

DP-GH Complete Illustrative Solutions

November 2008

1.

Learning Objectives:

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

Solution:

(a)

Carrier

$$\frac{\text{claims}}{\left(\frac{1 - \text{admin}}{\text{commission} - \text{profit}} \right)} \times \text{demo factor}$$

$$1 \frac{200}{(1 - 0.13 - 0.04 - 0.015)} \times (1.1) = 223.09$$

$$2 \frac{180}{(1 - 0.13 - 0.03 - 0.15)} \times (1.1) = 222.63$$

$$3 \frac{220}{(1 - 0.12 - 0.02 - 0.015)} \times (1.1) = 208.28$$

Blend 3 carriers, adjust for high risk pool demo = 1.3

$$\frac{1}{3} \times (223.09 + 222.63 + 208.28) \times 1.3 = 283.40$$

Multiply by 150%: $283.40 \times 1.5 = \$425.10$

1. continued

(b)

- HIPPA eligible people must meet these requirements:
 - Didn't lose coverage due to fraud or not paying premium
 - Most recent coverage is group coverage
 - Not eligible for Medicare
 - COBRA exhausted
 - Not eligible for other group coverage
 - Credible prior coverage of at least 18 months with no breaks more than 63 days
 - Doesn't currently have insurance coverage
 - Continuation of coverage for these people is mandatory
 - High risk pool could be used to cover these people

(c)

Funding options for pool

- Insurance company pay premium when put member in pool
- Tax on insurance companies
- State government could subsidize

2.

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 or
 - Individual DI plan
 - Medicare supplement

- 5 – 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.)

- 7 – Apply U.S. and Canadian taxation rules to employer and individual health plan

Solution:

(a)

Simplified Flex

- HSA only
 - HSA on top of traditional plan
- Modular
 - Benefits are grouped together in packages
 - Employees pick among packages
- Health care only
 - Employees direct employer funds within health care choices
- Net contribution pricing
 - Employees provided with net cost of each option
- Advantages
 - Least difficult admin
 - Good as “first step” and/or for smaller companies

Full Flex

- Core + Credits or Cafeteria
 - Employees chose from range of options in several categories
 - Core is minimum level permitted (may be zero)
- Advantages
 - Provide more choice
 - Offer significant tax advantages to employees

2. (a) continued

Financial Security

- Combines full flex with pension or group savings plan
- Allows for exchange between group savings for credits or HSA

Total Compensation

- Consider salary and benefits interchangeable
- Employer provides total comp package and employee determines allocation
- Advantages
 - For those with total comp philosophy

Premium Conversion

- No employer contribution
- Advantages
 - Flex plan is only way for employee contributions to be tax favored

(b)

- Voluntary coverages
 - Allow employees to “top up” their benefits by purchasing additional coverage (e.g. LTD, Life)
- Critical Illness
 - “Living benefit policies” provide a lump sum benefit upon diagnosis of certain specific conditions
- Vision and Hearing Benefits
 - One exam per year is common limitation
 - Corrective devices also typically covered (lenses and frames once per year or two years, hearing devices once per five years and adjustments more frequently)
- Special Risk coverages
 - Travel accident insurance
 - Coverage for accidental death (sometimes injury) while traveling
 - Accidental death and dismemberment
 - Coverage may be extended to dependents
 - Death benefits require death caused by accident and within a certain period of time (e.g., 6 months)
 - Dismemberment benefits require either complete severance of arm or leg or complete and permanent loss of use of arm, leg, sight or hearing; payment typically less than 100% for loss of one member
 - Student medical plans
 - Hospital indemnity plans
- Vacation buying

2. continued

(c)

- Assemble project team
 - Include: HR, corporate, systems, finance, legal, communication, etc.
- Understand current situation
 - Determine employee needs
 - Confirm/Identify human resource strategy
 - Measure competitiveness
- Identify gaps in current program
- Develop preliminary design
 - Data collection including objective setting
 - Develop design
- Develop financial structure
- Analyze implementation effort
- Determine communication needs
- Define administrative requirements
- Explore legal and tax issues
- Management approval
- Test with employees
- Test with insurer
- Implementation of the program
- Enroll employees

3.

Learning Objectives:

- 10 – Evaluate the process and be able to develop a medical manual rate for both ASO and fully-insured business

Solution:

(a)

Rerating

- Collect experience data – incurred claims, earned premium
- Restate experience – adjust to current benefit/rate level
- Project experience to future rating period – adjust for items causing future experience to be different, such as:
 - Change in underlying population not reflected in rating factors
 - Change in duration
 - Change in claims (inflation, utilization, health care delivery, intensity of benefits)
 - Leverage effect due to deductible
 - Other changes (underwriting, administration, plan provisions)
- Compare projected experience to expected result to determine desired rate increase
 - Consider expense, target profit, impact of rate increase on other assumptions
- Regulatory and management consideration
 - Public relations, public policy, competition
 - Loss ratio requirements

(b)

Leveraged trend

Freq	Annual Claims	Member Cost	Plan Cost	Plan Cost × Freq	Inflated Claims	Member Cost	Plan Cost	Plan Cost × Freq
0.4	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
0.2	\$100	\$100	\$0	\$0	\$110	\$110	\$0	\$0
0.1	\$500	\$500	\$0	\$0	\$550	\$510	\$40	\$4
0.1	\$2,000	\$800	\$1,200	\$120	\$2,200	\$840	\$1,360	\$136
0.1	\$5,000	\$1,000	\$4,000	\$400	\$5,500	\$1,000	\$4,500	\$450
0.1	\$17,000	\$1,000	\$16,000	\$1,600	\$18,700	\$1,000	\$17,700	\$1,770
				\$2,120				\$2,360

$$\text{Leveraged Trend} = \frac{\$2,360}{\$2,120} - 1 = 11.32\%$$

3. continued

(c)

(i)

No anti-selection:

$$\begin{aligned}\text{Projected claims cost} &= \text{Claims PMPM} \times \text{Leveraged trend} \times \text{Age/Benefit Adjustment} \\ &\quad \times \text{Duration} \times \text{Anti-selection} \times \text{Other} \\ &= 175 \times 1.1132 \times 1.03 \times 1.20 \times 1.00 \times 1.00 \\ &= \$240.79\end{aligned}$$

$$\text{Premium PMPM} = \frac{\text{Claims PMPM}}{\text{Target Loss Ratio}} = \frac{\$240.79}{0.80} = \$300.98$$

$$\text{Rate Increase} = \frac{\$300.98}{\$250} - 1 = 20.4\%$$

(ii)

Anti-selection

$$\text{Excess rate increase} = \frac{1.204}{(1.1132 \times 1.03)} - 1 = .050065$$

$$50\% \text{ of excess} = .050065 \times 0.5 = 0.025032$$

New rate increase calc:

$$\text{New PMPM} = 175 \times 1.1132 \times 1.03 \times 1.2 \times 1.025032 = \$246.81$$

$$\text{New premium} = \frac{\$246.81}{0.80} = \$308.52$$

$$\text{Rate increase} = \frac{\$308.52}{\$250} - 1 = 23.4\%$$

(d)

Premium leakage / buy-down effect is a result of internal anti-selection. Premium leakage is a form of the buydown effect. With a rate increase, healthy policyholders tend to purchase leaner forms of coverage (buydown) while unhealthy purchase richer forms (buy up). So with a rate increase, healthy people leave the richer plan, reducing premium collected. Then the premium collected after the rate increase is less than anticipated. In addition, the premiums decrease more significantly than claims because the remaining population is sicker than the previous “average” population (before healthy people buy-down).

3. continued

(e)

Premium PMPM from (c)(ii): \$308.52

75% go to plan with 10% savings = $0.75 \times \$308.52 \times 0.9$

$$= 0.75 \times \$277.67$$

$$= \$208.25$$

25% stay in current plan: $0.25 \times \$308.52 = \77.13

$$\$208.25 + \$77.13 = \$285.38$$

Buydown effect = $\$308.52 - \$285.38 = \$23.14$

$$75\% \times x + 25\% \times 2x = \$308.52$$

$$x = \$246.82$$

$$75\% \times \$246.82 \times 0.9 + 25\% \times 2 \times \$246.82 = \$290.01$$

Premium leakage = $\$290.01 - \$285.38 = \$4.63$

4.

Learning Objectives:

4 – Evaluate employer strategies for designing and funding benefit plans for:

- (i) Active employees
- (ii) Dependents
- (iii) Pre-65 retirees
- (iv) Post-retirees
- (v) Disabled

Solution:

(a)

Functional approach steps:

- Classify employee need into functional categories
- Classify employees into categories the employer would want to protect
- Understand and analyze the current plan of benefits
- Perform gap analysis and search for overlaps in coverage
- Consider recommendations for changes from employees and management
- Develop cost projections for corrective action
- Explore alternative methods of funding
- Explore other cost savings measures
- Finalize corrective action and discuss with management
- Implement changes to benefit program
- Communicate changes to employees
- Periodically review plan

(b)

Costs = (claims – deductibles) × coinsurance

<u>Claim range</u>	<u>Frequency</u>	<u>Current plan</u>	<u>Proposed plan</u>
0 – 100	10%	\$0	\$0
101 – 1000	40%	\$450	\$400
1001 – 6000	40%	\$3,510	\$3,120
6001+	10%	<u>\$9,810</u>	<u>\$8,720</u>
Weighted Average Gross Costs →		\$2,565	\$2,280
Member cost sharing (\$100 × 12) →		\$1,200	\$1,200
Net Cost (gross – member) →		\$1,365	\$1,080

So, employer costs savings = \$1,365 – \$1,080 = \$285

4. continued

(c)

Two tests must be met ... gross value test and net value test

Gross Value Test

The benefit from the plan must be at least the amount of Medicare Part D

Net Value Test

Benefits (net of retiree contribution) must be greater than those paid for standard Medicare Part D

Gross value of Medicare = $(0.4 \times \$480) + (0.4 \times \$1480) + (0.1 \times 7100) = \$1,494$

Net value of Medicare = $\$1,494 \times (1 - 0.255) = \$1,113$

So, for current plans ...

Gross value: $\$2,565 > \$1,494$

Net value: $\$1,365 > \$1,113$

Thus, current plan passes both tests and is therefore eligible for the subsidy

So, for proposed plans ...

Gross value: $\$2,280 > \$1,494$

Net value: $\$1,080 < \$1,113$

Thus, the proposed plan passes the gross test but fails the net test, therefore the proposed plan does not qualify for the subsidy.

5.

Learning Objectives:

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

Solution:

(a)

Considerations in small group underwriting

Small group underwriting falls under HIPAA and state laws

- First, evaluate the group
 - The group must be financially sound
 - Look at group characteristics
 - Geography
 - Industry
 - Age/gender
 - Family size
 - Current insurance status
 - Workers comp
 - Prior coverage / Experience
 - Ask why they are changing of if they change carriers a lot
 - Group size
 - Larger groups have can spread admin expense
 - Participation – larger means less risk
 - Employer contribution – more means less risk
 - Eligibility
 - Is this a real group
 - Hours at work
- Look at the individuals in the group
 - Enforce eligibility rules
 - Pre-existing conditions
 - Late entrants are underwritten
 - Do medical assessment on individuals
 - Use health questionnaire
 - Post issue underwriting

5. continued

(b)

HIPAA in Small Group

- HIPAA defines small groups as having 2-50 employees
- There is guaranteed issue for all groups with exceptions
- Groups are guaranteed renewable with exceptions like not paying premium
- All groups offered all plans
- Can use specific case characteristics to rate
- Can't single out single person on health status
- Cannot exclude preexisting conditions if prior creditable coverage

(c)

What are allowable rating factors according to NAIC

You can rate on age, sex, industry, group size, family size, benefit plan, geography

You cannot rate on health status, race, preexisting conditions

(d)

You can have up to 9 classes, with a 20% differential between the class

Differences based on substantial differences in expenses – claims or admin

Can have different classes if different distribution system or acquired business from another carrier or for association groups

Within the class can only have 25% difference

(e)

Index rate is the average of the highest and lowest base premium

Highest cannot be more than 25% above the lowest

$$\text{Current } \frac{(350 + 1.67 \times 350)}{2} = 467.25$$

$$\text{Acquisition } \frac{(430 + 1.67 \times 430)}{2} = 574.05$$

(f)

By the NAIC Model Law, can only have a 20% difference between highest and

lowest class. Here we have $\frac{574.05}{467.25} - 1 = 22.9\%$ difference currently, so it

needs to change to 20%. But needs to be revenue neutral.

Current revenue is $574.05 \times 1000 + 467.05 \times 5000 = 2,910,300$

Proposed revenue is $1.2x \times 1000 + x \times 5000 = 2,910,000$

So current needs to be at 469.40 with an increase of .46%

The acquisition needs to be at 563.28, a decrease of 1.9%

6.

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 (including mention of coverage within other plans)
 - Group life plan
 - Post ret coverages

Solution:

(a)

- Benefit amount
 - Intended to replace a reasonable proportion of an insured's income
 - Usually expressed as a % of salary

 - OUCH**
 - Benefit amount is too rich
 - Less incentive to return to work
 - Should be STD – reducing to 70% OR reducing with number of years of service
 - LTD – $66\frac{2}{3}\%$

- Maximum benefit
 - Expressed as a weekly benefit for STD, monthly for LTD

 - OUCH**
 - Should set a max not too high to motivate employee to return to work
 - Example: \$6,000 per month for LTD
 - Okay with no max for STD (salary continuance)

- Elimination periods
 - Length of time for which an insured must be disabled before receiving benefits

 - LTD
 - Typically 30 to 180 days

 - STD
 - Typically 0 for accident, 7 days for sickness

6. (a) continued

OUCH

Period too short

Example: 0- 0-7 for STD

6 months for LTD

- Maximum Benefit Duration

LTD

- Usually to 65, cease at retirement, can be in number of years of service (e.g., 2)

STD

- Usually between 13 to 52 weeks

OUCH

Benefit period could be longer for STD (6 months)

Okay for LTD

- Definitions of Disability

Determine ability to work, eligible for benefits

Most common is own occupation for first 12 to 36 months of disability

Then, any occupation (more restrictive)

OUCH

Should be 24 months own occ

- Integration

Amount should be enough to cover living expenses but not so much to discourage return to work

Direct

- Reduced dollar for dollar

All sources

- More expensive

OUCH

STD

- Integrate with state disability

LTD

- Integrate with Worker's Comp, State disability, Pension, part-time employment

6. (a) continued

- Cost of living adjustment
 - To mitigate the effects of inflation
 - Percentage is fixed, tied to external index

OUCH

COLA is high at 4%, this is expensive

- Minimum Benefit
- Survivor Income Benefit
- Pension Contribution Benefit
- Conversion
- Eligibility
- Exclusions and limitations

(b)

Have STD and LTD plans managed by the same insurer

- Can begin to manage the LTD claims earlier in the process

Use formal rehabilitation and other return-to-work programs

Apply utilization management techniques

Managing STD (by experts, integrated with LTD)

Team approach (with nurses, plan sponsor, physicians, rehab, at onset of disability)

For mental health: Adaptation of managed care spectrum

- Standard EAP programs
 - Access to professional
 - Early and controlled intervention
 - Pre-determined number of face-to-face counseling
 - Work / life related services
 - Free information resources
 - Management consultation services
 - Telephone or web-based access
- EAP gap plan
 - Access to EAP is encouraged by health plan design
 - More clients to managed care
 - Through better utilization = greater savings
- MH/SA network
 - Preferred network of providers
 - Relies on plan design incentives to use it
 - Experienced-rated

6. (b) continued

- MH/SA network with EAP gap
 - Early access
 - Experienced-rated

Managed behavioral health care

- Behavioral carve-out program that separates mental health from medical plan
- Focus on matching appropriate levels of specialists and treatment with needs

(c)

Preparation

- Determine the extent to which employees will be involved
- Employees should have a significant role, or will not participate in the program
- Employee committee

Research

- To determine if health promotion program would be advantageous and feasible
- Organization motives and goals
 - Determine the most appropriate program
 - Needs to determine priority of the goals
- Cost/Benefit Analysis
 - To survive, benefits must be greater than the cost
- Management and employee support
 - Most successful if broad-based and strong support
 - Other
 - Interviews and focus groups
- Organization capabilities
 - Need specific resources to be successfully implemented
 - Program design
- Staffing levels
 - Should have full-time professional
- Budget
 - Fixed \$ per employee. More if fitness facility is added
- Program eligibility
 - Could be to all receiving medical care coverage
- Financing
 - Employer pays all or a share
- Program evaluation

7.

Learning Objectives:

- 4 – Evaluate employer strategies for designing and funding benefit plans for:
 - (i) Active employees
 - (ii) Dependents
 - (iii) Pre-65 retirees
 - (iv) Post-retirees
 - (v) Disabled

- 7 – Apply U.S. and Canadian taxation rules to employer and individual health plan

Solution:

(a)

- Inputs and options
 - Options are taxable just as if it was under traditional plans
- Elections
 - Elections must be made prior to plan year and cannot change during year
- Statutory arrangement and plan
 - Salary deferral arrangement (SDA)
 - Employees accept to defer salary to subsequent year
 - Retirement compensation arrangements (RCAs)
 - Benefits on retirement or termination
 - Subject to unfavorable tax treatment
 - Employee benefit plan (EBPs)
 - Employer contributions tax deductible until used
 - Employee benefits not taxable until paid
 - Employee trust
 - Private health service plan (PHSP)
 - Sort of insurance to cover hospital and medical costs
- Welfare plan trust
 - Used for
 - Accident and sickness plan
 - Group term life
 - PHSP
- Employee directed health plan
 - Unused credit or excess claims can be used but not both
- Salary change
 - Employee could decide to transform salary into credits
 - Directly taxed
- Retirees are subject to same treatment as actives

7. continued

(b)

- Life insurance
 - Contributions by the employer are taxable to the employee
 - Function of average taxable income of co-workers
 - Benefits are not taxable to the beneficiary
- LTD
 - Contributions are not taxable
 - Benefits are taxable to the employee
 - Benefits could be not taxable if employee pay-all and certain requirements are met
- Medical and dental
 - Both contributions and benefits are not taxable (except in QC)
 - Plan must be considered a Private Health Services Plan (PHSP) for contributions to not be taxable

(c)

As we can see in (b), contributions are not taxable for LTD

So he is better to place \$400 in credits in LTD

The remaining \$700 should be credited as follows:

- \$500 in medical and dental benefit as it is only subject to provincial tax
- Remaining \$200 in life insurance (\$300 remaining should be paid out of pocket)
- Medical and dental tax = $500(0.20) = \$100$
- Life insurance tax
= $200(0.20(\text{provincial tax}) + 0.30(\text{federal tax})) = \100
- Total taxable benefit = $\$100 + \$100 = \$200$

8.

Learning Objectives:

11 – Understands and applies the concept of credibility theory

Solution:

Credibility Defined

- Credibility measures the extent to which a dataset can reliably project future claims
- $0\% \leq Z \leq 100\%$
- Larger data sets are more credible
- If not fully credible, experience may deviate due to random fluctuation
- Need a “universe” or industry-wide dataset to blend with

Credibility Uses

- New Business Underwriting
- Renewal Underwriting
- Ratemaking
- Reserving/Valuation
- Stop-Loss and Reinsurance
- Experience Rating
- Provider Analysis
- Trend Forecasting

Formulas

- Empirical Formula

$$Z = \frac{\sum \left[\frac{\text{abs}(D_A)}{D_A} \right] \times D_B}{\sum [\text{abs}(D_A)]}$$

- Hewitt's Formula

$$\mu = \frac{(\mu_A E[A] + \mu_B E[B] + \mu_C E[C])}{(\mu_A + \mu_B + \mu_C)}$$

- If population mean is known, can use to estimate expected value of group

8. continued

- Bayesian

$$C = Z \times R + (1 - Z) \times H$$

- C = compromise value
- R = observed mean
- H = hypothetical mean
- $Z = \frac{n}{n + k}$
- n = # of observations
- $K = \frac{E(\text{Process Variance})}{\text{Var}(\text{Hypothetical Means})}$
- Credibility increases as n increases
- Credibility increases as VHM increases
- Credibility decreases as EPV increases

Characteristics of products that impact credibility

- LTD
 - Low frequency
 - High severity
 - High volatility in claim amounts
 - High volatility in claim duration
 - Claims complete slowly (long tail)
 - Unpredictable claim trends
- Pharmacy
 - High frequency
 - Low severity
 - Claims complete quickly (short tail)
 - Little volatility in claim amounts
 - Predictable claim trends

9.

Learning Objectives:

9 – Understand predictive modeling techniques

Solution:

(a)

- Claims Data – Use past claims to identify. Not best method because
 - Lag in time between claims submissions and when they are actually analyzed
 - Data often unreliable and inaccurate
 - Does not indicate members willingness to change
- Threshold based – Identify members who meet certain criteria such as claims over a certain amount
 - Reactive
- Health Perception Surveys – Success because
 - Those willing to participate in surveys are more willing to change
 - Targets right people so high engagement rates
 - Survey results can be summarized quickly so programs can be set up in a timely manner
 - Reliable data because input comes directly from the members
- Predictive models
- Statistical Regression – Regression to the mean
- Neural networks – Requires tons of data
- Health risk assessment questionnaire

(b)

Confounding variables include:

- Demographics (e.g., age, sex, location)
- Exclusionary conditions for excluded members (e.g. AIDS, transplants, ESRD)
- Exclusionary conditions for excluded claims (e.g., catastrophic, pregnancy)
- Contactability – ability to contact and willingness to participate
- Severity of illness – affects costs and savings
- Prevalence of illness and risk classification
- Persistency – leaving/entering care management program, group
- Operational issues
 - Report on number eligible, contacted and enrolled
 - Consistent statistics

10. (a) continued

- HMO, POS may need longer commitment to plan
- The further right on the spectrum, there is more restriction to access
- The further right on the spectrum, the greater cost savings
- The further right on the spectrum, there will be more utilization management measures to contain costs
- HMO, POS products may experience initial low member satisfaction
- HMO is usually community rated, partially experience rated. Also encounter data may not be complete if there's capitation payments, other products are generally experience rated

(b)

	Indemnity	PPO	POS	HMO
Provider Choice	Unrestricted	In/Out of Network	In-Ntwk and OON	In Ntwk Only
Utilization Management	None	Mild	Moderate	Maximum
Provider Steerage	None	Mild	Moderate	In-Ntwk Only
Payment Method	R&C	In Ntwk fee schedule, OON: R&C	In Ntwk fee schedule, OON: R&C	In-Ntwk fee schedule
Balance Billing	Patient billed for difference	In-Ntwk: None, OON: Patient billed	In-Ntwk: None, OON: Patient billed	None
Referral Management	None	None	PCP must refer In-Ntwk Specialist	PCP must refer In-Ntwk Specialist

(c)

Moving from Coinsurance to Copay plan:

Advantages

- Members will know their costs in advance
- Does not present a challenge to members on a fixed income
- Less possibility for members to choose less effective drugs or forgo treatment

Disadvantages

- Members will not understand the true cost of drugs
- Most of the drug cost increases will be the responsibility of the plan, unless copays are indexed each year
- Less incentive for members to choose cost-effective drugs since the costs to them are flat copays

11.

Learning Objectives:

- 10 – Evaluate the process and be able to develop a medical manual rate for both ASO and fully-insured business

Solution:

(a)

Components of Medical Trend

- Provider Reimbursement Trend

Easier to measure for Managed Care since specifics provider contract provisions and particularly HMO since capitated. Trend in reimbursement to providers.

- Residual Trend

Remaining trend after provider reimbursement. Comprised of many factors:

- Random Fluctuations
 - Catastrophic claims, outbreaks, epidemic, flue, not expected to re-occur again
- Utilization Trend
 - Use of service (increase in # admits, # days, # O.V.s, # surgeries, etc.)
- Technology
 - New Treatments (MRIs, new drugs, infertility treatments, etc.)
- Intensity
 - Change in mix of services (i.e., more ICU or surgical days versus regular medical days)
- Benefits
 - New products (As POS once was) or benefit designs
- Upcoding / code creep
 - Charging for service beyond what was performed or unbundling to get a higher reimbursement rate (provider billing practices)
- Cost shifting
 - Both from government to private to inpatient to outpatient, difficult to reconcile
- Demographics
 - Aging population, more demanding consumers, etc.
- Government
 - Increase in # of state mandates and other legislation affecting costs/trend
- Practice Patterns
 - How providers practice, efficiency of protocols, standards, habits, etc.

11. (a) continued

- Antiselection
 - Affects only observed trends not underlying trend

$$\text{Medical trend} = \text{allowable trend} = (1 + \text{allowable trend}) = (1 + \text{prov. Reimb. Trend}) \times (1 + \text{residual trend})$$

(b)

$$\begin{aligned}\text{Original Net Cost (2006)} &= (18 - 10) \times 2 + (80 - 25) \times 1 \\ &= \$71 \text{ after copays}\end{aligned}$$

New (2008)

$$\text{Costs} \rightarrow \$18(1.08)^2 = \$21.00 \text{ generic}$$

$$\$80(1.08)^2 = \$93.31 \text{ brand}$$

$$\text{Paid} = (21.00 - 10) \times 2 + (93.31 - 25) = 90.31$$

$$\text{Paid Trend} \rightarrow \frac{90.31}{71} = 27.2\%$$

(Annualized = 12.85%)

(Whereas underlying trend = 8%)

(c)

Trend must equal 8%

(d)

Annual Underlying Paid Pharmacy Trend

$$2(18(1.08)^2 - 15) + (80(1.08)^2 - 30) = 75.30$$

$$\frac{75.30}{71.00} = 6.06\%$$

Annualized = 2.99%

12.

Learning Objectives:

- 10 – Evaluate the process and be able to develop a medical manual rate for both ASO and insured business

Solution:

(a)

- Covered Benefits
 - Due to elective nature of dental plan, cost sharing helps to control claims
- Cost Sharing Provisions
 - Deductibles
 - Copays/Coinsurance
 - Plan maximum
- Period of Coverage
 - Trend from experience prior to rate period
 - Include any benefit changes
- Provider reimbursement arrangements
 - Fee-for schedule
 - Can be UCR (usual customary & reasonable) or RC (reasonable and customary)
 - Fee schedule or table of allowance
 - Capitation
 - Provider is paid a set amount per insured and must perform necessary services
- Managed care – methods
 - Preauthorization – members must have preauthorization for expensive procedures before the insurer will cover them
 - Provider profiling
 - Self management through capitation – providers must perform necessary care efficiently in order to provide care within the costs of the capitation arrangement

(b)

- Age / gender
 - Children lower claim costs
- Geographic
 - Vary widely, depends on type of service
- Occupation
 - Those in front of public cost more
 - More awareness of benefits

12. (b) continued

- Participation
 - Higher reduces anti-selection
- Prior coverage
 - Reduces anti-selection
- Group size
 - Small group have more anti-selection
- Announcement of plan
 - Increase cost if no prior coverage
- High employee turnover increases cost
 - Employee has more chance of not having prior coverage

13.

Learning Objectives:

4 – Evaluate employer strategies for designing and funding benefit plans for:

- (i) Active employees
- (ii) Dependents
- (iii) Pre-65 retirees
- (iv) Post-retirees
- (v) Disabled

Solution:

(a)

Advantages

- Better allocation of costs between generations of stockholders
- Reduce the FAS 106 cost
- Tax advantages
- More security that benefits will actually be paid
- Protected from corporate raiders

Disadvantages

- Receive a higher ROI by investing in the business instead
- DEFRA limits the tax advantages of a trust
- 401(h) restrictions may be too limiting for effective funding
- Financial analysts may not handle the fund properly
- Funds in a trust are restricted for use (may not be revocable)

(b)

(i)

501(c)(9) trust: Do not use health inflation

(ii)

401(h) account: Use health inflation

Deductible plan cost is limited to 1/3 of the pension normal cost, so limited to:

$$\frac{1}{3} \times \$150,000 = \$50,000$$

13. continued

(c)

	501(c)(9) = VEBA	401(h)
Tax deductible ER contribution	Unclear or Restricted (U / R)	Unclear or Restricted (U / R)
Tax-free or tax-deferred savings mechanism for employees	-	-
Tax sheltered investment	U / R	+
Tax free benefit	+	+
No plan design impact	+	U / R
FAS 106 asset	+	+
Revocable assets	-	-

14.

Learning Objectives:

12 – Underwriting

Solution:

(a)

- Sales highly subjective to the level of premium
- Cohort grouping
 - Wear off of initial UW
 - Durational rating factors
 - % of unhealthy lives increasing as the block ages
- Managing the closed block
 - May not be self supporting
- Durational rating by classes may be restricted
- Subsidizing the closed block by explicit margin and durational rating factors
- Carrier may avoid durational rating by
 - Maintaining a major presence in the market
 - Low cost, effective network
 - Offer new products every 2 to 3 years
- Regulators respond to durational rating
 - Restrict varying rates by block
 - State risk pools
 - Mandatory community rates

(b)

Causes of durational effects

- Underwriting Wear Off
 - Regression to the mean leads to increased cost
- Antiselection
 - Healthy people leave plan for lower cost plan or healthier pools elsewhere with impaired lives left behind

Methods to managing durational effects

- Prefunding
 - Charging higher premiums initially
 - Setting up a reserve to cover later cost increases
- Interblock durational increase
 - Separate groups based on duration and charge rates based on duration

14. continued

(c)

Cost trends

- Changes in technology
- Changes in type of service
- Utilization increases
- Higher reimbursement level to providers

Aging of policyholders

(d)

(i)

Antiselection

- Member ability to predict future costs and make decisions as to what is best for them

External Antiselection

- When deciding to purchase insurance

Internal Antiselection

- When deciding about renewal benefit options

Durational / Cumulative Antiselection

- Healthy lapse
- Unhealthy remain

(ii)

- Rate up for substandard policies
- Offer a different policy
- Offer a different plan
- Charge a higher rate
- Deny coverage
- Exclude a condition or body system via rider

(iii)

Timing

- Only if the policy has not passed the incontestable period, usually a year

Size of the claim

- Don't spend time and money investigating relatively small claims

Sentinel conditions

- Treatment for certain conditions point to other conditions

14. (d)(iii) continued

Type of conditions

- Examples: accidents and pregnancy. Timing of these can be easily identified and these can be ruled out as pre-existing

(e)

(i)

- Reliable accuracy
 - Test on various input under various situations
- Suitability for use
 - Results can be determined for product being marketed
- Appropriate precision
 - Number of decimal points to be used
- Sensibility
 - Logically constructed; theoretically sound
- Effectively communicated
 - User or client can understand results

(ii)

- Projects multiple cells of business together with a long term perspective
- Exposure
 - Enrollment, lapses
- Revenue
 - Premium, investment returns, subsidies
- Claim costs
 - Incurred versus paid, reserves
- Expenses
 - Administrative, commissions
- Profit / Risk load
 - % of premium, ROI, ROE
- Capital costs
 - Surplus / Reserve strain

15.

Learning Objectives:

- 10 – Evaluate the process and be able to develop a medical manual rate for both ASO and insured business

Solution:

(a)

Calendar year loss ratio = incurred claims / earned premium for each calendar year

- Incurred claims = paid claims plus the increase in claim reserves during the year for all claim incurral years combined
- Resembles a company's financial statements
- Not best indicator of historical trends

Incurral year loss ratio = incurred claims / earned premium for each incurral year

- Incurred claims = PV of claim payments made to date plus PV of the current claim reserve, all discounted back to the year of incurral
- Provide better historical trend

(b)

Total paid claims discounted to midpoint of year of incurral

$$\begin{aligned} 2005: & \$2.5\text{M} + \$3.4\text{M} / (1.05) + \$3.3\text{M} / (1.05)^2 = \$8.73\text{M} \\ 2006: & \$2.3\text{M} + \$3.5\text{M} / (1.05) = \$5.63\text{M} \\ 2007: & \$2\text{M} \end{aligned}$$

Reserves discounted to midpoint of year of incurral

$$\begin{aligned} 2005: & \$16\text{M} / (1.05)^{2.5} = \$14.16\text{M} \\ 2006: & \$10\text{M} / (1.05)^{1.5} = \$9.29\text{M} \\ 2007: & \$4\text{M} / (1.05)^{0.5} = \$3.9\text{M} \end{aligned}$$

Total paid claims and reserves discounted to year of incurral

$$\begin{aligned} 2005: & \$22.89\text{M} \\ 2006: & \$14.92\text{M} \\ 2007: & \$5.9\text{M} \end{aligned}$$

Gross up for IBNR:

$$\begin{aligned} 2005: & \$22.89\text{M} / 0.7 = \$32.705\text{M} \\ 2006: & \$14.92 / 0.5 = \$29.855\text{M} \\ 2007: & \$5.9\text{M} / 0.2 = \$29.518\text{M} \end{aligned}$$

15. (b) continued

Grand total incurred claims = \$92.079M

Annual Covered Salary (100s):

2005: $\$395\text{M} \times 12 / 100 = \39M

2006: $\$330\text{M} \times 12 / 100 = \39.6M

2007: $\$330\text{M} \times 12 / 100 = \39.6M

Total = \$118.2M

Net Premium = $\$92.079\text{M} / \$118.2\text{M} = \$0.78$

Gross Premium = $\$0.78 / (1 - 0.11) = \0.88 per \$100 covered annual salary

(c)

In the calendar year rates, the change in reserves may not have been adjusted to remove the portion of increase due to interest on the reserves.

Either method may not be properly taking into account the incurred but not reported (IBNR) reserves

16.

Learning Objectives:

8 – Understand techniques for utilization and claims management

Solution:

(a)

Measures include:

Return on investment (ROI) = total savings due to program / total program costs

- Metric favored by DM industry
- No agreement on definition of the numerator or denominator
- ROI doesn't show the magnitude of savings – can save \$100 for every \$1 invested, but only in 0.01% of the population, is it justified?

Total Savings = total savings – total costs

- Thought to be the better measure as it accounts for the total impact of the program
- Average savings = (total savings – total cost) / total members
- Marginal savings = (total savings – total cost) / chronic members

(b)

Additional considerations involved when analyzing financial outcomes of disease management

- Design of study
- Is ROI higher than hurdle rate
- # and risk-intensity of targeted members
- # of staff / nurses and other program costs
- Type of interventions
- Program effectiveness at different penetration levels
- Demographics
- Disease prevalence
- Cost per event
- Timing
- Trend
- Method of contacting, engaging, and enrolling members
- Timing and number of members to be contacted
- Rules for integrating the program with the rest of care management
- Member satisfaction

16. continued

(c)

Estimates

Initial	A	B
Total Savings:	$\$2,000,000 - \$388,000 = \$1,612,000$	$\$4,000,000 - \$1,200,000 = \$2,800,000$
ROI:	$\frac{\$2,000,000}{\$388,000} = 5.15$	$\frac{\$4,000,000}{\$1,200,000} = 3.33$

Revised

	A	B
Total Savings:	$\$1,500,000 - \$699,400 = \$800,6000$	$\$2,500,000 - \$2,365,200 = \$134,800$
ROI:	$\frac{\$1,500,000}{\$699,400} = 2.145$	$\frac{\$2,500,000}{\$2,365,200} = 3.33$

(d)

Based on the internal estimates, I would select vendor A because of the higher ROI and total savings.

17.

Learning Objectives:

- 5 – 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.)

Solution:

(a)

Financing

- Canadian Medicare
 - Cost is borne by each province
 - Financed through general revenues, special payroll taxes and transfer payment from the Federal government
 - Federal subsidy was initially approximately 50% of the cost of the Medicare plans
 - For a province to be eligible for federal funding, need to comply with five principles of Canada Health Act:
 - Comprehensiveness
 - Universality
 - Accessibility
 - Portability
 - Public Administration
 - Extra billing and user charges are discouraged through the reduction of federal grants on a dollar-per-dollar basis

- US Medicare
 - Financed by Federal Government
 - Funded through two trust funds
 - Hospital Insurance (HI – Part A) Trust Fund
 - Supplementary Medical Insurance (SMI – Part B) Trust Fund
 - Part A financed through a mandatory payroll tax
 - Taxes are paid by both the employee and their employer
 - Current HI payroll tax rate is 1.45% of earnings for both employee and employer
 - Funded on a pay-as-you-go basis
 - Investment income from trust fund assets

17. (a) continued

- Part B financed through
 - Beneficiaries premiums and contributions from general fund of the Treasury
 - Premiums paid by beneficiaries account for about 25% of funding
 - Higher premiums are charged for individuals with higher incomes
 - Investment income from trust fund assets
- US Medicaid
 - Federal and State Governments finance the program jointly
 - Each state finances its own program with substantial support from Federal Government
 - Source of Federal funding is general revenues
 - The level of Federal support to each state depends on the state's average per capita income
 - In general, the Federal government funds 50% of the state's cost to administer the program

(b)

Eligibility

- Canadian Medicare
 - All permanent residents of a province or territory are eligible
 - A person who moves from one province to another becomes eligible as soon as coverage terminates under the plan of their former province of residence
 - Coverage may be continued for up to 12 months when a resident is temporarily absent from his / her province
- US Medicare
 - Part A
 - At least age 65 with 40 Social Security (SS) credits
 - If disabled, must have been eligible for SS or RR disability benefits for at least 24 months
 - People with ESRD who have paid Medicare taxes for 40 credits
 - People who did not work the required time may purchase Part A coverage
 - Part B
 - If covered by Part A, eligible for Part B
 - Requires payment of a monthly premium
 - Part C & D
 - Base their eligibility from Part A and B requirements

17. (b) continued

- US Medicaid
 - Federal government sets the minimum criteria
 - States are free to expand eligibility
 - AFDC: Adults and children in single-parent low-income families that qualify for cash assistance
 - SSI: Low-income aged, blind and disabled individuals on cash assistance
 - Recipients of foster care and adoption assistance
 - Low-income Medicare recipients
 - In addition to meeting these categorical requirements, certain income and asset requirements must also be met
 - States can also extend coverage to individuals whose medical expenses are reduce income below defined limits

(c)

Covered Services

- Canadian Medicare
 - Hospital services (room and board in a public ward)
 - Physicians services
 - Prescription drug for recipients of Social Assistance and residents over age 65
 - Other professionals such as optometrists, chiropractors, etc.
 - Prosthetics and therapeutic equipment
 - Other diagnostic services
 - Dental care
 - Out-of-province coverage
- US Medicare
 - HI/Part A services:
 - Inpatient hospital
 - Skilled nursing facility
 - Home health care
 - Hospice care
 - Inpatient psychiatric care
 - SMI/Part B services
 - Physician services
 - DME, lab and x-rays
 - Outpatient hospital services
 - Outpatient behavioral health care
 - Physical, occupation and speech therapy
 - Outpatient rehab

17. (c) continued

- US Medicaid
 - Inpatient and outpatient hospital
 - Physician services
 - Lab and x-rays
 - Preventive care, prenatal care, vaccines for children
 - Family planning
 - Services at federally qualified health centers and rural health clinics
 - Most states also offer in option
 - Dental
 - Outpatient prescription drugs
 - Prosthetic device sand hearing aids
 - Rehab therapy

18.

Learning Objectives:

- 10 – Evaluate the process and be able to develop a medical manual rate for both ASO and insured business

Solution:

(a)

Internal data sources for gathering experience data include:

- Medical Claims System Data
- Hospital Claims Forms (UB – 92) and Physician Claims Form (CMS 1500)
- Electronic Claims Forms
- Premium Billing and Eligibility System – keeps track of eligible enrollees and includes subscriber and group level information and detail on covered benefits
- Commission Payment System
- Utilization Review or Pre-Certification System
- Provider Contract System

(b)

Data Structures used to retrieve experience data include:

- Sequential Files
 - Each record contains all the information needed for processing a specific application
- Indexed Sequential Files
 - Indices are attached to key elements, which improves the speed of access over sequential files
- Relational Databases
 - Data elements are grouped into separate tables, and indices allow for quick access of specific records
- Dimensional Databases

(c)

Types of storage media are:

- On-line - Data are immediately available for applications
- Near-line - Online data, but has been compressed for more efficient storage
- Off-line - Less expensive, but slower access

18. (b) continued

Considerations when choosing storage media are

- Volume of data
- Whether the data are dynamic (updated frequently or in real-time) and how frequently they are used – data updated frequently and queried often needs to be online, whereas data used less frequently can be off-line
- Retrieval time - Off-line data is the slowest for access, on-line is the fastest, and near-line is a compromise between the two
- Ease of programming

(d)

The Buhlmann Credibility Formula has the following components and assumptions:

- $Z = \frac{n}{(n+k)}$ is the credibility factor, where n is the number of observations,
 $k = \frac{\text{expected value of process variance}}{\text{variance of hypothetical means}}$
- Blended Claims Rate = $Z \times \text{Experience Rate} + (1 - Z) \times \text{Manual Rate}$

For this calculation:

- $k = \frac{8,000,000}{20,000} = 400$
- $n = 100 \text{ average members} \times 12 \text{ months per average member} = 1,200 \text{ member months}$
- $Z = \frac{1,200}{(1,200 + 400)} = 75\%$
- Blended Claims Rate PMPM = $75\% \times 300 \text{ PMPM} + 25\% \times 550 \text{ PMPM}$
= \$362.50 PMPM

19.

Learning Objectives:

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

Solution:

(a)

$$(1) \quad (2) \quad (3) = \frac{(2)}{(1)} - 1$$

Population	Baseline Period	Intervention period	Trend	
Non-chronic Cost PMPM	\$125	\$135	8.00%	$= \frac{135}{125} - 1$
Non-chronic Risk Score	0.90	0.92	2.22%	$= \frac{.92}{.90} - 1$
Chronic Cost PMPM	\$350	\$355	1.43%	$= \frac{355}{350} - 1$
Chronic Risk Score	3.20	3.05	- 4.69	$= \frac{3.20}{3.05} - 1$

Baseline Chronic Cost PMPM	\$350	Table
Trend	8.0%	$= \frac{135}{125} - 1$
Trended Baseline Chronic Cost	\$378	$= 350 \times 1.08$
Actual Cost	\$355	Table
Estimated Savings PMPM	\$23.00	$= 378 - 355$

19. continued

(b)

	Option 1 (matches text)		Option 2 (alternate solution)	
Baseline Chronic Cost PMPM	\$350	Table	\$350	Table
Risk Adjusted Trend	5.65%	$\frac{(1+0.08)}{(1+0.022)} - 1$	5.65%	$\frac{(1+0.08)}{(1+0.022)} - 1$
Trended Baseline Chronic Cost	\$369.7	$350 \times (1+0.0565)$	\$369.78	$350 \times (1+0.0565)$
Actual Cost	\$355.00	Risk Adjustment	0.953	$\frac{3.05}{3.2}$
Risk Adjustment	$\frac{3.2}{3.05} = 1.049$	Risk Adjusted Target	\$352.45 = 369.78 \times .953	
Risk Adjusted Actual Cost	$355 \times 1.049 = \$372.46$	Actual Cost	\$355.00	Table
Estimated Savings	$369.78 - 372.46 = (\$2.68)$ PMPM		$(\$2.55) = 352.45 - 355.00$	

(c)

- Using risk-adjusted trend as an estimate of chronic trend gives a lower but more credible estimate of savings
- Using once chronic / always chronic methodology, the non-chronic trend is a poor proxy for chronic trend in DM evaluations
- There is bias in the savings estimate, overstatement of savings
- Using algorithms that retrospectively classify members as never or always chronic (or non-chronic) brings the chronic and the non-chronic trends closer to convergence
- Adjusting both chronic and non-chronic populations for changes in risk results in an adjusted non-chronic trend close to an adjusted chronic trend
- These conclusions hold when several years of trend are averaged