Cultivating Team Science in Clinical & Translational Research

George A. Mashour, MICHR
Elizabeth LaPensee, MICHR
Felix Kabo, ISR
Susan Murphy, MICHR
We do this by being a catalytic partner that educates, funds, connects & supports research teams everywhere.
CULTIVATING TEAM SCIENCE

ADVANCING

FUNDING

MEASURING
Funding Team Science

Beth LaPensee, PhD
Administrative Program Director, Research Initiatives
Michigan Institute for Clinical & Health Research
University of Michigan
Silos to Synergy
Large-Scale Grant Example Structure

- Administrative Core
- Scientific Core 1
- Scientific Core 2
- Scientific Core 3
- Research Project 1
- Research Project 2
- Research Project 3
- Program 1
- Program 2
## Large-Scale Grants

<table>
<thead>
<tr>
<th>NIH Research Program Project &amp; Research Centers</th>
<th>Cooperative Agreements: Research Projects &amp; Research Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01: Research Program Project</td>
<td>U19: Research Program</td>
</tr>
<tr>
<td>P20: Exploratory Grants</td>
<td>U24: Resource Related Research Project</td>
</tr>
<tr>
<td>P30: Center Core Grants</td>
<td>U54: Specialized Center</td>
</tr>
<tr>
<td>P50: Specialized Center</td>
<td>UM1: Resource Projects – Complex Structure</td>
</tr>
<tr>
<td>P60: Comprehensive Center</td>
<td>UM2: Research Project/Center – Complex Structure</td>
</tr>
</tbody>
</table>

**Logos:**
- CDC
- AHRQ
- FDA
- NSF
- National Endowment for the Humanities
- ACL
- Department of Defense
- Michigan Institute for Clinical & Health Research
Barriers to Developing Large-Scale Grants

- Grant strategy
- Administrative burden
- Identifying collaborators
- Establishing history of partnerships
- Organizing writing sessions
- Managing team dynamics
Portfolio of Support

- **Education**: Roundtables
- **Strategic Input**: Tailored Consultations
- **Proposal Management**: Planning & Resources
- **Grant Editing**: One Voice, Compelling
- **Financial**: Pilot Grants
Roundtable Conversations

Education

- **Foundations**
  - Principal Investigator
  - Infrastructure
  - Research Themes

  ![Silos to Synergy Star](image)

- **Structures**
  - Advisory Committee
    - Director
    - Deputy Director
    - Administrator
  - Core 1 Director
  - Core 2 Director
  - Project 1 Director
  - Project 1 Director
  - Project 1 Director

- **Collaborative Proposal Development**

- **Identifying FOAs**
Research Development Core

*We help faculty turn good ideas into funded science*

We can help with:

- Crafting an overall vision
- Identifying projects/cores
- Connecting with collaborators
- Study design and biostatistics
- Addressing reviewer comments
Multiple PD/PI Leadership Plan

The <insert project title> will be co-directed by Drs. <insert name 1> and <insert name 2>, who will both serve as PI/PDs for this application. We believe that the diverse training, clinical specialties and research backgrounds of our research team are some of the greatest assets of this grant application. While many are intimately involved in the work, Drs. <insert name 1> and <insert name 2> will be directing the project. Drs. <insert name 1> (<insert department 1>) and <insert name 2> (<insert department 2>) come from very different training and clinical practice backgrounds. Dr. <insert name 1> looks at training background 1. Dr. <insert name 2> looks at training background 2. Dr. <insert name 1> is an <insert title 1> at the University of Michigan Department of <insert department 1>. As an <insert type of researcher 1>, <his/her> focus has been on <insert research focus 1>. Dr. <insert name 2> is an <insert title 2>. <His/Her> expertise is in <insert research focus 2>.

While each Program Director will have specific leadership roles within the project, they will share responsibilities for the project as a whole. Such shared responsibilities include overall project administration, regulatory responsibilities and study conduct/management, AE reporting, data integrity as well as analysis, and dissemination. If either Program Director becomes unable to continue to serve this role, the other will take over sole responsibility for the study.

Dr. <insert name 1> will be primarily responsible for the overall organization and management of the project. <He/She> will <insert info on specific roles/responsibilities on project 1>.

Dr. <insert name 2>, in addition to shared responsibilities of the overall project, will <insert info on specific roles/responsibilities on project 1>.
Grant Editing

One Voice, Compelling

- Adhere to FOA
- Eliminate Jargon
- Cohesive
- Sentence Clarity
- Logic, flow, clarity
- Persuasive
- Content Review
- Page Limits

Grant Editing
Accelerating Synergy

- Supports teams in addressing significant, multifaceted research problems using a cross-disciplinary approach

- Requires collaboration across schools/colleges

- **Expectation**: Results will be used to develop a competitive external large-scale grant
Accelerating Synergy

Positioning

- $100K for one year
- Obtain/finalize preliminary data
- Publish with collaborators to solidify history of partnership

Grant Development

- $100K for one year
- Analyze/publish final preliminary data
- Prepare grant for submission

Supports basic, translational and health services research
Awardee Example Tailored Plan of Support

Grant Development

- Research Development Consultation
- Proposal Management
- Research Development Consultation
- Grant Editing
- Meet with Participant Recruitment
- Team Science Training

September 2018

September 2019
Preliminary Outcomes

29 Teams received large-scale grant support services in the last 1.5 years

5 Fold increase in the number of large-scale grants supported by MICHR

In the Works

- Tracking large-scale grant submissions at U-M
- Determining outcomes of grants supported by MICHR
Preliminary Outcomes

Teams awarded Accelerating Synergy funding

In the Works

- Sociometric surveys – team relationships, dynamics, networks
In the Works: Catalyzing Team Formation and Sustainability

Bringing Teams Together

Keeping Teams Together
Thank You.

Beth LaPensee, PhD
bethlap@umich.edu
Measuring Team Science

Felichism Kabo, M. Arch; PhD
Survey Research Center, Institute for Social Research
University of Michigan
Fundamentals

WHOM?

WHERE?

WHEN?

HOW?

WHAT?

MICHR’s Research Impact
Approach
Effect of a Clinical and Translational Science Award institute on grant funding in a major research university

Faithian W. Kado

1 Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, Michigan, USA
2 Office of Research, Medical School, University of Michigan, Ann Arbor, Michigan, USA
3 Michigan Institute for Clinical & Health Research, and Translational Research, University of Michigan, Ann Arbor, Michigan, USA

Introduction. Previous studies have examined the impact of Clinical and Translational Science Awards programs on either outcomes, but not on grant seeking. This study examines the effects of a grant seeking program at the Michigan Institute for Clinical & Health Research (MICHR), a Clinical and Translational Science Award Institute at the University of Michigan.

Methods. We assessed over 10,000 grant proposals submitted at the University of Michigan in the years 2002-2012 using data from the university and MICHR’s Tracking Moris and Reporting System. We used a retrospective observational study of the dynamics of pre-seeks success and overfunding. Hazard models were used to assess MICHR’s relationship with pre-seek’s success (advertising), and subsequently the award’s success (outcome). Models were fit for all proposals and for clinical and translational research (CTR) proposals alone. Other covariates included proposal classification, type of grant award, academic unit, and year.

Results. MICHR had a positive and statistically significant relationship with success for both proposals types. For all grants, MICHR was associated with a 1.5% increase in award rate. For CTR grants, MICHR had a statistically non-significant relationship with award rate.

Conclusions. MICHR self-introductions created to enable and enhance CTRs, has also created positive spillovers for a broader spectrum of research and grant seeking.

Received 13 August 2014; accepted 7 November 2014.

Keywords: Clinical and Translational Science Award (CTSA), grant seeking, research proposal success, grant award rate.

Introduction.

Recognizing the need for national accelerators and catalysts of clinical and translational research (CTR), the National Institutes of Health (NIH) established the Clinical and Translational Science Awards (CTSA) program in 2006 [1]. There are currently more than 60 CTSA institutes located at top academic health and related institutions. The CTSA program has met its objectives and has affected the landscape of clinical and translational science in these core institutions and in the nation. For example, studies have examined how CTSA programs have transformed the dimensions of collaboration and team science with respect to CTSA in their parent institutions [1-3]. However, the CTSA program has significantly and impacted research activities such as grant seeking. Given the significant investment in this program for the NIH and the US taxpayers, establishing metrics to quantify the many impacts of CTSA is of paramount importance.

Previous studies have examined the impact of CTSA programs on other metrics, but none of them have systematically analyzed how a CTSA program has shaped grant seeking over time. For example, the NIH encourages CTSA institutions to develop Ph.D. programs in clinical and translational science (CTS) in order to fulfill the education and training mandates of the CTSA mission (i.e., a steady flow of education and training programs that fulfill the CTSA mission). However, the CTR and CTS programs have been successful in the planning process for doctoral programs [5]. Mentoring is also a key component of the CTSA mission. A study of CTSA-sponsored research (the K12 program) found a preference for specific mentor qualifications—namely, independent research funding, previous mentoring experience, and seniority or advanced rank [6]. Our results, however, are the first study that empirically examined grant seeking as a metric for the impact of a CTSA institution.

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Grants

MICHR significantly associated with award receipt & size for all grants

MICHR significantly associated with award receipt & size for clinical & translational grants

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Table 1: Hedonic regression models of the impact of Michigan Institute for Clinical & Health Research (MICHR) on whether proposals are awarded and on the size of the grant award for the years 2002-2012. Models are shown for all grants.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICHR</td>
<td>0.324 (0.027)**</td>
<td>-0.779 (0.024)**</td>
<td>0.333 (0.029)**</td>
</tr>
<tr>
<td></td>
<td>0.313 (0.027)**</td>
<td>-0.786 (0.023)**</td>
<td>0.326 (0.025)**</td>
</tr>
<tr>
<td></td>
<td>0.316 (0.027)**</td>
<td>-0.777 (0.024)**</td>
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</table>

**GRANT TYPE**

<table>
<thead>
<tr>
<th>Grant (reference category)</th>
<th>Constant</th>
<th>Cooperative Agreement</th>
<th>Salaries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.808 (0.137)**</td>
<td>4.326 (0.139)**</td>
<td>3.950 (0.089)**</td>
</tr>
<tr>
<td></td>
<td>1.916 (0.137)**</td>
<td>4.326 (0.139)**</td>
<td>3.950 (0.089)**</td>
</tr>
<tr>
<td></td>
<td>1.924 (0.137)**</td>
<td>4.326 (0.139)**</td>
<td>3.950 (0.089)**</td>
</tr>
</tbody>
</table>

**PROPOSAL CLAS**

<table>
<thead>
<tr>
<th>Clinical Trial (reference category)</th>
<th>Constant</th>
<th>Other Sponsor Support</th>
<th>Research Training Grant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.809 (0.012)**</td>
<td>-0.357 (0.013)**</td>
<td>1.809 (0.012)**</td>
</tr>
<tr>
<td></td>
<td>1.828 (0.012)**</td>
<td>-0.357 (0.013)**</td>
<td>1.828 (0.012)**</td>
</tr>
<tr>
<td></td>
<td>1.847 (0.012)**</td>
<td>-0.357 (0.013)**</td>
<td>1.847 (0.012)**</td>
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</table>

**MEDICAL SCHOOLS**

<table>
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<tr>
<th>Constant</th>
<th>11.04 (0.072)**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11.01 (0.073)**</td>
</tr>
</tbody>
</table>

**Sizing of Grant Award: All Proposals.** For all grants, being processed by MICHR was associated with a 25% increase in award funding in dollars, even when controlling for all other variables—the academic unit of the scientist, the grant award type, the size of the proposal, and the year that the award was made. More academic units are associated with significantly lower amounts of funding per grant award compared with Medical School. However, Graduate Students and Public Health are associated with significantly higher funding per grant award compared with Medical School. For the grant award type, all other types are associated with higher funding per grant award compared with Grant. With the exception of Clinical Trial Site Activity, all other proposal classes are associated with higher funding per award compared with Clinical Trial.

**CPT Proposals.** For CPT proposals, Table 1 shows 3 models as follows: Model 4 has all variables except for the academic unit associated with the proposal. Model 5: award type; time variables; and Model 6: the fully fitted Hedonic equation.

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Table 2: Hedonic regression models of the impact of Michigan Institute for Clinical & Health Research (MICHR) on whether proposals are awarded and on the size of the grant award for the years 2002-2012. Models are shown for clinical & translational research grants.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICHR</td>
<td>-0.951 (0.212)**</td>
<td>-0.999 (0.227)**</td>
<td>-1.167 (0.218)**</td>
</tr>
<tr>
<td></td>
<td>-1.232 (0.225)**</td>
<td>-1.329 (0.235)**</td>
<td>-1.493 (0.236)**</td>
</tr>
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</table>

**GRANT TYPE**

<table>
<thead>
<tr>
<th>Grant (reference category)</th>
<th>Constant</th>
<th>Cooperative Agreement</th>
<th>Salaries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.657 (0.016)</td>
<td>-0.569 (0.027)</td>
<td>-0.019 (0.022)</td>
</tr>
<tr>
<td></td>
<td>0.660 (0.016)</td>
<td>-0.569 (0.027)</td>
<td>-0.019 (0.022)</td>
</tr>
<tr>
<td></td>
<td>0.662 (0.016)</td>
<td>-0.569 (0.027)</td>
<td>-0.019 (0.022)</td>
</tr>
</tbody>
</table>

**PROPOSAL CLAS**

<table>
<thead>
<tr>
<th>Clinical Trial (reference category)</th>
<th>Constant</th>
<th>Other Sponsor Support</th>
<th>Research Training Grant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.897 (0.037)</td>
<td>-1.164 (0.036)</td>
<td>1.961 (0.036)</td>
</tr>
<tr>
<td></td>
<td>1.907 (0.037)</td>
<td>-1.164 (0.036)</td>
<td>1.961 (0.036)</td>
</tr>
<tr>
<td></td>
<td>1.917 (0.037)</td>
<td>-1.164 (0.036)</td>
<td>1.961 (0.036)</td>
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</table>

**MEDICAL SCHOOLS**

<table>
<thead>
<tr>
<th>Constant</th>
<th>12.49 (0.039)**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12.49 (0.039)**</td>
</tr>
</tbody>
</table>

**Sizing of Grant Award: All Proposals.** For all grants, being processed by MICHR was associated with a 25% increase in award funding in dollars, even when controlling for all other variables—the academic unit of the scientist, the grant award type, the size of the proposal, and the year that the award was made. More academic units are associated with significantly lower amounts of funding per grant award compared with Medical School. However, Graduate Students and Public Health are associated with significantly higher funding per grant award compared with Medical School. For the grant award type, all other types are associated with higher funding per grant award compared with Grant. With the exception of Clinical Trial Site Activity, all other proposal classes are associated with higher funding per award compared with Clinical Trial.

**CPT Proposals.** For CPT proposals, Table 2 shows 3 models as follows: Model 4 has all variables except for the academic unit associated with the proposal. Model 5: award type; time variables; and Model 6: the fully fitted Hedonic equation.
Measuring team science: Associations between a clinical-translational science institute and investigator ego networks

Felicita W. Kabol and George A. Mashouf

Institute for Social Research, University of Michigan, Ann Arbor, MI, USA; Michigan Institute for Clinical and Health Research, University of Michigan, Ann Arbor, MI, USA; Office of Research, University of Michigan, Ann Arbor, MI, USA

Abstract

The National Institutes of Health’s Clinical and Translational Science Awards (CTSA) institutes have been created, in part, to have a positive impact on collaborations and team science. This study is the first to examine the associations between a CTSA hub, the Michigan Institute for Clinical and Health Research (MICHR), and investigators’ ego networks. We ran cross-sectional and panel models of the associations between collaborating with MICHR and the ego network measures of two-step reach (TSR) and that of colleagues of colleagues reachable in two steps—two of a network of 214 investigators who had co-submitted a grant proposal to an external sponsor in 2006. Our analysis covered the period 2006-2012, although some model specifications covered the shorter time period 2006-2009. Collaborating with MICHR had a positive association with the rise in network size and changes in investigates’ TSR across and over time, even controlling for research productivity and organizational affiliation. For example, over the period 2006-2010, an investigator who collaborated with MICHR showed an increase in size of their own network and a decrease in the size of their egocentric network compared to an investigator who did not.

Introduction

The NIH Roadmap was developed to address the complexities of biomedical science and to accelerate scientific progress by tackling challenges that cut across NIH’s institutes and centers [1-3]. The roadmap identified three major themes: (1) New Pathways to Discovery, (2) Research Teams of the Future, and (3) Re-engineering the Clinical Research Enterprise [1, 2]. The Clinical and Translational Science Awards (CTSA) program was launched in 2006, primarily to address the second and third of these themes. However, the methodology to assess the impact of a CTSA program hub on the development of research teams in clinical and translational science are still unclear.

CTSA program hubs were expected to catalyze clinical and translational research across the nation through activities such as training and catalyzing of a translational science workforce, and the fostering of collaboration, interdisciplinary team science [4-6]. There is burgeoning evidence for the positive impact of CTSA hubs on a range of outcomes including grant collaboration, publications, and citations [7-9]. The current study takes a novel approach to assess, which rather than focus only on outcomes, we examine the antecedent tissue of the potential benefits by which CTSA hubs are influencing the processes associated with the positive outcomes. We do this by identifying an individual’s ego network, through which a CTSA is transforming clinical and translational science. In particular, social network analysis is applied to advance understanding of how interactions with a CTSA program hub can influence individual or ego networks of an investigator.

Social networks contribute to knowledge creation, which is a collective and social activity [10]. In this study, we examined the impact of a CTSA program hub, the Michigan Institute for Clinical and Health Research (MICHR), on investigator ego networks at the University of Michigan (U-M) to assess the influence the institute has on the condition that fosters team science. MICHR is one of over 50 hubs of the CTSA program supported by the National Center for Advancing Translational Sciences (NCATS) of the National Institutes of Health (NIH). One of MICHR’s stated goals is to help enrich investigators’ research programs by connecting them to other units and individuals on campus. However, the most appropriate method by which to quantify enhanced scientific connectivity is unclear, both for MICHR and other CTSA hubs.

Previous network studies of CTSA program hubs have focused on changes of entire networks or communities of investigators. This type of approach is also referred to as socio-centric analysis. For example, network analysis was employed to assess collaborations, team science
Egonets

MICHR significantly associated with cross-sectional changes in ego network

MICHR significantly associated with longitudinal changes in ego network

Table 3. Cross-sectional models for the association with consulting MICHR in the years 2006-2010

<table>
<thead>
<tr>
<th>Year consulted MICHR</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td></td>
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<td></td>
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<tr>
<td>(2)</td>
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<td>(4)</td>
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<tr>
<td>(5)</td>
<td></td>
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</table>

Affiliation

Medical school (reference category)

College of engineering

<table>
<thead>
<tr>
<th>Value (percentage)</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
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<tr>
<td>(4)</td>
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</tr>
<tr>
<td>(5)</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Observations

9.96
9.96
9.96
9.96
9.96

Fig. 5. Two-step TSR values for the period 2006-2009 for investigators with proposals in 2006. The data are from the Michigan Health and Medical Research Institute (MHMRI) database.

Fig. 6. Two-step TSR values for the period 2006-2009 for investigators with proposals in 2006. The data are from the Michigan Health and Medical Research Institute (MHMRI) database.

Panel Analysis

We present models with (model 2, Table 4) and without (model 1, Table 4) controls for research productivity. Recall that model 1 captures all investigators in the panel, while model 2 only captures investigators in the panel who are affiliated with "Michigan Experts" units. The panel regressions revealed that consulting with MICHR had a robust, significant, and positive longitudinal association with ego network TSR for the period 2006-2010.

The findings for the models with and without controls for research productivity are similar. Therefore, we focused our analysis on model 1 as it allows us to discuss the association with consulting MICHR for the entire panel. Over time (2006-2010), the act of an investigator consulting with MICHR was associated with an increase in TSR by roughly 44 units (44.15 for the model without publications, and 45.58 for the model with publications) — that is, the investigator was able to reach 44 more individuals in two-steps compared to a peer who did not consult with MICHR.
Advancing Team Science

Susan Murphy, ScD, OTR
Associate Professor, Physical Medicine & Rehabilitation
Director, Clinical Trials Development, Physical Medicine & Rehabilitation
Director, Pain Rehabilitation Interventions for Symptom Management Lab
Michigan Institute for Clinical & Health Research
University of Michigan
Best Practices for Successful Team Science

Series of 11 short, motivational videos based on the National Cancer Institute’s *Collaboration and Team Science: A Field Guide* & the Top 10 Take-Aways

1. Trust
2. Vision
3. Self-Awareness and Emotional Intelligence
4. Leadership
5. Mentoring*
6. Team Evolution and Dynamics
7. Communication
8. Recognition and Sharing Success
9. Conflict and Disagreement
10. Navigating and Leveraging Networks and Systems
11. Diversity*
Program Goal
Train practicing clinicians with limited research training to become study team members

Through teamwork, participants develop skills to:
• Design a research project
• Apply and be reviewed for funding
• Conduct ethically and fundamentally sound research
• Disseminate findings through presentations and peer-reviewed manuscripts
Finding Research Partners

Communicating the Value of Your Research to a Broad Audience

• Workshop for faculty focused on developing value propositions
• Strategies for effectively communicating your research to different audiences in compelling ways
• Participants develop “Elevator Pitch” to be used in professional settings
Community Partner-Scholar Teams

Workshops for Community Partners on Research Development
• Collaboration between Community Engagement, Education, Biostatistics
• Trained partners on research design, qualitative design, and outcome measures
• Focused discussion on community-identified research priorities

Connect KL2 & TL1 scholars with community partners
• Project driven by community partner needs/interest
MICHR’s new **Pathway to Engagement program** provides training in stakeholder-engaged research methods

- **Audience:** U-M investigators with limited experience engaging community partners for research
- **Provides:** the tools and techniques investigators need to partner with patient and community stakeholders