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Family Medicine—Specific Practice-Based Research Network Productivity and Clinical and Translational Sciences Award Program Affiliation

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Abstract

Objective—Practice-based research networks (PBRNs) are groups of practices that work together to conduct research. Little is known about the degree to which PBRNs may be achieving success. This is the first general survey of family medicine–based PBRN directors in the United States and Canada to examine research productivity outcomes of PBRNs and explore the association between Clinical and Translational Science Awards (CTSA) program affiliation and PBRN outcomes.

Methods—The Council of Academic Family Medicine Educational Research Alliance conducted the survey and e-mailed it to 102 PBRN directors from the Agency for Healthcare Research and Quality's registration.

Results—A total of 54 (56%) PBRN directors responded to the survey. PBRNs with an affiliation with a CTSA program were more likely to report completion of quality improvement research and participation in multiple PBRN collaboration research projects. PBRNs affiliated with CTSA programs were less likely to report maintaining funding as a significant barrier.

Conclusions—CTSA involvement with PBRNs results in family physician scientists' completing research and disseminating this research through publication. Also, PBRNs with CTSA partnerships have more funding availability. PBRN partnership with a CTSA is beneficial in furthering research in family medicine.

Keywords

Clinical and Translational Science Awards; clinical research; family medicine; practice-based research networks; research productivity

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Practice-based research networks (PBRNs) are groups of practices that work together to conduct research and aim to bring together academic investigators and community-based practices, thereby creating a critical infrastructure for supporting community-engaged clinical and translational research.¹⁻³ In addition to being patient laboratories, PBRNs facilitate the conduct of clinical trials by providing opportunities to engage patients and practicing clinicians in the development and implementation of research across the translational spectrum.^{1,2,4,5}

The productivity of PBRNs reported most recently in 2011, showed that PBRNs participate in an average of 4 studies annually, with a range of 1 to 40 studies per year.⁶ This was in opposition to a study in 2007 that identified most PBRNs completing anywhere from 0 to 7 studies.⁷ Little is known, however, about the degree to which PBRNs may be achieving success by other measures, such as extramural funding, scientific publications, and integration within larger academic research settings.

Previous research has documented commonly cited barriers to successful PBRN research, including maintaining infrastructure funding, availability of electronic health records and biomedical informatics data tools, and clinician and practice research capacity.⁶ Clinical and Translational Science Awards (CTSA) programs, funded by the National Institutes of Health, aim to accelerate the process of translating laboratory discoveries into improved population health and include engaging communities in clinical research efforts.⁸ Collaboration with PBRNs is a commonly used strategy for the community-engagement activities of CTSA programs.⁹ In 2010, approximately half of PBRNs reported affiliation with a CTSA program; however, even PBRNs with CTSA affiliations reported persistent difficulties in maintaining infrastructure funding and developing a more prominent role in CTSA research activities.⁹ Collaboration between CTSA programs and PBRNs may offer PBRNs important resources for addressing barriers to PBRN success while providing opportunities for CTSA programs to increase community engagement in translational research.

We undertook the first general survey of family medicine-based PBRN directors in the United States and Canada to examine research productivity outcomes of PBRNs and the prevalence of significant barriers to PBRN productivity, and to determine which PBRN characteristics are associated with PBRN productivity. We measured productivity outcomes by PBRN director-reported extramural funding levels, number of manuscripts, types of research completed, and collaboration with other PBRNs. This study also sought to explore the association between CTSA program affiliation and selected PBRN outcomes.

Methods

We analyzed a survey conducted as part of the Council of Academic Family Medicine Educational Research Alliance (CERA). CERA is a joint initiative of four major US academic family medicine organizations: the Society of Teachers of Family Medicine, the North American Primary Care Research Group, the Association of Departments of Family Medicine, and the Association of Family Medicine Residency Directors.

The investigators submitted questions related to PBRN outcome measures for inclusion in the CERA survey. The survey was designed as an omnibus survey incorporating several distinct subprojects focusing on different topic areas. The sampling frame included directors of PBRN as identified by the Agency for Healthcare Research and Quality's registry of PBRNs. Within the registry the networks have a designated network type.

We selected family medicine networks (ie, at least 75% of network members are family medicine clinicians) and mixed networks, which included family medicine clinicians for participation. Networks primarily involving other specialties were not included in this family medicine CERA survey. This survey was limited to members in the United States and Canada. The American Academy of Family Physicians' institutional review board approved this study.

The survey was pretested for timing and understandability. During the pretests the omnibus survey took <10 minutes to complete. CERA administered the survey between September and October 2015. CERA invited potential respondents to participate using an e-mail invitation and introduced the survey in an e-mail that included a personalized greeting, a letter signed by the presidents of each of the four participating organizations of the Council of Academic Family Medicine urging participation, and a link to the survey. CERA sent nonrespondents three follow-up e-mails encouraging participation. Because the survey was structured as an omnibus survey with several subprojects contained within the overall survey, it was possible for respondents to skip questions.

CERA sent the survey initially to 102 different PBRN directors. Five e-mails did not reach their recipients, and one contacted individual indicated that the PBRN was no longer active, leaving a usable sample of 96. Among those 96 contacted PBRN directors, 54 participated in the survey, for a response rate of 56%.

Survey

The two principal investigators (T.H. and A.M.C.) developed the survey questions for this study, and the full research team reviewed and revised the questions. The survey asked PBRN directors to report the scope of their PBRN (local, state, regional, or national); number of years that the PBRN has been in existence; number of years as PBRN director; and number of practice locations, practitioners, and residencies included in the PBRN. The survey assessed CTSA affiliation through PBRN director self-report as well as report of duration of affiliation and types and amount of support provided. The survey measured PBRN success through the number of completed projects, the number of peer-reviewed publications, the amount of extramural funding and agreement with statements about the success of the PBRN function (ie, "our PBRN produces research that matters to primary care"). The research team also developed questions to assess PBRN-perceived barriers to and confidence in research success. We have made the survey questions available through headings located in Tables 1 through 4.

Statistical Analysis

We used descriptive analyses to provide basic information about the current practice of the PBRN programs. We created dichotomous variables by combining categories of the original

variables. We used χ^2 analysis to determine the bivariate associations between CTSA affiliation and PBRN productivity, perceived confidence in conducting different types of research, and perceived barriers to implementing research. We applied the Fisher exact test instead of χ^2 analysis when >20% of the expected cell sizes were <5. We used $P < 0.05$ to determine the significance of all of the bivariate testing. We conducted all of the analyses using SAS version 9.3 (SAS Institute, Cary, NC).

Results

As shown in Table 1, a majority of the PBRNs (77.3%) have >20 practice locations and 25.9% of the PBRNs include >5 residencies. Many PBRNs have been in existence for >6 years (75.6%) and have had the same director for >6 years (46.3%). More than half of the PBRNs are state (33.3%) or local (20.4%). Approximately half (50.9%) of the respondent PBRNs had an affiliation with a CTSA program. PBRNs reported that the affiliated CTSA programs provided support in the form of administrative support (51.9%), financial support (70.4%), and scientific guidance (55.6%). Most of the PBRNs provided support for project or proposal development (63.5%), practice research assistants (59.6%), incentives for project participation (63.5%), and electronic data capture (63.5%).

Productivity varied throughout the PBRNs (Table 2). Compared with PBRNs without a CTSA affiliation, PBRNs that reported an affiliation with a CTSA program were more likely to report completion of quality improvement research (88.5% vs 65.4%, $P = 0.048$). PBRNs affiliated with CTSA programs also were more likely to report participation in research projects that involved collaboration with one or more other PBRNs (80.8% vs 50.0%, $P = 0.02$). CTSA program affiliation did not change the proportion of PBRNs reporting completion of clinical trials research, pragmatic clinical trials research, observational studies, studies developed by academic researchers, or studies developed by PBRN practice champions.

The barriers to research productivity in the PBRN as perceived by the PBRN director are shown in Table 3. PBRNs affiliated with a CTSA programs were less likely to report maintaining funding as a significant barrier to the conduct of research (7.7% vs 52.0%, $P = 0.0005$). There was no association between PBRN CTSA program affiliation and PBRNs' reported ability to hire skilled support staff and securing time for the PBRN faculty. CTSA affiliation was not associated with PBRNs' reported ability to complete research projects or publish successfully in peer-reviewed journals. A majority of PBRNs, regardless of CTSA affiliation, reported they had a sufficient number of investigators to develop and implement research projects, available practice champions, practices interested in taking part in research, and the necessary tools for electronic health record data capture. No associations were found between CTSA affiliation and PBRN confidence in research activities (Table 4).

Discussion

Affiliation with a CTSA program was reported by half of the respondent PBRNs, which is consistent with findings from earlier research that suggested that CTSA continue to play a significant role with PBRNs.⁹ Previous publications have identified goals of the CTSA and

PBRN collaborations from both the CTSA's and PBRNs' perspectives.⁹ To our knowledge, our study is the first to evaluate the potential impact of CTSA affiliation on PBRN activities.

Extramural funding has been identified in academic institutions as a marker of research productivity. CTSA affiliation also was positively associated with PBRN participation in research projects across multiple PBRNs. CTSA affiliation may improve PBRNs' capacity to conduct larger-scale research, although this was not measured directly in our study.

Affiliation with a CTSA program was positively associated with completion of quality improvement research. Quality improvement is important to improving patient care delivery, patient health outcomes, and reimbursement.¹⁰ CTSA programs may provide resources to PBRNs to engage clinicians and practices in the development and implementation of practice-relevant quality improvement research.

PBRNs affiliated with CTSA's were much less likely than those not affiliated to report stable infrastructure funding as a perceived barrier to success. CTSA programs provide important infrastructure resources for PBRNs. As the capacity of PBRNs to conduct large-scale clinical research grows, the health impact of this investment may become apparent.

This study has several limitations that should be considered when interpreting the results. First, the study had a response rate of 56%. Although this is a reasonably high response rate for many e-mail-based studies, there is a possibility that nonresponders have some differences in either research productivity or attitudes. Second, this study is limited to family medicine-based PBRNs. This sampling frame may limit the generalizability of the results, although family medicine PBRNs account for the majority of PBRNs and therefore provide a window into a primary care-based translational science laboratory. Third, this study is cross-sectional and provides evidence of the current state of PBRNs. Fourth, this information was gathered through self-report data from PBRN directors, which may be subject to recall bias. Future research evaluating trends or cohorts may be useful to disentangle causation regarding some of the identified barriers and facilitators of PBRN research productivity, however.

Conclusions

CTSA investment in PBRNs is associated with PBRNs' conducting quality improvement research with community-based practices at the local level as well as large-scale collaborations across multiple diverse PBRN settings. CTSA association represents an important and powerful resource in practice-based research.

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Key Points

- Clinical and Translational Science Awards (CTSA) programs provide important infrastructure resources for practice-based research networks (PBRNs).
- Affiliation with a CTSA program was positively associated with completion of quality improvement research.
- CTSA investment in PBRNs is associated with large-scale collaborations across multiple diverse PBRN settings.

Table 1**PBRN demographics and service offered by PBRN**

Demographics	n	%
Describe the scope of your PBRN	54	
Local	11	20.4
State	18	33.3
Regional	16	29.6
National	9	16.7
How many years has your PBRN existed?	54	
<1	0	
1–3	8	14.8
4–5	5	9.3
6–10	16	29.3
>10	25	46.3
How long (y) have you been the director of the PBRN?	54	
<1	3	5.6
1–3	17	31.5
4–5	9	16.7
6–10	14	25.9
>10	11	20.4
How many practitioners are included as members of your PBRN?	54	
<20	1	1.9
21–49	10	18.5
50	43	79.6
How many practice locations are parts of your PBRN?	53	
<5	1	1.9
5–9	2	3.8
10–19	9	17.0
20	41	77.3
How many residencies are parts of your PBRN?	54	
<5	40	74.1
5–9	6	11.1
10–19	4	7.4
20	4	7.4
Does your PBRN have a formal relationship with a CTSA?	53	
Yes	27	50.9
No	26	49.1
Does the CTSA program provides administrative support for our PBRN?	27	
Yes	14	51.9
No	13	48.1
Does the CTSA program provides financial support for our PBRN?	27	
Yes	19	70.4

Demographics	n	%
No	8	29.6
Does the CTSA program provide scientific guidance for our PBRN (eg, methodology guidance, investigator training)?	27	
Yes	15	55.6
No	12	44.4
Does your PBRN provide support for project or proposal development?	52	
Yes	33	63.5
No	19	36.5
Does your PBRN provide practice research assistants to support research in your PBRN?	52	
Yes	31	59.6
No	21	40.4
Does your PBRN provide support to practice sites, through incentives, for project participation?	52	
Yes	33	63.5
No	19	36.5
Does your PBRN have electronic data capture through an electronic medical record?	52	
Yes	33	63.5
No	19	36.5

CTSA, Clinical and Translational Science Awards; PBRN, practice-based research networks.

Table 2

Productivity in relation to CTSA affiliation

Productivity variables	Affiliated with a CTSA (n = 27)	Not affiliated with a CTSA (n = 26)	<i>P</i> ^a
No. publications in indexed peer-reviewed journals in collaboration with your PBRN in 2013 and 2014 (%)			
< 5	10 (37.0)	16 (61.5)	0.07
5	17 (63.0)	10 (38.5)	
Amount of extramural funding resulted from collaboration with your PBRN in 2014 (%)			
\$100,000	7 (25.9)	11 (42.3)	0.21
>\$100,000	20 (74.1)	15 (57.7)	
Percentage of research projects funded extramurally (%)			
49	5 (20.8)	6 (28.6)	0.55
50–100	19 (79.2)	15 (71.4)	
Types of research projects completed by your PBRN			
Research projects developed by PBRN practice champions	20 (76.9)	17 (65.4)	0.36
Projects developed by academic researchers who are not part of the PBRN	22 (84.6)	19 (73.1)	0.31
Observational studies using electronic health record data (%)	17 (65.4)	13 (50)	0.26
Clinical trials research	11 (42.3)	9 (34.6)	0.57
Pragmatic clinical trials research	15 (57.7)	13 (50)	0.58
Quality improvement research	23 (88.5)	17 (65.4)	0.048
Other	11 (91.7)	6 (75.0)	0.31
Participated in a research project that involved collaboration with 1 other PBRNs	21 (80.8)	13 (50)	0.02

Sample sizes vary for responses to productivity questions because of missing values. CTSA, Clinical and Translational Science Awards; PBRN, practice-based research networks.

^a*P*value of χ^2 analysis comparing the difference of productivity variables between PBRNs affiliated with a CTSA and those not affiliated with a CTSA.

Table 3

Perceived barriers in relation to CTSA affiliation

Perceived barrier variables	Affiliated with a CTSA (n = 27)	Not affiliated with a CTSA (n = 26)	P ^a
Investigator availability to develop and implement research projects (%)			
Not at all/somewhat/moderate	19 (73.1)	20 (76.9)	0.75
Significant	7 (26.9)	6 (23.1)	
Availability of practice champions to collaborate with investigators (%)			
Not at all/somewhat/moderate	21 (80.8)	17 (68.0)	0.30
Significant	5 (19.2)	8 (32.0)	
Practice's interest in participating in research projects (%)			
Not at all/somewhat/moderate	22 (88.0)	18 (72.0)	0.16
Significant	3 (12.0)	7 (28.0)	
Availability of electronic health record tools to conduct research (%)			
Not at all/somewhat/moderate	22 (84.6)	21 (87.5)	1.0
Significant	4 (15.4)	3 (12.5)	
Funding to support PBRN infrastructure (%)			
Not at all/somewhat/moderate	24 (92.3)	12 (48.0)	0.0005
Significant	2 (7.7)	13 (52.0)	
Hiring or retaining skilled PBRN support staff (%)			
Not at all/somewhat/moderate	23 (88.5)	21 (80.8)	0.70
Significant	3 (11.5)	5 (19.2)	
Securing protected time for PBRN faculty to develop and maintain the PBRN (%)			
Not at all/somewhat/moderate	19 (73.1)	13 (50.0)	0.08
Significant	7 (26.9)	13 (50.0)	
Completing PBRN research projects in a timely manner (%)			
Not at all/somewhat/moderate	24 (92.3)	22 (84.6)	0.67
Significant	2 (7.7)	4 (15.4)	
Publishing PBRN research findings in peer-reviewed journals (%)			
Not at all/somewhat/moderate	25 (96.1)	23 (88.5)	0.61
Significant	1 (3.9)	3 (11.5)	

Sample sizes vary for responses to perceived barrier questions because of missing values.

CTSA, Clinical and Translational Science Awards; PBRN, practice-based research networks.

^aPvalue of χ^2 analysis or Fisher exact test comparing the difference of productivity variables between PBRNs affiliated with a CTSA and those not affiliated with a CTSA.

Table 4

Perceived confidence in relation to CTSA affiliation

Perceived confidence variables	Affiliated with a CTSA (n = 27)	Not affiliated with a CTSA (n = 26)	<i>P</i> ^a
Research projects developed by PBRN practice champions (%)			
Not at all/somewhat confident	10 (37.0)	8 (32.0)	0.71
Confident /very confident	17 (63.0)	17 (68.0)	
Research projects developed by academic researchers (%)			
Not at all/somewhat confident	2 (7.4)	6 (23.1)	0.14
Confident /very confident	25 (92.6)	20 (76.9)	
Observational studies using electronic health record data (%)			
Not at all/somewhat confident	6 (22.2)	9 (36.0)	0.27
Confident /very confident	21 (77.8)	16 (64.0)	
Clinical trials research (%)			
Not at all/somewhat confident	15 (55.6)	16 (64.0)	0.53
Confident /very confident	12 (44.4)	9 (36.0)	
Pragmatic clinical trials research (%)			
Not at all/somewhat confident	5 (18.5)	9 (36.0)	0.16
Confident /very confident	22 (81.5)	16 (64.0)	
Quality improvement research (%)			
Not at all/somewhat confident	2 (7.4)	4 (16.0)	0.41
Confident /very confident	25 (92.6)	21 (84.0)	

Sample sizes vary for responses to perceived confidence questions because of missing values. CTSA, Clinical and Translational Science Awards; PBRN, practice-based research networks.

^a*P*value of χ^2 analysis or Fisher exact test comparing the difference of perceived confidence variables between PBRNs affiliated with a CTSA and those not affiliated with a CTSA.