

This is a sample of the instructor materials for *Gapenski's Cases in Healthcare Finance*, sixth edition, by George H. Pink and Paula H. Song.

The complete instructor materials include the following:

- PowerPoint slides
- Case questions
- Case solutions
- Spreadsheet models

This sample includes the PowerPoint slides, case questions, and case solution for Case 1, “New England Healthcare.”

If you adopt this text, you will be given access to the complete materials. To obtain access, e-mail your request to hapbooks@ache.org and include the following information in your message:

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CASE 1

NEW ENGLAND HEALTHCARE (Premium Development)

Introduction

- **This case illustrates the development of a health plan's premium bid to a large employer consortium.**
- **The primary goal of this case is to give you the opportunity to**
 - **use cost data to estimate medical costs for a covered population,**
 - **see the impact of copays and coverage limitations on medical costs, and**
 - **convert PMPM rates into single and family premiums.**

Spreadsheet Model

- **The spreadsheet model for this case is relatively lengthy.**
- **The model uses input data, such as base PMPMs for individual services, copay adjustment factors, and inflation rate, to estimate the average PMPM cost and premium rates for the covered population.**

Spreadsheet Model

- The model consists of a complete base case analysis. No changes need to be made to the existing MODEL-GENERATED DATA section. However, values in the INPUT DATA section of the student spreadsheet have been replaced by zeros. Students must select appropriate input values and enter them into the cells with values colored red. After this is done, any error cells will be corrected and the base case solution will appear. The KEY OUTPUT section includes the most important output from the MODEL-GENERATED DATA section.

Key Input

Inflation adjustment	2 years x 2.5% per year = 5%
Administrative expense %	Stated in case
Profit / reserves %	Stated in case

Q1: PMPM for inpatient services

Fee-for-service method:

Inpatient utilization	425 per 1000
Per diem rate	\$2,200
Annual cost per member	$(0.425 \times \$2,200) = \935.00
PMPM	$\$935.00 / 12 = \77.92

Q2: PMPM for facilities services

Fee-for-service method:

From exhibit 1.3:

Skilled nursing care	$0.0252 \times \$650 / 12 = \1.37
Inpatient mental health	$0.0644 \times \$740 / 12 = \3.97
Surgery	$0.0417 \times \$1,800 / 12 = \6.26
Emergency department	$0.132 \times \$250 / 12 = \2.75

Q3: PMPM for PCP services

Cost approach:

Visits per PCP	4,000
PCP visits per member	3.4
Members per PCP	$4,000 / 3.4 = 1,176.47$
Reimbursement per PCP	\$200,000
PMPM	$\$200,000 / 1,176.47 / 12 = \14.17

Q3: PMPM for specialist services

Fee-for-service method:

Specialist utilization	1.5 visits per year per member
Cost per visit	\$92.65
Annual cost per member	$1.5 \times \$92.65 = \138.98
PMPM	$\$138.98 / 12 = \11.58

Q4: Moderate-cost plan

I. Medical Expenses

Facility Services:

	Historical Cost Data	Historical Utilization	Base PMPM Cost	Copay Adjustment Factors		Adjusted PMPM Cost	Inflation Adjusted PMPM Cost
				Cost	Utilization		
Inpatient:							
Acute	\$ 2,200.00	0.4250	\$ 77.92	0.9777	0.9600	\$ 73.13	
Skilled nursing	650.00	0.0252	1.37	1.0000	1.0000	1.37	
Mental health	740.00	0.0644	3.97	0.9768	1.1520	4.47	
Substance abuse			0.41	1.0000	1.0000	0.41	
Surgical procedures	1,800.00	0.0417	6.26	0.8846	1.0000	5.53	
Emergency room	250.00	0.1320	2.75	0.9429	0.9850	2.55	
Outpatient procedures			3.43	1.0000	1.0000	3.43	
Total facility services PMPM amount			\$ 96.10			\$ 90.89	\$ 95.44



Q4: Moderate-cost plan

Physician Services:

Primary care	\$	14.17	0.8593	0.9500	\$	11.57
Specialist care						
Office visits		11.58	0.7795	0.9460		8.54
Surgical services		9.00	0.9544	1.0000		8.59
All other services		23.67	0.8659	0.9100		<u>18.65</u>
Total physician services PMPM amount						<u>\$ 47.35 \$ 49.71</u>

Q4: Moderate-cost plan

II. Other Expenses

Administrative	\$	21.77	
Reserves		<u>7.26</u>	
Total other expenses	\$	29.03	\$ 30.48
Total PMPM amount			<u>\$ 175.63</u>

III. Premium Rates

	<u>Single</u>	<u>Family</u>
Rate factor	1.216	3.356
Monthly premium	\$213.57	\$589.43



Q5: High-cost plan

III. Premium Rates

	Single	Family
Rate factor	1.216	3.356
Monthly premium	\$233.45	\$644.30



Q6: Low-cost plan

III. Premium Rates

	Single	Family
Rate factor	1.216	3.356
Monthly premium	\$197.27	\$544.43



Q7: Which plan?

Summary:

	PMPM	Single Premium	Family Premium	Single Total Premiums	Family Total Premiums	Total Annual Premiums
Low cost plan	\$162.23	\$197.27	\$544.43	\$28,406,486	\$117,597,244	\$146,003,730
Moderate cost plan	\$175.63	\$213.57	\$589.43	\$30,754,133	\$127,316,041	\$158,070,173
High cost plan	\$191.99	\$233.45	\$644.30	\$33,617,379	\$139,169,312	\$172,786,691

Q7: Which plan?

- 1. Let the buyer consortium choose the plan that it wants to offer to its employees and then charge the appropriate estimated cost.**
- 2. Make a “lowball” bid that might increase the chances of getting the contract. However, this could be risky and potentially lead to large premium increases in the future.**
- 3. Make a “highball” bid to increase profit margin. However, overpricing is probably not possible because of local market competition.**

Q8: Employees pay half

**The monthly total premium amount for the moderate plan (from Q7) is
 $\$158,070,173 / 12 = \$13,172,514$.**

Employers will pay half the monthly premium, so employees will be responsible for

$$0.5 \times \$13,172,514 = \$6,586,257.$$

There are 12,000 single and 18,000 family subscribers.

Let x be the amount of the single premium:

$$12,000x + 18,000(2x) = \$6,586,257$$

$$48,000x = \$6,586,257$$

$$x = \$137.21$$

The family premium is

$$2 \times \$137.21 = \$274.43.$$

KLP 1: Medical costs must reflect both historical payer experience and the effect of future actions

- **The key to a correct premium is a sound estimate of medical costs. The starting point for this estimate is the payer's experience with this or similar populations. Any changes that will affect either utilization or costs must be included in the premium analysis.**

**KLP 2: Health plan premiums depend on
(1) services offered, (2) service limitations,
and (3) amount of copay**

- **The factors that affect utilization and medical costs affect premium requirements. Thus, buyers of healthcare services have a great deal of say in the final cost of the healthcare plan.**

KLP 3: Although calculated on a PMPM basis, premiums must be converted to tiers

- **Premiums paid by employees for single and family coverage rarely reflect actuarial costs. Rather, it is common for employers to (1) subsidize a large portion of the premium and (2) require single employees to pay more than their fair share.**

CASE 1 QUESTIONS

NEW ENGLAND HEALTHCARE

Premium Development

1. Historical data indicate that the covered population uses 500 inpatient days of acute care services per 1,000 members. Furthermore, the consortium's current average daily payment for inpatient services is \$2,800. However, the managed care company's data indicate that utilization management could reduce utilization into the 400-450/day range and that hospitals within the state currently have managed care plan contracts with per diem rates of \$2,000 to \$2,400. With this information in hand, calculate the appropriate base PMPM for inpatient services.
2. What are the appropriate base PMPM costs for the remaining facilities services, including skilled nursing home, mental health, surgical, and emergency department utilization?
3. What are the base PMPM costs for physician services, including primary care services and specialist office visits?
4. Use the data developed in Questions 1 through 3, along with other required inputs, to complete the exhibit 1.1 Premium Development Worksheet, assuming that a moderate approach is taken regarding the delivery of health services. Consider this premium to be the base case.
5. What is the premium for the high-cost plan? (This plan will have the lowest copays and highest service thresholds.)
6. What is the premium for the low-cost plan? (This plan will have the highest copays and lowest service thresholds.)
7. Which plan should the managed care company offer to the buyer consortium?
8. Assume that the consortium wants employees to pay half of the final premium. Furthermore, assume that the consortium accepts your base case (moderate) bid. Finally, the consortium wants to limit the family coverage premium to twice that of the individual coverage premium. What are the resulting premium costs to employees under single and family coverage? Explain why the premium costs to employees calculated for this question are not the same as the premium costs calculated in the model.
9. In your opinion, what are three key learning points from this case?

CASE 1 SOLUTION**NEW ENGLAND HEALTHCARE****Premium Development****Case Information**

This case requires students to develop a health plan's premium bid to an employer consortium. In the process, students gain knowledge of the effects of copays and coverage limitations on health plan costs. The case makes the distinction between a plan's medical costs and its administrative costs. Students must grapple with the problem of converting an average PMPM for the covered employee population into specific single and family monthly premiums.

This case is relatively complex in that many individual calculations are required to build the premium. However, the accompanying model takes much of the busywork out of the process.

Model Description

The model takes much of the busywork out of the case, so it enables students to spend more time on interpretation and evaluation. Like most case models, the student and instructor versions differ only in regards to the input data. The instructor's version contains the complete base case inputs, whereas these inputs are zeroed out in the student version of the model.

The model for this case takes the input data (base PMPMs, copay adjustment factors, and inflation rate) and calculates the final PMPM rate and single and family premiums. The model is structured with much of the input data contained in the MODEL-GENERATED DATA section, so it is not practical to reproduce it here. However, because the model uses the basic format given in exhibit 1.1 of the case, with minor modification, it is relatively easy to use by both instructors and students.

Case Solution

As a starting point in evaluating students' solutions, we provide a solution that is based on the questions contained in this manual. It is important, however, to recognize that this solution is merely a starting point, and student work should be graded at least as much on the basis of thought processes, assumptions used, creativity, and the ability to express ideas coherently as on the resulting numerical answers.

Some questions address conceptual issues that most students understand but typically would not include in a case presentation or write-up. These questions may be directed to the presenting team, if team presentations are used, or offered to the class in general.

1. Historical data indicate that the covered population uses 500 inpatient days of acute care services per 1,000 members. Furthermore, the consortium's current average daily payment for inpatient services is \$2,800. However, the managed care company's data indicate that utilization management could reduce utilization into the 400-450/day range and that hospitals within the state currently have managed care plan contracts with per diem rates of \$2,000 to \$2,400. With this information in hand, calculate the appropriate base PMPM for inpatient services.

When developing premiums, the base PMPMs must reflect the best expectations of the plan, as opposed to blindly accepting historical data. Of course, such expectations are based on historical utilization and cost data, but if actions taken by the plan (such as tightened utilization management or more aggressive provider contracting) mean that the historical data are invalid, then these changes must be incorporated into the rate-setting process.

Here, we assume that the HMO has a good chance of attaining the utilization and contract rates that it has experienced, so the base inpatient acute care PMPM is based on inpatient utilization of 425 days per 1,000 members and a \$2,200 per diem rate. Thus, the annual utilization per member is $425 / 1,000 = 0.425$ days per year, producing an annual cost per member of $0.425 \times \$2,200 = \935.00 . Thus, the monthly PMPM is $\$935.00 / 12 = \77.92 . Note that the model automatically calculates this amount when the \$2,200 per diem rate and 0.425 days per member annual utilization are entered into the appropriate cells.

2. What are the appropriate base PMPM costs for the remaining facilities services, including skilled nursing home, mental health, surgical, and emergency department utilization?

The fee-for-service approach that was used in Question 1 is also applied here.

For skilled nursing care, utilization is 0.0252 days per member per year, and the current average daily cost is \$650, for an annual per member rate of $0.0252 \times \$650 = \16.38 . Thus, the monthly PMPM is $\$16.38 / 12 = \1.37 . Note that the model automatically calculates this amount when the \$650 daily cost and 0.0252 days per member annual utilization are entered into the appropriate cells.

For inpatient mental health care, utilization is 0.0644 days per member per year, and the current average daily cost is \$740, for a PMPM of $(0.0644 \times \$740) / 12 = \3.97 . Note that the model automatically calculates this amount.

For hospital-based surgery, utilization is 0.0417 surgeries per member per year, and the current average cost is \$1,800 per case, for a PMPM of $(0.0417 \times \$1,800) / 12 = \6.26 . Note that the model automatically calculates this amount.

For emergency department care, utilization is 0.132 visits per member per year, and the current average cost is \$250 per visit, for a PMPM of $(0.132 \times \$250) / 12 = \2.75 . Note that the model automatically calculates this amount.

Facilities services not listed in the preceding paragraphs were calculated in a similar manner. (See the model for details.)

3. What are the base PMPM costs for physician services, including primary care services and specialist office visits?

The budgetary approach is used for primary care physicians. Because each primary care physician is assumed to handle 4,000 patient visits, and utilization is expected to be 3.4 visits per member, each physician can be assigned $4,000 / 3.4 = 1,176.47$ members. Assuming an annual reimbursement of \$200,000, the PMPM cost is $\$200,000 / 1,176.47 / 12 = \14.17 .

Specialist's office visit costs are estimated using the fee-for-service approach. Here, each member has 1.5 visits per year at a cost of \$92.65 per visit, for a PMPM of $(1.5 \times \$92.65) / 12 = \11.58 . Both these amounts are calculated in the model.

4. Use the data developed in Questions 1 through 3, along with other required inputs, to complete the exhibit 1.1 Premium Development Worksheet, assuming that a moderate approach is taken regarding the delivery of health services. Consider this premium to be the base case.

The base (moderate cost plan) case solution is presented below. In general, moderate (mid-range) limitations are placed on mental health care services and moderate copays are assessed. The final result is a PMPM of \$175.63, which further breaks down into a monthly premium of \$213.57 for single subscribers and a family premium of \$589.43.

The solution shown here assumes a 5 percent inflation rate in both medical and other costs associated with the contract. This allows for cost increases that are expected to occur between the data collection used to develop the bid and the actual implementation of the contract.

The amount that needs to be collected (based on 75,000 total members) is $75,000 \times \$175.63 = \$13,172,514$. Furthermore, the premiums collected are expected to be $(12,000 \times \$213.57) + (18,000 \times \$589.43) = \$2,562,844 + \$10,609,670 = \$13,172,514$, so the premium amounts generate the requisite revenues.

Students will come up with different solutions, depending on how they define the moderate scenario. However, most will develop a PMPM within a few dollars of the one presented here. Here are the limitations and copays used in the base case solution:

Mental health coverage is limited to 60 days.

Copays are as follows:

Acute inpatient care	\$150 per admission
Mental health inpatient care	\$150 per admission
Inpatient surgical services	\$150 per procedure
Emergency care	\$ 25 per visit
Primary physician care	\$ 15 per visit
Specialist physician care	\$ 10 per visit plus \$10 PCP copay

PMPM Calculation:

	Historical Cost Data	Historical Utilization	Base PMPM Cost	Copro Adjustment Factors		Adjusted PMPM Cost	Inflation Adjusted PMPM Cost
				Cost	Utilization		
I. Medical Expenses							
<i>Facility Services:</i>							
Inpatient:							
Acute	\$ 2,200.00	0.4250	\$ 77.92	0.9777	0.9600	\$ 73.13	
Skilled nursing	650.00	0.0252	1.37	1.0000	1.0000	1.37	
Mental health	740.00	0.0644	3.97	0.9768	1.1520	4.47	
Substance abuse			0.41	1.0000	1.0000	0.41	
Surgical procedures	1,800.00	0.0417	6.26	0.8846	1.0000	5.53	
Emergency room	250.00	0.1320	2.75	0.9429	0.9850	2.55	
Outpatient procedures			3.43	1.0000	1.0000	3.43	
Total facility services PMPM amount			\$ 96.10			\$ 90.89	\$ 95.44
<i>Physician Services:</i>							
Primary care			\$ 14.17	0.8593	0.9500	\$ 11.57	
Specialist care							
Office visits			11.58	0.7795	0.9460	8.54	
Surgical services			9.00	0.9544	1.0000	8.59	
All other services			23.67	0.8659	0.9100	18.65	
Total physician services PMPM amount						\$ 47.35	\$ 49.71
Total facility and physician services PMPM amount							\$ 145.15
II. Other Expenses							
Administrative						\$ 21.77	
Reserves						7.26	
Total other expenses						\$ 29.03	\$ 30.48
Total PMPM amount							\$ 175.63
III. Premium Rates							
	Single	Family					
Rate factor	1.216	3.356					
Monthly premium	\$213.57	\$589.43					

5. What is the premium for the high-cost plan? (This plan will have the lowest copays and highest service thresholds.)

This result is shown below. Again, there is some room for differences among analyses. Here are the limitations and copays used in this solution:

Mental health coverage is limited to 90 days.

There are no copays with this plan.

PMPM Calculation:

	Historical Cost Data	Historical Utilization	Base PMPM Cost	Copay Adjustment Factors		Adjusted PMPM Cost	Inflation Adjusted PMPM Cost
				Cost	Utilization		
I. Medical Expenses							
<i>Facility Services:</i>							
Inpatient:							
Acute	\$ 2,200.00	0.4250	\$ 77.92	1.0000	1.0000	\$ 77.92	
Skilled nursing	650.00	0.0252	1.37	1.0000	1.0000	1.37	
Mental health	740.00	0.0644	3.97	1.0000	1.2500	4.96	
Substance abuse			0.41	1.0000	1.0000	0.41	
Surgical procedures	1,800.00	0.0417	6.26	1.0000	1.0000	6.26	
Emergency room	250.00	0.1320	2.75	1.0857	1.0250	3.06	
Outpatient procedures			3.43	1.0000	1.0000	3.43	
Total facility services PMPM amount			\$ 96.10			\$ 97.40	\$ 102.27
<i>Physician Services:</i>							
Primary care			\$ 14.17	1.0352	1.0150	\$ 14.89	
Specialist care							
Office visits			11.58	1.0000	1.0000	11.58	
Surgical services			9.00	0.9544	1.0000	8.59	
All other services			23.67	0.8659	0.9100	18.65	
Total physician services PMPM amount						\$ 53.71	\$ 56.39
Total facility and physician services PMPM amount							\$ 158.67
II. Other Expenses							
Administrative						\$ 23.80	
Reserves						7.93	
Total other expenses						\$ 31.73	\$ 33.32
Total PMPM amount							\$ 191.99
III. Premium Rates							
		Single	Family				
Rate factor		1.216	3.356				
Monthly premium		\$233.45	\$644.30				

6. What is the premium for the low-cost plan? (This plan will have the highest copays and lowest service thresholds.)

This result is shown below. Again, there is some room for differences among analyses. Limitations and copays are as follows:

Mental health coverage is limited to 30 days.

Copays are as follows:

Acute inpatient care	\$250 per admission
Mental health inpatient care	\$250 per admission
Inpatient surgical services	\$250 per procedure
Emergency care	\$ 50 per visit
Primary physician care	\$ 25 per visit
Specialist physician care	\$ 20 per visit plus \$20 PCP copay

PMPM Calculation:

	Historical Cost Data	Historical Utilization	Base PMPM Cost	Copay Adjustment Factors		Adjusted PMPM Cost	Inflation Adjusted PMPM Cost
				Cost	Utilization		
I. Medical Expenses							
<i>Facility Services:</i>							
Inpatient:							
Acute	\$ 2,200.00	0.4250	\$ 77.92	0.9642	0.9200	\$ 69.12	
Skilled nursing	650.00	0.0252	1.37	1.0000	1.0000	1.37	
Mental health	740.00	0.0644	3.97	0.9532	0.8762	3.32	
Substance abuse			0.41	1.0000	1.0000	0.41	
Surgical procedures	1,800.00	0.0417	6.26	0.8077	1.0000	5.05	
Emergency room	250.00	0.1320	2.75	0.8000	0.9550	2.10	
Outpatient procedures			3.43	1.0000	1.0000	3.43	
Total facility services PMPM amount			\$ 96.10			\$ 84.79	\$ 89.03
<i>Physician Services:</i>							
Primary care			\$ 14.17	0.6834	0.8900	\$ 8.62	
Specialist care							
Office visits			11.58	0.6692	0.9080	7.04	
Surgical services			9.00	0.9544	1.0000	8.59	
All other services			23.67	0.8659	0.9100	18.65	
Total physician services PMPM amount						\$ 42.89	\$ 45.04
Total facility and physician services PMPM amount							\$ 134.07
II. Other Expenses							
Administrative						\$ 20.11	
Reserves						6.70	
Total other expenses						\$ 26.81	\$ 28.15
Total PMPM amount							\$ 162.23
III. Premium Rates							
		Single	Family				
Rate factor		1.216	3.356				
Monthly premium		\$197.27	\$544.43				

7. Which plan should the managed care company offer to the buyer consortium?

Here is a review of the results:

Summary:

	PMPM	Single Premium	Family Premium	Single Total Premiums	Family Total Premiums	Total Annual Premiums
Low cost plan	\$162.23	\$197.27	\$544.43	\$28,406,486	\$117,597,244	\$146,003,730
Moderate cost plan	\$175.63	\$213.57	\$589.43	\$30,754,133	\$127,316,041	\$158,070,173
High cost plan	\$191.99	\$233.45	\$644.30	\$33,617,379	\$139,169,312	\$172,786,691

The plans differ in total premiums by more than \$26 million dollars between the least costly to the most costly. There are three possible strategies:

1. Let the buyer consortium choose the plan that it wants to offer to its employees and then charge the appropriate estimated cost.
2. Make a "lowball" bid that might increase the chances of getting the contract. However, this could be risky and potentially lead to large premium increases in the future.
3. Make a "highball" bid to increase profit margin. However, overpricing is probably not possible because of local market competition.

Considering all factors, strategy 1 is probably the best.

8. Assume that the consortium wants employees to pay half of the final premium. Furthermore, assume that the consortium accepts your base case (moderate) bid. Finally, the consortium wants to limit the family coverage premium to twice that of the individual coverage premium. What are the resulting premium costs to employees under single and family coverage? Explain why the premium costs to employees calculated for this question are not the same as the premium costs calculated in the model.

The problem can be solved algebraically by recognizing that the monthly total premium amount (as calculated above this solution) is $\$158,070,173 / 12 = \$13,172,514$ and that there are 12,000 single and 18,000 family subscribers. Then, remember that the employers will pay half the monthly premium, so employees will be responsible for $0.5 \times \$13,172,514 = \$6,586,257$. Then, set up the following equation, where x is the amount of the single premium:

$$\begin{aligned} 12,000x + 18,000(2x) &= \$6,586,257 \\ 48,000x &= \$6,586,257 \\ x &= \$137.21. \end{aligned}$$

Thus, the monthly premium for single subscribers is \$137.21, and the premium for families is $2 \times \$137.21 = \274.43 .

Note that the original cost to employees under the moderate-cost plan, assuming a 50 percent payment by employers, was estimated to be $\$213.57 / 2 = \106.79 for individuals and $\$589.43 / 2 = \294.71 for family coverage. The difference is due to the fact the consortium wants to limit the cost of family coverage to only twice that of single coverage. The resulting adjustment produces a situation in which single employees subsidize married employees.

9. In your opinion, what are three key learning points from this case?

1. **Medical costs must reflect both historical payer experience and the effect of future actions.** The key to a correct premium is a sound estimate of medical costs. The starting point for this estimate is the payer's experience with this or similar populations. Any changes that will affect either utilization or costs must be included in the premium analysis.
2. **Health plan premiums depend on (1) services offered, (2) service limitations, and (3) amount of copay.** The factors that affect utilization and medical costs affect premium requirements. Thus, buyers of healthcare services have a great deal of say in the final cost of the healthcare plan.
3. **Although calculated on a PMPM basis, premiums must be converted to tiers.** Premiums paid by employees for single and family coverage rarely reflect actuarial costs. Rather, it is common for employers to (1) subsidize a large portion of the premium and (2) require single employees to pay more than their fair share.