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Dissemination and implementation of comparative effectiveness evidence: key informant interviews with Clinical and Translational Science Award institutions

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Abstract

Aim—To identify ongoing practices and opportunities for improving national comparative effectiveness research (CER) translation through dissemination and implementation (D&I) via NIH-funded Clinical and Translational Science Award (CTSA) institutions.

Materials & methods—Key informant interviews were conducted with 18 CTSA grantees sampled to represent a range of D&I efforts.

Results & conclusions—The institutional representatives endorsed fostering CER translation nationally via the CTSA Consortium. However, five themes emerged from the interviews as barriers to CER D&I: lack of institutional awareness, insufficient capacity, lack of established D&I methods, confusion among stakeholders about what CER actually is and limited funding

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opportunities. Interviewees offered two key recommendations to improve CER translation: development of a centralized clearing house to facilitate the diffusion of CER D&I resources and methods across CTSA institutions; and formalization of the national CTSA network to leverage existing community engagement relationships and resources for the purpose of adapting and disseminating robust CER evidence locally with providers, patients and healthcare systems.

Keywords

comparative effectiveness research; dissemination; implementation; NIH

The USA makes significant public investments in medical research to study the causes, treatment and cures for diseases, largely through investment in the NIH [101]. However, lengthy delays have historically persisted between the generation of new medical evidence and its translation into clinical practice [1-3]. The Institute of Medicine reported that 17 years elapse, on average, before new research advances are incorporated into widespread clinical practice [4]. This dilemma has also been observed for comparative effectiveness research (CER) [5].

CER has been defined as the “generation and synthesis of evidence that compares the benefits and harms of alternative methods to prevent, diagnose, treat and monitor a clinical condition or to improve the delivery of care” [6]. Its ultimate purpose is to help patients and providers make more informed decisions with the goal of improving health and healthcare. The NIH and other federal leaderships have acknowledged the importance of CER for achieving better patient-centered healthcare in the USA [5,7,8,102]. However, CER evidence is only useful to the degree to which it is fully disseminated and implemented, in other words translated into clinical practice. Several funding initiatives have occurred over the last several years to jumpstart CER, research and address barriers to its dissemination and implementation (D&I), including the 2009 American Recovery and Reinvestment Act [9]; and the Patient Protection and Affordable Care Act of 2010, which established the Patient-Centered Outcomes Research Institute (PCORI) [10].

Another initiative to promote the adoption of medical advances, such as CER evidence, is the NIH’s National Center for Advancing Translational Sciences [11]. The Clinical and Translational Science Award (CTSA) is the centerpiece of this effort, having been awarded to 60 medical research institutions in 30 states and the District of Columbia. CER is a key area of research within the national CTSA Consortium. One of the few metrics currently available regarding the D&I of CER evidence nationally is through annual surveys conducted by the CTSA. The survey tracks CER activities, capacity, needs and D&I efforts. Respondents to a 2010 survey of CTSA programs indicated a broad range of CER D&I efforts – extensive (25%), moderate (39%) and minimal (36%) [CTSA CER Key Function Committee unpublished data]. However, these surveys offer limited detail about what is actually being carried out and by whom. To advance our understanding of the current state of CER-related D&I research and to understand where improvement might be achieved, we conducted key informant interviews with representatives from a sample of CTSA targets to represent institutions that previously reported all levels of CER D&I activities ranging from minimal to extensive. These key informant interviews offer insights into priority areas for future CTSA D&I support, as well as other federal initiatives noted above that are designed to improve the translation of evidence-based advances into daily medical practice.

Methods

The study sample was drawn from the 46 CTSA institutions who participated in the 2010 survey (84% response rate) administered by the CTSA CER Key Function Committee. In

this survey, each institution reported their level of CER D&I activity as either ‘extensive’, ‘moderate’ or ‘minimal’. A convenience sample of six institutions per D&I activity stratum, representing 18 geographically diverse institutions in total, were invited to participate in the key informant interviews. Convenience sampling is a nonprobability sampling technique common in qualitative research where subjects are selected because of their convenient accessibility and/or proximity to the researcher. Initial contact was made with each institutional representative on the CTSA Consortium’s CER Key Function Committee. This individual was asked to serve as our key informant or to designate an alternative with adequate knowledge of their institution’s CER activities. A semi-structured interview guide was developed with Rogers’ Diffusion of Innovation Theory as a conceptual framework to explore whether elements known to be associated with speed of adoption (e.g., communication strategies and channels, and social system dynamics) were being strategically considered in the D&I of CER evidence and innovation [12]. The semi-structured interview guide and short pre-interview questionnaire are provided in the Supplementary Data; see online at www.futuremedicine.com/doi/suppl/10.2217/CER.13.10. Interviews were conducted between August 2011 and February 2012 by the five authors, each conducting at least three interviews. Interviewers took notes, including both direct quotes and paraphrased comments. Consistent with qualitative research methods, we report themes and patterns that emerged from the interviews using participant quotes and comments in support where appropriate. We report the findings in aggregate, rather than by stratum, because of the small sample sizes. We also offer several case studies that are representative of D&I activities. Since institutional data were being collected and analyzed, the project was determined not to be human subjects research by the Colorado Multiple Institution Review Board.

Results

The interviews were conducted with individuals from six institutions from each strata of D&I activities (extensive, moderate and minimal) as reported in the 2010 survey. When we conducted the interviews in 2011 and 2012, we found that most individuals reported moderate activity ($n = 9$), while five reported extensive activity and four reported minimal activity.

CTSA CER D&I infrastructure & approaches

Organization—Six CTSA had established CER cores within their institution, while seven had groups of CER researchers who regularly met informally and collaborated. The remaining five CTSA representatives reported that their CER efforts were limited to a few individual researchers within the institution. With regard to the type of CER studies being performed, a range were mentioned, including healthcare delivery strategies (14 mentions), drug–drug comparisons (eight), D&I comparisons (six), drug-procedure comparisons (four), CER methods (four), medical procedure comparisons (two) and community engagement methods (one).

Leaders—Dissemination of CER evidence within CTSA academic institutions was conducted primarily by individual research groups, often in collaboration with partner health systems or as part of quality improvement initiatives. Efforts were organized to take advantage of institutional strengths, such as clinical expertise in a specific discipline, an established practice-based research network or a funded dissemination center.

Audience—The most commonly noted audiences were clinical practices of all sizes and healthcare delivery systems within a CTSA’s geographically based network. The group of providers engaged in these activities depended on the study and disease of interest.

Occasionally, additional audiences were mentioned, for example, healthcare administrators and clinic managers. Other academic researchers were noted as an audience when the institution was engaged in disseminating evidence on CER methods. No respondent reported efforts to identify local opinion leaders who may facilitate (or possibly hinder) D&I of evidence through provider social networks. Few respondents commented that they directly engaged patients in their efforts.

Objectives—The goals of the different CTSA CER D&I initiatives covered a range of stages of adoption noted in Diffusion of Innovation Theory: education/knowledge transfer, adoption of new clinical behaviors and sustainable practice change. Some institutions stated that building relationships with community stakeholders and research partners was another important goal of the D&I process.

Communication channels—The majority of institutions used mass media to disseminate CER evidence (e.g., online messaging, email, newsletters, websites, list serves and scientific papers). Fewer mentioned the use of interpersonal channels, largely confined to the local academic setting (e.g., town hall meetings, seminars/grand rounds and consultation/technical assistance). A few institutions included interpersonal role modeling of exemplary providers, regular conferences/forums with community stakeholders and interactive online communication capabilities.

Research & evaluation—With the exception of institutions conducting D&I trials (primarily the subset of CTSA with extensive CER D&I), it was unclear whether institutions had specific, measurable and time-bound objectives to evaluate the effectiveness of these efforts. Most institutions simply tracked the number of publications resulting from D&I studies or monitored the use of online materials.

Types of CER D&I activity & research

Overall, CTSA institutions were not engaged in activities to broadly disseminate CER evidence from national resources, such as materials from the Agency for Healthcare Research and Quality (AHRQ), results from landmark clinical trials or conclusions from rigorous systematic reviews. These activities were primarily restricted to institutions that were funded to perform CER D&I activities, such as serving as a center to disseminate AHRQ evidence. Examples of funded centers and projects included the Evidence-Based Practice Centers, Developing Evidence to Inform Decisions about Effectiveness and Accelerating Change and Transformation in Organizations and Networks.

Research from landmark trials was primarily disseminated to the community via traditional scientific dissemination through lectures or other peer-to-peer communication among specialists. One key informant noted that a common fallacy was that researchers at academic centers were already knowledgeable about advances so they would not require organized D&I activities.

Some institutions provided case examples of population-based D&I research and practice collaboratives such as: the Depression Improvement Across Minnesota – Offering a New Direction [13] patient decision aids for diabetes care (Diabetes Cards, Mayo Clinic, MN, USA [14]); an intervention to decrease catheter-related bloodstream infections in intensive care patients (Keystone intensive care unit project [15,16]); web-enhanced guideline implementation for post-heart attack patients receiving care in community-based outpatient clinics (MI-Plus Study [17,18]); and collaboration with state-based quality improvement organizations and practice-based research networks to conduct community-engaged dissemination research (NC TraCS Institute [19]).

CER D&I barriers

Five themes emerged as barriers to the D&I of CER evidence by CTSA institutions including: lack of institutional awareness, insufficient capacity with regard to individuals with appropriate expertise, lack of well-established D&I methods, lack of clarity about the quality and utility of CER evidence among stakeholders, and limited funding support. See Table 1 for sample comments related to these barriers. It was also noted that the methodology for CER itself is underdeveloped, for example, the relative weight of data from observational versus randomized studies and how to design and conduct pragmatic clinical trials. If there was no valid evidence generated from robust methods, D&I efforts could have an opposite impact by spreading potentially false evidence. Thus, an additional barrier to CER D&I is knowing when the findings are robust enough to disseminate.

Recommendations for improvements in the CTSA CER D&I infrastructure

Given the barriers and gaps, three overall suggestions were made for improving the translation of publicly-funded CER and other patient-centered medical evidence via the CTSA Consortium: create a national clearinghouse for D&I tools useful for translating CER evidence; identify sources for best D&I practices; and help network the CTSA institutions with D&I resources (Table 2 offers examples of these suggestions).

Discussion

The dissemination, application and public communication of CER evidence is a prominent feature of this relatively new research discipline [5]. Our interviews of CTSA representatives offer insights into the ways that CER translation is being adopted into the research and practice-delivery portfolios of institutions with CTSA, as well as the barriers that are being encountered. Although the key informants expressed interest in utilizing the CTSA infrastructure to accelerate clinical translation of CER evidence, three barriers stood out: lack of institutional awareness, prioritization and support; insufficient capacity to conduct these activities; and lack of clarity about the quality and utility of CER evidence among stakeholders is hindering efforts. These barriers were also cited by Timbie and colleagues in their recent perspective discussing the reasons why CER may not alter patient care [20]. However, other reasons noted by these investigators did not emerge as themes in our interviews, including misaligned financial incentives and failure of CER studies to answer questions of interest to practitioners and patients. To achieve the ultimate promise of CER transforming healthcare, all of these challenges must be addressed.

Using insights from our discussion with the CTSA CER representatives, we offer the following recommendations to improve the CER translation process through D&I activities within the CTSA Consortium.

Recommendation 1: develop a CER D&I clearinghouse

One strategy to accelerate translation is to facilitate broader adoption of CER D&I research, resources, methods and outcomes among CTSA institutions. Luce and colleagues have proposed, as a guideline for conducting this research, that “the CER study plan and the final report should explicitly include plans and recommendations for D&I and evaluation” [21]. To accomplish this, many institutional representatives expressed the need for a user-friendly clearinghouse for D&I, including resources such as tool kits, how-to guides and effective turnkey approaches. It was notable that current CER D&I efforts often consisted of scientific dissemination of the findings via meetings and journal articles. We speculate that this may be because these traditional methods of dissemination are what is valued (and counted) in the promotion and tenure process at academic centers. Therefore, a clearinghouse could play an educational role and provide frameworks for selecting appropriate D&I strategies and

tools for a given target audience, setting and existing practices, such as financial and nonfinancial incentives affecting adoption. The clearinghouse could also facilitate dissemination of reliable and valid CER methods and criteria for determining when this evidence merits broad D&I.

CER is being funded by multiple sources including AHRQ, the NIH, CDC and PCORI, as well as embedded in healthcare systems (e.g., Veterans Affairs, Kaiser and Mayo) [22]. This results in fragmentation of resources including materials, tools and information. A true clearinghouse would gather, index, store and share resources developed through all of these research venues. Such a clearinghouse could also help achieve one of the NIH's core principles for the science of D&I research – that is, archivable 'cumulative knowledge' [23].

To realize this vision of a useful D&I clearinghouse, institutional end-users must be actively engaged to provide support for experts to develop needed materials. Relatively low-cost mass media (e.g., websites, journal articles and YouTube™) and social media channels (e.g., Facebook® and Twitter™) offer efficient means to share knowledge about the clearinghouse. However, interpersonal channels (e.g., active mentorship, role modeling and peer-to-peer discussion forums) offer important complementary approaches to promote sustainable behavior change across the CTSA Consortium [12]. The ultimate product will be policies and practices that will promote the incorporation of D&I strategies and methods in all phases of CER to insure integration of results into real-world practice.

Recommendation 2: establish a national CER D&I network using CTSA infrastructure

A second strategy to accelerate CER translation is to leverage the existing CTSA infrastructure and community-engagement networks via coordinated national CER D&I campaigns. This recommendation arises from the finding that CTSA have forged strong local community networks with providers, patients and other stakeholders through their community engagement cores. Thus, the CTSA institutions are ideally situated to serve as local 'change agents' to help adapt CER findings to be relevant to local users in order to facilitate their adoption. Figure 1 presents a visualization of such a national CER D&I hub-and-spoke CTSA network.

The change agent hub-and-spoke model has been successfully employed in other settings. Diffusion of Innovation Theory has demonstrated that personal interaction with change agents (people who are similar to the potential adopter, but connected to outside expert knowledge) increases the likelihood of information exchange, and thereby the likelihood that the intended behavior will be adopted [12]. The Cooperative Extension Service of the US Department of Agriculture offers an early model of local change agents (i.e., agricultural specialists from designated land-grant universities) to promote the adoption of research findings in the field of agriculture. A healthcare cooperative extension service was proposed by Grumbach and Mold to build upon existing assets in the field of healthcare workforce development, such as Area Health Education Centers, to transform primary care and community health [24]. In the private sector, the pharmaceutical industry employs networks of medical liaisons to facilitate the transfer of drug product information in a similar way. A coordinated multi-CTSA D&I campaign could capitalize on existing local networks to facilitate interpersonal communication about the CER evidence.

As Bonham and Solomon argued, academic medicine is primed with a wide range of experts (e.g., clinicians, clinical implementation scientists, systems engineers, behavioral economists and social scientists) who can contribute to CER D&I efforts [25]. CTSA could serve as hubs for encouraging transdisciplinary collaboration. For efficiency, a national CER D&I network may be embedded within a larger CTSA pragmatic trial infrastructure to promote stakeholder engagement throughout the research process [26].

Overcoming organizational barriers

Despite the enthusiasm of our interviewees for improving CER D&I via the CTSA network, a major barrier discussed by many of them was limited funding and institutional emphasis. Although the CTSA Consortium sponsors a CER Key Function Committee, this initiative is unfunded and participation is voluntary. The degree to which an individual CTSA institution supports CER D&I is at their discretion. Thus, it is not surprising that there was very little CER D&I activity reported at many institutions within the interview sample.

Historically, a small fraction of federal research money has been invested annually in the science and practice of disseminating and implementing new medical evidence. Translation of CER-specific evidence is a more recent addition to this research portfolio. For every dollar that the NIH invests annually in medical research [101], approximately 10 cents is being spent by its sister agency, AHRQ, on research relevant to D&I of this evidence [23]. In the American Recovery and Reinvestment Act of 2009, only 5% of the US\$1.1 billion invested in CER went to translation and dissemination [9]. Only recently, a standalone D&I portfolio was developed within the NIH [23].

The potential return on D&I investment is significant [23]. Woolf argued that correcting health disparities via improved adoption of evidence-based advances could avert five-times as many deaths as investment in new discovery and modernization of health delivery systems [27]. The pharmaceutical industry offers a good example of the value placed on D&I in the private sector, where one-third of the amount invested in evidence generation via research and development is spent on dissemination and promotional activity [103]. Fortunately, the PCORI has recognized ‘communication and dissemination research’ as one of its five national priorities for research [104], and the US Department of Health and Human Services has incorporated into its strategic plan the need to identify “key factors influencing the scaling up of research-tested interventions across large networks of services systems” in order to achieve its goal to transform healthcare [105].

Greater emphasis and financial support for CER D&I could be accomplished through different approaches. The first could be to proactively insert dissemination activities involving stakeholders into the original scope of the CER project, as suggested by Luce and colleagues and required by PCORI study applications [21]. A second strategy could be to promote greater emphasis on CER in CTSAs. For example, individual CTSAs could redistribute funds within their institutions to promote CER and support D&I. Some CTSAs are starting to do this. A third strategy could be greater synergy of existing D&I research funding between CER funding agencies, including AHRQ, PCORI and the NIH. Lastly, extramural funding targeted toward CER D&I could be increased, whether it be for research studies, centers or CTSA institutional D&I support. Ultimately, more public discourse needs to address the optimal use of taxpayer funds to achieve the ultimate objective of more timely integration of new and compelling comparative effectiveness evidence into real-world clinical practice.

Our project’s limitations should be acknowledged. We used convenience sampling, a common qualitative method. However, this approach relies on nonrandom selection and may have introduced sample bias. Although care was taken to interview a diverse set of CTSA institutions (both geographically and by self-reported level of CER D&I activity), the findings represent the opinions of individuals from 18 institutions (~one-third of CTSA institutions eligible for this study). Thus, the degree to which these interview responses are representative of the overall CTSA community is uncertain. The findings are intended to provide guidance for further investigation. However, following recommendations for qualitative research [28]: participant selection was carefully designed to meet the aims of this study and resulted in participants with a range of CER D&I activities; our data

collection used a common, structured guide for all interviews; the interview questions about CER D&I were guided by social science theory (diffusion of innovation); more than one investigator collected and analyzed the raw data; and member checking occurred between interviewers and the participating institutions to confirm that the participants' viewpoints were adequately interpreted. Lastly, qualitative research identifies themes and patterns and is not intended to quantify their relative contribution.

Future perspective

The CTSA mission to “link and facilitate collaboration among the networks and to develop capacity and methods for translating research results” resonates with the national objective to translate CER evidence into practice more effectively. To quote the Institutes of Medicine’s workshop summary on CER infrastructure requirements, “current infrastructure planning must build to future needs and opportunities” [5]. The CTSA Consortium is positioned to contribute to the expanding national CER infrastructure.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Executive summary

The NIH Clinical & Translational Science Award Consortium

- The federally-funded National Center for Advancing Translational Sciences is a national hub for translating scientific discovery into practice. Sixty research-intensive academic health centers and universities have received Clinical and Translational Science Awards (CTSAs) to pursue this agenda, including the translation of comparative effectiveness research (CER).

CER dissemination & implementation at CTSA institutions

- CTSA institutions are making progress in CER dissemination and implementation (D&I); however, effort was fragmented and siloed within disciplines or clinical expertise and was largely determined by extramural funding priorities.
- CER D&I has not been an explicit priority of CTSAs, even within the CER portfolio. Few respondents described explicit plans for disseminating research beyond peer-reviewed publication. There was recognition of a need to do more in this area. Five themes emerged as barriers to the D&I of CER evidence by CTSA institutions including: lack of institutional awareness; insufficient capacity with regard to individuals with appropriate expertise; lack of well-established D&I methods; lack of clarity about the quality and utility of CER evidence among stakeholders; and limited funding support.

Recommendations for improving CER translation via the CTSA Consortium

- The CTSA CER D&I research workgroup within the CTSA CER Key Function Committee could play a pivotal role in serving as an organizing center for a CER D&I clearinghouse.
- Individual CTSAs have forged strong local community networks with providers, patients and other stakeholders, and could serve as a network of 'change agents' for national campaigns to promote specific high-priority CER evidence.
- Financial resources should be dedicated to support D&I activities as a usual activity of research grants and contracts.

Figure 1. Conceptual framework for a Clinical and Translational Science Award comparative effectiveness research dissemination and implementation network

CER: Comparative effectiveness research; CTSA: Clinical and Translational Science Award; D&I: Dissemination and implementation.

Table 1

Barriers to comparative effectiveness research dissemination and implementation within Clinical and Translational Science Awards institutions.

Barrier	Selected comments & insights
Lack of institutional awareness	Although individual investigators were actively engaged in CER D&I efforts, this work was not 'on the radar' at several institutions. CER D&I has had to compete with traditional quality improvement efforts
Insufficient capacity	Several key informants recognized the urgent need to increase institutional capacity for D&I research: "...our group is at capacity and we are actively recruiting. A lot of interest ... [but] not a lot of expertise [i.e., senior faculty], or if there is, the focus may not be on health." As some acknowledged, having an institutional champion who is a skilled researcher can stimulate the development of a whole cadre of researchers. On the other hand, another noted that "...in a world where the NIH R01 is the gold standard, the incentives are low for collaboration across many disciplines"
Lack of established methods	Many key informants were concerned about the methods of D&I: "What are the best methods of dissemination and communication? I am not sure we have that figured out ... We haven't figured out how to push it out to the right people. Even when it happens, how do we sustain what does work well over time?"
Confusion over relevance	CER evidence has to be relevant for the intended audience: "CER research might be important to us, but whether it is high on the radar for others is another question. There is skepticism related to the generalizability of the results to 'our practice site and setting' ... 'what does it mean for my particular patient?'"
Limited funding support	As one participant noted: "Grant-specific funding ... would help. But those funding sources are for specific projects and deliverables. It is difficult to finance [and sustain] infrastructure from those grants." Another commented: "I think [the] NIH should change its funding structure to insist (and adequately support) that CER grants have a dissemination component. You could do it by project ... or funding agencies could fund centers for rapid turnaround of dissemination. The Clinical and Translational Science Awards could be a vehicle for this"

CER: Comparative effectiveness research; D&I: Dissemination and implementation.

Table 2

Suggestions for improving comparative effectiveness research dissemination and implementation within Clinical and Translational Science Awards institutions.

Suggestion	Selected comments & insights
Create a national clearinghouse for D&I tools	“How do you plan D&I to be the right amount at the right time for the right people? I’d like an out-of-the-box (turnkey) approach to dissemination... a well-produced standardized product...” “Besides just telling them about it [the CER evidence], how do we make it implementable ... provide tools so that it can actually be used...”
Identify sources for best D&I practices	“What is the evidence base for the process of D&I?” “What quality of evidence is necessary in order to merit broad D&I?”
Help network existing D&I resources	“I think the AHRQ materials are in the right direction ... I just get the impression that these resources are not as widely used as they could be” “Get the CTSAs to work together ... to speed the [D&I] process along ... more coordination at a national level ... yet dissemination needs to be adaptive to local circumstances”

AHRQ: Agency for Healthcare Research and Quality; CER: Comparative effectiveness research; CTSA: Clinical and Translational Science Awards; D&I: Dissemination and implementation.