FACILITATING INTERDISCIPLINARY RESEARCH

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We are not students of some subject matter, but students of problems. And problems may cut right across the borders of any subject matter or discipline.

~Karl Popper, 1963
What is Interdisciplinary Research?

• “A mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or field of research practice.”

• “Involves a team of researchers from different disciplines that comes together around an important and challenging issue, the research question(s) for which is/are determined by a shared understanding in an interactive and iterative process”

• “Enables investigators across disciplines, including basic, translational and clinical scientists, to collaborate with a goal of bringing advances in scientific understanding of disease mechanisms and treatments to patients in need.”
Other Similar Terms

• **Translational research**
  • Links basic science to clinical field (i.e. bench to bedside)

• **Multidisciplinary research**
  • Research involving different disciplines but with limited interaction, “not necessarily integrated or coordinated”

• **Transdisciplinary research**
  • Integrates many disciplines and in doing so transcends each of the traditional boundaries
Comparison of Multi-, Inter-, and Transdisciplinary Approaches

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<th>Multidisciplinary</th>
<th>Interdisciplinary</th>
<th>Transdisciplinary</th>
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<tr>
<td><strong>Keyword</strong></td>
<td>Additive</td>
<td>Interactive</td>
<td>Holistic</td>
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<tr>
<td><strong>Mathematical example</strong></td>
<td>2+2=4</td>
<td>2+2=5</td>
<td>2+2=yellow</td>
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<tr>
<td><strong>Food example</strong></td>
<td>a salad bowl</td>
<td>a melting pot</td>
<td>a cake</td>
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Why Interdisciplinary Research?

- To resolve real health care problems
- To answer complex questions
- To provide different perspectives to a research area/question
- To establish “the right question”
- To develop consensus
What Drives Interdisciplinary Research?

• Complexity of nature and science including health care
  • Requires not only **depth** of knowledge but **breadth** of knowledge, integration, synthesis and an array of skills

• Drive to explore research questions that are not limited to a single discipline

• Need to solve societal problems
  • i.e. National Cancer Act 1971

• Development of new technologies
Advantages of IDR

- Diverse perspectives – prevents ‘tunnel vision’
- Many medical problems are multi-faceted and are approached in practice with multidisciplinary team of experts
- Individuals with limited research experience can learn from participation
- Division of labor
- Increased probability of funding
- Increased likelihood of publication
Key Conditions for Successful Interdisciplinary Research: Building your Bridges

- Common problem(s) to solve
- Leadership
- Environment that encourages collaboration
- Establishing a team philosophy
- Seed/glue money if needed
- Frequent meetings among team members
- Think of the end at the beginning
Potential Team Members

- Physician(s)
- Pharmacist(s)
- Nursing – Bedside, Clinical Nurse Specialist, Nurse Practitioner
- Dietician
- Biostatistician
- Laboratory/Microbiology
- Students
But really, WHY?

“Building the wheel is difficult enough when one person builds the wheel; now try to have three to five people working on the wheel with different tools and different ideas about what kind of bike it will go on”.

~ Morse quoting a study participant, 2004
Challenges of IDR

- Individual members place emphasis on their own work rather than the team vision
- Individual members devalue the contributions of other team members
- Lack of leadership
- Inadequate recognition for contributions
- Low participation or lack of understanding by members
- Inadequate time to establish close working relationships
- Insufficient funding
- Culture gap/diversity in background/communication styles
“I understand they’re going to connect them. The Provost ordered it.”
Keys to Successful IDR

• **Start Early!**
  • Bring together potential research collaborators early in the process and work toward agreement on key issues

• Establish early agreements on research methods, goals and timelines, and regular meetings.

• Determine who will take responsibility for each portion of the research plan, and what the expected contribution is for each member

• Establish appropriate ways to share credit, including authorship credit

• Provide opportunities for members to learn the content, languages, and cultures of the other disciplines
Criteria for Authorship

- An author should have made substantial contributions to the scholarly work and intellectual process.
- Authorship credit should be based on
  1. Substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data
  2. Drafting the article or revising it critically for important intellectual content
  3. Final approval of the version to be published.
- Examples of activities considered to be a substantial contribution may include one or more of the following: creating the original idea, project planning, experimental work, data collection, analysis, interpretation.
- An author should be able to articulate and defend their contribution to the scholarly work. They should know and be able to explain how their contribution relates to the overall project.
- As single contributions, the acquisition of funding, the provision of technical services and/or materials, the collection of data, or the general supervision of a research group are generally not adequate to justify authorship.
How Does Stress Hyperglycemia Related to Burn Injury Impact Outcomes in the Pre-diabetic Patient

• To answer this question, what areas of expertise are needed?
Clinical Impact of PCR Identification of MRSA and MSSA

• To answer this question, what areas of expertise are needed?
Impact of Multi-drug Resistant *Acinetobacter* on Clinical Outcomes in a Surgical ICU

- To answer this question, what areas of expertise are needed?
Does Delaying Early IV Fat Emulsion During TPN Reduce Infections During Critical Illness?

- To answer this question, what areas of expertise are needed?
Do higher doses of dexmedetomidine increase the risk of hypotension?

• To answer this question, what areas of expertise are needed?
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