GH FVA Model Solutions
Fall 2021

1. **Learning Objectives:**
1.   The candidate will understand and apply valuation principles for insurance contracts.

Learning Outcomes:
(1c)   Calculate appropriate claim reserves given data.

Sources:
Bluhm Individual Health Chapter 6

GHFV-103-16-Health Reserves

Commentary on Question:
Commentary listed underneath question components.

Solution:
(a)   Identify and explain the four major categories of reserves.

Commentary on Question:
Some candidates were able to recall all four. A small portion of the candidates confused categories of reserves with the different types of statements (statutory, GAAP, tax and embedded value based). Credit may be awarded for reasonable alternative answers.

Major categories of reserves:
1. Premium reserves – amounts set aside in financial statements to reflect premiums that have that have either (1) been received by the valuation date, but provide for insurance coverage after the valuation date, or (2) not yet been received on the valuation date, but which relate to coverage that was provided prior to the valuation date.
2. Claim reserves – amounts set aside to cover future payments for claims which have been incurred under the contract, but which have not yet been paid.
3. Policy reserves – amounts of money set aside to account for current funding of costs over the future lifetime of the policies. Account for any long term differences between the slope of the revenue and benefit streams. At times referred to as "contract reserves", "additional reserves", and "active life reserves".

1.   Continued

> 4. Gross premium reserves / Premium deficiency reserves – used when the future revenue streams plus current reserves and liabilities for a given block are not sufficient to cover future costs; thus the company needs to set aside money to cover the shortfall.

(b)   Calculate the total net level annual premium for the block. Show your work.

Commentary on Question:
Candidates can receive partial credit for this question. Most candidates can calculate persistency, discount rates and present value of claims correctly. Some candidates forgot to multiply the correct net level premium per policy by 120.

Year	Claims	Persistency	Discount	PV (Claims)	Net Level Premium
0	$0.00	1.000	1.000		P
1	$1,500.00	0.800	0.980	$1,176.47	P
2	$1,620.00	0.640	0.961	$996.54	P
3	$1,749.60	0.512	0.942	$844.13	P
4	$1,889.57	0.410	0.924	$715.03	

PV of Claims per policy	$3,732.16	= Sum of PV (claims)
PV of Net Level premiums Factor	2.88	= Sumproduct (Persistency, Discount)
Solve for P	$1,295.02	= PV of Claims per policy / PV of Net Level premiums Factor
Net Level Premium for block	**$155,402.66**	**= Net Level Premium per policy * 120 Policies**

(c)   Calculate the total policy reserves for the block at the end of year 2 per policy still in force in year 2. Show your work.

Commentary on Question:
Candidates can receive partial credit for this question. No credit was deducted if candidates did the calculation correctly using an incorrect answer from part b. Some candidates forgot to multiply the correct net level premium per policy by the number of policies. Multiplying by 120 policies or by the number of policies in force at year 2 were both acceptable for calculating the total policy reserve.

Year	Net Level Premium	Claims	Persistency	Discount
2	$1,295.02		1.000	1.000
3	$1,295.02	$1,749.60	0.800	0.980
4		$1,889.57	0.640	0.961

PV of Future Claims	$2,534.60	= Sumproduct (Claims, Persistency, Discount)
PV of Future Premium	$2,310.73	= Sumproduct (Net Level Premium, Persistency, Discount)
Policy Reserves	$223.87	= PV of Future Claims - PV of Future Premium
Total Policy Reserves	**$26,864.83**	**= Policy Reserves * 120 Policies**

2.

Learning Objectives:
1. The candidate will understand and apply valuation principles for insurance contracts.

Learning Outcomes:
(1b) Explain the limitations and biases of the traditional valuation methods.

(1c) Calculate appropriate claim reserves given data.

(1e) Evaluate data resources and appropriateness for calculating reserves.

Sources:
AAA Premium Deficiency Reserves Discussion Reports

GHA-103-16: Health Reserves (Lloyd)

Commentary on Question:
This was a fairly lengthy question focused specifically on premium deficiency reserves (PDRs) with some straightforward calculations. Few candidates did well on this question, with the average candidate receiving around half of the total points available.

Solution:
(a) List factors the actuary should consider when projecting claims for a Premium Deficiency Reserve ("PDR") calculation.

   Commentary on Question:
   Most candidates did poorly on this part, instead referring to a different list in the syllabus that included many items not specifically related to claims projections (e.g., non-claim expenses, rate increases, asset returns, etc.). Credit may be earned for items not included on the list below.

   *   Current trends in medical cost and utilization
   *   Provider risk-sharing
   *   Changes in provider contracts
   *   Environmental and demographic impacts on morbidity
   *   Potential improvements in technology resulting in new services being offered and covered
   *   Positive morbidity impact of growth in underwritten coverage
   *   Durational wear-off
   *   The impact of benefit changes

(b) Describe two reasons why a PDR of $0 may be appropriate for Woodford's Medicare Supplement business.

2. **Continued**

Commentary on Question:
Candidates performed poorly on this part. Many just provided the definition of a PDR, or brought up other reserves (contract reserves, deferred acquisition costs) that were not relevant. Full credit required more than just a list; some description was necessary. Credit may be earned for items not included on the list below.

- Lapsation of members that had high claims so that the business will be profitable going forward
- Large rate increase approved by state makes the business profitable

(c) Calculate the PDR at the end of year 2 for the group medical contract given the premium rate increases are guaranteed through year 5 and assume a discount rate of 0%. Show your work.

Commentary on Question:
Candidates generally did well on this part. Almost all candidates calculated the revised profits correctly, but many did not calculate the resulting PDR correctly.

For each of the years 3 through 5, calculate revised gain/loss = earned premiums – revised claims – expenses.

| Year | Annual Results ($000) | | | | |
	Earned Premiums	Original Claims	Revised Claims	Expenses/ Commissions	Revised Gain/(Loss)
3	$454	$382	$396	$54	$4
4	$464	$392	$414	$56	($6)
5	$475	$403	$417	$57	$1

At end of year 2, only year with projected loss is year 4, and then a gain in year 5. PDR = present value of the losses in year 3 and 4 = $4 - $6 = $2.

(d) Calculate the PDR at each testing level for the Denmain businesses including the business acquired from Bayshore. Show your work.

Commentary on Question:
Many candidates did well on this part and calculated the testing level PDRs correctly. Few candidates combined the existing individual and acquired group contracts for testing purposes.

2. **Continued**

Testing Group	Projected Underwriting Cash Flows by Year ($000)					Testing Level PDR
	3	4	5	6	7	
Group Disability	($14)	$3	$4	$5	$7	$14
Group Long-Term Care	$19	$22	$21	$23	$25	$0
Group Dental	$13	$10	$9	$6	$5	$0
Individual Medicare Supplement	($9)	($7)	($5)	($4)	$0	$25
Individual Major Medical	($22)	$0	$15	termed	termed	
Bayshore Group Medical	$4	($6)	$1			
Combined Major Medical	($18)	($6)	$16			$24

(e)   Recommend a grouping for the PDR at the reporting level for Denmain including the business acquired from Bayshore. Justify your answer.

Commentary on Question:
Most candidates answered this part correctly. In order to receive full credit, candidates had to provide a justification for their recommendation. A sample justification is provided below.

- Group Long-Term Care would need to be reported on its own
- Group Disability would need to be reported on its own
- Comprehensive Major Medical (including Group Dental, Individual Major Medical, Individual Medicare Supplemental, and Bayshore Group Medical) would be combined when reporting

This is the grouping recommended by the Health Reserves Guidance Manual (HRGM).

(f)   Calculate the PDR at the reporting level for Denmain including the business acquired from Bayshore using your recommended grouping from (e). Show your work.

Commentary on Question:
Some candidates received full credit for this part, but many made various mathematical or grouping errors.

2. **Continued**

	Projected Underwriting Cash Flows by Year ($000)					PDR
	$13 - $9 - $22 + $4 =	$10 - $7 + $0 - $6 =	$9 - $5 + $15 + $1 =	$6 - $4 = $2	$5 + $0 = $5	
All Comprehensive Major Medical	($14)	($3)	$20			$17

All Comprehensive Major Medical = Group Dental + Individual Medicare Supplement + Individual Major Medical + Bayshore Group Medical

Reporting Grouping		PDR
Group Disability		$14
Group Long-Term Care		$0
All Comprehensive MM		$17
Total		**$31**

(g) Recommend a method to allocate the PDRs from (f) by product for internal reporting purposes. Justify your answer.

Commentary on Question:
Many candidates answered this part correctly. To receive full credit, candidates had to provide a justification for their recommendation. Credit may be earned for other reasonable recommendations.

Recommend allocating the resulting PDR for reporting purposes based on earned premium. This would be a good approximation of the relative size of the groupings.

(h) Calculate the PDR at the reporting level for each product using the method recommended in part (g). Show your work.

Commentary on Question:
Generally, if candidates answered part (g) correctly, the calculations done for this part were correct. Other calculations may receive credit based on the recommendations given in part (g).

2. Continued

Product	Grouping	Earned Premium	% of grouping	Grouping PDR	Product PDR
Group Disability	Disability		100.0%	$14	$14.0
Group Long-Term Care	LTC		100.0%	$0	$0.0
Group Dental	Comp MM	$300	23.8%	$17	$4.0
Individual Medicare Supplement	Comp MM	$472	37.4%	$17	$6.4
Individual Major Medical	Comp MM	$47	3.7%	$17	$0.6
Bayshore Group Medical	Comp MM	$443	35.1%	$17	$6.0
Total		$1,262			

Product PDR = Grouping PDR * % of grouping

3. **Learning Objectives:**
1. The candidate will understand and apply valuation principles for insurance contracts.

Learning Outcomes:
(1a) Describe the types of claim reserves (e.g., due and unpaid, ICOS, IBNR, LAE, PVANYD).

(1b) Explain the limitations and biases of the traditional valuation methods.

(1c) Calculate appropriate claim reserves given data.

(1e) Evaluate data resources and appropriateness for calculating reserves.

Sources:
GHFV-103-16: Health Reserves

Commentary on Question:
Successful candidates summarized the authorization data on an incurred basis and utilized other information appropriately to calculate the reserve. Additionally, successful candidates justified their ways to add conservatism instead of simply providing a list.

Solution:
(a) Calculate the total estimated inpatient Incurred But Not Reported (IBNR) reserve as of the end of the year. Show your work.

Commentary on Question:
Many candidates summarized the authorization data appropriately, but some ignored the data, summarized incorrectly, or did not summarize on an incurred basis. Some candidates had trouble applying completion, seasonality, and/or credibility correctly. Most candidates understood that the IBNR was calculated as incurred minus paid. Partial credit was given where appropriate.

Summarize authorizations on an incurred basis using a combination of month and sum-if functions, using a pivot table, or using appropriate sorting. The 'Authorized Days' column below shows the correct amounts.

3. Continued

The following table outlines the remainder of the calculation:

Incurred Month	Authorized Days	Completion	Incurred Days	Contract Cost/Day	Lag-Based Cost/Day	Credibility	Blended Cost/Day	Incurred Claims (000s)	Incurred & Paid (000s)	Estimated IBNP (000s)
	a	b	c=a/b	d	e	f	g=e*f+d*(1-f)	h=c*g/1,000	i	j=h-i
1	948	0.9700	977	$1,100	$930	100%	$930	$909	$909	($0)
2	1,048	0.9700	1,080	$1,100	$1,012	100%	$1,012	$1,093	$1,093	$0
3	1,080	0.9700	1,113	$1,100	$1,068	100%	$1,068	$1,189	$1,165	$24
4	1,061	0.9700	1,094	$1,100	$1,083	100%	$1,083	$1,185	$1,137	$48
5	1,088	0.9700	1,122	$1,100	$1,042	100%	$1,042	$1,169	$1,099	$70
6	1,002	0.9700	1,033	$1,100	$1,026	100%	$1,026	$1,060	$975	$85
7	1,274	0.9700	1,313	$1,100	$939	100%	$939	$1,233	$1,110	$123
8	1,187	0.9700	1,224	$1,100	$1,081	100%	$1,081	$1,323	$1,164	$159
9	1,088	0.9700	1,122	$1,100	$969	100%	$969	$1,087	$935	$152
10	880	0.9500	926	$1,100	$1,153	100%	$1,153	$1,068	$897	$171
11	811	0.9000	901	$1,155	$1,046	90%	$1,057	$952	$781	$171
12	864	0.8500	1,016	$1,045	$942	80%	$963	$978	$774	$204
Total							Totals			$1,207

(b) Describe issues with using authorization reports when estimating an IBNR reserve.

Commentary on Question:
Most candidates received credit for generally noting that data quality may be an issue. Candidates may earn credit for other reasonable responses not listed.

1) Not all days that are authorized happen so you may need to adjust for differences
2) Not all days that happen are authorized so you may need to adjust for differences
3) COB may result in actual days being less than authorized
4) Appeals may be why actual days are more than authorized

(c) Explain four different ways to add conservatism when using authorized days to estimate your IBNR reserve in (a). Justify your answer.

Commentary on Question:
Many candidates successfully listed ways to add conservatism. Some candidates struggled to justify their answers. Candidates may earn credit for other reasonable responses not listed.

1) Combine this data with data from another block of business with similar payment patterns to increase data credibility
2) Add conservatism to the cost per day to compensate for the variance in costs caused by combining more than one type of plans as the contractual provisions, benefit structures, and other dynamics of the plans being grouped may differ

3. **Continued**

      3) Be conservative in selecting credibility assumed of lag data to provide implicit margin for variability in patterns

      4) Be conservative in selecting completion factors used in lag approach to provide implicit margin for variability in patterns

4. **Learning Objectives:**
2.   The candidate will understand an actuarial appraisal.

Learning Outcomes:
(2b)   Describe an approach for preparing an actuarial appraisal.

(2e)   Describe the actuarial due diligence process.

Sources:
GHFV-130-19: Ch. 4 of Insurance Industry Mergers and Acquisitions, Toole and Herget

GHFV-131-19: Ch. 5 of Insurance Industry Mergers and Acquisitions, Toole and Herget

Commentary on Question:
Commentary listed underneath question component.

Solution:
(a)
(i)   Describe the objectives of due diligence.

(ii)   Explain why due diligence objectives are so important to the buyer.

Commentary on Question:
Many candidates described why due diligence was generally important in part (ii), but generally lacked specificity. The best performing candidates tended to structure their response in part (ii) by discussing each of the objectives from part (i). Candidates may earn credit for reasonable additional explanation beyond the commentary listed below.

- Confirm Strategic Value:
  - Successful M&A bids most often occur when the restructuring create more value following the acquisition than existed prior to the deal.
- Confirm Financial Value:
  - The buyer's financial consideration begins with the seller's actuarial appraisal, which is then modified based on the market value of the target as well as the actual and projected financial performance.
- Confirm Operational Value:
  - A major driver of value is the quality of the operations to be acquired.
- Construct the Appropriate Bid:
  - This is the main deliverable of the due diligence process. The bid must recognize the key components of value if it is to be high enough to win the bidding process.

4. Continued

(b)   Describe the role of each of the following functional areas of the due diligence team:

      1. Finance
      2. Investments
      3. Tax
      4. Legal & Compliance
      5. Marketing & Distribution
      6. Systems
      7. Human Resources
      8. Product Management
      9. Claims
      10. Reinsurance
      11. Risk Management
      12. Actuarial

Commentary on Question:
Many candidates were able to provide one subpoint for each functional area, but few candidates provided enough items to achieve full credit for part (b). Candidates may earn additional credit for reasonable detail beyond the items below.

- Finance
    - Financial analysis is the crux of due diligence in that it either directly sets the appraisal value or defines the parameters that drive value.
    - Generally, includes a review and analysis of financial statements (both STAT and GAAP), supporting worksheets, data listings and interpretations, and financial processes and controls.
- Investments
    - Analysis typically includes support from investment bankers.
    - In stock deals, the buyer will acquire the seller's investment portfolio and must review everything.
- Tax
    - Addresses the potential impact of the seller's positions regarding the broad array of tax issues.
    - The necessary homework is performed to adequately validate the tax strategies and quantify various options open to the buyer.
- Legal & Compliance
    - Role is to determine that there are no legal impediments or hidden liabilities that could prevent a buyer from realizing the value of the target.

4. Continued

- Marketing and Distribution
  - Analysis of the target's marketing capabilities and distribution channels.
  - Important to understand how they impact the value of in-force and new business.
- Systems
  - Includes a review of the entire IT spectrum, including hardware, networks, committed upgrades, ongoing support agreement, disaster recovery plans, third party providers, in-house developed software, vendor relationships to determine the cost of continuing or discontinuing services.
- Human Resources
  - Must understand the key staff of the selling company and their roles.
- Product Management
  - Need to confirm the target's practices and plan how they will be integrated into the buyer's operations.
- Claims
  - Assess the claims management process which includes claim intake, validation, and settlement.
- Reinsurance
  - Focus attention on a cross-section of the target's reinsurance arrangements.
- Risk Management
  - Focus on precisely the types of exposures and concerns that the due diligence team is trying to analyze.
- Actuarial
  - Most important role is to translate the data and information developed by the due diligence team into quantified expressions of value.

(c)   Describe uses of the actuarial appraisal report for the buyer.

Commentary on Question:
Many candidates achieved full or near-full points. Candidates that scored poorly failed to provide any of appropriate uses or described unrelated items. Candidates may earn additional credit for reasonable detail beyond the items below.

4. Continued

- Projection of statutory earnings and capital requirements – insight into patterns of profitability of the business and level of capital required.
- The buyer's actuarial appraisal is typically a key element in establishing the opening balance sheet for the purposes of purchase accounting under US GAAP.
- The actuarial appraisal can form the basis of alternative accounting methodologies resulting from cross-border transactions, such as Canadian GAAP or U.K. Achieved Profits.
- Buyers may use the actuarial appraisal as the basis for ongoing performance measurement after the acquisition.

(d) Calculate the actuarial appraisal value for the digital start-up company. State your assumptions and show your work.

Commentary on Question:
Candidates performed strongly on this question. Many candidates received full or near-full credit. Common errors included failing to incorporate claim reserves in the pre-tax profit calculation, failing to calculate corporate tax for year one, and including the change in required capital in the pre-tax or after-tax profit calculations. Partial credit was given to candidates who made errors in early steps, but then used correct formulas in subsequent steps.

Pre-Tax Profit (Loss) = Premium + Investment Income – Paid claims – Change in Reserves – Expenses – Change in Statutory Reserves

After-Tax Profit (Loss) = Pre-Tax Profit (Loss) – Corporate Tax

4. **Continued**

	Year 1	Year 2	Year 3	Year 4	Year 5
Premium	12,000,000	12,600,000	13,860,000	17,325,000	21,656,250
Investment Income	54,167	109,620	114,927	131,957	160,822
Paid Claims	8,000,000	8,190,000	8,783,775	10,705,226	13,046,994
Change in Claim Reserves	666,667	15,833	49,481	160,121	195,147
Salary Expenses	750,000	825,000	907,500	998,250	1,098,075
Policy Administration Expenses	500,000	525,000	577,500	721,875	902,344
Marketing Expenses	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000
IT Expenses	1,000,000	425,000	467,500	514,250	565,675
Change in Statutory Reserves	2,166,667	51,458	160,814	520,393	634,229
Pre-Tax Profit (Loss)	(2,529,167)	1,177,328	1,528,356	2,336,842	3,874,608
Corporate Tax	(885,208)	412,065	534,925	817,895	1,356,113
After Tax Profit (Loss)	(1,643,958)	765,263	993,432	1,518,947	2,518,495

Required capital closing balance for each year = Factor * Premium

	Year 1	Year 2	Year 3	Year 4	Year 5
Required Capital Closing Balance	600,000	630,000	693,000	866,250	1,082,813
Required Capital Opening Balance	-	600,000	630,000	693,000	866,250
Change in Required Capital	600,000	30,000	63,000	173,250	216,563

Distributable cash flows for each year = After-Tax Profit – Change in Capital

4. **Continued**

	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
After Tax Profit (Loss)	(1,643,958)	765,263	993,432	1,518,947	2,518,495
Change in Required Capital	600,000	30,000	63,000	173,250	216,563
Distributable Cashflows	(2,243,958)	735,263	930,432	1,345,697	2,301,933

Discount Rate = Risk Free Rate of Return + Measure of Risk of Digital Company * (Market Rate - Risk Free Rate) = 5% + 2.40 * (9% - 5%) = 14.6%

Discounted Cash Flows (Year t) = Distributable Cash Flows (Year t) / (1 + Discount Rate)^t

Discounted Cash Flows (Year 1) = Distributable Cash Flows (Year 1) / (1 + Discount Rate) = (2,243,958) / (1.146) = (1,958,078)

	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Years to discount	1	2	3	4	5
Discount factor	0.8726	0.7614	0.6644	0.5798	0.5059
Discounted Cash Flows	(1,958,079)	559,853	618,202	780,205	1,164,581

Actuarial Appraisal Value = -1,958,079 + 559,853 + 618,202 + 780,205 + 1,164,581 = 1,164,762

5.

Learning Objectives:
1.   The candidate will understand and apply valuation principles for insurance contracts.

Learning Outcomes:
(1c)   Calculate appropriate claim reserves given data.

(1g)   Apply applicable standards of practice related to reserving.

Sources:
GHFV-103-16-Health Reserves

ASOP # 5

ASOP # 23

ASOP # 41

Commentary on Question:
Candidates had a difficult time with making correct calculations. Challenges include the correct length of lag durations and the claims data to be used for the calculation. Since this is the last question, some candidates may have experienced a challenge with limited time.

Solution:
(a)   Calculate the incurred but not reported (IBNR) reserve as of September 30, Year 4. Show your work.

Incurred Date	(A) Paid Through Dec	(B) Paid 4th qtr Year 4	(C) = (A) - (B) Paid thru Sep Year 4		Sep-Year 3	(D) Cumulative	(E) CF	(F) = (C) / (E) Calculate Ultimate	(G) = (F) - (C) Reserve
	$1,871,000						100%		
Sep-Year 3	$2,298,000						100%		
Oct-Year 3	$2,185,000	$0	$2,185,000		Lag 12	$2,298,000	100.0%	$2,185,000	$0
Nov-Year 3	$2,436,000	$4,000	$2,432,000		Lag 11	$2,293,000	99.8%	$2,437,303	$5,303
Dec-Year 3	$1,782,000	$13,000	$1,769,000		Lag 10	$2,289,000	99.6%	$1,775,955	$6,955
Jan-Year 4	$1,888,000	$16,000	$1,872,000		Lag 9	$2,286,000	99.5%	$1,881,827	$9,827
Feb-Year 4	$1,131,000	$15,000	$1,116,000		Lag 8	$2,277,000	99.1%	$1,126,292	$10,292
Mar-Year 4	$1,629,000	$42,000	$1,587,000		Lag 7	$2,263,000	98.5%	$1,611,545	$24,545
Apr-Year 4	$1,252,000	$76,000	$1,176,000		Lag 6	$2,229,000	97.0%	$1,212,404	$36,404
May-Year 4	$1,489,000	$64,000	$1,425,000		Lag 5	$2,196,000	95.6%	$1,491,189	$66,189
Jun-Year 4	$1,321,000	$342,000	$979,000		Lag 4	$2,122,000	92.3%	$1,060,199	$81,199
Jul-Year 4	$1,166,000	$399,000	$767,000		Lag 3	$1,784,000	77.6%	$987,985	$220,985
Aug-Year 4	$1,230,000	$737,000	$493,000		Lag 2	$819,000	35.6%	NA	
Sep-Year 4	$1,400,000	$1,327,000	$73,000		Lag 1	$56,000	2.4%	NA	

PMPM (Aug-Year3) = $1,871,000 / 11,700 = $159.91
PMPM (Sep-Year3) = $2,298,000 / 11,400 = $201.58
PMPM (Aug-Year4) = $159.91 * 1.07 = $171.11

5. Continued

Projected Claims (Aug-Year4) = $171.11 * 11,900 = $2,036,192
Reserve (Aug-Year4) = $2,036,192 - $493,000 = $1,543,192

PMPM (Sep-Year4) = $201.58 * 1.07 = $215.69
Projected Claims (Sep-Year4) = $215.69 * 12,100 = $2,609,843
Reserve (Aug-Year 4) = $2,609,843 - $73,000 = $2,536,843

Total Reserve = $\sum$(Column G) + $1,543,192 + $2,536,843 = $4,541,734

(b) Calculate the difference between the original reserve and the revised reserve from the run-out study. Show your work

		(H)	(I)	(J) = (A) / (E)	(K) = (J) - (H)	(L)	(M) = (K) + (L)	(N) = (G)
		Paid Thru	Lag factors	Revised	Reserve as	4th Qtr	Run-out	Original
		Dec - Year 4	from part a	Ultimate	of 12/31/Year 4	Payments	Reserve	Reserve
Lag 17	Aug-Year 3	$1,871,000	100.0%					
Lag 16	Sep-Year 3	$2,298,000	100.0%					
Lag 15	Oct-Year 3	$2,185,000	100.0%	$2,185,000	$0	$0	$0	$0
Lag 14	Nov-Year 3	$2,436,000	100.0%	$2,436,000	$0	$4,000	$4,000	$5,303
Lag 13	Dec-Year 3	$1,782,000	100.0%	$1,782,000	$0	$13,000	$13,000	$6,955
Lag 12	Jan-Year 4	$1,888,000	100.0%	$1,888,000	$0	$16,000	$16,000	$9,827
Lag 11	Feb-Year 4	$1,131,000	99.8%	$1,133,466	$2,466	$15,000	$17,466	$10,292
Lag 10	Mar-Year 4	$1,629,000	99.6%	$1,635,405	$6,405	$42,000	$48,405	$24,545
Lag 9	Apr-Year 4	$1,252,000	99.5%	$1,258,572	$6,572	$76,000	$82,572	$36,404
Lag 8	May-Year 4	$1,489,000	99.1%	$1,502,733	$13,733	$64,000	$77,733	$66,189
Lag 7	Jun-Year 4	$1,321,000	98.5%	$1,341,431	$20,431	$342,000	$362,431	$81,199
Lag 6	Jul-Year 4	$1,166,000	97.0%	$1,202,094	$36,094	$399,000	$435,094	$220,985
Lag 5	Aug-Year 4	$1,230,000	95.6%	$1,287,131	$57,131	$737,000	$794,131	$1,543,192
Lag 4	Sep-Year 4	$1,400,000	92.3%	$1,516,117	$116,117	$1,327,000	$1,443,117	$2,536,843

Total Original Reserve = $\sum$(Column N) = $4,541,734 (from part a)
Total Revised Reserve = $\sum$(Column M) = $3,293,949
Difference = $4,541,734 - $3,293,949 = $1,247,785

(c) List considerations of Actuarial Standard of Practice #5 that can be used in estimating incurred claims.

Commentary on Question:
There was some confusion on what ASOP 5 represents.

Considerations include:
- Health Benefit Plan Provisions and Business Practices
- Economic and other External influences
- Behavior of Claimants
- Organizational Claims Administration
- Claim Seasonality
- Credibility

5. **Continued**

- Risk Characteristics and Organizational Practices by Line of Business
- Legislative Requirements
- Carve-Outs
- Special Considerations for Long-term Products (not applicable for health insurance)