HST 502 - Survival Skills for Researchers

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Bias in Research and the Responsible Use of Laboratory Animals

Stephanie J. Bird, PhD

I. Underlying goal and expectation of research design: Validity & objectivity, ie, research findings uncontaminated by the observer/experimenter; "truth"

A. "Expectation" - Whose? Why does that matter?

B. Conflict of Interest

1. Financial

2. Other - eg., teaching vs recognition vs mentorship

3. Direct impact on objectivity

C. Conflict of commitment - eg. time, responsibilities

1. Professional: multiple projects, funding, teaching, community

dissemination of findings

2. Personal: family, friends, self

3. Indirect effect

D. Bias - Direct and/or indirect effect

1. Conscious - framework of research provided by literature

2. Unconscious assumptions, eg., congenital adrenal hyperplasia, XYY

3.   Semiconscious - Assumption of biomedical. research community:

generalizeability of research results

a. Across time of day, season, circumstances, gender, age

b. Across species, ie., animal models of human disease & dysfunction

II. Use of lab animals in research

A. Controversial topic

1. Society has right to participate in discussion

2. Scientists feel, and sometimes are, threatened

3. Lump rather than split and focus on extremes

4. Continuum: animal rights/animal welfare/scientists --

    Good science depends on the state of the animal

5. Researchers need to know about this:

    a. As member of scientific community, speak in an informed way

    b. Entrusted to uphold society's values, i.e., research must be done in a

       responsible and humane way.

B. Mechanism of oversight: Institutional Animal Care and Use Committee

   (IACUC, aka Committee on Animal Care)

C. Background information

   1. What lab animals are used for: Teaching - 5%; Diagnosis - 5%;

       Production & development of biologicals including vaccines, & testing

       toxicity of new chemicals and prod. (eg., shampoo) - 20%;

       Drug development & testing - 30%; Basic and applied research - 40%

   2. Basic vs. applied research

   3. Types of experiments:

      a. Observation with or without intervention (invasive or noninvasive)

      b. Acute vs. chronic

      c. Psychological/ behavioral

      d. With or without pain; suffering is a continuum, eg., anxiety

      e. Care & housing are potential sources of discomfort & anxiety

D. Scientific rationale (aka justification): generalizeability

   1. Example: animal models

a. Ideal: same function, behavior, disease or dysfunction via same anatomical,

physiological, biochemical, <u>and</u> genetic mechanism

b. Models selected for:

Scientific factors- behavior, transmitter system, pathology, physiology

Practical factors - costs, familiarity, technical expertise, fundability

E. Ethical justification

1. Dominionism - Humans have greater power and are superior.

2. Utilitarian argument: Increased knowledge base leads to therapies that mitigate

suffering caused by illness & trauma

3. Underlying assumptions:

a. Research can be carried out with no or minimal discomfort or

distress to the research animal

b. Pain and suffering experienced is compensated for by alleviation of pain and

suffering in humans

4. Note: The greater the similarity of a research animal to humans, the better the animal

model, but also the more ethically problematic

F. IACUC oversight

1. Ethical principles underlie regulations that govern research

a. Respect, including protection from pointless suffering

b. Maximize possible benefits and minimize harms

c. Justice - application to veterinary care

d. Responsibility of investigator to do more than the minimum.

e. Recognition of relationship - avoid abuse of power

2. Reflected in the three R's: Replacement, Reduction, Refinement