CHAPTER 14

COST ALLOCATION, CUSTOMER-PROFITABILITY ANALYSIS, AND SALES-VARIANCE ANAYLSIS

# LEARNING OBJECTIVES

1. Identify four purposes for allocating costs to cost objects
2. Guide cost-allocation decisions using appropriate criteria
3. Discuss decisions faced when collecting costs in indirect-cost pools
4. Discuss why a company’s revenues can differ across customers purchasing the same product
5. Apply the concept of cost hierarchy to customer costing
6. Discuss why customer profitability differs across customers
7. Provide additional information about the sales-volume variance by calculating the sales-mix variance and the sales-quantity variances
8. Provide additional information about the sales-quantity variance by calculating the market-share variance and the market-size variances

## CHAPTER OVERVIEW

Chapter 14 emphasizes the subject described by one successful business owner as the purpose of cost accounting—cost allocation. If all costs were traceable to the cost object, cost accounting texts would be much smaller. The difficulty of assigning indirect costs to the cost object is the subject of much study but necessary for providing information needed for strategic and operating decisions. In this chapter the customer is the cost object and the approach is on macro issues in cost allocation—allocation of costs to divisions, plants, and customers.

Combining an analysis of revenues and of costs by customer provides the manager insight into why differences in customer profitability exist. Revenues are primarily analyzed through volume of units of product purchased and magnitude of price discounting. An illustration of an activity-based costing system on customer rather than products is used to describe customer cost analysis. The costs are defined through the use of a cost hierarchy. Several factors are described as useful in deciding how to allocate resources across customers.

In the second section of the chapter, actual amounts of revenue are compared to those budgeted through variance analysis. Revenue price variance or flexible budget variance was covered in Chapter 7. Volume variance for sales is reviewed and then subdivided into the sales mix variance and sales quantity variance. If reliable data about market size and share are available, the sales quantity variance can be separated for those—market-size variance and market-share variance. The appendix gives explanation for subdividing the cost variances introduced in Chapter 7. The mix and yield variances for substitutable inputs are similar in concept and computation to the mix and quantity variances for revenue.

## CHAPTER OUTLINE

1. Cost allocation
2. Problem for organizations and accounting but necessary for decisions, both strategic and operating
3. Purposes of cost allocation

***Learning Objective 1:***

Identify four purposes for allocating costs to cost objects

1. Costs related to cost object cannot be traced in cost-effective way—indirect costs
2. Costs that cannot be traced must be allocated
3. Such costs often comprise a large percentage of overall costs
4. Different costs are appropriate for different purposes *[Exhibit 14-1]*

TEACHING TIP: The purpose or reason for doing any activity should be carefully considered and defined at the start of that activity. As noted in the previous chapter, a company can benefit from having a specific strategy chosen to guide decisions and activities throughout that organization. The purposes of allocating costs are at the beginning of the discussion of cost allocation so as to guide the method by which costs are allocated.

1. To provide information for economic purposes
2. To motivate managers and other employees
3. To justify costs or compute reimbursement
4. To measure income and assets for reporting to external parties

**Do multiple choice 1.** **Assign Exercise 14-16 and Problem 14-26.**

***Learning Objective 2:***

Guide cost-allocation decisions using appropriate criteria

1. Criteria to guide cost-allocation decisions *[Exhibit 14-2]*
2. Choose the purpose, then select criteria, implement allocation
3. Cause-and-effect criterion – superior for economic decisions or motivation; used for activity-based costing applications
4. Benefits-received criterion – superior for economic decisions or motivation
5. Fairness criterion – especially difficult to obtain agreement
6. Ability-to-bear criterion – raises issues related to cross-subsidization

**Do multiple choice 2.** **Assign Exercise 14-17 and Problem 14-27.**

1. Use cost-benefit approach when designing and implementing cost-allocation systems
2. Cost of collecting data and educating managers about cost-allocation system
3. Benefit of making better-informed decisions derived from well-designed system
4. Advances in technology reduce costs and allow for more detailed cost allocations
5. Cost allocation and costing systems: costs incurred in different parts of a company assigned, and then reassigned, for costing products, services, customers, or contracts with illustration

 *[Exhibits 14-3 and 14-4]*

***Learning Objective 3:***

Discuss decisions faced when collecting costs in indirect cost pools

1. Allocating corporate costs to divisions and products *[Surveys of Company Practice]*
2. All corporate costs to divisions
3. Incurred to support activities of the divisions
4. Motivates division managers to examine how corporate costs planned and controlled
5. Used to determine full cost of product

1. No corporate costs to divisions: costs not controllable by division managers
2. Only some corporate costs to divisions
3. Costs widely perceived as causally related to division activities
4. Cost widely perceived that provide explicit benefits to divisions
5. Choosing cost pools to use in allocation: key decision of number of indirect cost pools
6. Use of a single cost pool
7. Use of **homogeneous cost pool**
8. Similar cause-and-effect or benefits-received relationship with cost-allocation base
9. More accurate costs of a given cost object: same allocation results for pool as if each individual activity allocated separately
10. Fewer cost pools required to accurately explain differences in how divisions or products use company resources
11. Use of numerous individual corporate cost pools
12. Costs not homogeneous with current pools
13. Resources used differently by divisions
14. Information technology reduces cost/increases benefit of using multiple pools
15. View of managers
16. Improvements in information-gathering technology
17. Choosing cost-allocation base to use in allocation: ones that have best cause-and-effect relationships with costs

**Do multiple choice 3.** **Assign Exercises 14-18 and 14-19.**

1. **Customer profitability analysis**
2. Purpose
3. The reporting and analysis of revenues earned from customers and costs incurred to earn those revenues
4. Ensuring that customers making large contributions to operating income of a company receive a level of attention from the organization matching their contribution to company’s profitability

***Learning Objective 4:***

Discuss why a company’s revenues can differ across customers purchasing the same product

1. Customer revenue analysis
2. Variable of volume sold
3. Variable of magnitude of **price discounting** (reduction of selling price below list selling prices to encourage increases in customer purchasing)
4. Records needed of pricing history
5. Reasons for discounting

i. Volume discounts

ii. Desire to sell to customer who might help promote other sales

iii. Poor negotiating by salesperson or unwanted effect of incentive plan based only on revenues

**Do multiple choice 4. Assignment follows L. O. 5 and 6.**

***Learning Objective 5:***

Apply the concept of cost hierarchy to customer costing

1. Customer cost analysis
2. **Customer** **cost hierarchy**: categorizes costs related to customers into different cost pools on the basis of different types of cost drivers (cost-allocation bases) or different degrees of difficulty in determining cause-and-effect (benefits received) relationships
3. Some costs can be reliably assigned to individual customers
4. Some costs can be reliably assigned only to distribution channels or to corporatewide efforts

 **Assign Problems 14-28 and 14-31.**

***Learning Objective 6:***

Discuss why customer profitability differs across customers

1. Customer-level costs *[Exhibit 14-5]*
2. Customer output unit-level costs: resources sacrificed on activities performed to deliver each unit to a customer
3. Customer batch level costs: resources sacrificed on activities that are related to a group of units delivered to a customer
4. Customer-sustaining costs: resources sacrificed on activities undertaken to support individual customers, regardless of the number of units or batches of product delivered to customers

d. Cost reduction of each activity highlighted by use of activity-based costing

3. Customer-level operating income analysis *[Exhibit 14-6]*

1. Distribution-channel costs—not allocated to customers
2. Changes in customer behavior does not affect distribution-channel costs

ii. Salespersons responsible for managing individual customer accounts demotivated if bonuses affected by costs over which they had minimal influence

1. Corporate-sustaining costs—no cause-and-effect or benefits-received relationship for individual customers and distribution channels
2. Some argue allocation of all costs for pricing decisions that use full costs
3. Not allocating has value in distinguishing between various degrees of objectivity and different levels at which decisions made and performance evaluated
4. Customer-profitability profiles *[Exhibit 14-7]*
5. Highlights how vital a small set of customers is to retail profitability *[Exhibit 14-8]*
6. Focuses on ways to make future business with customer more profitable
7. Assesses customer value
8. Likelihood of customer retention
9. Potential for customer growth
10. Long-run customer profitability
11. Increases in overall demand from having well-known customers
12. Ability to learn from a customer
13. Deserves cautious approach when deciding to drop customers—concern for long-run profitability may provide misleading signals about customer’s short-run profitability

# Do multiple choice 5. Assign Exercises 14-20, 14-21 [Refer to Problem 5-34], 14-22, and Problems 14-20, 14-30, 14-38.

1. Sales variances
2. Static-budget variance: difference between an actual result and a budgeted amount in the static budget *[Refer to Exhibit 14-9]*
3. Flexible-budget variance: difference, based on level of output actually achieved (sold), between actual result and the flexible-budget amount—budgeted contribution margin times actual unit volume sold

**TEACHING TIP**: The flexible-budget variance is also the selling-price variance. As the selling-price variance the difference between actual selling price and budgeted selling price is multiplied by level of output actually achieved (sold). As the flexible-budget variance in this section of the text the budgeted contribution margin is used in the calculation to multiply by the actual unit of volume sold, eliminating the need to refer to variable costs. Use of the selling price rather than the contribution margin will change the amount of the variances. Some of the problems in the text include the selling price but also include the variable costs so the contribution margin can be calculated.

2. Sales-volume variance: effect on budgeted contribution margin of the difference between actual quantity and budgeted quantity of units sold

***Learning Objective 7:***

Provide additional information about the sales-volume variance by calculating the sales-mix variance and sales-quantity variances

1. Subdivisions of sales-volume variance *[Exhibit 14-10]*
2. **Sales-mix variance**: difference between budgeted contribution margin for actual sales mix and budgeted contribution margin for budgeted sales mix
3. Trade-off between products with greater contribution margin and those with smaller contribution margins—and effect on profitability
4. **Composite unit**: hypothetical unit with weights based on mix of individual units
5. Reason for variance should be investigated
6. **Sales-quantity variance**: difference between (1) budgeted contribution margin based on actual units sold of all products and the budgeted-mix and (2) contribution margin in the static budget [budgeted units of all products to be sold and the budgeted mix] *[Exhibit 14-11]*

**Do multiple choice 6, 7, and 8. Assign Exercises 14-23 and 14-24 and Problems 14-32 [Refer to**

 **Problem 14-33] and 14-34 [Refer to Problem 14-35].**

***Learning Objective 8:***

Provide additional information about the sales-quantity variance by calculating the market-share variance and market-size variances

1. **Market-share variance**: difference in budgeted contribution margin for actual market size in units caused solely by the actual market share being different from the budgeted market share
2. **Market-size variance**: difference in budgeted contribution margin at the budgeted market share caused solely by the actual market size in units being different from budgeted market size in units

**Do multiple choice 9 and 10. Assign Exercises 14-25 and Problems 14-33 and 14-35 [L. O. 7].**

1. Necessary to obtain reliable market share and size data to calculate the variances *[Exhibit 14-12]*
2. Appendix: Mix and yield variances for substitutable inputs
3. Substitutable inputs
4. Efficiency variance—Direct materials or direct labor *[Exhibit 14-13]*
5. Mix variance (inputs) *[Exhibit 14-14]*
6. Yield variance

 **Assign Problems 14-36 and 14-37.**

**CHAPTER QUIZ SOLUTIONS:** 1.**d** 2.**c** 3.**a** 4.**b** 5.**c** 6.**b** 7.**c** 8.**d** 9.**a** 10.**b**

## CHAPTER QUIZ

1. Which of the following is **not** a primary purpose given in the text for allocating costs?
2. To provide information for economic decisions
3. To motivate managers and other employees
4. To measure income and assets for reporting to external parties
5. To foster cost awareness among managers to improve decisions
6. Which of the following is considered more of an objective than a criterion?
7. cause and effect
8. benefits received
9. fairness or equity
10. ability to bear
11. Homogeneity is used to
12. develop cost pools in which the costs have the same or similar cost-allocation base.
13. develop cost pools of similar amounts for allocation purposes.
14. develop cost pools based upon similarity of origination of costs to be allocated.
15. develop cost pools only for activity-based costing.
16. Information about price discounting can be useful in analyzing revenues of customers if
17. sales people are properly trained in sales forecasting.
18. records in the information system are kept of reductions in selling price below list price.
19. a strictly enforced company policy is in place regarding volume-based price discounts.
20. sales people are on an incentive plan that is based on revenues.
21. Which of the factors that managers must consider in deciding the allocation of resources across customers might provide misleading signals about dropping a current customer?
22. Potential for customer growth
23. Likelihood of customer retention
24. Long-run customer profitability
25. Ability to learn from customer

**Use the following information for questions 6–10.**

 Natural Nutrients Bakery of Springfield produces three flavors of cat morsels that have budgeted and actual sales data for a bag of a dozen of their cat morsels as follows for December 2003:

 Budgeted Data Actual Data

 Pheasantries Dairy Dew Sea Shells Pheasantries Dairy Dew Sea Shells

 Bags 7,200 4,800 4,000 10,800 3,600 7,200

 Price per bag $2.50 $4.00 $5.00 $2.00 $3.00 $7.50

 Revenues $18,000 $19,200 $20,000 $21,600 $10,800 $54,000

 Total revenue $57,200 $86,400

 According to company forecasts, they were budgeting to earn a 25% market share in total units (bags) of specially prepared cat treats sold in December 2003 in Springfield. Reliable industry sources indicate that the total number of bags of cat treats sold for December 2003 in Springfield was 72,000.

1. The amount of Natural Nutrients Bakery’s *sales-volume variance* for December 2003 is

a. $3,600 F. b. $20,200 F. c. $20,020 F. d. $29,200 F.

1. The *sales-quantity variance* for December 2003 for Natural Nutrients Bakery is

a. $3,600 F. b. $20,200 F. c. $20,020 F. d. $29,200 F.

1. The *sales-mix variance* for December 2003 for Natural Nutrients Bakery is

a. $8,600 F. b. $8,760 F. c. $160 F. d. $180 F.

1. Natural Nutrients Bakery experienced a *market-size variance* for December 2003 of

a. $7,150 F. b. $8,000 F. c. $11,440 F. d. $11,600 F.

1. The *market-share variance* for December 2003 for Natural Nutrients Bakery is

a. $20,020 F. b. $12,870 F. c. $11,600 F. d. $11,440 F.

**WRITING/DISCUSSION EXERCISES**

1. **Identify four purposes for allocating costs to cost objects**

***Who decides the purpose for which a cost is to be allocated?*** The given situation for which a cost is being developed defines the purpose because one would not calculate the cost of something without a reason. Managers are usually the first to recognize the need for a cost to be developed and, therefore, would be the ones to consider the reason or purpose behind that cost. Few situations would be so focused as to only have one purpose, however. Cost allocation is a matter of judgment. Reasonable people will disagree in matters of judgment. The allocation of indirect costs is best done when a purpose is clearly understood by those who would be affected by the cost. Managers should work closely with the accountants so that the purpose of the allocation is not lost in the mechanics.

1. **Guide cost-allocation decisions using appropriate criteria**

***Give reasons why the cause-and-effect criterion is superior among the given criteria.***

Various reasons are given in the text for the superiority of the cause-and-effect criterion as a guide to allocating costs. Among those reasons are the following:

* more accurate costing of a product, service, customer, or activity;
* more easily explained to a manager or customer;
* greater understanding of the processes and activities that comprise the operations of the organization; and
* a better basis on which to make decisions.

In the Chapter 5 discussion of activity-based costing, these same reasons are given as to the benefit of using cause-and-effect as a basis for choice of cost-allocation base.

1. **Discuss decisions faced when collecting costs in indirect-cost pools**

**If a company chooses to not allocate some costs, for example, corporate costs to divisions, what happens to those costs?** Obviously, the costs exist and are included in the financial reports. Not allocating some costs will result in total company profit being less than the sum of individual product profits in an income statement arranged to show each product, service, or distribution channel [See Exhibit 14-6]. If an income statement was categorized by divisions, the sum of the profits of each division would be more than the overall company profit because the unallocated cost would be subtracted from the sum of the division profits to arrive at the profit for the whole of the company.

1. **Discuss why a company’s revenues can differ across customers purchasing the same product**

***Discuss the importance of the scorekeeping function of accounting in explaining revenue differences of customers due to price discounting.*** As noted in the text, “companies that record only the invoice price in their information system cannot readily track the magnitude of their price discounting.” Information obtained from tracking discounts not only by customer but also by salesperson enables a company to do profitability profiles on their customers. Without the detail provided by the scorekeeping function of the accounting information system, such profitability analysis could not happen.

1. **Apply the concept of cost hierarchy to customer costing**

***The term “hierarchy” refers to a structuring of items by rank or grade. Would the “hierarchy” be different for costing a product than for a customer?*** The terms “ hierarchy” and “cost” derive meaning in relationship to an object. The purpose for developing the cost hierarchy begins the process by clearly identifying the objective of the costing system. If the purpose were to cost a product or service, then the cost hierarchy would be developed with the product or service as the object. If the purpose is to cost a customer, then the customer is the object. Products or services would have a different configuration of costs than a customer, requiring their hierarchies of costs to differ. The overall concept of a hierarchy is that of ranking or assigning priority to a group of persons or things, and in this case, costs.

1. **Discuss why customer profitability differs across customers**

***How does the all-purpose 80-20 rule apply to customer-profitability analysis?***

The 80-20 rule is a general expression of having a small group provide the most benefit. In examining profitability of customers, a company may notice that 20% of those customers provide 80% of the profit. Knowing this enables the company to service that 20% in such a way as to maintain or enhance profits. The information also helps the company to work with the other 80% of their customers through careful study of revenues and costs associated with them in an effort to enhance their profitability. The 80-20 rule does not always apply. The phenomenon is widely observed and may be applicable. A company is better served if it can determine that such a situation exists for them. [An aside: The 80-20 rule is often applied to eating habits. People eat 20% of the foods known to them 80% of the time. The fast food industry has used and enhanced this concept.]

1. **Provide additional information about the sales-volume variance by calculating the sales-mix variance and sales-quantity variance**

***Is it possible to overdo the variance thing by subdividing variances too many times?***

Variance analysis provides a means of examining differences between actual results and planned activity. As stated in Chapter 1, “The success of management accounting depends on whether the planning and control decisions of managers are improved by the accounting information provided to them.” The planning decisions incorporated in the budgeting process are compared to the control decisions resulting in actual quantities and prices, providing useful feedback. The cost required to plan ahead, however, must be exceeded by the benefit obtained from this feedback. Variance analysis is not an end in itself but a means to improve decisions made.

Cause and effect is a complicated relationship, seldom totally explained by a few interactions. The more specific pieces of information obtained through an in-depth analysis, the better the opportunity to make connections between the many factors involved in designing, manufacturing, and selling a product. Pulling numbers together into a variance analysis format is the starting point for the analysis. Examining the revenue variances along with the cost variances keeps managers focused on the effectiveness and efficiency of the organization as a whole.

1. **Provide additional information about the sales-quantity variance by calculating the market-share variance and market-size variance**

***What actions can a company take in an attempt to increase market size?***

Market size could be changed if the product being sold is relatively price elastic and the price was discounted or reduced, resulting in greater demand. Advertising could also be used to increase the size of the market. If more potential customers know about the product, then they could possibly become customers. Both price discounting and advertising could be used in the short run to increase market size. A long-run approach could be the development of new products that were similar or considered a part of the same market. The new products could generate additional sales and thus increase the size of the market.

New products are developed to meet customers’ needs. Using an example from the text [Problems 14-34 and 14-35], Debbie’s Delight, Inc., has several types of cookies. If Debbie could delight cookie consumers by developing another type of cookie that could meet the needs of people who were not presently customers, the market of cookie customers would be expanded or increased in size. The market is being defined as customers who buy cookies in Chicago in August 2003. If the new product was purchased by customers who would have bought one of the types of cookies already on the market but from a competitor, then Debbie’s market share would be changed but not the size of the market. The new product would have to enlarge the number of customers within the industry for the size of the market to increase.

**WHICH AMOUNT IS CORRECT?**

**All amounts were calculated using systematic rational methods.**

**EXAMPLE 1—Castleford Engineering has a cost reimbursement contract requiring 100 hours of time in Machining Dept. and 15 hours of Assembly Dept. time. For the combined departments the costs of manufacturing overhead is $1,316,000 and 7,000 hours of direct labor are used.**

# Method 1 $21,140

###### Method 2 $22,325

**Method 3 $22,185**

**EXAMPLE 2—Farmers’ Dairy produces 100,000 gallons of product at a cost of $400,000. [25,000 gallons of cream and 75,000 of liquid skim]**

**Method Cream—Selling for $8/gal. Liquid Skim-selling for $4/gal**

 **1 $6.40 $3.20**

 **2 4.00 4.00**

 **3 4.40 3.86 2/3**

 **4 3.80 4.06 2/3**

**EXAMPLE 3—Plastim, Inc., manufactures lenses for automobile rear lamps or taillights.**

 **Selling Price Cost Method 1 Cost Method 2**

# Simple lens $ 63 $58.75 $ 49.98

# Complex lens $137 $97.00 $132.07

**NOTE TO INSTRUCTOR:** *These examples were taken from illustrations in the text: Example 1 is from Chapter 15 and uses the direct, step-down, and reciprocal methods, respectively. Example 2 is from Chapter 16 and uses the sales value at splitoff, physical measures, estimated net realizable, and constant gross margin methods, respectively. Example 3 is comparing using one cost driver with activity-based costing in Chapter 5. This could be used to stress the importance of the purpose of cost allocation or, more broadly, the type of costing system. Which is correct?* ***Know the purpose for allocating the costs and use appropriate criteria in determining the method to use*.**

DEMONSTRATION PROBLEM—DIRECT LABOR EFFICIENCY, YIELD, AND MIX VARIANCES

Riverside Hospital reports the following information for July 2003 regarding its nursing staff consisting of registered nurses (RNs), licensed practical nurses (LPNs), and aides.

####  Actual Hours Budgeted Hours Budgeted Rate per Hour

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| RNs | 8,750 | 8,100 | $25 |
| LPNs | 4,900 | 5,400 | 17 |
| Aides | 3,850 | 4,500 | 12 |

**Required:**

1. Calculate the total direct nursing labor efficiency variance for July 2003.
2. Calculate the total direct nursing labor yield and mix variances for July 2003.
3. Briefly describe the conclusions you would draw from the variance analysis.

[The following tables may be included.]

Actual total quantity of all inputs used and actual input mix percentages for input are as follows:

##### Nursing Staff Actual Hours Actual Mix Percentage

|  |  |  |
| --- | --- | --- |
| RNs | 8,750 | 8,750 ÷17,500 = 0.50 |
| LPNs | 4,900 | 4,900 ÷ 17,500 = 0.28 |
| Aides | 3,850 | 3,850 ÷ 17,500 = 0.22 |
| Total | 17,500 | 1.00 |

Budgeted total quantity of all inputs allowed and budgeted input mix percentages for each input are as follows:

#### Nursing Staff Budgeted Hours Budgeted Mix Percentage

|  |  |  |
| --- | --- | --- |
| RNs | 8,100 | 8,100 ÷ 18,000 = 0.45 |
| LPNs | 5,400 | 5,400 ÷ 18,000 = 0.30 |
| Aides | 4,500 | 4,500 ÷ 18,000 = 0.25 |
|  | 18,000 | 1.00 |

**DEMONSTRATION PROBLEM SOLUTION—DIRECT LABOR EFFICIENCY, YIELD, AND MIX VARIANCES**

1 & 2. Direct Nursing Labor Yield, Mix, and Efficiency Variances for Riverside Hospital for July 2003

|  |  |  |  |
| --- | --- | --- | --- |
|  | (Actual Total Quantityof All Inputs Usedx Actual Input Mix)x Actual Price | (Actual Total Quantityof All Inputs Usedx Budgeted Input Mix)x Budgeted Price | Flexible Budget(Budgeted TotalQuantityof All Inputs Allowed forActual Outputx Budgeted Input Mix)x Budgeted Price |
| RNs | 17,500 x 0.50 x $25 = $218,750 | 17,500 x 0.45 x $25 = $196,875 | 18,000 x 0.45 x $25 = $202,500 |
| LPNs | 17,500 x 0.28 x $17 = 83,300 | 17,500 x 0.30 x $17 = 89,250  | 18,000 x 0.30 x $17 = 91,800 |
| Aides | 17,500 x 0.22 x $12 = 46,200  | 17,500 x 0.25 x $12 = 52,500 | 18,000 x 0.25 x $12 = 54,000 |
|  | $348,250 | $338,625 | $348,300 |
|  |  |  $9,625 U |  $9,675 F |
|  |  |  |  |
|  | Total mix variance | Total yield variance |
|  |  $50 F  |  |

 Total efficiency variance

(F = favorable effect on operating income; U = unfavorable effect on operating income.)

The total direct nursing labor efficiency variance can also be computed as:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Direct nursing labor efficiency variance for each input | = | Actual inputs | – | Budgeted inputs allowed for actual outputs achieved | x | Budgeted price |

The total direct nursing labor mix variance can also be computed as the sum of the direct nursing labor mix variances for each input.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Direct nursing labor mix variance for each input | = | Actual nursing labor input mix percentage | – | Budgeted nursing labor input mix percentage | x | Actual total quantity of all nursing labor input used | x | Budgeted price of nursing labor inputs |

The total direct nursing labor yield variance can also be computed as the sum of the direct nursing labor yield variances for each input

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Direct nursing labor yield variance for each input | = | Actual total quantity of all direct nursing labor inputs used | – | Budgeted total quantity of all direct nursing labor inputs allowed | x | Budgeted direct nursing labor input | x | Budgeted price of direct nursing |

3. Riverside Hospital shows an unfavorable mix variance because it used a higher percentage of the higher (budgeted) price RNs in the actual mix relative to the budgeted mix. It shows a favorable yield variance because the total number of actual hours of nursing time was less than the budgeted amount. One possible explanation is that using more experienced and qualified RNs reduced the total time needed for nursing activities—the unfavorable mix variance was more than offset by the favorable yield variance. Alternatively, of course, management might find that the mix and yield variances are unrelated. In either case, management must evaluate if using fewer nursing hours compromised the quality of care. Poor quality care could hurt the long-run reputation and prospects of the hospital. Management’s goal is to control costs without reducing the quality of care.