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What Open-Ended Comments Reveal: An Analysis of a Clinical Translational Science Institute's Annual Surveys

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Abstract

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Keywords

: Clinical Translational Science Institute, Longitudinal Surveys, NVivo, Matrix Coding, Open-Ended Survey Questions

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What Open-Ended Comments Reveal: An Analysis of a Clinical Translational Science Institute's Annual Surveys

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Analyzing open-ended responses can provide insight regarding participants' experiences or illuminate organizational issues. The purpose of this study was to qualitatively analyze 1096 open-ended responses to a longitudinal survey and report patterns observed across participants. Word frequency, text search and matrix coding were used to analyze the data. Thematic differences were noted by the college group denoting the participant's primary appointment. Although perceived gaps between expectations and service delivery were expected, participants' statements pointed out informational inaccuracies or an absence of awareness. The inherent richness and insight of the analysis yielded complexities, otherwise not discernable using quantitative analyses. The authors offer suggestions for improving the university clinical translational science institute's delivery of biomedical research services. Keywords: Clinical Translational Science Institute, Longitudinal Surveys, NVivo, Matrix Coding, Open-Ended Survey Questions

Introduction

An often-cited criticism of qualitative research is an absence of clarity regarding data analysis and a lack of rigor (LaDonna, Taylor, & Lingard, 2018). This concern becomes more pertinent when analyzing the text of open-ended questions is the study's primary focus (Hickey & Kipping, 1996; LaDonna et al., 2018). Despite these concerns, an analysis of open-ended data can offer a collection of insights unavailable through statistical techniques.

An analysis of open-ended responses can generate insights regarding participants' experiences or highlight organizational issues (Jackson & Trochim, 2002; Leech & Onwuegbuzie, 2007). As Miles and Huberman (1994) noted, qualitative data tends to provide richness and understanding about context, potentially yielding complexities, otherwise not discernable. Additionally, qualitative findings can corroborate or refute results from quantitative analyses. Varied approaches to analyzing open-ended comments have been described in the literature. These approaches include constant-comparison, content analysis, keywords in context (KIWC), word count, domain analysis, taxonomic analysis, componential analysis, and concept mapping (Hickey & Kipping, 1996; Jackson & Trochim, 2002; Leech & Onwuegbuzie, 2007).

Since 2011, the Evaluation and Tracking Committee of the Clinical Translational Science Institute (CTSI) at our institution has invited faculty to take its Annual Survey. The aim of the survey is to assess the use and impact of the CTSI and its programs on the research environment at the university. Each year the committee provides a summary of the quantitative findings. Up to this point, open-ended responses have not been systematically analyzed. The purpose of this study was to qualitatively analyze the open-ended responses and report patterns observed across the participants by location of appointment.

Methods

This study, approved by the institutional review board (#2014-U-0545), was conducted at a research-intensive university located in the southeast. In addition to the main campus the university has a large satellite medical campus in an urban area located more than 70 miles away. A letter of informed consent was sent to participants to permit access to the survey. Respondents were informed that, by clicking on the survey link and submitting responses, they agreed to participate in this study.

Participants

Overall, 1845 participants were included in the CTSI longitudinal dataset. Among those, 1096 provided comments to one or more of the eight open-ended survey questions. For purposes of this study, the text of three open-ended survey questions was analyzed across the following: 1. What changes can you suggest (if any) that would encourage collaboration? This question was asked between 2014-2016; 2. Please share any additional suggestions or comments that can help the CTSI better meet your needs. This question was asked between 2014-2015; and 3. Other comments. This was asked between 2011-2016. Responses for faculty were compared by the college group affiliation of their appointment denoted as: the main campus health science, main campus others, and the satellite medical campus (see Table 1).

Table 1

Number of Participants by Open-Ended Questions

Open-ended Question #	Questions	Years	N
1	What changes can you suggest (if any) that would encourage collaboration?	2014-2016	395
2	Please share any additional suggestions or comments that can help the CTSI better meet your needs.	2014-2015	232
3	Other comments	2011-2016	459

Individual participants were coded as unique cases and identified using their CTSI-ID (a number used to track their use of clinical and translational services) across the datasets. Participants' demographics were coded as a case classification. The case classifications included several attributes: CTSI users/nonusers, laboratory/non-laboratory faculty, clinical/non-clinical faculty, location (main campus/satellite campus), and college group (Main Campus Health Science/Main Campus Others/Satellite Campus-Med/Main Campus No Specified College).

Of the participants, 1102 (59.7%) were CTSI service users, 743 (40.3%) were non-CTSI service users; 686 (37.2%) worked in laboratory, 1159 (62.8%) were non-laboratory; 700 (37.9%) were designated as clinical faculty, 1145 (62.1%) were non-clinical; 123 (6.7%) worked at the satellite campus, while 1722 (93.3%) were employed at the main campus (see Table 2). Participant appointments were categorized into one of four groups: Main Campus Health Science (n=879, 47.6%), Main Campus Others (n= 560, 30.4%), Main Campus No Specified College (n=283, 15.3%), or Satellite Medical Campus (n=123, 6.7%) (see Table 2). Participants who reported worked in main campus but did not specify the college were categorized as Main Campus No Specified College, and their responses were not further involved in the campus group comparative analysis. The number of references cited across participants, ranged from 184 to 425 per question (see Table 3). In this study, we report the

thematic similarities and differences observed by the college group denoting their primary appointment.

Table 2

Frequency of Appointment by Attributes

Attribute	N (%)	College	N (%)
Campus	Main campus	Main campus health science	879 (47.6%)
		Main campus other colleges	560 (30.4%)
	Satellite campus	Main campus no specified college	283 (15.3%)
		Satellite campus college of medicine	123 (6.7%)
CTSI user	User	1102 (59.7%)	
	Non-user	743 (40.3%)	
Lab	Lab	686 (37.2%)	
	Non-lab	1159 (62.8%)	
Clinical	Clinical	700 (37.9%)	
	Non-clinical	1145 (62.1%)	

Table 3

Most Frequent Words by Total Weighted Percentage

Open-Ended Question	Participant Responses (N)	N (weighted %)/Most Frequent Words
1. What changes can you suggest (if any) that would encourage collaboration?	349	15 (18.2)/ Researches, collaborators, faculty, funds, departments, college, clinical, grants, support, campus, opportunities, interests, university, people, projects
2. Please share any additional suggestions or comments that can help the CTSI better meet your needs.	184	14 (12.3)/ Researchers, services, support, investigators, funding, clinical, program, science, available, faculty, helps, resources, offer, translational
3. Other comments.	425	13 (12.3)/ Researchers, services, support, investigators, clinical, funding, available, faculty, program, resources, provide, needs, better

Research Approach

NVivo Pro 11.4 was used to conduct the qualitative analyses. First, we imported participants' responses to the open-ended questions, as well as their demographics into a dataset in NVivo. Each data file was separated as a unique Excel spreadsheet. Second, we used the word count feature to identify the most frequently occurring words of five or more letters.

Counting words also provided an audit trail, increased legitimation, improved analytic rigor, and prevented the researcher from overweighting (Halpern, 1984; Lincoln & Guba, 1985; Onwuegbuzie & Leech, 2007; Sandelowski, 2001). Words of five or more letters helped ensure the inclusion of more meaningful words and avoided an unnecessary identification of articles, pronouns and prepositions. Third, we used the text search query to identify the most frequent words. References with the highlighted codes were tagged and extracted. Matrix coding was employed in the final analytical step. A matrix, analyzed for each question, resulted in four matrices: the most frequently occurring words by CTSI/non-CTSI service users, laboratory/non-laboratory faculty, clinical/non-clinical faculty and location of appointment. The number in each cell of the matrix reflected the number of cases corresponding with the attribution that mentioned the most frequently occurring words in the responses. Following that, an inductive analysis was used to identify themes. This process involved (a) open coding (b) organizing data to identify and develop themes and (c) thematic identification and conceptual definitions (see Table 4). Driven by what the researchers want to know, inductive analysis was used to analyze the participants' subjective descriptions of their experiences (Saldaña, 2015).

Researcher's Perspectives

The research team included one faculty member and a Ph.D. graduate in educational leadership. The first author is an experienced qualitative and educational researcher from the College of Education who studies outcomes that accrue from pedagogical interventions, and explores changes in faculty beliefs related to teaching, educational research, and assessment practices. Her research initiatives encompass faculty development, cultural competency, and the assessment of behavioral, cognitive, and attitudinal change. The second author has expertise in qualitative and quantitative analyses as well as in NVivo. The researchers' interest in this study emanated from their observation that open-ended surveys comments had not been previously analyzed and their belief that this dataset potentially contained rich information.

Results

To the survey question 1, which asked, what changes can you suggest (if any) that would encourage collaboration? there were 349 responses. The most frequent words, representing 18.2% of the dataset included: Researches, collaborators, faculty, funds, departments, college, clinical, grants, support, campus, opportunities, interests, university, people, and projects. To the survey question 2, which asked, please share any additional suggestions or comments that can help the CTSI better meet your needs, there were 184 responses. The most frequent words, representing 12.3% of this dataset included: Researchers, services, support, investigators, funding, clinical, program, science, available, faculty, helps, resources, offer, and translational. To the survey question 3, which asked for, Other comments, there were 425 responses. The most frequent words, representing 12.3% of this dataset included: Researchers, services, support, investigators, clinical, funding, available, faculty, program, resources, provide, needs, and better (see Table 3).

The results are organized by themes. Within each theme, we report the differences and similarities that seen within the college group denoting their primary appointment: main campus health science, main campus others and the satellite medical campus. The themes for the main campus health science participants included: (a) enhancing collaboration, (b) advantages of collaboration, (c) barriers to collaboration, (d) cultural issues, and (e) recommended changes to CTSI. The thematic findings for main campus others included (a) enhancing collaboration, (b) barriers to collaboration, (c) lack of awareness of CTSI, (d)

cultural issues, and (e) recommended changes to CTSI. The thematic findings for this satellite medical campus were (a) enhancing collaboration, (b) disadvantages to collaboration, and (c) recommended changes to CTSI (see Table 4).

Table 4*Themes and Conceptual Definitions, and Location of Faculty Appointment*

Themes	Conceptual Definition	Main Campus Health Science	Main Campus Others	Satellite Campus
Enhancing Collaboration	Refers to problems with fostering research partnerships or ways to promote research alliances	X	X	X
Advantages of Collaboration	Refers to benefits accruing from research alliances	X		
Barriers to Collaboration	Refers to factors that impeded the development of research alliances	X	X	
Disadvantages to Collaboration	Refers to how engaging with the CTSI caused direct or related indirect burdens that limited potential research alliances.			X
Lack of Awareness of CTSI	Refers to a lack of knowledge and foresight about how the CTSI could benefit research		X	
Cultural Issues	Refers to practices, values and traditions of the organization	X	X	
Recommended Changes to CTSI	Refers to ideas offered to facilitate the growth or receipt of the CTSI's mission	X	X	X

Enhancing Collaboration

Participants described problems that ensued during the course of fostering research partnerships and described ways to promote research alliances. Participants at all three campus groups, the main campus health science, main campus others, and the satellite medical campus all expressed viewpoints on this theme.

Main Campus Health Science. While referencing ways to promote research alliances, Main Campus Health Science participants proposed developing a database to list all faculty by research interests, which could provide “better tools to find experts [and] institutional sponsored programs” [that would] promote collaboration.” The inability to locate collaborators often constrains the logistical implementation of research and results in loss of time and productivity. A loss of time typically delays study completion, writing manuscripts and postpones publishing. Since publications are a measure of productivity, a loss of time and delays can have a deleterious impact on promotion and tenure decisions. The need for locating campus collaborators has been addressed, in part, by the recent development of a searchable database. However, knowledge of this database is seemingly not widely apparent.

Locating both research mentors and collaborators was also cited as limitation to fostering collaboration. Several participants suggested augmenting collaborative opportunities via social venues such as (a) providing scheduled opportunities to meet other researchers, (b) organizing university-wide interest groups/research forums led by senior investigators in which junior investigators would present poster sessions of current projects, (c) offering roundtable sessions in which researchers with common interests were grouped together, and (d) creating better messaging. Participants wanted the CTSI to play a more active role in identifying likely collaborations. Other suggestions included (a) holding one-hour speed dating sessions to

discuss possible collaborations, (b) publicizing CTSI-supported research accomplishments, (c) expanding the institute's visibility to basic science-oriented researchers, (d) preparing summaries of CTSI offerings, (e) attending departmental faculty meetings to describe what the CTSI could offer researchers, and (f) convening special interest groups that researchers could join.

Giving clinical faculty more time to conduct research instead of emphasizing clinical revenue generation was expressed as a mechanism to improve collaboration. However, this observation distinctly contrasts with internal survey finding that many clinicians held little to no interest in conducting research. This finding also points out the contradictions between institutional expectations and the support. All clinical faculty at this institution are required to publish in order to seek promotion. There is an irony between expectations for clinical faculty to publish and a lack of allocated time that would afford clinicians time to conceptualize a study, collect and analyze data, and develop manuscripts. Notably, the CTSI has allocated pilot funding to seed potentially fundable NIH projects, but again this source does not provide salary support. Until clinicians have assigned time to conduct academic research, fruitful collaboration is unlikely.

Main Campus Others. Similar to the main campus health science participants, main campus others opined that incentivizing cross-disciplinary research would foster increased collaboration. Participants asked administrators to consider how they could encourage the university promotion and tenure committee to value collaborative, multi-researcher, multi-authored work.

Like main campus participants, this respondent group suggested designating internal space to share research ideas and search for collaborators. For example, they suggested convening peer writing groups to provide assistance with manuscript development and editing. They also recommended hosting cross-disciplinary workshops across colleges to foster an awareness about the breadth of CTSI- and other related research. Participants proposed appointing a college-level broker who was knowledgeable about the scope of research in other colleges to do "match-making" between potential collaborators.

Other ideas designed to foster collaboration included (a) sponsoring an "organized research meet and greets" whereby researchers would make five-minute presentations and (b) hosting a "Research Speed Dating" event to introduce researchers who otherwise might not meet.

Satellite Medical Campus. Medical faculty at the satellite campus asked for an improved level of respect for, and collaboration with the satellite campus. They opposed the main campus faculty's practice of submitting grants based on "their patients and resources without first discussing it." They yearned to be regarded as full partners rather than "being used to further the research of others." They asked for designated funding rather using their "data and excluding them from the funding and submission processes." They requested a reduction in time-consuming budgets and contact operations to minimize "frustrating collegial responses from [the] main campus."

Advantages of Collaboration

Participants described the myriad benefits of collaborative research. Only main campus health science participants expressed viewpoints on this theme. Participants at the other two campus groups did not discuss this.

Main Campus Health Science. Some participants described the benefits accruing from research alliances. A few participants, complimentary of the CTSI's efforts, reported that it had done a "nice job of providing researchers with collaboration opportunities." While praising the CTSI, a participant described it as one of the "most productive programs ever underwritten by

the NIH.” Another participant simply stated, “Keep doing what you are doing and thank you for all of your contributions to my education and research.” Another participant characterized that the i2b2 (the secure collection and organization of data from across the university’s clinical and research enterprises) initiative as very promising.

Barriers to Collaboration

Participants described the factors which they believed impeded the development of research alliances. Participants at main campus health science and main campus others shared their viewpoints about barriers to collaboration.

Main Campus Health Science. Participants spoke frequently about the structural or organizational factors that impeded research alliance. Time and access to tissue specimens were identified as barriers to participating in CTSI endeavors. Conducting translational research was similarly thwarted by a lack of access to clinical biopsy and tissue material removed by surgical procedures. However, this problem has been partially resolved with the implementation of the current biorepository.

Twenty participants criticized (a) the administrative leadership, (b) the institute’s structure, (c) its procedures and (d) fiscal operations. Although they did not expand about this criticism, its source bears additional inquiry, perhaps via focus groups. Participants also harshly denounced the institutional review board (IRB). Although the difficulties attributable to the IRB were not caused by the CTSI, delays in obtaining approval was perceived as a significant barrier to conducting research. Others remarked that IRB, in particular, was responsible for causing “inordinate bottlenecks” in patient-oriented research. They described the board’s request for revisions as akin to having their studies “held ransom” due to “inane critiques” that otherwise could have been rapidly resolved by employing cooperative staff. Recently, while working in collaboration with the CTSI’s evaluation and tracking committee, IRB has decreased time to approval.

Several participants also sharply criticized the Institutional Animal Care and Use Committee (IACUC), and Research Advisory Committee (RAC), characterizing them as “real barriers to research productivity” and to the pursuit of “effective translational research.” They opined that extensive compliance and oversight decreased potential for securing clinical trials and resulted in some trials being lost to other universities. Widely agreed was that university bureaucracy and an over interpretation of rules and regulations caused unnecessary barriers. Protracted time sitting in internal contracts and grants offices added to delays in securing approval to conduct studies. The necessity to be in accord with these pathways was particularly worrisome to investigators who competed with the private sectors which were regarded for their quick responsiveness.

CTSI’s primary focus was on clinical research. Thus, some participants perceived a reluctance to develop programs outside the university as some as a limitation to broadening the scope of its mission. The absence of international support and expertise, according to one participant, was “a glaring omission and a disincentive” for his research. The CTSI’s primary focus on large initiatives to the exclusion of improving the research environment across laboratories, clinics and populations was also viewed as disadvantageous. Others claimed that fees for CTSI services were rapacious. They also questioned its value and benefits for established researchers.

Nearly 20 participants claimed that the institute lacked specific services that they desired including a Pilot Project Award program for junior investigators. This finding stands in clear contrast to the observation that the CTSI has been offering pilot funding for the past several years and calls into question the respondents’ knowledge versus the actual availability.

Eighteen participants asserted that (a) information and services were organizationally scattered and physically separate, (b) staff were arrogant and portrayed an attitude of "why should I bother with you - I'm with the CTSI" rather a "how can I serve you" orientation, and (c) services were inadequate. One participant exclaimed that the CTSI performed poorly in efforts to explain their services. Another respondent suggested making personal contact with various researchers to increase outreach efforts. Implementing a designated phone number to call where research staff could ask a question and be directed to the appropriate place was also recommended. The "overwhelming levels of administration" also was cited as a barrier to research.

Nine participants cited systemic and long-standing barriers that faced the university and by extension, the CTSI. According to one participant, funds spent on CTSI infrastructure and salaries were misaligned with the charges for services. According to experienced participants, the CTSI's "inadequate and very expensive services," posed a drain and an impediment rather than a help to researchers.

Main Campus Others. Participants reported that collaboration barriers emanated from insufficient resources. Participants pointed out that engaging in interdepartmental research was actually discouraged by the institution's "accounting system that require[d] each division to pay for all space." Participants reported that certain colleges lacked expertise in handling inter-institutional (and inter-college) agreements and that removal of these bureaucratic structures might stimulate collaboration.

Agreeing with health science faculty participants, non-health science faculty asserted that the lack of a centralized database for locating potential collaborators was disadvantageous. They encouraged development of a searchable university-wide database indexed by research topics or specialty and a listing of preferred levels of desire for collaboration. A drawback of not having a database was highlighted by participant's inability to find someone to assist on clinical trials. A more serious circumstance occurred in which the "reported" facilities on campus were unavailable for preparation and evaluation of specimens. Others pointed out that failure to use social media more broadly negatively impacted identifying potential collaborations.

Disadvantages of CTSI

Participants described how engaging with the CTSI caused direct or indirect burdens and limited potential research alliances. Notably, only satellite medical campus participants described disadvantages emanating from working with the CTSI. Most of their disagreement focused on the main campus health science's reluctance to capitalize on the vast urban patient population for study and issues related to collegiality and mutual conceived proposals.

Satellite Medical Campus. Participants reported hindrances and indirect burdens that CTSI, sometimes caused which in turn thwarted potential research alliances. Participants expressed disappointment that patient population at the satellite campus had been underutilized. They opined that the main campus CTSI's disinterest in the "rich opportunities" to engage in the satellite's "community-based, participant-oriented research" resulted in missed opportunities for community-engaged research that could impact patient care.

Lack of Awareness of CTSI

Participants explained how a lack of knowledge and foresight about how the CTSI could benefit research. Main campus others were the only participant group to discuss this theme. These findings suggest that perhaps information sharing was not broad enough to reach non-health faculty.

Main Campus Others. Several participants reported having a lack of knowledge about what the CTSI could offer or that they were unable to foresee how the CTSI might benefit them. Several social science researchers reported that they had not been given a chance to be involved. Others assumed that CTSI only funded researchers that worked with “directly with humans or whose research was immediately translatable to humans.” Several participants wondered how CTSI funding could assist researchers to obtain essential data for extramural proposals other than its companion KL2 training program for early-stage investigators, which provided salary support and protected time.

Several participants indicated that translational research occurring on campus beyond the “institute’s narrow human clinical medicine” description remain unacknowledged. To address this matter, they urged leadership to adopt a broader perspective of translational research.

Cultural Issues

Participants at main campus health science, and main campus others, described how organizational practices, values and traditions impacted their research.

Main Campus Health Science. Participants suggested placing less emphasis on clinical revenue generation. They opined that the university should position itself at the forefront of “disease mechanisms and develop novel therapies.” However, they pointed out that the positioning itself to achieve this goal would require the university to “incentivize collaborative research” and enhance funding opportunities. They believed that this approach would inherently foster collaboration between basic and clinical departments. One respondent advised developing an innovative business plan to accommodate changes within clinical departments. Often, competing interests and emphases, linked to an individual department and or to its clinical mission precluded collaboration. For example, many departments solely emphasized clinical work that was revenue generating, whereas others allowed faculty to conduct research and actually promoted collaboration. A singular emphasis on faculty clinical work was perceived as a barrier, especially for those clinicians who held academic research interests.

Complicating clinician faculty desire to pursue clinical or collaborative research was how it would be regarded when they sought tenure and promotion. Because the tenure and promotion committees tended to prioritize individual funding and first authored publications, this presented another obstacle for those who desired to engage in collaborative research. In today’s research climate, adopting a single approach to define the parameters of a successful promotion is likely to inhibit research creativity and collaboration. It also dis-incentivizes engaging in team science research and multi-authored work. Team science researchers now typically outnumber solo scientists in the production of high-impact science (Börner et al., 2010; Falk-Krzesinski et al., 2011). In recent decades, researchers in almost all branches of science have turned towards teams. Within this context, coordinated teams of investigators with diverse skills and knowledge study and resolve scientific problems that have multiple causes or are a byproduct of complex social problems (National Cancer Institute, 2017). Thus, engagement and production in team science must be carefully weighed in tenure and promotion evaluations. Assessing collaborative productivity as a negative factor is antithetical to the national practice of collaborative and team-science research.

Study participants urged that chairs support and encourage collaboration because ultimately, all parties compete over limited subject populations. Hiring more senior level funded investigators was proposed as a means to share college and departmental resources and to catalyze mid-level and junior faculty collaborations. Notably, through its preeminence initiative, the university has responded by hiring more than 100 researchers, many with a long-

standing history of grant funded initiatives. The overall return on investment for preeminence faculty hires has resulted in \$3.14 for every dollar the state has spent (Sikes, 2016). Expanding the portfolio of funding was perceived as a mechanism to defray collaborative publication costs that crossed department, college, and institutional boundaries. In this regard, preeminence hiring has been responsive.

Main Campus Others. Like main campus health science participants, the main campus others also cited identified not holding value for collaborative research as a hindrance to the evaluation of tenure and promotion packets. They also identified resource related deficits that hampered research productivity such as (a) the lack of “opportunities to integrate computational and modern mathematical approaches in biomedicine, (b) an insufficient competitive bioinformatics infrastructure and a limited number of genomic/bioinformatics faculty” and (c) “weak cyber-infrastructure at [the university coupled] with substantial gaps to reach, train and educate biomedical researchers at all levels includ[ing] senior level.” Each for these under-resourced areas bear further investigation to see how bolstering financial commitments would impact research service delivery and productivity.

Recommended Changes to CTSI

Participants offered ideas that they believed would facilitate the growth of or augment esteem for the CTSI’s mission. Participants at all three campus groups shared recommendations regarding changes to CTSI.

Main Campus Health Science. To facilitate the growth or receipt of CTSI’s mission, participants proposed structural changes to support the institution’s research processes including (a) reconstituting the IRB board, (b) revising IRB procedures, (c) applying IRB policies consistently, (d) reviewing protocols in a timely manner, and (e) applying for IRB without completing online training.

Participants recommended including faculty salary in the disbursement of pilot funding. Despite the sentiment of this respondent, this action is expressly prohibited by the National Center for Advancing Translational Sciences. Perhaps this is not widely known. Others pointed out an inability to obtain salary funding from pilot study, forced their declination to participation and actually “stymie[s] academic pursuits and new project development.”

To enhance CTSI services, participants suggested (a) making the biorepository more affordable and (b) providing clinical staff and biorepository services on weekends and evenings. Main campus participants recommended enhanced offering CTSI designated resources to conduct research at the satellite medical campus directed towards increasing community-based research and supporting subject recruitment. Streamlining services such as (a) getting blood from the CTSI lab to its biorepository and connecting researchers with clinical laboratories such as LabCorp or Quest to arrange contracts as well as (b) helping CTSI researchers network with private business organizations to forge partnerships related to biomarkers were suggested to facilitate timely collection and analysis of data. Others recommended offering access to Research (Nurse) Coordinators to help with IRB, to obtain patient consents and get samples on evenings and weekends, as well as holding regularly scheduled training session to teach how to obtain patients/family consent. Participants suggested developing a single multi-investigator IRB protocol to avert faculty and resident inconsistencies in their extraction of frozen and fixed tissue as a way to reduce the potential of confounding study results.

Technical needs related to database management were also suggested. These ideas focused on (a) findings ways to automatically download EPIC data into REDCap, (b) developing mechanisms to ensure that similar REDCap “codes” could be used by different

teams and (c) locating a process to merge codes into data/fields if a PI later enrolled patients into an NIH multi-center study.

Twenty-two participants recommended holding grant writing workshops, finding ways to increase accessibility to biostatisticians for Ph.D. level research/dissertation and collaboration on research studies. The desire for grant writing workshops has been addressed, in part, via the provision of annual training workshops and research design studios. Meeting the continuous professional development needs of participants across the span of their careers has also been emphasized.

Main Campus Others. Five participants suggested broadening the perception of CTSI beyond biomedicine and bench sciences. They suggested showcasing related research in agriculture, plant science, or food science on the CTSI's website. Similarly, a suggestion, voiced by health science faculty, was the idea to sponsor workshops aimed at bringing clinicians and researchers together to brainstorm and ultimately stimulate interdisciplinary collaborations. One novel suggestion was to engage other college faculty in considering "how to build environments that could influence chronic diseases related to obesity and a lack of physical activity" (e.g., diabetes, heart disease, cancers and other similar diseases).

Satellite Medical Campus. Participants stressed that the main campus focus on building the satellite medical campus' research capacity. In this regard, they recommended that the main campus administration offer strategies that would provide clinician release of time to conduct funded research. Others agreed and urged a greater commitment to promoting collaboration. They suggested "forcing senior researchers to work with junior colleagues; identifying true opportunities for collaboration [such as] planning a research investigation together, submitting to NIH, and then following up regardless of the outcome." They advocated sharing protocols and convening disease specific gatherings to promote interactions between clinicians and basic science researchers.

Although satellite participants leveled blame on the main campus for failure to collaborate, they confessed that they too needed to increase local institutional support for cross-campus discussion and collaboration. However, they did not concede the main campus' concerted effort to engage them in educational endeavors. For the past several years, the main campus CTSI has used distance technology and offered training opportunities in research design studios and educational scholarship venues. Since 2015, the health science center's Educational Scholarship Program has encouraged satellite faculty participation. Program sessions have been videotaped and posted on a secure server to permit faculty to view and earn credit towards advancing their careers. Interestingly, satellite medical participants accepted some responsibility for a perceived lack of main campus collaboration.

Amplifying a need to use social media more broadly, participants suggested developing a message board that would list research studies currently in preparation and posting ideas about research studies along with contact information for principal investigators.

Discussion

These findings portray the complex and multi-faceted perceptions among the three participant groups relative to their beliefs regarding (a) changes designed to encourage collaboration, (b) the important impact of the research facilitated by the CTSI, and (c) additional suggestions for ways that the CTSI could better meet their needs.

Main campus health science and other "non-health science" participants felt that services were valuable. However, they suggested the CTSI expand the scope of research and funding opportunities. They also pointed out that some of the translational research occurring remained unacknowledged because it did not fit the institute's narrow human clinical medicine description. Participants identified substantial barriers to the research enterprise including the

structure and practices of long-standing non-CTSI institutional committees such as IRB and IACUC. Participants reported that an over interpretation of rules and regulations created barriers for researchers. They opined that bureaucratic policies unnecessarily slowed research studies and productivity. Main campus health science participants were disappointed by staff who were unwilling to exercise problem-solving skills. Improved advertising efforts and broader outreach across the entire campus was suggested as means to inform others of the CTSI' roles and to invite additional collaborations. Participants stressed the need to develop a searchable researcher database to promote interdisciplinary research initiatives.

Both main campus health science and satellite medical participants requested an improved level of respect for and collaboration among the main campus towards the satellite campus. To promote collaboration across the campuses, participants advocated sharing resources more effectively and developing file sharing services for research collaborations. They urged allocating time to clinicians who held an interest in translational research and recommended incentivizing collaborative research. An unwillingness to engage physicians in research was expressed. This statement alone raises cause for concern. How can translational research be occurring without physician collaboration? Participants emphasized increasing opportunities to obtain pilot awards. In particular, they noted that funding to assist junior and clinical investigators should be increased. Overall, participants across all settings desired a greater investment in research directed towards improving lives as well as establishing research initiatives that valued community inclusiveness.

The gaps between expectations and service delivery might be equally due to leadership as well as to the participant perceptions. However, as shown by several statements below, at times, participants lacked awareness, or possessed inaccurate information.

1. *That the CTSI should incentivize cross-disciplinary research.* This activity is clearly supported by the university's annual call for funded research proposals.
2. *Include faculty salary in the disbursement of pilot funding.* Despite this sentiment, this action is expressively prohibited by NCATS.
3. *Have CTSI re-implement its Pilot Project Award program for junior investigators.* This comment raises questions about what and how much participants know about the CTSI. The CTSI pilot awards are announced via the CTSI website several times each year during the fall, spring and summer semesters.

Overall, many of the participants' suggestions are germane to improving CTSI services and delivery. Their recommendations, broadly conceptualized into four categories, were (a) address institutional factors that impede research productivity, (b) augment researcher collaboration, (c) improve relationships with satellite campus, and (d) capitalize on the capacity of social media, are followed by actionable steps to address each idea.

Address Institutional Factors that Impede Research Positivity

Regarding institutional factors that impede research productivity, we gleaned five recommendations from the data. We provide suggested action steps for each recommendation.

The first recommendation was to reduce and/or remove bureaucratic structures imposed by cross-college budgeting and support. Action steps to address this dilemma are first, to create a running list of all bureaucratic issues and organize it by college; next, search for the commonalities among those issues and implement a plan to reduce their impact on research

implementation; then, following implementation of the action plans, assess the changes that have resulted.

Second, form a task force to review all of the rules and regulations, bureaucratic and administrative requests and training requirements of investigators. The action steps for this recommendation are to identify redundancies and unnecessary procedures that promote burden; then, implement the newly revised rules and regulations and assess their impact.

Third, address IRB difficulties. We suggest determining those factors that cause delays in receiving IRB approval and developing a plan to reduce time to approval.

Fourth, analyze the source and type of conflicts that have previously occurred and resulted in trials being lost to other universities. The suggested action steps include developing clear mechanisms to correct or guide the acquisition of clinical trials; and then, implementing the process and assessing the impact of those changes.

The fifth recommendation is to consolidate information services into divisions. We suggest implementing a designated number to call where research staff can ask questions or be directed to the appropriate place to get an answer; followed by assessing the impact of implementation by using focus groups to gather data about users' perceptions of services.

Augment Researcher Collaboration

Under this category, we offer two recommendations and suggested action steps. First, create a centralized searchable university-wide database that would serve as a mechanism for locating potential collaborators. This issue is currently being resolved. The next step is to determine the frequency in which the database is accessed and to determine patterns of usage of user demographics.

Second, use social media and networking more broadly to cultivate collaboration. Towards this end, we suggest enhancing the outreach effort via texting or listserv emails.

Improve Relationships with Satellite Medical Campus

Based on the findings, we recommend strengthening working relationships between main campus health science and satellite medical campus faculty to forge productive research initiatives, which will serve the needs of the local patient populations. The action steps for this recommendation include: (a) conducting focus groups with satellite participants; (b) attaining participant recommendations for implementing practices that can be improved in the short term; (c) soliciting participant advice on how to remedy long-standing issues; (d) using focus group findings to develop a collaborative plan that is dedicated to improving the integration of research between the satellite and main campus; and (e) implementing this plan and studying the outcomes.

Capitalize on the Capacity of Social Media

Regarding the need to capitalize on the capacity of social media, we recommend creating better messaging to promote cross campus engagement and information sharing via the web and blast emails. Specifically, we suggest following action steps:

- a. Consider using text messaging to contact groups that are interested in educational opportunities. Assess the change in numbers of respondents.
- b. Offer periodic CTSI videotapes on resource availability of researcher educational opportunities. Explain and illustrate through the use of diagrams how to go about finding and using these resources. Ensure that these

- videotapes can be shared digitally and accessed by those who can attend these sessions.
- c. Determine how many clinicians are interested in and committed to becoming clinical translational researchers. Then develop publicly accessible strategies that help clinician faculty obtain release time to conduct funded research or learn how they can apply to the clinical translational science (CTS) or KL2 programs.
 - d. Sponsor quarterly lunch or breakfast seminars to advertise the role of the CTSI across the university.
 - e. Showcase how non-biomedical faculty researchers might benefit from CTSI services. Explain how CTSI helps researchers whose work has implications for human health. Use communication research studies as an exemplar.
 - f. Offer courses and training initiatives that do not require admission into a graduate program of study but that augment faculty's educational and research scholarship.
 - g. Broaden the CTSI mission to include quality improvement projects. While maintaining a focus on large initiatives, foster the development of smaller initiatives aimed at improving the research environment across laboratories, clinics, and populations and assess the outcomes. Disseminate outcomes of those studies to other CTSA hubs.
 - h. Expand CTSI's focus on in-hospital clinical research.

Limitations

Limitations of this study include the use of single institutional datasets and the lack of comparison groups. The depth of data was impacted by the number of survey administrations. For example, survey question 1, What changes can you suggest (if any) that would encourage collaboration? was asked across two survey administrations. Survey question 2, Please share any additional suggestions or comments that can help the CTSI better meet your needs, was asked during one survey administration. Survey question 3, Other comments, was asked across five survey administrations. The density of data was also impacted by the participant's willingness to share their views. These data are representative of only those individuals who elected to respond to open-ended questions. These data represent snapshots in time among the individuals who responded. We can offer no insight about those who did not respond. Thus, the data may not be representative of all participant experiences or potential organizational issues.

Conclusions

The analysis of the open-ended text responses served as the primary focus of this study. The findings offer contextually rich understandings that exceed what could be ascertained from the close-ended survey items. From a methodological perspective, the findings illustrate the value of qualitative research in mining the open-ended comments for patterns using NVivo's word frequency query, text search, and matrix coding. The findings provided rich insights concerning ways that the CTSI could improve its services, expand its mission, and amplify the degree to which its work can be recognized by others. Finally, the findings provide new and unique findings that had not been previously explored or revealed by an analysis of CTSI annual survey reports (Tracy, 2010).

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