking a vendor
- Determine what marginal improvement is compared to existing underwriting
- Risk adjustment needs to be compared with competition's quoting system, they may not use their risk adjustment for quotes
- Accuracy of risk adjustment depending on group size, within group size, improvement is marginal

## 18. Learning Objectives:

1. Understand and evaluate the effectiveness of the various types of Single Employer group coverage typically offered under:
   - Group health plan, including Consumer driven plans, etc.
   - Prescription Drug
   - Group dental plan
   - STD or LTD plan (incl. mention of coverage within other plans)
   - Group life plan
   - Other miscellaneous benefits
   - Multi-employer groups (Taft-Hartley, etc)

**Learning Outcomes:**

(1a) Describe the various coverages, including typical benefit provisions, eligibility requirements, cost-sharing provisions, limits and funding mechanisms.

(1c) Identify which participants would find each coverage a valued benefit and why.

(1d) Assess the advantages and disadvantages to a sponsor of offering a given coverage/benefit.

(1g) Assess the advantages and disadvantages to a participant of offering a given coverage/benefit.

**Sources:**

2009 Annual Meeting, Session 51, Value-Based Insurance Design

**Solution:**

(a) Describe similarities and differences between a value based approach and VBID.

**Commentary on Question:**

- Most candidates successfully listed the common aspects of VBID and Value Based Approach and key aspects of VBID.
- Few candidates drew a clear contrast between the two.
- Several candidates compared VBID to a traditional insurance design, which wasn't the question asked.

<u>Common Elements</u>

- Both consider cost and value of a service and attempt to maximize value for a given cost
- Both agree that preventive and routine care is less expensive

**18.** Continued

Value Based Approach
- Applies to all members equally

VBID
- Applies to chronically ill only
- Cost sharing is reduced for high valued services for those who will benefit the most
- Simple (target specific service) or complex (target specific group)

(b) Explain how the company could implement VBID into their existing plan and the expected result.

**Commentary on Question:**
Most candidates successfully described a practical example of VBID and some of the expected results.

Example: Add a Tier 0 with $0 copay and 0% employee cost for high value drugs (or similar)

Expected Results
- Expect more utilization of high valued services
- Improved compliance / adherence
- Lower overall costs due to use of high value service
- Improved "health" of individuals with targeted "disease"

(c) Prepare a business case that outlines the cost and benefits associated with moving to a disease-specific VBID approach.

**Commentary on Question:**
- Most candidates identified the major costs and benefits.
- Few candidates discussed the appropriate threshold or criteria for actually implementing the program.

Costs
- Increased utilization of targeted services
- Increased cost per unit of targeted services
- Administrative costs
  - Depends on the complexity of the system

**18.** Continued

Offsets to costs

- Lower long term costs of targeted disease
- Reduction in medical costs due to unnecessary care
- Increased employee health and productivity
- Decreased absenteeism
- Decreased disability costs

Overall Results

Breakeven threshold is at the upper end of effectiveness.
Picture improves if you factor in societal benefits.