

Cost Accounting

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Syllabus

- Definition**
- Purpose**
- Advantages**
- Method**
- Break-even analysis**
- Billable test**

Definition

Cost accounting

A technique for calculating costs associated with tasks or processes that are performed by an organization.

Purpose

When do cost analysis

- To introduce new services
- To eliminate a test
- To modify methods
- To replace or introduce an equipment
- To evaluate tests referred to other laboratories
- To decide deployment of personnel

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Advantages

Advantages of using cost analysis

- Being beneficial to the institution, the laboratory and the patient**
- Being valuable in the continued surveillance of laboratory cost**
- Being useful in selecting cost-efficient procedures**
- Having more effective laboratory budgeting programs**

Method

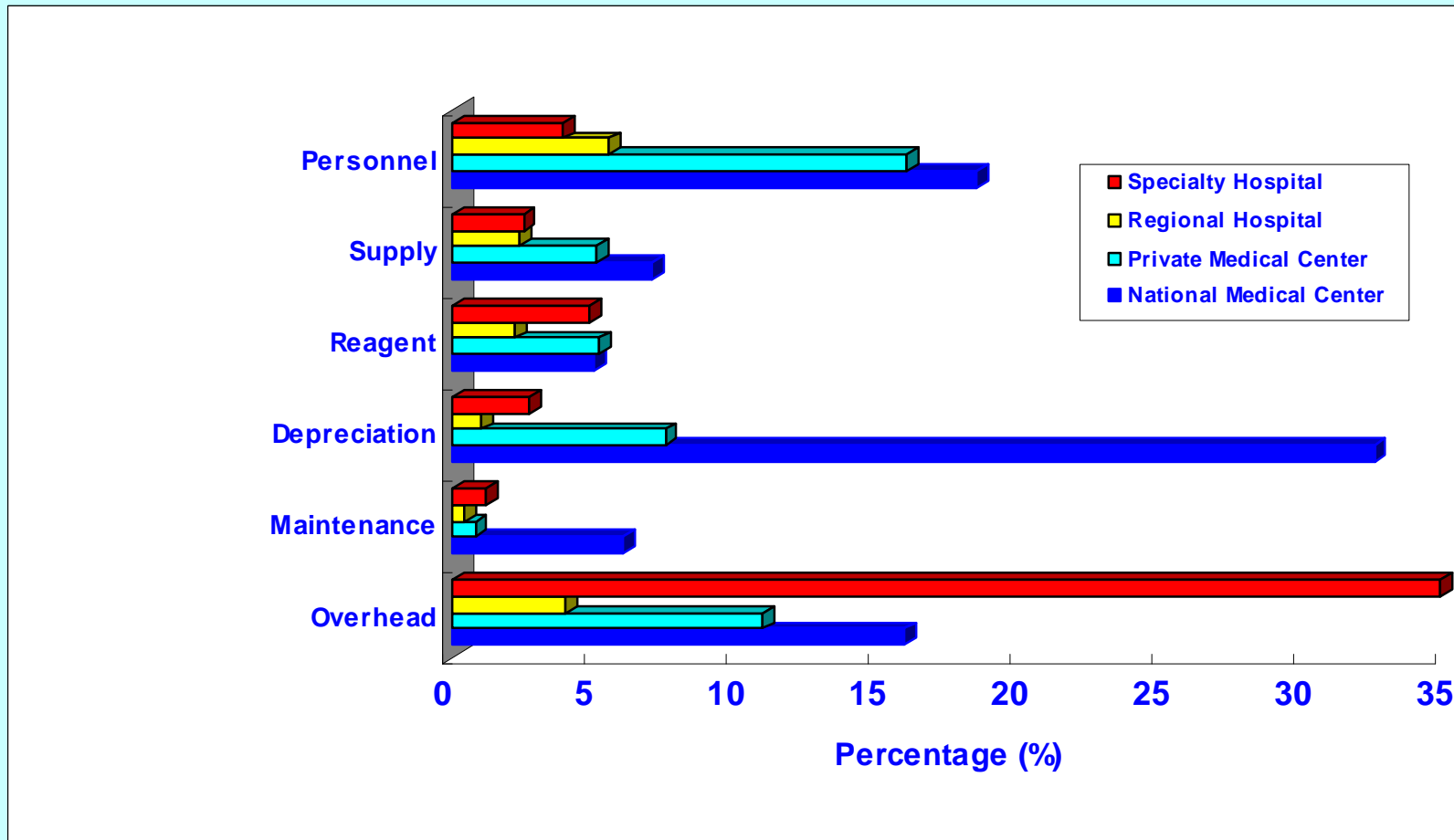
Method to establish test price

- Comparison method
- Engineering method
- Historical method

Comparison method

**setting test price by
comparing with
others**

Different cost at different hospital



Comparison method

- Easier
- Not very accurate
- Neither reliable nor fair

Engineering method
setting test price by
calculating both
direct and indirect
cost

Costs

Direct cost

- Labor costs
 - Performance of test
 - Specimen procurement
- Supplies for specimen procurement
- Supplies for performing test
- Reagents for performing test

Indirect costs

- Labor for running standards and controls
- Reagents and supplies for standards and controls
- Costs of standards and controls
- Overhead
- Depreciation of capital equipment
- Building depreciation

Direct cost

➤ *Labor costs*

Performance of test

CAP workload units x average salary/min

Specimen procurement

CAP workload units x average salary/min

Direct cost

➤ *Supplies for specimen procurement*

Cost x number used/test

Direct cost

➤ *Reagents for performing test*

Cost ÷ tests

Indirect costs

➤ *Labor for running standards and controls*

Labor for standards =

$$\begin{aligned} & [\text{standards (12 month)} \div \text{patient tests (12 month)}] \\ & \times (\text{CAP unit} \times \text{average salary/min}) \end{aligned}$$

Labor for controls =

$$\begin{aligned} & [\text{controls (12 month)} \div \text{patient tests (12 month)}] \\ & \times (\text{CAP unit} \times \text{average salary/min}) \end{aligned}$$

Indirect costs

➤ *Reagents and supplies*

Reagents and supplies for standards =
[standards (12 month) ÷ patient tests (12 month)]
x (supply/test + reagent/test)

Reagents and supplies for controls =
[controls (12 month) ÷ patient tests (12 month)]
x (supply/test + reagent/test)

Indirect costs

➤ *Costs of standards and controls*

Cost of standards =

standards (12 month) ÷ patient tests (12 month)

Cost of controls =

controls (12 month) ÷ patient tests (12 month)

Indirect costs

➤ *Overhead*

$$\begin{aligned} \text{Allocated overhead} &= \\ &\text{allocated overhead (year)} \\ &\div \\ &\text{total laboratory tests (year)} \end{aligned}$$

$$\begin{aligned} \text{Laboratory overhead} &= \\ &\text{laboratory overhead (year)} \\ &\div \\ &\text{total laboratory tests (year)} \end{aligned}$$

Indirect costs

➤ *Depreciation of capital equipment*

$$\frac{\text{Equipment used depreciation/year}}{\text{tests/year}}$$

Indirect costs

➤ *Building depreciation*

Depreciation allocated

÷

total laboratory tests (year)

Total costs =

Total direct costs + Total indirect costs

Price per test =

Total costs x (1 + profit)

Engineering method

- More accurate
- More time-consuming
- Expensive to perform

Laboratory

- Revenue center
- Nonrevenue center
- Allocation of cost

Laboratory direct costs (I)

	Chem	Hema	Micro	BB	Sero
Salaries	1,208	1,125	1,233	1,192	1,091
Equipment	226	244	272	132	318
Reagents	1,914	291	1,372	126	2,591
Others	120	86	118	12,537	116
Subtotal	3,468	1,746	2,995	13,987	4,116

unit: thousand

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Laboratory direct costs (II)

	Lab admin	SCC	Information desk
Salaries	2,098	40	40
Equipment	412	60	50
Reagents	17	20	30
Others	722	60	80
Subtotal	3,249	180	200

unit: thousand

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Lab nonrevenue cost center apportionment

		Chem	Hema	Micro	BB	Sero
Revenue center direct costs		3,468	1,746	2,995	13,987	4,116
Nonrevenue center direct costs						
Lab admin	3,249	428	215	370	1727	508
SCC	180	24	12	20	96	28
Information desk	200	26	13	23	106	31
Total apportioned direct costs		3,946	5,932	3,408	15,916	4,683

unit: thousand

Allocation of indirect costs

			Chem	Hema	Micro	BB	Sero
Building depreciation	107	M ²	21	34	18	21	13
Personnel dept.	101	Personnel	20	32	17	20	12
Purchasing	92	% purchases	18	30	16	18	10
Administration	650	% direct cost	76	114	65	305	90
Total indirect cost			135	210	116	364	125
Total direct cost			3,946	5,932	3,408	15,916	4,683
Total allocated cost			4,081	6,142	3,524	16,280	4,804

unit: thousand

Historical method

setting test price by CAP workload units

Historical method

Total annual costs (AC) in department =

annual direct costs + annual indirect costs

Annual CAP workload units (W) in department

Cost per workload unit (CP) = AC / W

Cost per test (CT) = CP x CAP workload unit

Price per test = CT x (1 + profit)

Historical method

- Easy
- Less time consuming
- More general

Break-even analysis

Cost

◆ Variable cost

(變動費用)

Reagent and
supplies

Direct labor

◆ Fixed cost

(固定費用)

Allocated indirect

Equipment

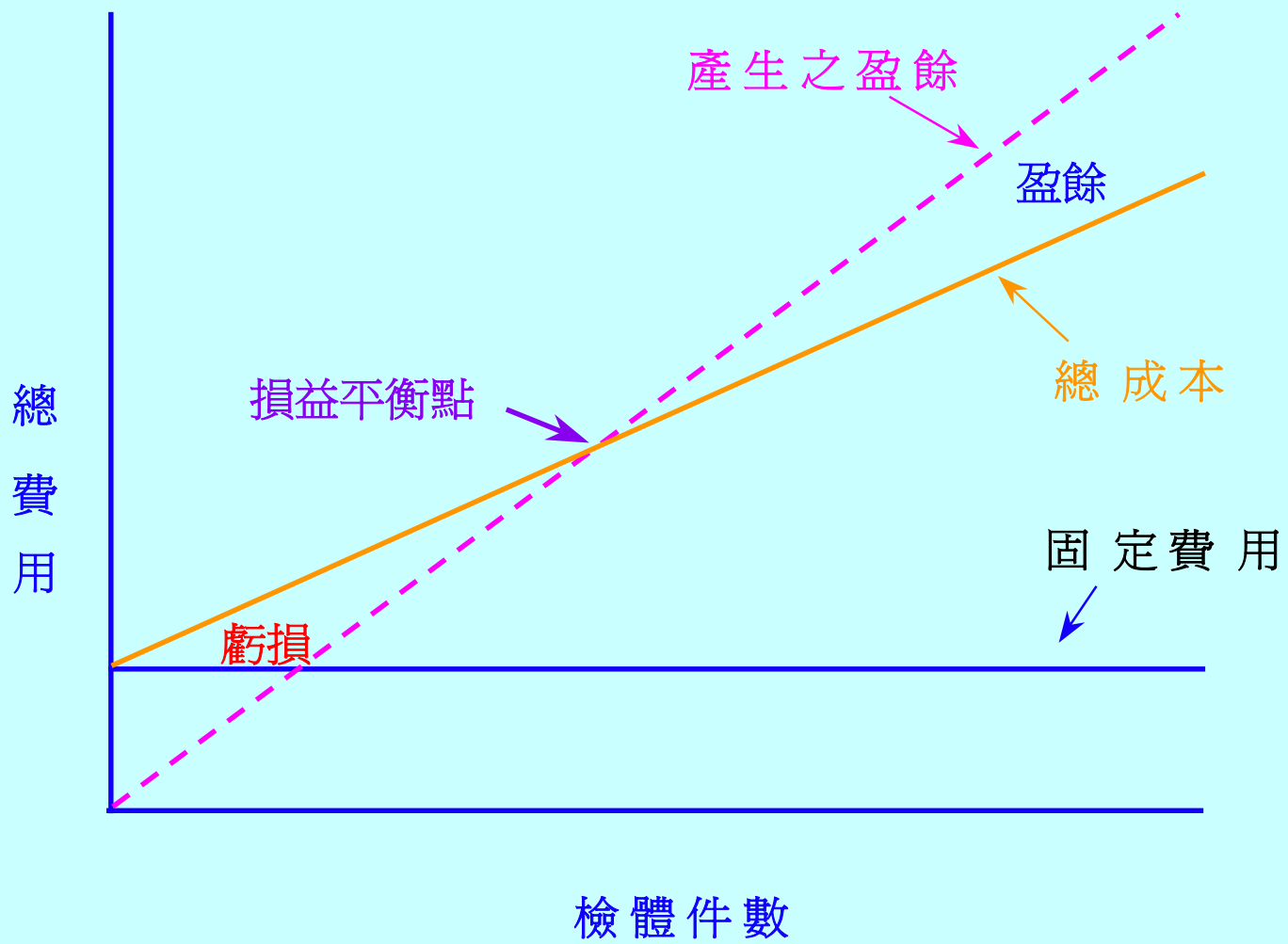
depreciation and

maintenance

Difficult to classify definitively

Break - even point

That point at which the **numbers of tests** performed produced total revenues equal to total costs (fixed costs and variable costs).



	Number of tests		
	50	100	150
Total cost			
Variable cost (\$6.0)	300	600	900
Fixed cost	10,000	10,000	10,000
Total cost	10,300	10,600	10,900
Unit cost			
Variable cost per unit	6	6	6
Fixed cost per unit	200	100	66.7
Total cost per unit	206	106	72.7

Break - even point

$$rx = vx + f + c$$

$$x = \frac{f + c}{r - v}$$

x = the break-even point (number of tests)

r = revenue per unit

v = variable cost per unit

f = total fixed cost

c = net income contribution

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If fixed cost is \$10,000 and unit variable cost is \$6. Setting the unit revenue at \$10 and c at zero, then what is the break-even point?

$$rX = vX + f + c$$

$$X = \frac{f + c}{r - v} = \frac{10,000 + 0}{10 - 6} = 2,500$$

Thus, 2500 tests must be performed in order to break even.

Component	Current	Volume (↑20%)
Volume	125	150
Total revenue @ \$10	\$ 1,250	\$ 1,500
Variable cost @ \$6	\$ 750	\$ 900
Fixed cost	\$ 500	\$ 500
Net income	\$ 0	\$ 100

$$(\$ 900 + \$ 500) / 150 = \$ 9.33$$

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Component	Current	Labor (↓20%)
Volume	125	125
Total revenue @ \$10	\$ 1,250	\$ 1,250
Variable cost	\$ 750	\$ 600
	@ \$6	@ \$4.8
Fixed cost	\$ 500	\$ 500
Net income	\$ 0	\$ 150

Component	current	Revenue (↑20%)
------------------	----------------	---------------------------

Volume	125	125
Total revenue	\$ 1,250	\$ 1,500
	@ \$10	@ \$12
Variable cost	\$ 750	\$ 750
@ \$6		
Fixed cost	\$ 500	\$ 500
Net income	\$ 0	\$ 250

Break – even analysis

- ❑ **To demonstrate the economic batch size**
- ❑ **To determine frequency of testing**
- ❑ **To determine the test volume required to justify the purchase of automated equipment**
- ❑ **To establish the number of tests needed to perform a procedure**

Billable test:

Total number of tests billed to patients or third party

Non-billable activity:

quality control, calibration, repeats, duplicates, primes and proficiency testing.

Cost per billable test

- This is proportional to cost per test.**
- This is dependent on equipment design and use.**

**Thank you for
your attention**

Management of Information

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Syllabus

- **Definition**
- **Rules and needs for record keeping**
- **Method**
- **Stages in data processing**
- **System development**
- **Laboratory Information Management System**
- **Hospital Information System**
- **System acquisition**
- **Implementation**
- **Evaluation**

Data

**Factual information
used as a basis for
reasoning, discussion or
calculation.**

Record

**A group of related data
necessary for
performing a given
function.**

Information

A systematic record of data organized to convey meaning, communication, or reception of knowledge.

Data



Record



Information

Rules for systematic record keeping

- **Each item of information must be recorded in a reserved space.**
- **Each item of information must be recorded in a specific way.**

Needs to process data

- **Limitations in the capacity of the human mind**
- **Requirement for written evidence**

Management information system

- **Manual**
- **Partially automated**
- **Fully computerized**

History of clinical laboratory computerization

- **Late 1950s – workload and associated clerical tasks**
- **1960s – to automate these tasks: paper tape, punched cards, magnetic tape**
- **1970s – microprocessors – fully functional, user-oriented computer systems**
- **1980s – HIS and LIS interactive ability**

Requirements of methods of recording information

- **Concise**
- **Consistent**
- **Comprehensive**
- **Convenient**

Stages in data processing

- **Origination**
- **Input**
- **Processing**
- **Output**
- **Storage**

Advantages of laboratory information management system

- **Faster report and retrieval of patient test results**
- **Easing of laboratory workload**
- **Better management**

Faster report and retrieval of patient test results

- **Through speed of reporting**
- **By use of patient cumulative reports**
- **Through faster retrieval**

Easing of laboratory workload

- **Through generation of specimen labels**
- **Through automatic calculations of results**
- **Through elimination of transcription activities**
- **By making an inventory of pending workload**
- **Through generation of laboratory worksheet**
- **By faster reporting, causing a decrease in telephone inquiries**

Better management

- **Through quality control results**
- **Through workload statistics**

System development

- **System analysis**
- **System design**
- **System acquisition**
- **Implementation**
- **Evaluation**

System analysis

➤ **Initiation**

➤ **Survey**

Testing process

- **Order entry and order communication**
- **Phlebotomy service**
- **Receipt of specimens**
- **Analysis of specimens**
- **Quality control and results verification**
- **Interpretative functions**
- **Results reporting**
- **Statistics and quality assurance functions**
- **Billing**

System design

- **Preliminary design**
- **Detailed design**

Laboratory information management system

- **Input subsystem**
- **Processing subsystem**
- **Output subsystem**
- **Control subsystem**

Input subsystem

- **Record patient demographic data**
- **Record test requests**
- **Prepare collection schedule and container labels**
- **Prepare log of specimens received**

Processing subsystem

- **Prepare working lists and logs**
- **Prepare specimens for analysis**
- **Perform analysis and calculate result**
- **Enter results on working list**
- **Evaluate quality control results**
- **Autoverification of patient results (e.g. limit checks, delta checks)**
- **Reflex testing**

Output subsystem

- **Prepare report to patient chart**
- **Report critical (panic) values**
- **Transmit report to nursing station**
- **Prepare billing information**
- **Prepare work load reports**
- **Prepare reports to laboratory archives**

Control subsystem

- **Review quality control records**
- **Perform periodic inspection of inventory**
- **Review workload data; initiate requests for staffing or new equipment or revised operation**
- **Review requests for new services**
- **Monitor budgets and take corrective action**
- **Complete traceability in a manner compliant with the US Food and Drug Administration Regulation 21 CFR Part 11**

Hospital Information System

- **Laboratory subsystem**
- **Pharmacy subsystem**
- **Registration subsystem**
- **Billing subsystem**
- **Catering subsystem**
- **In-patient subsystem**
- **Emergency subsystem**

System acquisition

- **In-house production system**
- **Ready-made system**
- **Development**

Implementation

- **Installation**
- **Testing**
- **Training**
- **Backup system**

Evaluation

- **Comparison**
- **Modification**

Considerations in Purchasing a LIMS

➤ **Speed**

Response time between screen < 3 s

➤ **Reliability**

Real-time backup capability

No need for redundant processors

Downtime only for planned maintenance

➤ **Connectivity**

Total independence of peripherals and cabling from LIS server

HL-7 interfaces to hospital information system

Accessibility to laboratory clients

Attachment of instrument with ASTM standards

➤ **Adaptability**

Database systems that support real-time decisions

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Paperless

**Thank you for
your attention**