American Federation for Medical Research

Collaboration and Multidisciplinary Research: Keys to Success

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“Life is short, science is long, opportunity is elusive, experiment is dangerous, judgment is difficult.”

“It is not enough for the physician to do what is necessary, the patient and the attendants must do their part as well, and circumstances must be favorable.”

- Hippocratic writings

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We’ve entered an unprecedented era of discovery ...

BIOMECHANICS
For successful organ procurement ...

STEM CELL RESEARCH
Cures for Parkinson’s, leukemia & more ...

HUMAN GENOME PROJECT
Hope for cancer, diabetes ...

NEW VACCINES
For emerging infections & bioterrorism ...

NEW DRUGS
For AIDS, Alzheimer’s, atherosclerosis ...

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Promise of Basic Research Unrealized

- Revolutionary progress has been made with New Discoveries

BUT...

- Impact on clinical practice is lagging.
Delivering the Promise

Clinical Research could...

- *Expedite movement of basic science breakthroughs*

or

- *Limit the translation of basic science findings to benefit human health*

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Even When A Therapy Is Proven Effective, Getting It to Patients is Still Daunting

- High costs
- Slow results
- Lack of funding
- Regulatory burdens
- Fragmented infrastructure
- Incompatible databases
- Shortage of qualified investigators
- Shortage of willing participants
The translational journey is rarely swift ...

Statins
Cholesterol-reducing wonder drugs

- Made a 20-year journey from basic discovery to clinical practice

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More often, the translational journey is painstakingly slow ...

Aspirin

From analgesic to cardiovascular wonder drug ...

... in only 100 years!

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Why it takes so long to deliver on the promise

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Clinical Research Roundtable (CRR)

- Convened by the Institute of Medicine 2000 - 2004
  - We explored why basic discoveries weren't being translated efficiently

Central Challenges Facing the National Clinical Research Enterprise

Medical scientists and public health policymakers are increasingly concerned that the scientific discoveries of the past generation are failing to be translated efficiently into tangible human benefit. This concern has generated several initiatives, including the Clinical Research Roundtable at the Institute of Medicine, which first convened in June 2000. Representatives from a diverse group of stakeholders in the nation’s clinical research enterprise have collaborated to address the issues it faces. The context of clinical research is increasingly encumbered by high costs, slow results, lack of understanding, regulatory burdens, fragmented incentive systems, and a shortage of clinical research scientists.

Begun in 2001, the Clinical Research Roundtable (CRR) is a collaborative effort of the National Academies, including the Institute of Medicine, National Academy of Sciences, and National Academy of Engineering, together with the National Institutes of Health, the Office of Science and Technology Policy, and the Food and Drug Administration. Over the last five years, the CRR has convened numerous meetings to develop recommendations for improving clinical research. The Roundtable’s work has been informed by extensive consultations with hundreds of members of the clinical research community, including clinical researchers, patients, ethicists, policymakers, and others. The CRR has identified several key issues that need to be addressed to improve the efficiency and effectiveness of clinical research.

Human health and well-being depend on clinical research involving human subjects and populations, as well as translational research that translates basic discoveries into knowledge that will affect clinical practice and, ultimately, improve health. Clinical research is the foundation of improved health services based on the results of research. This next scientific frontier deserves a correspond.

For editorial comment see p 1205.

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Two translational blocks

Figure 1. The 2 Translational Blocks in the Clinical Research Continuum

Translational Blocks
- Lack of Willing Participants
- Regulatory Burden
- Fragmented Infrastructure
- Incompatible Databases
- Lack of Qualified Investigators
- Career Disincentives
- Practice Limitations
- High Research Costs
- Lack of Funding

Basic Biomedical Research → Translation From Basic Science to Human Studies → Clinical Science and Knowledge → Translation of New Knowledge Into Clinical Practice and Health Decision Making → Improved Health

CLINICAL RESEARCH CONTINUUM


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Four central challenges

- The CR Roundtable identified strategies in four key areas:
  - Increasing public participation
  - Improving information systems
  - Increasing funding
  - Building a well-trained workforce
Why are clinical/translational researchers so important?

As Longo and colleagues observed, physician-scientists:

"...can play a key role in linking the laboratory and the bedside, serving as a bridge-builder between these two cultures"

Clinical Workforce Issues

- The clinical research workforce has been shrinking for decades
- Pressure to speed translation of basic research discoveries to clinical care continues to grow
- Evidence-based medical practice must be implemented nationwide
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Key Ingredients: What we need to do

We must **prime** the translational research pipeline by developing:

- A **core clinical research curriculum** to train the next generation of clinical researchers;
- **Supportive mentoring programs**;
- **Institutional measures** including funding, tenure, and promotion metrics to **attract and retain** physician-scientists;
- **Broader levels of collaborations**:
  - Specialty societies, public and private interests.


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What Is Multidisciplinary Research?

- Often takes place at the edges of traditional disciplines and across traditional subject boundaries

- Involves collaboration amongst scientists in more than one field, with each member of the team contributing their particular expertise to the project
Why Is Multidisciplinary Research Essential To Translation?

- Many diseases affect multiple organ systems and require multidisciplinary management (e.g., diabetes)
- Just as disease is often complex, so too must be research to find effective measures to manage/cure/prevent disease and illness.
Examples of Successful Multidisciplinary Collaborations at UMSOM

- Stem cells and Regenerative Medicine
- Genomic Sciences
- Transplant Medicine
Stem Cell Biology and Medicine

Richard Eckert, PhD, MS
Meredith Bond, PhD
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Using stem cells to restore normal cardiac function following a heart attack or other heart disease.

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Stem Cell Biology and Medicine
Genomic Science and Personalized Medicine

Claire Fraser-Liggett, PhD
Alan Shuldiner, MD
Working on ways to apply genomic information to develop “personalized” treatment approaches

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Genomic Science and Personalized Medicine

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Composite Tissue Transplantation,
Science & Medicine

Stephen Bartlett, MD leading a group working aggressively on limb transplantation

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Composite Tissue Transplantation, Science & Medicine

Target Population:

Soldiers coming home from wars in Iraq and Afghanistan with single, double, triple, and even quadruple amputations

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The Complete Translational Model

Basic Research
- Diseases
- In Vitro
- Animal Studies
- Genomics

Clinical Research
- Mechanisms
- Markers
- Drugs
- Interventions
- Human Research
- Participants

Quality Improvement
- Feasibility
- Strategy
- Effectiveness
- Safety
- Barriers

Health
- Patient Populations
- Practice Workflows
- Policies

Bench to Bedside Translation
Laboratory to Human

Bench to Community Translation
Evidence to Practice

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America's Oldest Public Medical School - A Third Century
Where Discovery Sets Us Apart

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