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Slide 2

Dimensions of Quality

Technical performance
Access to services
Effectiveness of standards
Interpersonal relations
Efficiency of service delivery
Continuity of services
Safely
Physical infrastructure and comfort
Choice of services

Slide 3

Definition of quality

“The quality of technical care consists in the application of medical science and technology in a way that maximizes its benefits to health without correspondingly increasing its risks. The degree of quality is, therefore, the extent to which the care provided is expected to achieve the most favorable balance of risks and benefits.”

• Avedis Donabedian M.D., 1980
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**Definition of quality**

“Doing the right thing, right, the first time. Doing it better the next time.”

- ODI Consulting

Slide 5

**Definition of quality**

“Quality is conformance to requirements or specifications.”

- Phil Crosby 1979

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**Definition of quality**

“...proper performance (according to standards) of interventions that are known to be safe, that are affordable to the society in question, and have the ability to produce an impact on mortality, morbidity, disability, and malnutrition.”

- M.I. Roemer and C. Montoya Aguilar, WHO, 1988
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**Definition of quality**

“Quality is compliance with standards.”
- QA Project Contract, 1997

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**Perspectives on quality**

- Client / Family
- Provider
- Health Care Administration & Management
- Community

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**Systems view of quality**

- Input
  - Right workers for the right job
  - Availability of drugs
  - Necessary equipment and supplies

- Process
  - Compliance to standards of care

- Outcomes
  - Correctly treated patient
  - Satisfied clients
  - Increased utilization
  - Healthy patients
  - Reduced disability
  - Death
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QD Defining Quality
QI Improving Quality
QM Measuring Quality

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Institutionalization model

Slide 12

Definition of quality assurance

"Quality Assurance is that set of activities that are carried out to set standards and to monitor and improve performance so that the care provided is as effective and as safe as possible."

The Quality Assurance Project, 1995
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Four principles of QA

- Customer focus
- Team work
- System thinking
- Data use

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Quality assurance

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Systems view of QA

- Input
  - QA Specialist
  - Clinical and managerial guidelines
  - Resources to implement standards of care

- Process
  - Training in QA
  - Communication of standards (approaches)
  - Quality design activities

- Outcome
  - Improved quality of care
  - Compliance to standards
  - Establishment of QA culture
Slide 16

What is cost?

- Something expended to obtain a benefit (expense, disbursement)
- The quantity of one thing that is exchanged for a service or a product (price, charge)
- A loss incurred in the course of gaining something (toll, sacrifice, loss)

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What is cost?

<table>
<thead>
<tr>
<th>Cost Type</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monetary or financial (e.g., wage rate of employees)</td>
<td>Actual expenses incurred for an input or to provide a product or service, at a given time</td>
</tr>
<tr>
<td>Economic or opportunity (e.g., value of employee’s time engaged in work outside of primary job duties)</td>
<td>The value of benefits foregone by using resources to provide alternate products or services</td>
</tr>
<tr>
<td>&quot;Accounting&quot; (e.g., depreciation allowance)</td>
<td>Artificial costs applied to reflect the real value of a product or service at a given time; cost is not actually incurred</td>
</tr>
<tr>
<td>Shadow prices, for non-monetary (e.g., donated time and equipment)</td>
<td>Costs applied to subsidize goods and services whose true value is not the same as listed</td>
</tr>
</tbody>
</table>

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Major cost categories

- PEOPLE
- MACHINE
- MATERIAL
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**Cost dimensions**
- Direct vs. Indirect Cost
- Obvious vs. Hidden cost
- (Investment or Capital or Fixed) Cost vs. (Recurrent or Variable) Cost
- Unit cost
- Average Cost
- Incremental Cost

*Note: Some costs are “unknown and unknowable” (Deming)*

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**Cost of quality**
- Costs incurred in achieving/maintaining quality standards, and
- Those costs resulting from not achieving/maintaining quality standards

Source: Juran, Shewhart

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**Cost of quality**

- Prevention: Costs incurred to prevent ‘defective’ units of services from being produced
- Appraisal: Costs incurred to detect ‘defective’ units of services before they are given to clients
- Failure:
  - Internal: Costs incurred when services are identified as defective before they reach the client
  - External: Costs incurred when services are identified as defective after they reach the client

*Not included: Cost of ‘doing business’ or providing services*
Example - use of drugs

**PREVENTION COST:**
- Drug use protocol

**APPRaisal COst:**
- Inspection of drug stock

**Failure**
- **Internal:** Use of nonessential list drugs
- **External:** Adverse drug reaction

Assumptions

Improved Quality Requires Additional Resources, But...
- Increased efficiency or reduced re-work may save resources
- Standards may decrease variation and save costs
- Additional inputs or complex technology will require additional resources
- Increased resources do not guarantee improved quality

Assumptions (cont’d)

Costs Of Poor Quality Are Easily Seen And Fixed, But...
- Most costs of poor quality are hidden
- The causes of poor quality are often complex, systems-related issues
- Costs of correcting problems are diminished when actions are taken as close to the problem as possible
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**Quality in cost terms**

**Poor Quality:**
- Care "that falls short of customer expectations... Time or money spent on something that doesn't help the (client)... Cost of not doing things right the first time and having to do them over" (Webster)

- "Costs associated with (poor) quality are those costs that would not be expended if quality was perfect" (Waress)

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**Cost of poor quality**

- Dissatisfied patients
- Death
- The Tip of the Iceberg
- The Rest of the Iceberg
- Prolonged illness
- Misdiagnosed patients
- Incorrect use of drugs/antibiotics
- Incorrect treatment
- Wasted materials
- Wasted time
- Prolonged infectiousness
- Lost productivity
- Unnecessary services
- Frustrated workers
- Dissatisfied managers
- Suspicious community

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**Theory of quality economics**

- Quality
- Waste
- Productivity
- Cost

Source: Ishikawa (1988)
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**Effect of a change in cost on quality**

<table>
<thead>
<tr>
<th>Quality↑</th>
<th>Quality↓</th>
</tr>
</thead>
</table>
| Cost↑ | • Necessary resource is added  
         • Harmful or redundant resource is added |
| Cost↓ | • Harmful or redundant resource is removed  
         • Necessary or redundant resource is removed |


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**Taguchi’s laws**

- We can improve quality without increasing cost
- We can reduce cost by improving quality
- We cannot reduce cost without reducing quality

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**Taguchi’s loss function**

\[
L = k(y - T)^2
\]

- \(L\) = Loss in dollars
- \(k\) = Cost coefficient
- \(T\) = Specified target value
- \(y\) = Value of the measured characteristic

Source: Ealy (1988)
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**Simple example**

- **Increasing Loss to society**
  - Patient arrives, leaves and returns another time
  - Patient is on eat appointment or complication
  - Patient arrives, leaves and returns another time

- **Cost examples**
  - More patient fuel cost, unproductive time, repair and rework, cost of care, pollution
  - Patient fuel cost, loss of productive time, inconvenience, repair cost, rework

* due to equipment breakdown.

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**Flowchart of cost recovery**

- Increased Willingness to Pay
  - Loyalty to Health Facility
  - Increased Revenues

- Reputation for Quality
  - Patient Satisfaction
  - Increased Net Revenues

- Patient Satisfaction
  - Provider Satisfaction
  - Quality Assurance & Reputation for Quality
  - Efficient Implementation: Do it right the first time
  - Lower Costs

- Cost Effective Standards
  - Efficient Implementation: Do it right the first time
  - Lower Costs

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**Cost analysis guidelines**

1. Define Objective of Cost Analysis
2. Decide on level of analysis...
Cost analysis guidelines (cont’d)

- Decide on level of analysis (for cost and quality):
  - clinic, hospital, regional, national (health systems and sub-systems)
  - intervention (e.g., for improving quality), GI tool, approach, program
  - by cost category, activity, process, department, organization or and/or program

- Measure what is relevant to decision to be made or objective of analysis
- Decide on level of precision required
- Set time period of analysis (e.g., prospective or retrospective)

Spectrum of methodologies for analyzing cost and quality

- Cost relative to benefit
- Cost and cost of poor quality
  - e.g., Cost-effectiveness analysis
  - Cost-Benefit Analysis
  - Return on Investment
  - Cost-utility analysis
  - Cost of Quality analysis
  - Analysis of inefficiency

Definitions

- Effect: Change among individuals, families or communities as a result of an activity, project or program
- Benefit: Advantages in dollar terms resulting from various actions
- Utility: (Perception of) satisfaction from consuming a specific bundle of goods and services (subjective)
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Why cost-effectiveness (C-E)?

- Useful for comparing alternatives
  - alternative interventions to achieve the same goal
  - alternative means for intervention to achieve its objectives
  - trade-offs in varying size, scope or composition of a given strategy
- Identify optimum alternative

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Cost-effectiveness analysis (CEA)

<table>
<thead>
<tr>
<th>Intervention A</th>
<th>Intervention B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>$C_A$</td>
</tr>
<tr>
<td>$C_B$</td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td>$E_A$</td>
</tr>
<tr>
<td>$E_B$</td>
<td></td>
</tr>
<tr>
<td>C-E analysis</td>
<td>$C_A/E_A$</td>
</tr>
<tr>
<td>$C_B/E_B$</td>
<td></td>
</tr>
</tbody>
</table>

Other possible analysis:
Difference in $C$ vs. Difference in $E$

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General measurement guidelines

<table>
<thead>
<tr>
<th>COST</th>
<th>EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentrate on costs</td>
<td>Decide which outcome criteria to use (output, effect, impact)</td>
</tr>
<tr>
<td>that are relevant to</td>
<td>Develop measures for criteria that can be quantified, feasibly measured, and will change depending on the alternative selected</td>
</tr>
<tr>
<td>the decision (i.e.,</td>
<td></td>
</tr>
<tr>
<td>those that depend on</td>
<td></td>
</tr>
<tr>
<td>the choice made)</td>
<td></td>
</tr>
<tr>
<td>Focus on costs that</td>
<td></td>
</tr>
<tr>
<td>will vary with each</td>
<td></td>
</tr>
<tr>
<td>alternative</td>
<td></td>
</tr>
</tbody>
</table>

Cost and Quality in Healthcare – Core Curriculum
Quality Assurance Project
September 2001
Some limitations

1. Conceptual limitations
   - when alternatives are not exactly comparable
   - when multiple effects exist for an alternative
   - deciding which costs and effects to measure

2. Interpretational limitations
   - not the only component for making decision
   - risk of overgeneralizing results

3. Measurement limitations
4. Data limitations
5. Calculation limitations

CBA and ROI

• Cost-Benefit Analysis:
  comparison of cost of resources and health benefits in terms
  of a common unit of measurement, usually monetary

• Return on Investment:
  the amount of cost benefits (savings) achieved by an
  intervention over the incremental cost of that intervention

Cost-utility analysis

• Used when effectiveness cannot be measured
• Compares cost of alternatives with subjectively derived ratings of
  those alternatives

Example of utility measures:
- DALYs - Disability Adjusted Life Years
- YHLL - Years of Healthy Life Lost
- QALYs - Quality Adjusted Life Years
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Cost-utility from sample of interventions


Chemotherapy for tuberculosis
Treatment of leukemia
Lower cost
Greater effectiveness
Environmental control of dengue
Vitamin A supplement

Evaluation of CUA

<table>
<thead>
<tr>
<th>PROS</th>
<th>CONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Enables comparison of interventions across different sectors</td>
<td>• Results depend on assumptions made in calculation</td>
</tr>
<tr>
<td>• Useful for guiding policy decision</td>
<td>• Raises ethical questions about value of life</td>
</tr>
<tr>
<td>• May not lead to equitable decisions</td>
<td></td>
</tr>
</tbody>
</table>

Sample calculation

\[ \text{YHLL} = I \times (\text{CFR} \times E(Af)) + (\text{CDR} \times D\% \times D_t) \] per 1000 per year

<table>
<thead>
<tr>
<th>1</th>
<th>Incidence rate per 1000 population per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFR</td>
<td>Case Fatality Ratio (proportion of those developing the disease who die from the disease)</td>
</tr>
<tr>
<td>Af</td>
<td>Expected average age of death</td>
</tr>
<tr>
<td>E(Af)</td>
<td>Expectation of life for age of death</td>
</tr>
<tr>
<td>CDR</td>
<td>Case Disability Ratio (1 - CFR)</td>
</tr>
<tr>
<td>D</td>
<td>Duration of Disability</td>
</tr>
<tr>
<td>D%</td>
<td>Extent of disability</td>
</tr>
</tbody>
</table>
Use of DALYS for burden of disease

<table>
<thead>
<tr>
<th>Region</th>
<th>Communicable Disease</th>
<th>Non-Communicable Disease</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formerly Socialist Economies of Europe</td>
<td>15.0</td>
<td>15.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Established Market Economies</td>
<td>12.5</td>
<td>20.0</td>
<td>12.5</td>
</tr>
<tr>
<td>World</td>
<td>14.0</td>
<td>16.0</td>
<td>14.0</td>
</tr>
</tbody>
</table>


Activity-based cost management

- Method for allocating resources to services/products using activities performed to produce services/products
- More accurate product costing and insight into the production process itself.
- ABC and Activity-Based Management (ABM) map out these cause-and-effect relationships in production of services/products

Example

Company XYZ makes two products - blue cars and red cars
- 900 blue cars produced per year, 100 red cars
- Red cars are more specialized and consume 60% of personnel time

Traditional Accounting
Assign 90% of overhead/support costs to blue cars

ABC Accounting
Assign 40% of overhead/support cost to blue cars
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**Traditional vs. ABC accounting**

<table>
<thead>
<tr>
<th>Traditional Accounting</th>
<th>ABC Accounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs</td>
<td>Costs</td>
</tr>
<tr>
<td>Products / Services</td>
<td>Activities</td>
</tr>
<tr>
<td></td>
<td>Products / Services</td>
</tr>
</tbody>
</table>

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**ABC supports process view**

<table>
<thead>
<tr>
<th>Inputs (Departments)</th>
<th>Inputs (Departments)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Process</td>
<td>Products &amp; Services</td>
</tr>
<tr>
<td>ACTIVITIES</td>
<td>ACTIVITIES</td>
</tr>
<tr>
<td>Output Unit</td>
<td>Output Unit</td>
</tr>
</tbody>
</table>

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**ABC and QA**

- Value-added vs. non-value added activities
- Primary vs. secondary activities
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**Cost and quality report**

<table>
<thead>
<tr>
<th>Company XYZ</th>
<th>Illustrative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Appraisal</td>
<td>20%</td>
</tr>
<tr>
<td>Cost of Prevention</td>
<td>20%</td>
</tr>
<tr>
<td>Cost of Failure</td>
<td>60%</td>
</tr>
<tr>
<td>Total Cost of Quality</td>
<td>100%</td>
</tr>
</tbody>
</table>

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**Analysis of inefficiency**

**Definition of efficiency**
- The achievement of objectives without wasting resources
- The relationship between output and input

**For example:**
- Two programs, A & B, use the same amount of resources
- Program A screens 10 mothers/day
- Program B screens 5 mothers/day
- Program A is more efficient than Program B

Source: Reynolds and Gaspari

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**Sources of inefficiency - examples**

- High variation in the processes for delivering a product/service
  - may itself be due to lack of standards or procedures, or lack of knowledge of these and therefore non-compliance with standards and procedures, among other things
- Using unnecessarily high cost inputs,
- Poor productivity
  - may be due to a myriad of issues, not excluding, poor processes, wrong match between skill and performance expectation
- Non-value added activities, e.g., repetition
General guideline for selecting methodologies

- Evaluate the impact of a change on cost and quality
- Compare alternatives
- Look at symptoms
- Consider cost and quality

Suggested Methodology

- Cost-effectiveness analysis
- Cost-utility analysis
- Cost-benefit analysis
- Cost management
- Analysis of efficiency

- Qualitative/quantitative
- Some effect/measure not quantified
- Different effect, but measure quantified
- Effect measured qualitatively/quantitatively
- Cost and quality, but not monetarily quantified
- Effect monetarily quantified
- Costs related to specific activities only
- Costs viewed by activity
- Analysis of inefficiency

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