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Pharmacy 476

How to Write Specific Aims

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Objectives

- Discuss the process of formulating specific aims
- Demonstrate how specific aims are developed using examples

What is a specific aim?

- A specific aim is similar to an objective
 - it tells the reviewer how you are going to test your hypothesis
 - it helps direct your approach to your research
 - “what” aims vs. “why” aims
- The specific aims section should serve as a succinct description of what you plan to accomplish during the project

“What” Aims

- Are more like objectives and tend to focus on what’s going to be done rather than the importance of the work
- Sometimes aims are obvious
 - they shouldn’t be obvious
 - they shouldn’t be redundant of the methodology
- “What” aims tend to be:
 - to determine, to compare, to measure

“Why” Aims

- Focus the aims and associate them with your hypothesis
 - “the hypothesis will be tested by the following aims”
- Have an element of “how”
 - Establish...by...

Examples of “Why” Aims

- **AIM 1.** Establish safety, feasibility and accuracy of fluorescence image-guided lymph node dissection in patients with Stage I and II lung cancer by...
- **AIM 2.** Establish the utility of fluorescence image-guided lymph node identification by comparing it with excision using conventional staging lymphadenectomy.
- **AIM 3.** Assess the predictive value of the detection of “occult” nodal metastatic disease on subsequent disease recurrence by...

Another Example

- **Establish the differentiating plasma metabolites of sepsis.** This aim will be accomplished by comparing metabolites in existing heparin-preserved plasma samples from *sepsis patients* with age, ethnic/racially, body-mass index (BMI) and gender-matched controls using a rigorous statistical approach.

Writing Specific Aims

- KEEP THEM SIMPLE
- S--specific
- I-- important and relevant to the project
- M--measurable (think about what you are going to measure)
- P--practical (realistic & feasible)
- L--logical (they fit together but are NOT dependent on each other)
- E--evaluable (significant- they will generate meaningful data)

Specific Aims

- As you write your aims for your project:
 - think of them as the goals you want to achieve in your study
 - they need to be achievable even if your hypothesis is wrong
 - they have to generate meaningful data
 - think about how you're going to execute your aims
 - are they feasible?
 - they should be directly related to your hypothesis
 - it's the "aim" you'll use to prove your hypothesis!
 - your aims should correlate with your central hypothesis
 - you need 2-4 aims for your proposal
 - concise, independent
 - determine, compare ("what")
 - assess, establish, identify by...("why")

Specific Aims

- Your aims will determine the type of study design you will need
- Your aims should be CLEARLY, COMPLETELY and SPECIFICALLY worded
 - they are SPECIFIC aims after all!
- Aims should not be dependent on one another
 - this is VERY important
- Aims should NOT be a laundry list of what you are going to do in your study

Dependent Aims

- This means that subsequent aims are dependent on the outcome of the work proposed under the first aim
 - if aim #1 is not successful then the whole project falls apart
 - this is viewed as a “fatal flaw” in a research proposal
 - ALL aims must be achievable

Example of Dependent Aims

- Aim 1: to determine if drug A interacts with drug B
- Aim 2: to determine the mechanism for the interaction between drug A and drug B

Your ability to achieve aim 2 is completely dependent on the success of aim 1

These are also broad, non-descript aims that may not be achievable

Relationship Between the Hypothesis and Specific Aims

- The hypothesis is a logical, rationale, “best guess”
 - it may not be true
- ***Hypothesis***: The average age of the male students in this class is higher than that of the female students.

Relationship Between the Hypothesis and Specific Aims

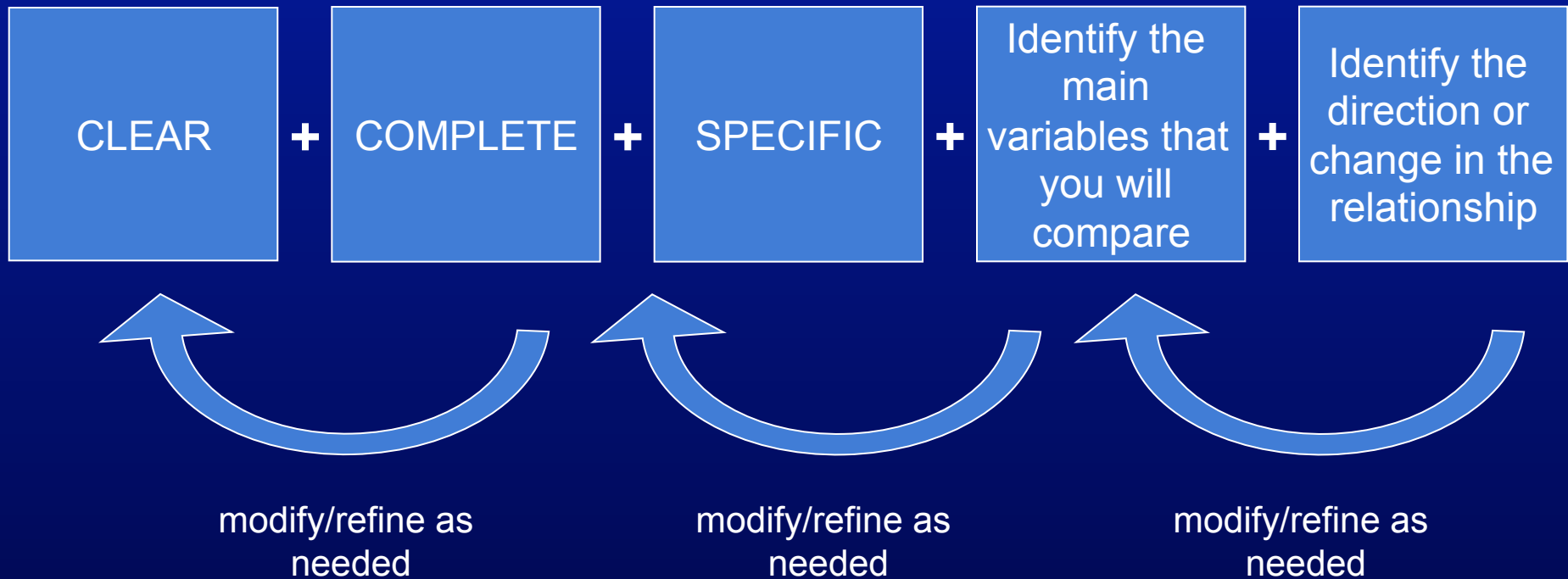
- **Hypothesis:** The average age of the male students in this class is higher than that of the female students.
- Specific aims have to be achievable
 - The hypothesis will be tested by the following specific aims:
 1. To count the number of male and female students in the class
 2. To average the ages of male and female students in the class
 3. To compare the average ages of male and female students in the class



Relationship Between the Hypothesis and Specific Aims

- *Hypothesis*: The average age of the male students in this class is higher than that of the female students.
 - Specific aims have to be achievable
 - The hypothesis will be tested by the following specific aims:
1. To determine whether differences exist in the average ages of male and female students using an appropriate statistical approach.

The Characteristics of Specific Aims



- Think about your hypothesis and your study design!
- If you need to, refine your hypothesis!

Assignment #2: Intro, Hypothesis, Aims

due 2/11/11 via CTools Assignments

Introduction and Hypothesis

- clearly stated, concise
- supported by the background information you provided in the introduction
- references are very helpful- don't worry about format at this point
- Here are some guiding principles for writing good specific aims (Adapted from Morrison and Russell, *Grant Application Writer's Workbook*)

Assignment #2: Intro, Hypothesis, Aims

due 2/11/11 via CTools assignments

- Delineate your specific aims in a **numbered** list and:
 - Ensure that your specific aims are associated with your hypothesis.
 - Ensure that all specific aims relate to and support your overall project goal.
 - Provide conceptual rather than descriptive specific aims (not a laundry list of tasks!).
 - Delineate a reasonable number of specific aims, presented in a logical order. You should have 2-4 aims.
 - “Why” aims are generally stronger than “what” aims.
 - Make sure no specific aim is dependent on the successful outcome of another aim. Very important!!

Assignment #2: Intro, Hypothesis, Aims

due 2/11/11 via CTools assignments

- **FORMAT**

- Introduction (heading)
- Hypothesis (either heading or embedded in text)
 - Therefore, we *hypothesize* that...
 - ...will be tested by the following *hypothesis*...
- The hypothesis will be tested by the following specific aims:
 1. Numbered list of 2-4 aims

- Examples on Ctools (may not be in correct format)
- Rubric, rubric, rubric



Additional Source Information

for more information see: <http://open.umich.edu/wiki/CitationPolicy>

Slide 5: Kumar, R. Chapter 4: Formulating a Research Problem. In: Research Methodology, 2nd Edition.

Slide 8: <http://www.aats.org/multimedia/files/Grantsmanship-Workshop/2007/9-Hypothesis-Specific-Aims.pdf>

Slide 10: *Proposal Planning and Writing 2nd edition, Oryx Press, 1998*

Slide 11: Kumar, R. Chapter 4: Formulating a Research Problem. In: Research Methodology, 2nd Edition.

Slide 12: Kumar, R. Chapter 4: Formulating a Research Problem. In: Research Methodology, 2nd Edition.

Slide 16: Source Undetermined

Slide 18: Kathleen A. Stringer

Slide 22: University of Michigan, <http://www.umich.edu/>