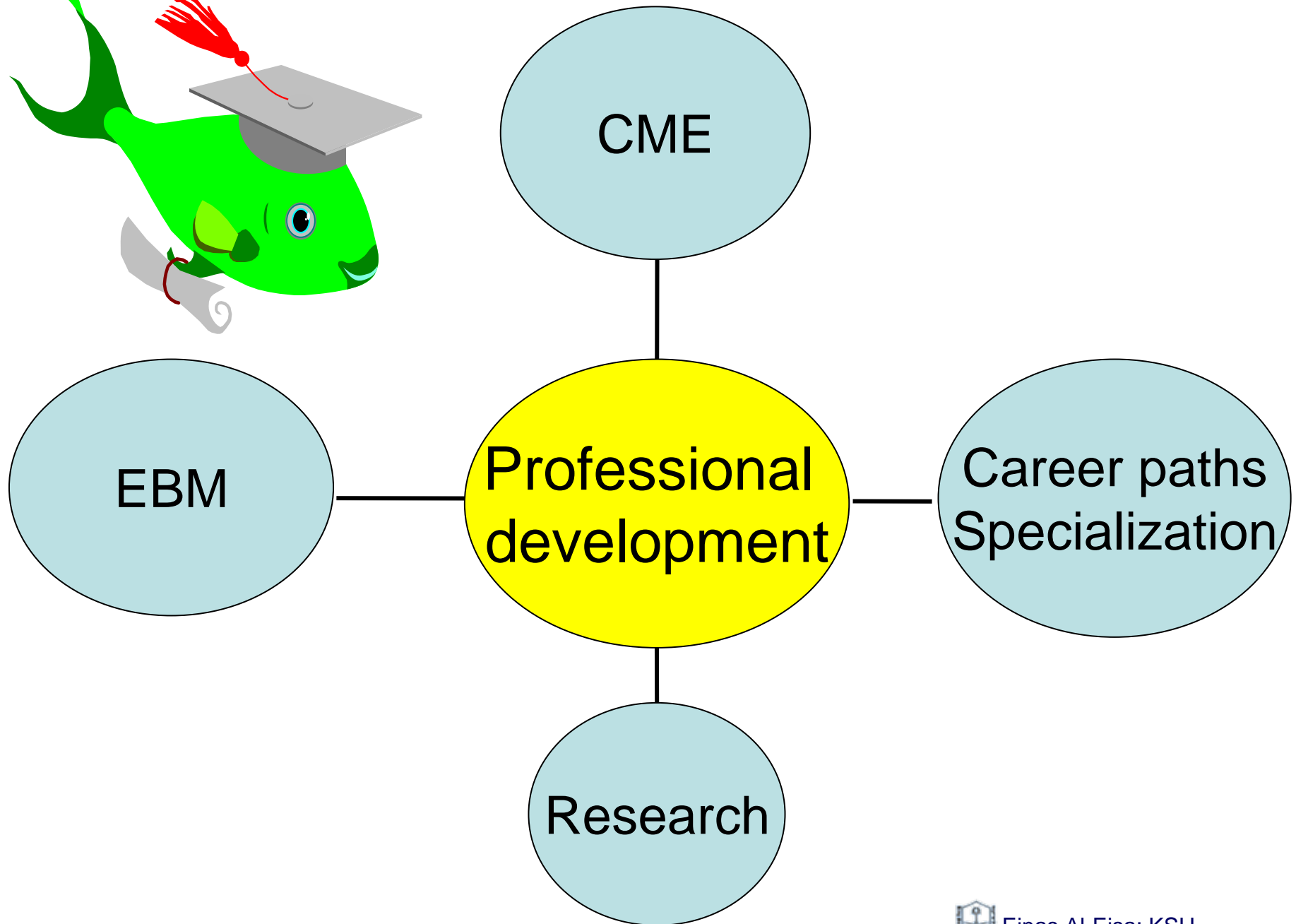
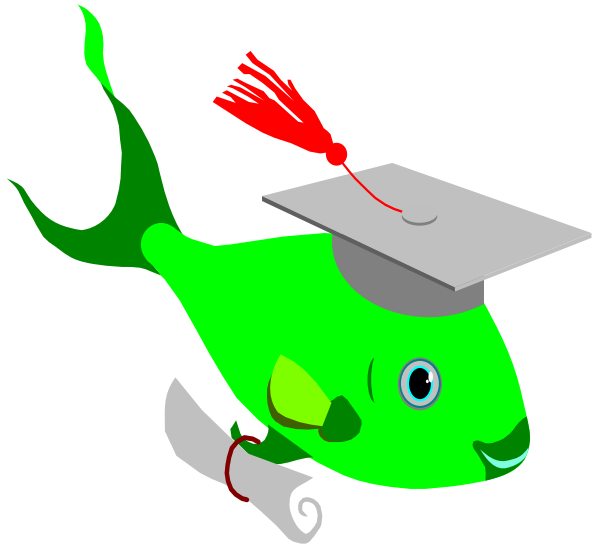


Introduction to Research in Physical Therapy

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Outline

- Definition of research
- Why research?
- Evidence-based medicine
- Who should research
- Barriers of research
- Developing answerable research problem
- Research paradigms

Definition of Research

- “The process by which we determine whether what we do as physical therapists makes a difference in the lives of the people we serve”
(Domholdt, 2000)

Definition of Research

- “ The process of asking and answering questions, as well as the process of abstracting answers from observations”

(Silverman, 1977)

Research is NOT synonymous to “problem solving”

- Research is a search for new knowledge or verification of beliefs and has a definite objective through the controlled process of scientific inquiry.
- The purpose of research is to uncover new information, whereas the purpose of problem solving is to solve an immediate problem.

Why research?



Why research?

1. To establish a **body of knowledge** for physical therapy
 - For the survival of a profession
 - Stop borrowing from other disciplines!!

Why research?

2. To determine the **efficacy** of physical therapy treatments
 - Research should not be undertaken to show that what we do works (***Bias error***)
 - We should study **whether** what we do works

Why research?

3. Improve **patient care**

- Helping clinicians make decisions about the use of **existing practices**
- Test **new procedures**

Physical therapists must be willing to:

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graph TD; A[Physical therapists must be willing to:] --- B[Search for evidence (effectiveness of practice?)]; A --- C[Modify the practice in response to the evidence]
```

Search for **evidence**
(effectiveness of practice?)

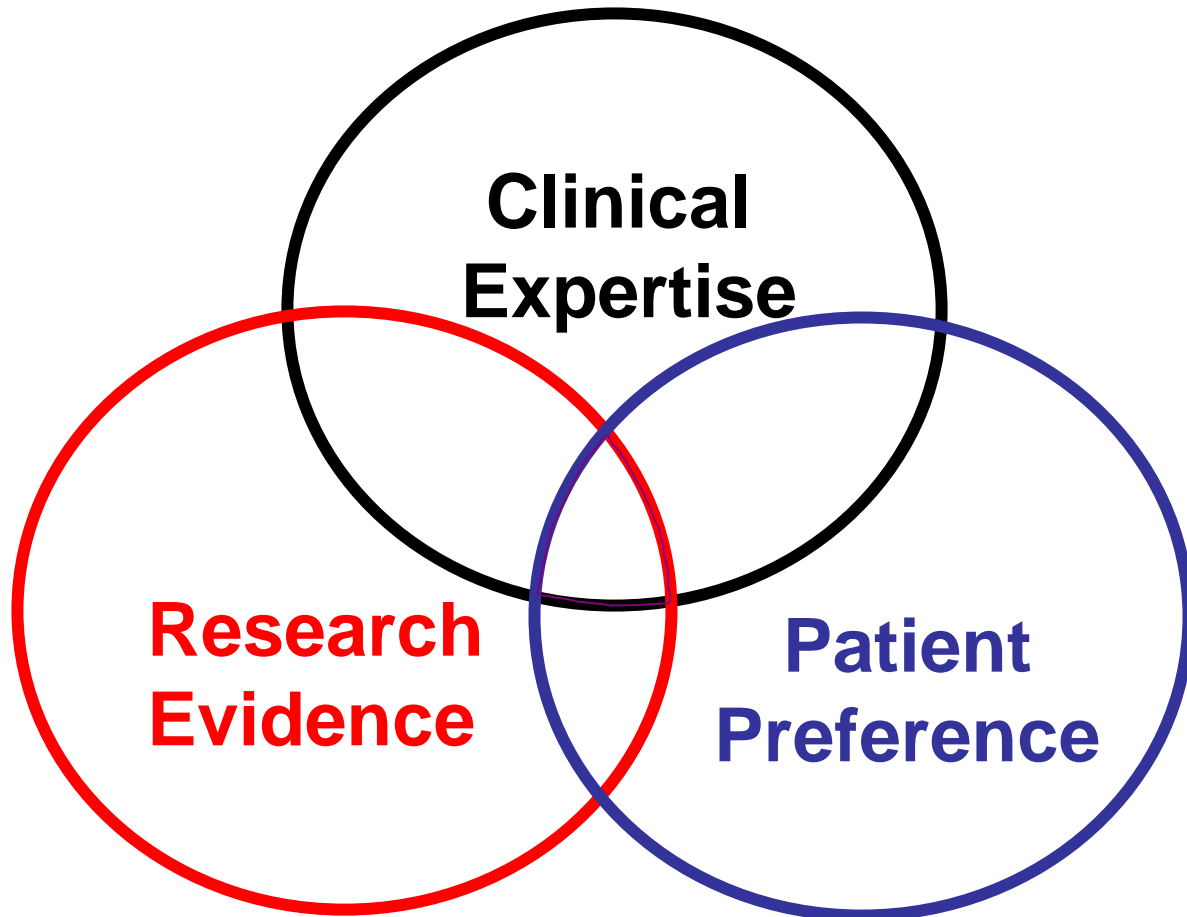
Modify the practice
in response to the evidence

Knowledge of research design and data analysis is a prerequisite



evaluate existing evidence and
produce new evidence

Evidence-based Medicine



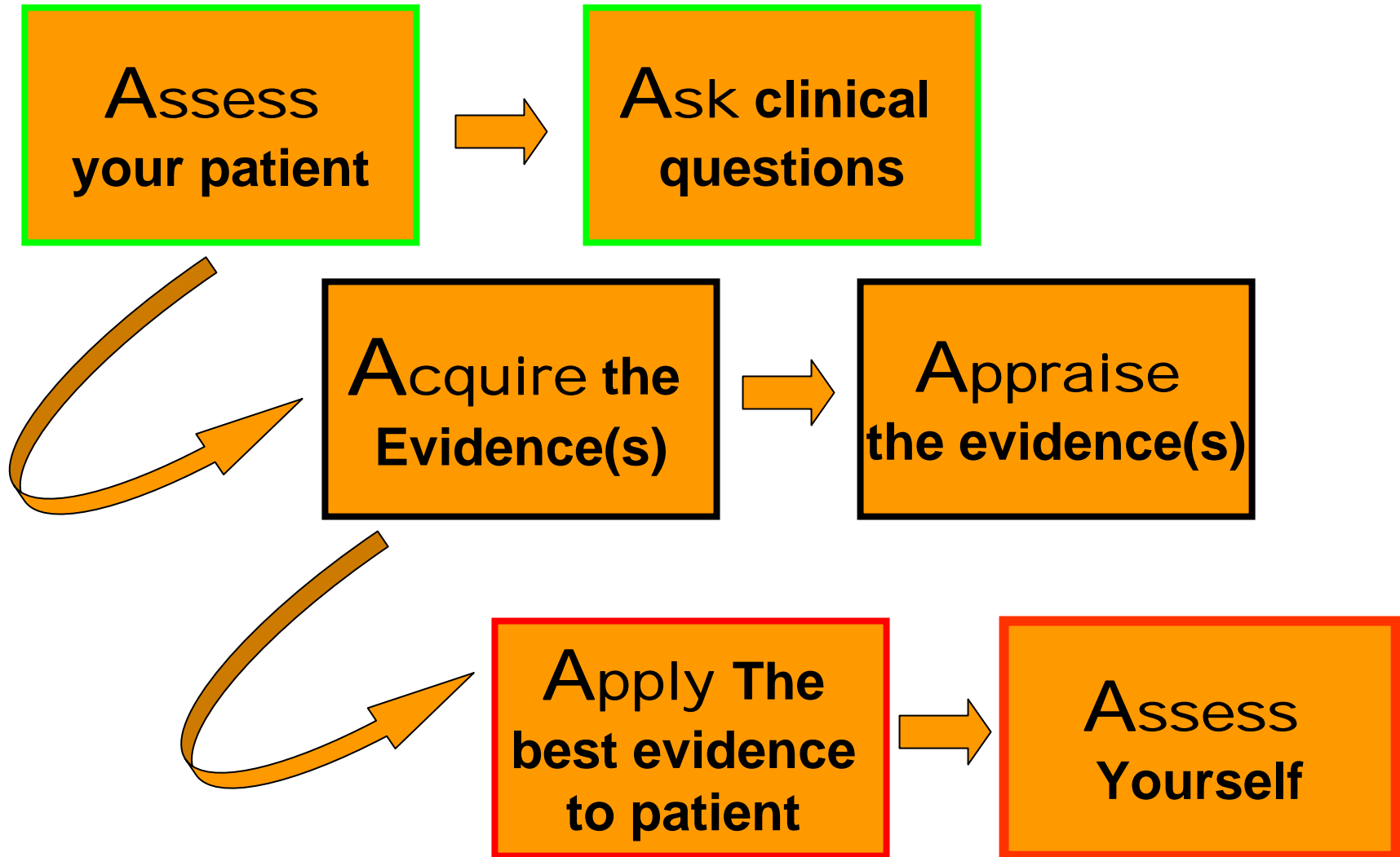
Evidence-based Medicine

Integrating the:

- ✓ best research evidence with
- ✓ clinical expertise
- ✓ patient values

(Brinkley et al., 1999)

Haven't all concerned physicians
been doing this EBM for ages... ?



5 Steps to Evidence-based practice

1. Define the **question**
2. **Collect the best evidence** related to the question
3. **Critically appraise** the evidence

5 Steps to Evidence-based practice

4. **Integrate** the evidence with clinical expertise & patient factors to make a decision
5. **Evaluate** the process so it can be improved next time

EBM Step 1

- Formulate a clinically relevant and “searchable” question

Developing answerable research **problem**

“The challenge in searching for a research question is not a shortage of uncertainties in the universe; it is the difficulty in finding an **important** one that can be transformed into a **feasible** and valid **study plan**”

(Cummings et al., 1988)

Topic

```
graph TD; Topic((Topic)) --> Problem((Problem)); Problem --> Question((Question));
```

A flowchart consisting of three circular nodes connected by arrows. The first node is labeled 'Topic', the second 'Problem', and the third 'Question'. The nodes are arranged in a descending staircase pattern from top-left to bottom-right.

Problem

Question

Example

- **Topic:** Low Back Pain (LBP)
- **Problem:** the popular use of back support to prevent LBP

Example

Questions:

- Do back support increase intra-abdominal pressure?
- How well do different back supports unload the spine?
- Do back support preserve the endurance of the back extensor muscles?

A good research problem is:

- **Feasible** (subjects, equipment, time, technical support, money)
- **Interesting** (to the investigator)
- **Novel** (challenge the old)
- **Can be studied ethically** (with no negative impact on the subjects)
- **Relevant** (who cares?)

EBM Step 2

Find the Evidence

But Too many articles retrieved

How do you find the best evidence?

EBM Step 3

Critical Appraisal

- Are the results of the study likely to be true?
- Are the results likely to be free of systematic bias?

Rx

*Intervention
RCT*

Dx

Diagnostic

Review

*Systematic
Meta-analysis*

EBM Step 4

Integrate evidence & practice

If the **methods** are **valid**:

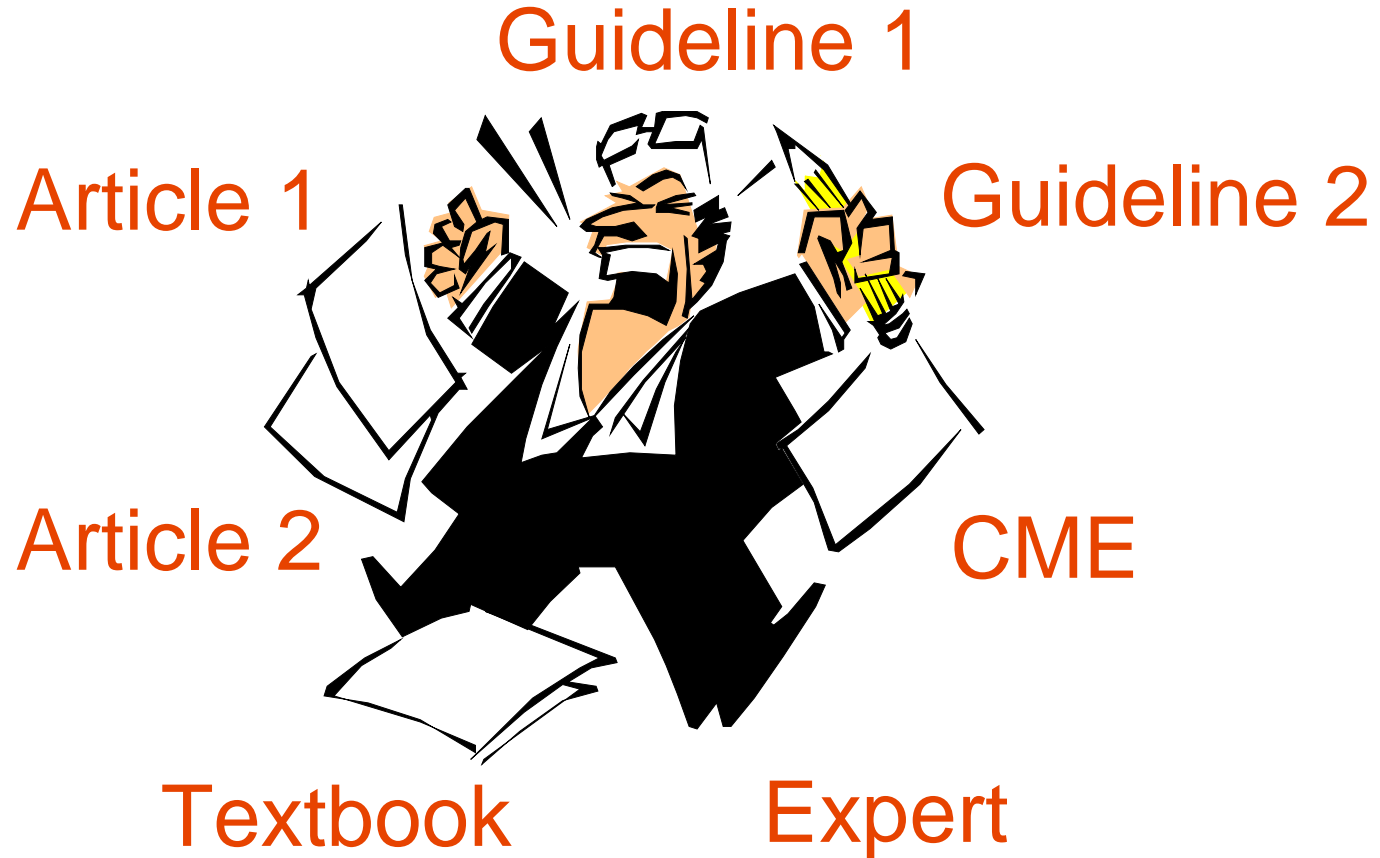
–What are the **results**?

–Magnitude of results?

➤ Study design

➤ Conflicting results

Conflicting Results--



What's the truth?

**EBM will NOT tell you
what to do!**

What will determine what you do:

The integration of

- individual clinical expertise

with the:

- best available external clinical evidence from systematic research

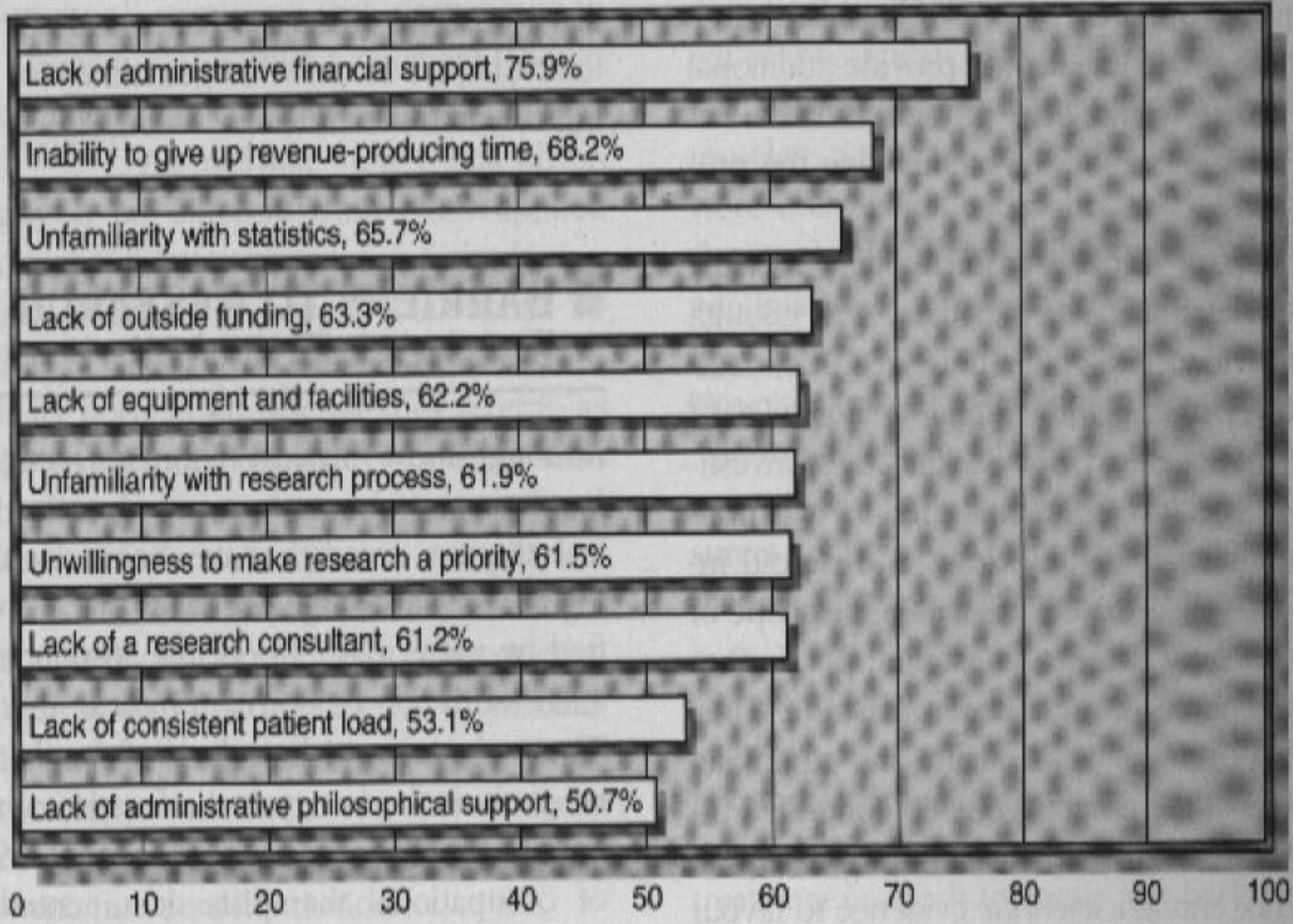
Who should research?

Members of the profession that:

- Have interest in a particular area
- Are motivated & willing to devote effort & time
- Possess considerable knowledge of the area being investigated
- Are familiar with the procedures of conducting research & analyzing the results
 - Clinical researcher = practitioner & investigator

Barriers of research

- Lack of familiarity with research
- Unfamiliarity with statistics
- Lack of funding
- Lack of equipment & facilities
- Lack of time
- Lack of administrative support



Methods of obtaining knowledge

Research Paradigms

```
graph TD; A[Research Paradigms] --> B[Quantitative Paradigm: Study of groups whose treatment is manipulated]; A --> C[Qualitative Paradigm: Broad description of a phenomenon without manipulation]; A --> D[Single-system Paradigm: Individual responses to manipulation];
```

Quantitative Paradigm:
Study of groups whose treatment is manipulated

Qualitative Paradigm:
Broad description of a phenomenon without manipulation

Single-system Paradigm:
Individual responses to manipulation

Paradigm



The assumptions & beliefs that guide the researcher

versus

Methods



The actions taken by the investigators as they implement the research

Quantitative paradigm

- The traditional method of science
- Characterized by measurement

Quantitative paradigm assumptions

1. There is a single objective reality
2. The investigator & subject are **independent** of each other
3. **Generalizability** of findings is **possible** and desirable
4. **Cause and effect** relationship can be determined
5. **Value free** (investigator opinion, social norms)

Qualitative paradigm assumptions

1. There are multiple constructed realities
2. The investigator & subject are **interdependent** of each other
3. **Not generalizable** (may be generalizable in specific situations)
4. **Cause and effect** relationship can **not** be determined
5. **Value bound** (inability to separate values from inquiry)

Single-system paradigm assumptions

The general assumptions behind the quantitative paradigm apply here with minor differences:

- The effectiveness of treatment is subject and setting dependent (not generalizable)
- Focus on individuals rather than groups

Not synonymous with “case-report” or “case-study”

THINK BIG !



start small

ACT NOW