

DEVELOPING GREAT AIMS AND OBJECTIVES

WEBINAR LOGISTICS

RUNTIME



~30 minutes plus additional time for Q&A

Q&A



Please submit your questions using the Q&A button rather than chat so we can respond at the end of the presentation.



RECORDING



All attendees and registrants will receive a copy of the recording and slides.

PRESENTER



**Mallory
Waters**

GRANTS ADVISOR



SPECIALIZES IN



E·D·A
Epidemiologic Data Analysis

- M.A in Political Science
- Certified Project Manager
- Joined Hanover in 2012
- Specializes in complex and multi-institutional proposal management
- Began grants career with the San Diego Superior Court

ON A PERSONAL NOTE...



AVID READER: Averages 2 books per week



CHILDHOOD DREAM: To hunt viruses as an epidemiologist with the CDC




MOTHER OF THREE: Two dogs, one human



AGENDA

DEVELOPING GREAT AIMS AND OBJECTIVES

- ✓ Framing a competitive research question
- ✓ Identify components of a testable hypothesis
- ✓ Generate project aims/objectives



**FRAMING YOUR
RESEARCH QUESTION**

FRAME YOUR QUESTION

START WITH A RESEARCH QUESTION

Think of your overall question

Does exercise influence chemotherapy side effects?



Get a little more specific

Do cancer patients who exercise regularly experience fewer side effects from chemotherapy?

...compared to sedentary patients.

FIRST, WHAT IS YOUR GOAL?

Your goal is where you want to be:

- *My overarching goal is to improve the side effects experienced by patients with chemotherapy.*
- *The goal of this research project is to determine whether a regular exercise regimen reduces the side effects experienced by patients with cancer who are undergoing chemotherapy.*

Goals are your big idea, what you endeavor to do:

- *Your lofty vision*
- *Not always measurable*
- *Often longer term*
- *Do not often convey how you will get there*



FRAME YOUR QUESTION

WHAT ARE YOUR OBJECTIVES?



To fulfill the goal behind your idea



To focus your study



To aid in the design and methodology of your idea



To provide measurable criteria that can be used to evaluate your outcome(s) – did you achieve your goal?

FIVE WAYS TO FRAME A RESEARCH OBJECTIVE

1. The research objective of this proposal is to *test the hypothesis H.*
2. The research objective of this proposal is to *answer the research question A.*
3. The research objective of this proposal is to *measure parameter P with accuracy A.*
4. The research objective of this proposal is to *prove conjecture C.*
5. The research objective of this proposal is to *apply method M from field Q to solve problem X in field R.*

Source: https://www.nsf.gov/bfa/dias/policy/outreach/grantsconf/propprep_june14.pdf



FRAME YOUR QUESTION

MAKE IT TESTABLE

Start with a question:

- *Does exercise influence chemotherapy side effects?*

Get specific:

- *Do cancer patients who exercise regularly experience fewer side effects from chemotherapy compared to more sedentary patients?*

Make it testable:

- *Patients with cancer who engage in moderate exercise for 15 min/day will have fewer side effects from chemotherapy compared to more sedentary patients.*



FRAME YOUR QUESTION

A GREAT HYPOTHESIS IS...

- ✓ **Logical**
Supported by a literature search and preliminary data
- ✓ **Testable (falsifiable!)**
With resources you have access to
- ✓ **Focused**
It addresses a specific unknown
- ✓ **Simple**
No great leap in logic



FRAME YOUR QUESTION

TAKE YOUR HYPOTHESIS SERIOUSLY

- A **lack of a testable hypothesis** is pointed out by reviewers *surprisingly often*, even for established investigators...
- and a strong hypothesis forms the **basis for generating great aims.**

FRAME YOUR QUESTION

LANGUAGE MATTERS

microRNAs are important for
hair follicle development



What do you notice about this
hypothesis?

Is it strong or weak?

What makes it strong or weak?

FRAME YOUR QUESTION

LANGUAGE MATTERS

vague ← microRNAs are important for
hair follicle development → vague
→ not specific

What could you change about the wording
to make this a stronger hypothesis?

FRAME YOUR QUESTION

LANGUAGE MATTERS

vague ← microRNAs are important for hair follicle development → vague

→ not specific

miR-205 is **required** for hair follicle development **in mice**

specific & testable



**THE ART OF GENERATING
GREAT AIMS & OBJECTIVES**

WHAT IS AN AIM?



- A *specific* goal with a *measurable outcome* that can be accomplished in a reasonable amount of time
- Good aims directly contribute to *supporting or refuting your hypothesis or answering your research question*



DEVELOPING AIMS AIMS “DO’S”

**Aims are the
actions to be
taken to test
the hypothesis
or answer the
question**

THEY SHOULD

- Be a natural extension of the overall hypothesis or research question
- Be brief, informative, and attract the reviewer’s attention
- Convey why each part of the research is being done
- Result in a measurable outcome
- Be related but *not interdependent*

Sources: BioScience Writers (April 9, 2015); Dersbeck (2013); Giddings (nd); NIH (November 25, 2015); Univ. of Washington (n.d.)



DEVELOPING AIMS

AIMS “DON'TS”

THEY SHOULD NOT

Aims are the actions to be taken to test the hypothesis or answer the question

- Introduce new ideas that reviewers have not seen
- Be sequentially dependent
- Be unrealistic — the goal is to propose a project that is ambitious BUT attainable

IN THE REAL WORLD...

- It is common (and acceptable) **to propose a separate hypothesis for each aim**, rather than an overarching hypothesis
- Also typical for **mixed-methods research**
- As you navigate the process from concept to proposal, it can still be very helpful to **start with a broad central hypothesis**, and get more specific from there

EVALUATING AIMS

- Would **someone familiar with your field** agree that accomplishing these aims would lead to the achievement of your goal?
- Are your aims **independent**?
- Are the aims **structured logically** according to your research question or hypothesis?

If you can answer all these questions in the affirmative, you're ready to move forward!



Q&A