A multi-method assessment of pilot grants & research collaboration at UIC's Center for Clinical & Translational Science

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RESEARCH QUESTIONS

As part of the multiyear evaluation of the Center for Clinical and Translational Science (CCTS) at the University of Illinois at Chicago (UIC), this research investigates the potential impact of the initial round of CCTS pilot grant funding by comparing the grant proposals and collaborative networks of 2006 pilot grant recipients to a comparison group of pilot grant applicants who did not receive an award. We also use qualitative data to describe the intermediate outcome experiences of two recent recipients. Our questions include the following:

1. To what extent does pilot grant funding impact downstream funding opportunities?
2. To what extent does pilot grant funding impact future research collaborations?
3. What other short-term impacts do pilot grants have on recipient research?

DATA AND METHODS

Quantitative data for this analysis come from a list of pilot grant applicants and recipients provided by the pilot grant program as well as funded grant proposals from outside funding sources (e.g., NIH, NSF). The Office of Research Services at UIC provided four years of data on these proposals. Pilot grant recipients were defined as principal investigators receiving funding from the initial round of pilot funding in 2006. Seven of 76 pilot grant submissions were awarded funds ranging from $49,685 to $100,000. The control group was composed of the PIs of the 69 project teams that did not receive an award. Although these awards were made prior to UIC's CTSA award, the purpose of the funding is generally consistent with the current objectives of the pilot program. Qualitative data come from semi-structured interviews with the director of the Novel Translational and Collaborative Studies Core (NTCS), which sponsors the pilot grants, and with two pilot grant recipients funded in 2006 and 2010.

OVERVIEW OF PILOT GRANT PROGRAM

The purpose of the grant program is to provide funding and core services to support pilot clinical and translational research at UIC. In particular, pilot funds are targeted at three types of research:

1) Generation of preliminary data for submission of grant applications
2) Research that improves clinical design, biostatistics, clinical research ethics, informatics, or regulatory pathways
3) Research that develops new technologies

Clinical and translational pilot studies were first funded in 2006, prior to CCTS funding. They were funded again in 2008, 2009 (the year the UIC CCTS was funded), and 2010. Each year the RFPs, application review process, and recipient support processes were revised to improve the outcomes of the pilot studies. Initially, a request for applications was announced that described the target area of research for that round of funding. For example, 2010 studies were required to be community-based or focused on pediatrics in addition to meeting the basic purposes of the pilot grant program. Approximately 80 applications were received each round, making review to allocate about $500,000 to six or seven projects very time consuming. Beginning in 2009, letters of intent were requested, and noteworthy projects meeting the grant criteria were sent invitations to apply. Each round of applications is reviewed and the process improved for the next request for submissions.

POTENTIAL IMPACT OF PILOT GRANTS ON POST-PILOT FUNDING OPPORUNITES

Table 1 shows results of an ANOVA comparing the proposals for outside funding of the 2006 pilot grant awardees to the nonawardee control group. This analysis shows that subsequent to the pilot grant award and compared to the control group:

- Pilot grant PIs had a significantly higher success rate on subsequent proposals for outside funding than the control group. However, the total dollar amount received on these awards was not significantly different than the control group.
- Pilot grant PIs were awarded proposals significantly more frequently from industry sources than the control group and received more awards and more funding from industry sources than the control group.
- Pilot grant PIs submit proposals to foundations less frequently than the control group and receive less funding from foundations.

IMPACT ON POST-PILOT RESEARCH COLLABORATIONS

We conducted additional analysis to compare the research collaborations of pilot grant recipients versus the control group. We found the following:

- The size of the collaborative teams submitting funding proposals to outside sources where the pilot grant PI is either a PI or co-PI is not significantly different than the size of the collaborative team for the control group (Pilot mean = 3.86, control mean = 3.61, p = .818).
- Subsequent to pilot grant funding, pilot grant PIs submitted proposals with fewer collaborators that they worked with on the pilot grant than the control group. Specifically, the 7 PIs who were awarded pilot grants in 2006 also submitted 31 proposals for grant funding from other sources. There were 34 PI-co-PI relationships across these 31 proposals. Only three of these collaborations were with people with whom the pilot grant PI collaborated on the pilot grant proposal (9%). This compares to 20% of control group proposal collaborations.
- Pilot grant collaborations do not reoccur as frequently as other collaborations. Specifically, the control group of 69 pilot grant applicants submitted 750 proposals during this same time period with 470 different collaborative relationships among PI's and others. Of these, 154 were also collaborations on the pilot grant application (20%).

OTHER POTENTIAL IMPACTS OF PILOT GRANT ON RECIPIENTS

Case studies of two pilot grant recipients describe intermediate outcomes and indicate progress prior to documentation of publications and subsequent funding.

Case Study 1: A Clinical Trial of Early Physical Therapy to Promote Locomotion in Infants with White Matter Injury (2006 recipient)

Why a pilot grant? The investigator wanted to try out a new physical therapy treatment and add new facilities to her ongoing research sites. Because this was treatment for a rare disease, which can be very costly to study, she needed additional data to support a request for funding for a larger clinical trial. Following are some impacts of pilot grant funding:

- ***Additional CCTS Core Support Received:*** None was needed.
- ***Collaborations Developed:*** This created a very multidisciplinary approach.
  - *New sites:* A new hospital site was added to increase opportunities to find cases for rare diseases. An MRI center was added to include brain scans in the outcomes.
  - *New disciplines:* An anesthesiologist and a physician who was head of the Neonatal Intensive Care Unit at the new site.
- ***Outcomes:***
  - Several areas for improvement in the intervention were found. They will need to be addressed prior to proposing a larger trial.
  - The intervention appears to have found improvement in the treatment group.
- ***Publications and Presentations:***
  - A presentation was given at an international conference. Many people were interested in this intervention and the uniqueness of the research.
  - Several publications are in process.
- ***Subsequent Funding:*** This is challenging, because it will cost millions of dollars and many, many sites to get enough cases.

Case Study 2: Human Alzheimer's Disease Pathology in a New Transgenic Mouse Model (2010 recipient)

Why a pilot grant? The researcher had a large amount of data available from a prior study that needed organization and analysis. She needed a grad student, a biostatistician, and mouse tissue samples. Impacts of the pilot grant funding:

- ***Additional CCTS Core Support Received:*** Regulatory Support and Advocacy Core, Design and Analysis Core.
- ***Collaborations Developed:***
  - *Transgenic mouse researcher:* Led to Alzheimer's disease research model that has never been done before with transgenic mice.
  - *CCTS biostatisticians:* The Design and Analysis Core director was fascinated with the study design and lack of appropriate analysis. He researched approaches outside the field of medicine and adapted another method for this study. He taught this method to one of the core biostatisticians who now runs the analyses.
- ***Outcomes:***
  - A new, unique research model to study Alzheimer's disease based on transgenic mice tissue and human tissue.
  - A new method of analysis which the investigator believes will set a new standard for this type of research.
- ***Planned Publications:***
  - Two minor publications are at the point of being submitted. Several others are planned. Both statisticians will be prominent coauthors on her publications. She believes that the core director will publish his statistical method as well.
- ***Subsequent Funding:*** None yet.

Table 1. ANOVA analysis of CCTS Pilot Grant PIs' Subsequent Grant Proposals and Awards

PROPOSALS SUBMITTED PER SCHOLAR	CCTS Pilot Grant Recipients [*n* = 7 Principal Investigators] (*n* = 31 proposals)		CCTS Pilot Grant Nonrecipients [*n* = 69 Principal Investigators] (*n* = 750 proposals)		Difference between the Means
	Mean	SD	Mean	SD	
# of proposals submitted	7.75	5.62	10.87	9.05	-3.12
% of proposals awarded	45%	51%	27%	44%	15 %*
Amount requested per proposal	$689,178	$1,068,841	$726,354	$1,018,665	$37,176
Average amount awarded per proposal	$112,392	$359,371	$130,226	$634,449	$17,834
% of NIH proposals awarded	23%	42%	26%	44%	3%
Amount awarded per NIH proposal	$73,899	$348,474	$100,916	$625,258	$27,017
% of government agency† proposals awarded	52%	52%	59%	49%	7%
% of foundation proposals awarded	—	—	21%	40%	21%**
% of industry proposals awarded	39%	50%	8%	28%	31%***
% of university proposals awarded	10%	30%	12%	33%	2%

AWARDS PER SCHOLAR	CCTS Pilot Grant Recipients w/ subsequent awards [*n* = 4 principal investigators]		CCTS Pilot Grant Nonrecipients w/ subsequent awards [*n* = 69 Principal Investigators]		Difference between the Means
	Mean	SD	Mean	SD	
# of proposals awarded	3.5	3.3	2.9	3.2	0.6
Amount of funding awarded	$871,035	$879,779	$1,415,500	$2,246.060	$544,465
# of government agency† proposals awrded	4.0	4.0	6.4	7.0	2.4
Amount of government agency† proposals awarded	$582,553	$946,986	$1,355,000	$2,226,440	$772,447
# of foundation proposals awarded	0	0	2.2	3.0	2.2
	[*n* = 2 principal investigators]		[*n* = 31 principal investigators]		
# of industry proposals awarded	3.0	5.4	0.9	1.3	2.1*
Amount of industry funded proposals awarded	$571,820	$807,827	$113,299	$213,422	$458,521*
# of university proposals awarded	0.8	1.0	1.3	2.5	0.5
Amount of university funding awarded	$5145	$7275	$198,808	$450,897	$193,663

* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$.
†Government agency funding includes NIH funding.

KEY FINDINGS FOR FUTURE EVALUATION

- Subsequent to the pilot grant, PIs seek and acquire more industry funding and less foundation funding; this may be an indication that pilot grants are motivating new technology. Further evaluation is required to better understand the factors behind this potential difference.
- Case study suggests that new multidisciplinary collaborations form because of pilot grants. Quantitative analysis suggests that pilot grant collaborations form for the pilot grant and then disband as pilot grant PIs submit fewer subsequent funding proposals with the pilot grant collaborators. Further assessment is required to explore the formation and dissolution of collaborative ties.
- A mixed approach of case study and network analysis can be a useful tool for assessing pilot grant programs.

LIMITATIONS

- Only 7 PIs are in the pilot grant recipient group. Recipients are heavily skewed by rank and high-level positions.
- Counts of proposals are not weighted by sample size.
- Due to data limitations, we were unable to link or associate subsequent funding proposals with research conducted as part of the pilot grant.

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