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Brenda M. Joly
University of Southern Maine

Fleur Hopper
University of Southern Maine

Carolyn Gray
University of Southern Maine

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INNOVATION HIGHLIGHT

Northern New England Clinical and Translational Research Network Assesses the Training Needs of Investigators

Brenda M. Joly, PhD, MPH,¹ Fleur Hopper, MPH,¹ Carolyn Gray, MPH¹

¹Northern New England Clinical & Translational Research Network, Tracking and Evaluation Core, University of Southern Maine, Portland, ME

- Introduction:** The Northern New England Clinical and Translational Research (NNE-CTR) Network aims to enhance the region's research capacity and infrastructure with support in research design and technology, professional development and mentorship, and funding for pilot projects. This study sought to identify characteristics of NNE-CTR investigators and their research interests, training needs, and perceived barriers to research.
- Methods:** A registration survey and needs-assessment module were developed and administered to investigators in Maine, New Hampshire, and Vermont. Univariate statistics were calculated for all structured items. Bivariate frequencies were generated to assess the relationship between training interests and level of research experience. Content analysis was used to identify common themes.
- Results:** Of 272 investigators, many were women (60%), white (85%), and physicians (54%). Most respondents reported participating in a research project (88%) and an interest in translational science research (51%). Fewer than half reported receiving extramural funding. Many respondents expressed interest in receiving mentoring and/or training related to study design. Participants with fewer than 3 years of research experience were more likely to report barriers related to lack of time to conduct research, while participants with ≥3 years of experience more often reported inadequate institutional support and challenges in recruiting and identifying patients.
- Discussion:** Echoing findings from other needs assessment efforts, this study underscores the need to build core research skills through professional development and to tailor training opportunities to investigator's needs.
- Conclusions:** Ongoing efforts to match the identified needs and interests with the appropriate resources remains a key feature of the NNE-CTR.
- Keywords:** translational medical research, needs assessment, IDeA, program evaluation
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In 1993, Congress mandated the Institutional Development Award (IDeA) program. IDeA supports faculty development and enhancements to the research infrastructure in states that have traditionally received low levels of NIH funding.¹ In 2017, Maine Medical Center (MMC), in collaboration with the University of Vermont (UVM) and the University of Southern Maine (USM), received IDeA funding to support clinical and translational research (CTR) efforts in Maine, New Hampshire, and Vermont. This 5-year, \$20 million initiative

established the Northern New England Clinical and Translational Research (NNE-CTR) Network.

The NNE-CTR is part of a national network of NIH-funded medical and academic partnerships focused, in part, on providing investigators with research support services.^{1,2} The goal of the NNE-CTR is to foster research activity and enhance the region's research infrastructure and capacity to conduct studies that support improved health outcomes, particularly for rural communities. The NNE-CTR is organized into cores that provide research design consultation, technical assistance, research technologies support, professional development opportunities, mentorship, and

Correspondence: Brenda M. Joly, PhD, MPH
University of Southern Maine,
PO Box 9300 Portland, ME 04101
brenda.joly@maine.edu

funding for pilot projects. In addition, the NNE-CTR includes cores focused on project management and administration, rural health and community engagement, and evaluation.

Several CTR-related initiatives have focused on the benefits of a diverse workforce³ and the value of identifying the needs, priorities, and challenges of specific audiences.^{4,5} To identify the NNE-CTR workforce, and to inform and tailor ongoing research support services, a registration process and needs assessment survey were developed during the first six months of the initiative. This survey was designed to capture information about investigators who were interested in NNE-CTR services. While limited, similar assessment activities have been published by other translational research programs. These efforts have been successfully used to create opportunities to support researchers.⁶⁻⁸ The purpose of this report is to describe the characteristics of NNE-CTR participants and to summarize their reported research interests, training needs, and perceived barriers to research.

METHODS

Participant recruitment

From February 2018 through December 2018, three approaches were used to recruit investigators; (1) NNE-CTR leadership sent invitational emails with the survey link to targeted distribution lists of potentially interested participants at MMC, UVM, and USM. Each of the three institutions used somewhat different criteria for identifying eligible participants, and grant staff helped to identify appropriate distributions lists within each organization, (2) NNE-CTR leadership conducted a series of outreach efforts (e.g., conference presentations) and encouraged investigators to register through the survey link on the NNE-CTR website; and (3) The NNE-CTR required lead investigators seeking pilot-project funding to join the NNE-CTR as part of the application process.

Survey

A two-part survey, approved by the USM Institutional Review Board, was developed during the first 6 months of the award. Survey items were based, in part, on a previously published needs-assessment tool.⁷ The survey was modified to assess additional needs and interests based on input from each of the NNE-CTR Cores and informally pilot tested by a small group of NNE-CTR staff. The survey

was administered between February 2018 and December 2018 via the web-based application Research Electronic Data Capture (REDCap).⁹ Part I of the survey also served as NNE-CTR's registration mechanism and included structured questions that collected information on participant demographics, credentials, professional settings, and research experience. Upon completing Part I, participants were directed to Part II, a voluntary 13-item needs-assessment module. This module contained open-ended questions and structured items using Likert-type response options, ratings, and check all that apply. The items assessed research interests, barriers, and training needs.

Data analysis

Univariate statistics (frequency distributions and percentages) were calculated for all structured items. Bivariate frequencies were also generated to compare training interests and barriers based on reported level of research experience. Fisher's exact tests were performed with a significance level determined as $p \leq .05$ to assess differences between those with less than 3 years of research experience versus 3 years or more. All quantitative analyses were performed using SAS software version 9.4 (SAS Institute). Content analysis was performed on select open-ended items, with a focus on identifying common themes related to translational technology and funding needs.

RESULTS

Participant findings

A total of 272 investigators responded to the NNE-CTR registration and needs-assessment survey. Given the open-ended recruitment strategy described above, a precise response rate was not available. As seen in Table 1, participants were primarily from Maine (68%), women (60%), white (85%), and physicians (54%). More than half (51%) of participants reported being engaged in research for 10 or more years, and most (93%) respondents indicated some research experience (Table 1). Participants were more evenly distributed by self-identified research skills and experience: 22% of participants classified themselves as "beginner," 29% as "intermediate," 28% as "proficient," and 21% reported their research skills as "expert" (data not shown).

Most respondents reported participating in a range of research activities. An overwhelming majority

Table 1. NNE-CTR Registrant Characteristics (n = 272)

Topic Area	%	n
State of Primary Workplace		
ME	68.4	186
VT	29.8	81
NH or other state	1.8	5
Gender		
Female	59.9	163
Male	39.3	107
Prefer not to answer	0.7	3
Race		
White	84.7	182
Asian	7.9	17
More than one race	3.3	7
American Indian or Alaskan Native	1.4	3
Black or African American	1.4	3
Prefer not to answer	0.9	2
Don't know	0.5	1
Missing/No response	--	57
Highest Academic Degree		
MD or DO	54.4	148
PhD/ScD	27.9	76
BS/BA/BSN	6.6	18
MS/MSN	3.7	10
MPH	1.8	5
Other (e.g., DDS, DMD, DNP, MSW, PharmD)	5.5	15
Currently Practice in Rural Clinical Setting*		
No	79.1	163
Yes	20.9	43
Graduated with Highest Degree in Past 5 Years		
No	76.8	209
Yes	23.2	63
Number of Years Involved in Research		
≥ 10 years	50.7	138
7 – 9 years	8.5	39
4 – 6 years	14.0	38
1 – 3 years	14.3	23
< 1 year	5.5	15
No research experience	7.0	19
Involvement in Select Research Activities		
Participated in a research project	88.2	240
Presented research at a conference	72.4	197
Published in a peer-reviewed journal	68.0	185
Lead a research project	67.3	183
Wrote a grant	63.2	172
Received research mentoring	59.2	161
Received internal research funding	53.7	146
Received external research funding	46.0	125
Received NIH funding	25.4	69

*Among those reporting current clinical practice

(88%) were part of a research project, and nearly half (46%) indicated receiving external research funding. Overall, 25% of participants reported obtaining NIH funding.

Research interests and barriers

Participants were asked to rate their interest in eight specified types of research. Approximately half of the participants expressed interest in translational science research (51%), and about 4 in 10 indicated interest in clinical science (43%) and practice-based clinical research (39%). A third of respondents were interested in clinical trials (34%), public health (32%), or health services research (31%). Approximately 20% of participants reported interest in basic science research. Among participants indicating interest in “other” types of research, several identified medical education and quality improvement.

Participants were also asked to identify their level of interest in five research topics related to the NNE-CTR’s major aims. They indicated research interests in rural health (39%), cardiovascular disease (29%), substance use disorder (29%), cancer (28%), and aging (26%). Additionally, many participants were interested in a broad range of research areas beyond the NNE-CTR’s topics, including blood disorders, cystic fibrosis, environmental toxins, genetic research, health disparities, infectious disease, interprofessional research, molecular biomarkers, obesity, and sports medicine.

Participants identified a number of research barriers based on a list provided. The top barriers included:

- Lack of time (57%)
- Lack of funding (50%)
- Inadequate administrative support (24%)
- Inadequate institutional support (22%)
- Inadequate data management or analytic capability (22%)
- Inadequate research-related expertise (17%)
- Inadequate compensation for research-related efforts (16%)
- Challenges identifying and recruiting patients (11%)

Only a few respondents identified inadequate research instrumentation (2%) and facilities (4%) as barriers. Open-ended responses revealed additional needs related to a lack of mentorship, committed partners, data, technical expertise, and patients.

Bivariate analyses also revealed significant associations among several perceived barriers to research and participants' years of research experience. Less experienced researchers more frequently reported a lack of time to conduct research (69% vs. 53%; $p = .03$). More experienced researchers frequently reported inadequate institutional support for research (26% vs. 14%; $p = .048$) and challenges identifying and recruiting patients (13% vs. 4% $p = .044$).

Training needs overall and based on experience

Nearly half of all respondents expressed strong interest in working with a clinical (47%) or scientific mentor (48%). About one in three also expressed a strong interest in working with a research techniques mentor (36%) or an administrative mentor (33%).

Participants were asked to identify their level of interest in the following list of training topics and to indicate whether they were "very interested," "somewhat interested," or "not interested" in the topics.

- Study design (e.g., hypothesis formulation, research design)
- Epidemiology and biostatistics (e.g., measurement, sampling, analytic methods)
- Research conduct (e.g., ethics, compliance, Institutional Review Board)
- Research technologies (e.g., instrumentation)
- Research management (e.g., funding/budget, research tools/documents)
- Research domain expertise (e.g., literature review, team science, networking)
- Communication (e.g., poster and oral presentations, proposals, manuscripts)

As depicted in Table 2, more than half of respondents indicated being "very interested" in study design (54%) and "somewhat interested" in research conduct (52%) and research domain expertise (52%). Bivariate analyses revealed a significant

association between years of research experience and interest in training on research communication ($p = .01$) as well as and study design ($p = .02$).

DISCUSSION

The goal of the NNE-CTR's registration and needs-assessment survey was to better understand the characteristics, needs, and interests of the initiative's target audience: current and potential clinical and translational researchers within the NNE-CTR's catchment area. With the information gathered through this survey, the NNE-CTR leadership aims to enhance the responsiveness of current research support services and, in some instances, design new services to support CTR in Northern New England.

The NNE-CTR's registration and needs-assessment survey provides important preliminary insight into the characteristics, research interests, and research training needs of participants. Survey results suggest that a majority of NNE-CTR participants are white women with a terminal medical degree (MD/DO) and at least 3 years of experience in conducting research. Of note, NNE-CTR participants were more likely to be further in their career compared to researchers participating in needs assessments conducted by other recently initiated CTRs.^{6,7} For example, nearly two-thirds of respondents to the Rhode Island-based Advance-CTR's needs assessment reported having obtained their terminal degree within the past 5 years. Among NNE-CTR participants, only 23% graduated with their terminal degree within the past 5 years.⁶

Echoing findings from other recently initiated CTR's, the survey results suggest that lack of adequate time and funding to conduct research activities are key barriers faced by NNE-CTR participants.^{6,7} Additionally, challenges recruiting and identifying patients differed significantly by years of research experience. These data suggest that different approaches to reducing research barriers may be needed and that such efforts could be tailored toward researcher's level of experience.

The needs assessment revealed that NNE-CTR participants are especially interested in training related to study design, biostatistics, and research communication. In other regions of the US, needs assessments conducted by CTR initiatives found a similar need for study design and statistical support among respondents.^{6,7} While a large number of

Table 2. NNE-CTR Registrants' Interest in Training (n = 226*)

Training Interest	All Registrants		Years of Research Experience			
			< 3 Years (n = 61)		≥ 3 Years (n = 165)	
	%	n	%	n	%	n
Study Design†						
Very interested	53.5	121	55.7	34	52.7	87
Somewhat interested	31.4	71	39.3	24	28.5	47
Not interested	15.0	34	4.9	3	18.8	31
Epidemiology & Biostatistics						
Very interested	47.8	108	50.8	31	46.7	77
Somewhat interested	37.2	84	36.1	22	37.6	62
Not interested	15.0	34	13.1	8	15.8	26
Research Conduct						
Very interested	23.5	53	31.2	19	20.6	34
Somewhat interested	52.2	118	52.5	32	52.1	86
Not interested	24.3	55	16.4	10	27.3	45
Research Technologies						
Very interested	26.1	59	21.3	13	27.9	46
Somewhat interested	42.5	96	50.8	31	39.4	65
Not interested	31.4	71	27.9	17	32.7	54
Research Management						
Very interested	36.7	83	41.0	25	35.2	58
Somewhat interested	47.4	107	49.2	30	46.7	77
Not interested	15.9	36	9.8	6	18.2	30
Research Domain Expertise						
Very interested	36.7	83	41.0	25	35.2	58
Somewhat interested	51.8	117	50.8	31	52.1	86
Not interested	11.5	26	8.2	5	12.7	21
Communication‡						
Very interested	42.5	96	52.5	32	38.8	64
Somewhat interested	44.7	101	44.3	27	44.9	74
Not interested	12.8	29	3.3	2	16.4	27

*Participants who did not respond to all training interest items were excluded from analyses

†Significant difference in training interest based on years of research experience ($P = 0.0153$)

‡Significant difference in training interest based on years of research experience ($P = 0.0127$)

NNE-CTR investigators indicated at least moderate interest in training on research communication, this interest differed significantly by years of research experience. These data suggest that professional development opportunities may need to be designed to meet the needs of both emerging and experienced researchers.

Limitations

Several limitations deserve comment. First, the survey reflects self-reported information based on a single time point. Second, while most registration questions were required, the needs assessment module was voluntary and therefore may not reflect the needs and interests of all participants. Third, registering for the NNE-CTR Network is strongly encouraged but is not mandatory to access NNE-CTR services. Thus, the data may underrepresent investigators accessing services and their professional development needs. Fourth, the communication and outreach activities designed to recruit participants varied by organization. Therefore, these findings may not be generalizable to all investigators in northern New England. Finally, this study is descriptive in nature. As the number of individuals who participate in the NNE-CTR registration and needs assessment increases, additional analyses may help to further explore institutional and discipline-specific differences that could be used to further tailor training.

CONCLUSIONS

The NNE-CTR is helping to support and create a cadre of investigators who are engaged in clinical and translational research efforts designed to improve health outcomes. A key part of this initiative is describing the characteristics, research interests, and needs of these investigators to provide research support services that are aligned with these factors. To date, the registration and needs-assessment results have revealed a wide range of research expertise and interests. Ongoing efforts to match the research, mentorship, and professional

development needs with the appropriate resources remains a key feature of the NNE-CTR.

Conflicts of Interest: None

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