

Types of decisions medical Uncertainty and Physician Decision Making Lecture 3



Types of decisions

- Routine decisions
 - decision made when problems are relatively well defined and common
 - established rules, policies, and procedures can be used to solve them
- Adaptive decisions
 - decision made when problems and alternative solutions are somewhat unusual and only partially understood
- Innovative decisions
 - decision made when problems are unusual and unclear and creative solutions are necessary



Decision making situation

- Personal decision making
- Clinical decision making
 - Process of gathering, interpreting, and evaluating data in order to select an evidence-based choice of action
- Organizational decision making
 - choosing options directed toward the resolution of organizational problems and the achievement of organizational goals



Decision levels

- Strategic decisions
 - Mainly made by top executives
 - crucial to operations or long-range planning
- Administrative decisions
 - Made by middle managers
 - resolve unusual problems and develop techniques to improve functioning
- Operational decisions
 - Made by middle and low level managers
 - routine day-to-day events.



Decision Making vs Problem Solving

- Similar but not synonymous
- Sometimes depend on one another
- Decision making may or may not involve a problem
 - (ex. Getting dressed)
 - involves selection of alternatives
- Problem solving involves diagnosing a problem and solving it
 - may be more than one correct solution
- **Decision making is a subset of problem solving**



Problem solving

- Problem

- A present unsatisfactory state that needs to be changed to a desired state as soon as possible

- *Problem solving*

- Active process that starts with a problem and ends with a solution.
- Always includes a decision-making step



Decision Making Process

- Defining the problem
- Gather Information
- Develop Alternatives
- Weigh Alternatives
- Select the best alternative
- Implement the solution
- Monitor progress



Problem Solving Methods

- Trial-and-error method
 - one solution after another is tried until the problem is solved or appears to be improving.
- Experimentation
 - a theory is tested to enhance knowledge and understanding



Problem Solving Steps

- Define the problem (assessment, diagnosis).
- Gather and analyze information (outcome identification).
- Generate alternatives and select an action (planning).
- Implement the selected action (implementation).
- Evaluate the action (evaluation).



1-Define the problem

- Difficult to solve a problem if you do not know what the problem is
- Simple vs. complex



2. Gather Information

- Collect data and information
- Research
- History-taking



Questions to ask

- 1. What is the setting?
- 2. What is the problem?
- 3. Where is it a problem?
- 4. When is it a problem?
- 5. Who is affected by the problem?
- 6. Is this your problem or someone else's problem?
- 7. What is happening?
- 8. Why is it happening? What are the causes of the problem? Can the causes be prioritized?
- 9. What are the basic underlying issues? What are the areas of conflict?
- 10. What are the consequences of the problem? Which is the most serious?



3. Define objectives clearly

- Without a clear objective, a poor-quality decision is very likely.
- One problem may need multiple objectives
- Examples: increase life expectancy, reduce pain, see patients more quickly, improve patient satisfaction



4. Generate Many Alternatives

- Brainstorming
- Don't limit yourself
- Get input from many
 - No idea is crazy or stupid



5-Evaluate alternatives

- List alternatives
- Think about each alternative
- How to evaluate each alternative?
- Thomas Saaty's Analytical Hierarchy Matrix
- SFF Matrix



7. Choose best alternative and act decisively

- Not acting is a decision
- Example of buying a car



6. Evaluate

- Monthly reports
- Patient follow up
- Feedback from others
- Monitor results



Example

- Problem
- Bedouin people in Jordan living in rural areas have a hard time accessing doctors
- Gather information
- Research: how many people live there, how many doctors are there, how do they currently access care, what are the barriers to them receiving care...
- History taking: talk to MOH, local doctors, local Bedouins



Examples

- Define objectives

- Increase access to primary healthcare for Bedouins living in rural areas

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Develop alternatives

- Alternative A: pay doctors in rural areas more money
- Alternative B: Provide free transportation to rural Bedouins
- Alternative C: Give a monthly salary to poor rural Bedouins
- Alternative D: Build more clinics in rural areas
- Etc, etc, etc.



Choose best alternative and act decisively

- We will start paying doctors a higher salary to work in rural areas



Evaluation

- Monitor number of doctors working in rural areas
- Monitor health outcomes of Bedouins in rural areas
- Talk with rural Bedouins

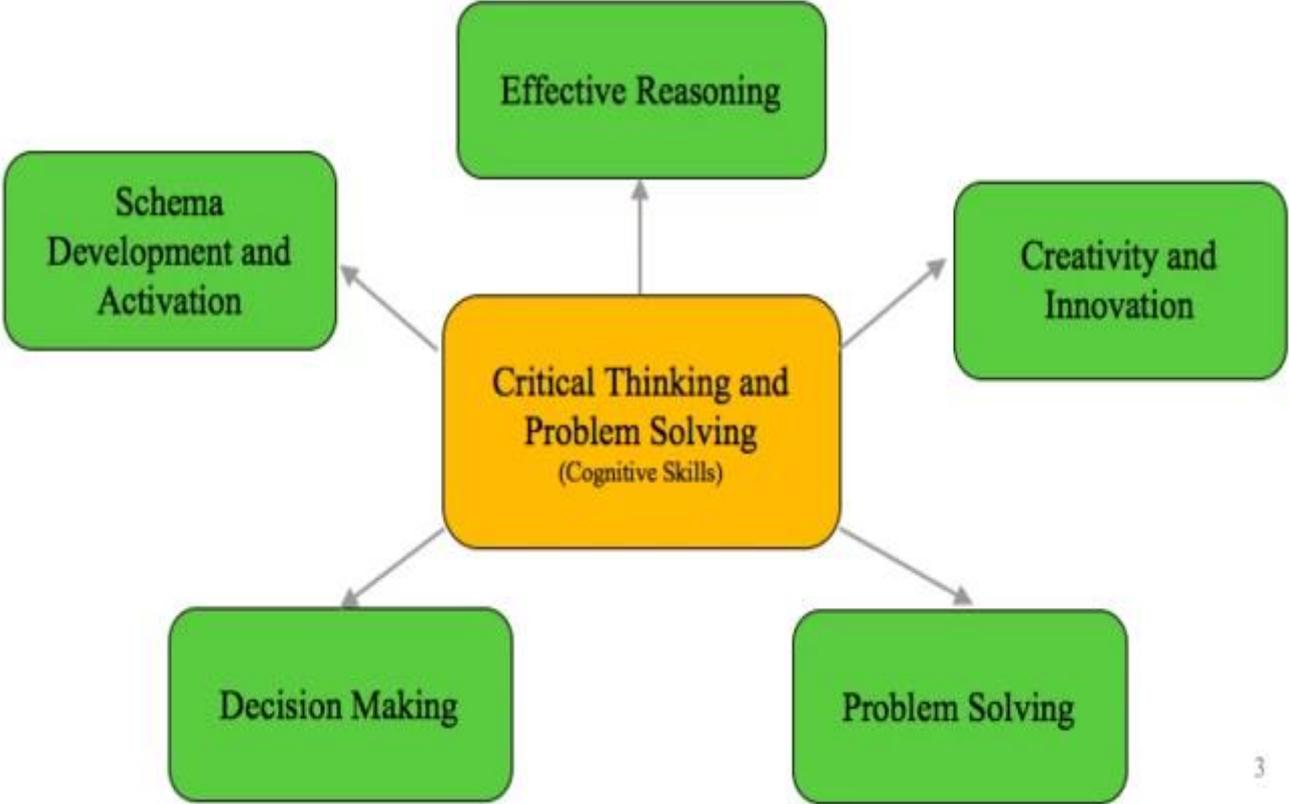


Critical thinking

- Critical thinking is a higher-order thinking skill. Higher-order thinking skills go beyond basic observation of facts and memorization.
- They are what we are talking about when we want our students to be evaluative, creative and innovative.
- When most people think of critical thinking, they think that their words (or the words of others) are supposed to get “criticized” and torn apart in argument, when in fact all it means is that they are criteria-based.
- These criteria require that we distinguish fact from fiction; synthesize and evaluate information; and clearly communicate, solve problems and discover truths.



what we mean by critical thinking. After a review of the literature and looking at the practice at other schools, we identified five constructs that encompass a set of broadly applicable skills: schema development and activation; effective reasoning; creativity and innovation; problem solving; and decision making.

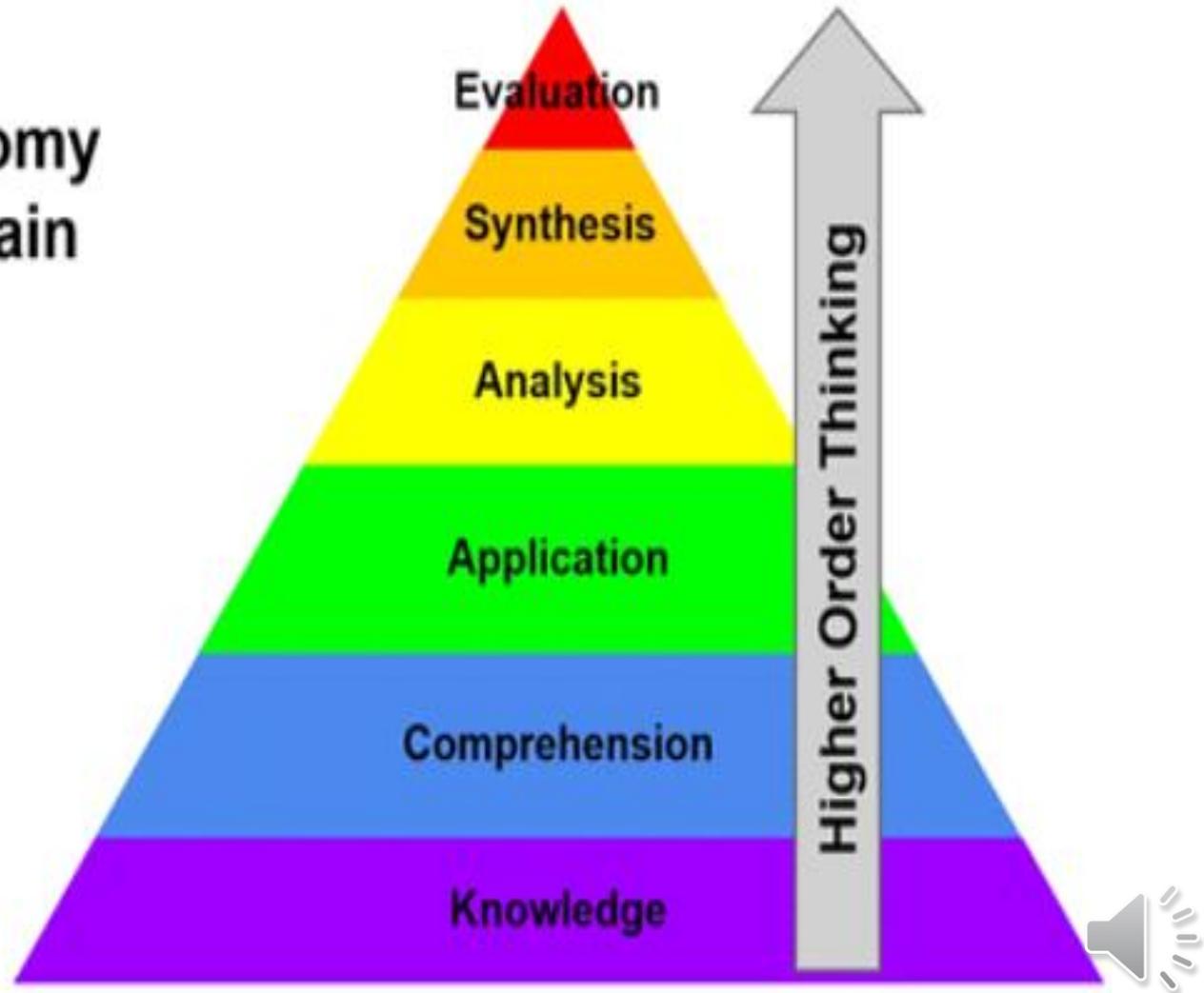


- **Using Bloom's Taxonomy of thinking skills, the goal is to move students from lower- to higher-order thinking:**
- from knowledge (information gathering) to comprehension (confirming)
- from application (making use of knowledge) to analysis (taking information apart)
- from evaluation (judging the outcome) to synthesis (putting information together) and creative generation
- This provides students with the skills and motivation to become innovative producers of goods, services, and ideas. This does not have to be a linear process but can move back and forth, and skip steps.



Blooms Taxonomy Cognitive Domain

Bloom's Taxonomy Cognitive Domain



□ Clinical Reasoning

- “the cognitive process necessary to evaluate and manage a medical problem”
- Reasoning (The action of thinking about something in a logical, sensible way) المنطق
- Knowledge المعرفة
- Skill مهاره

□ Diagnostic process

- Differential Diagnosis Generation
- Information gathering
- Diagnosis Refinement
- Diagnosis Verification



- The physician's **training in clinical reasoning**.
- This skill builds upon the taking of a relevant **history, the performance of a physical examination, and the use of the cognitive processes inculcated by medical education** to arrive at a probable range of diagnoses and corresponding treatment options.
- Ideally, a physician would **narrow the differential** to a testing to arrive at a single unifying diagnosis. limited number of diagnostic possibilities, and would use diagnostic
- Every diagnostic process begins with **uncertainty**, and there are many **cognitive errors** that can lead to a **wrong diagnosis**—at the patient's expense.



MEDICAL UNCERTAINTY IN CLINICAL PRACTICE :

Uncertainty in **medical students** stems from **personal ignorance**, limitation of available medical knowledge .

Patient and physician factors causing medical uncertainty:

Patient factors

1. Uncertainty in history
2. Inappropriate prioritization of history
3. Test variability
4. Variable response to treatment
5. Access to variable sources of information on same topic
6. Influence of society



Physician Factors

1. Poor communication skills
2. Inappropriate assessment of probability
3. Physician's tolerance to uncertainty
4. Test interpretation
5. Inability to apply evidence- based treatment
6. Inability to appraise best evidence
7. Influence of medical organization and local practice environment



Uncertainty constitutes a **major obstacle to effective decision-making**.

Three questions:

- (1) How do decision makers **conceptualize** the uncertainty which they encounter in their work?
- (2) How do decision makers **cope** with their uncertainty?
- (3) Are there systematic relationships between different conceptualizations of uncertainty and different **methods of coping**?



Conceptualizations of Uncertainty

The related conceptual propositions :

PROPOSITION 1. Uncertainty in the context of action is a sense of **doubt** that blocks or delays action.

It has three essential features:

(1) it is **subjective** (different individuals may experience **different doubts in identical situations**),

(2) it is **inclusive** (**no particular form of doubt**, e.g., **ignorance of future outcomes**, is specified), and

(3) it **conceptualizes uncertainty in terms of its effects on action** (**hesitancy, indecisiveness, and procrastination**)



PROPOSITION 2. Different types of uncertainty can be classified according to:
their **issue** (i.e., what the decision maker is **uncertain about**) and **source** (i.e., what **causes** this uncertainty.)

Three basic **issues** are :

outcomes,
situation, and
alternatives.

Three basic **sources** are:

incomplete information,
inadequate understanding and
undifferentiated alternatives.



There are three kinds of uncertainty:

- 1) **technical uncertainty** which occur from **inadequate scientific data**,
- 2) **personal uncertainty** which arises from being **unaware of patient's wishes** and
- 3) **Conceptual uncertainty** which arises from an **inability of applying abstract criteria to concrete situations**.

While it is reasonable to assume that one could **with more experience** and **effort** address the issue of **technical and personal uncertainty**, the **problem of conceptual uncertainty could continue to remain**.



SOURCES OF UNCERTAINTIES

Most apparent reason for enormous uncertainties in medicine is the:

1. profound variation among individuals.
2. limitation of knowledge
3. Diagnostic, therapeutic, and prognostic



I. VARIATION AMONG INDIVIDUALS

Major source of variation in medicine is **biological differences among individuals**.

This includes:

1. **host factors** such as:

- genetic make-up,
- age,
- gender,
- height/ weight, and
- blood group.

However, the **most important contributor, particularly for pathological conditions**, is the:



2. Environment with which biological factors interact in a complex manner.

Significant environmental factors are:

- diet, nutrition, exercise, and addictions such as smoking;
- behaviour such as sexual promiscuity and mixing driving with drinking;
- mental attitude, anxiety, and personality traits; stress and strains,
- social support (love, affection, and prayer) and
- culture;
- infections,
- hygiene, water, and sanitation;
- education,
- income, and occupation;
- roads, traffic, and vehicles;
- crowding and housing;
- availability and utilization of health services and health personnel; and climate pollution , mosquitos and flies

3. **Laboratories** vary with respect to equipments, appliances, reagents, and methods; and the quality and quantity of technicians. This also **contributes to uncertainty**.

❑ **Diagnostic tools are never perfect** even in most ideal conditions, and they do give **false negative and false positive** results in some cases.

❑ **Observer variation**, such as in **measurement of blood pressure**, is quite common.

❑ Physicians would **differ in managing a borderline** case such as with intra-ocular pressure 22 mmHg.

❑ **Effectiveness of a therapy** depends on the expertise of the medical attendant, on the quality of prescriptions, availability of drugs, laboratory investigation results, compliance of the regimen, etc. All these vary from situation to situation.

II. INCOMPLETE KNOWLEDGE

Two types of deficiencies in knowledge are common.

A. First is **lack of full information** on a patient either because:

- a. the patient has forgotten,
- b. is not able to explain,
- c. the records not available,
- d. the investigation required such as CT scan is prohibitively expensive, or
- e. because of lack of time as in an emergency situation.

Thus, the patient management has to **start with incomplete information**.

All these **aggravate uncertainty** in medical practice.



B. Limitation of knowledge.

- ❑ Medical science is incomplete in many respects.
- ❑ Nobody knows yet a definite **protocol to treat an AIDS case, how to revert essential hypertension that could prevent dependence on drugs, or how to treat a patient for urinary tract infections** when the patient has impaired renal functions.
- ❑ In addition there are **limitations of recall**. You might know all that is known for a health condition but **the ability to recall everything at the time when a patient is confronted is rare**.
- ❑ Physicians and surgeons, just as anybody else, have **biases**, and the **memory storage and recall is always selective**.
- ❑ Furthermore the **expertise of medical professionals is not uniform**. Some are good, and the others are not so good.



III. DIAGNOSTIC, THERAPEUTIC, AND PROGNOSTIC UNCERTAINTIES

Most uncertainties confronted in health and disease can possibly be categorized into **diagnostic, treatment, and prognostic** framework.

Diagnostic uncertainties

- in exercise stress test for coronary artery disease
- FNAC, ultrasonography, and mammogram for breast cancer What is the cut off point for normal range in different
- human variables , Hb, sugar, cholesterol, FBC, etc...
- What is the reliability of different test?

Therapeutic uncertainty :

The most common causes of therapeutic uncertainties are:

1. faulty diagnosis or wrong diagnose
2. Insufficient determining the pathologic condition and history
3. our forgetfulness of the actions of drugs
4. huge number of drugs available.
5. unaware about the action, dosage, side effects, route of administration of the drug, interactions.

Prognostic uncertainties in:

- uncertain about the natural history of the diseases.
- what are the causes of sudden illnesses ?
- early prediction of irreversible brain damage after ischemic stroke?
- Terminally ill patient

HOW DO DECISION MAKERS COPE WITH UNCERTAINTY?

- ❑ **First**, reduce ignorance as much as possible by gaining full information and understanding .
- ❑ **Secondly** , attain as much control or predictability as possible by learning and responding appropriately to the environment.
- ❑ **Finally**, wherever **ignorance is irreducible**, treat uncertainty statistically

Three basic strategies of coping with uncertainty:

1. *reducing uncertainty,*
2. *acknowledging uncertainty*
3. *suppressing uncertainty*

❑ Reducing Uncertainty Tactics for reducing uncertainty include :

1. collecting additional information before making a decision.
2. Deferring (postponing) decisions until additional information becomes available.

When **no additional information** is available it is possible to reduce uncertainty by **extrapolating from available information** by:

1. use **statistical methods to predict future events** from information on present or past events,
2. **assumption-based reasoning**.
3. **filling gaps** in firm knowledge by **making assumptions** .

Using **assumption-based reasoning**, **experienced decision makers** can act **quickly and efficiently** within their domain of **expertise with very little information**.



Another approach to reducing uncertainty is **to control the sources of variability which reduce predictability.**

Organizations **constrain the variability** of their internal environments by:

1. **Using standard operating procedures** ,i.e , Clinical Practice Guidelines, check list,
2. limit the variability of external environments by **incorporating critical elements into the organization** (i.e., acquisition) or
3. continuous performance evaluation,

The control tactics is referred to as “**power responses**”



❑ Acknowledging Uncertainty

This strategy can be applied when reducing uncertainty is either unfeasible or too costly.

Decision makers can acknowledge uncertainty in two ways:

1. by taking it into account in selecting a course of action and by
2. preparing to avoid or confront potential risks.

❑ According to this model, the attractiveness of an option is a **compensatory function** of the attractiveness of its **outcomes**, the probability that they will show up, and the **cost of collecting information to reduce uncertainty** .

❑ Another tactic is **avoiding ambiguity** by preferring options with clear outcome probabilities

❑ **Organizations cope with uncertainty this way** by: “the structural response”



❑ Suppressing Uncertainty

This strategy includes :

1. tactics of **denial** (ignoring or distorting undesirable information) and
2. tactics of **rationalization** (coping with uncertainty by going through the motions of reducing uncertainty or acknowledging it).

Evidence-Based Practice Implementation

- ❑ **Evidence-based practice (EBP)** is the careful and thorough and judicious and sensible use of current best evidence in conjunction with clinical expertise and patient values to guide ...
- ❑ Evidence-based health care practices are available for a number of conditions such as asthma, heart failure, and diabetes.
- ❑ However, these practices are **not always implemented in care delivery**, and **variation in practices** abound.
- ❑ Traditionally, **patient safety research** has focused on data analyses to identify patient **safety issues** and to demonstrate that a **new practice will lead to improved quality and patient safety**.
- ❑ **Evidence-based practice** is a vital part of enhancing critical care nursing **practice**, which is essential for providing quality care to patients. Adopting **EBP** to your culture improves patient outcomes and patient, family, and healthcare provider satisfaction.

Evidence-based practice (EBP) is the **reliable and sensible** use of **current best evidence** in combination with **clinical expertise** and patient values to guide health care decisions.

Best evidence includes observed evidence from:

1. randomized controlled trials (RCT);
2. evidence from other scientific methods such as **descriptive and qualitative research**;
3. use of information from **case reports**,
4. **scientific principles**, and **expert opinion**.

- When enough research **evidence is available**, the practice should be **guided by research evidence in conjunction with clinical expertise** and **patient values**.
- In some cases, however, a sufficient **research base may not be available**, and health care decision making is derived principally from non research evidence sources such as **expert opinion** and scientific principles.
- As more research is done in a specific area, the research evidence must be incorporated into the EBP
- This definition of EBM requires integration of **three major components** for medical decision making:
 - 1) the best external **evidence**,
 - 2) individual practitioner's clinical expertise,
 - **3) patients' preference**

Models of Evidence-Based Practice

EBM is the process of translating research into practice.

Multiple models of EBP are available and have been used in a variety of clinical settings.

A common elements of these models are:

1. selecting a practice topic (e.g., discharge instructions for individuals with heart failure, management of chest pain),
2. Assessment and syntheses of evidence,
3. Implementation(application and execution)
4. evaluation of the impact on patient care and provider performance,
5. consideration of the context/setting in which the practice is implemented.

Adopt an Evidence-Based Practice Model to Facilitate Practice Change

1. Ask: Identify a clinical problem.
2. Attain: Review relevant literature.
3. Appraise: Critically appraise **evidence**.
4. **Apply**: Evaluate the need for **practice change** and potential **implementation**.
5. Assess: Evaluate outcomes.



Steps of Evidence-Based Practice

Three major stages:

1. knowledge creation and distillation.
2. diffusion and dissemination.
3. organizational adoption and implementation.

