FOCUS

TECHNICAL BRIEF NO. 14
2006

A Publication of the National Center for the Dissemination of Disability Research (NCDDR)

# Overview of International Literature on Knowledge Translation

## Overview

*Knowledge translation* (KT) is a term that is closely related to dissemination or diffusion; however, most scholars draw an important distinction—KT is a much broader concept and places a significant emphasis on the issue of research quality and the implementation of research evidence within a system (Davis, Evans, Jadad, Perrier, Rath, Ryan et al., 2003). For many scholars, KT is an appropriate process and strategy to address and reduce the gap between "what is known" and "what is currently done" in practice settings (Davis et al., 2003; Grol & Grimshaw, 2003; Grol & Jones, 2000). Many countries have identified apparent gaps in both the utilization of evidence-based knowledge and in high-quality consumer-centered resources that can be used to inform decision making (Choi, 2005; Scullion, 2002). Persistent gaps have been reported in the education, health care, and rehabilitation fields (Brandt & Pope, 1997; Institute of Medicine, 2001; Riehl, 2006).

International scholars, particularly from Canada and Europe, have published numerous articles on KT processes and strategies. While the majority of these KT articles are published in medical and health-care journals, there is a growing interest in applying the KT concept more generically (i.e., knowledge to action) and to other disciplines (Graham, Logan, Harrison, Straus, Tetroe, Caswell et al., 2006), including disability and rehabilitation research. Generalizing KT to other disciplines may require conceptualizing "knowledge translation as turning knowledge into action and encompassing the processes of both knowledge creation and knowledge application" (Graham et al., 2006, p. 22).

The National Institute on Disability and Rehabilitation Research (NIDRR) has identified KT as an important component in its 2005–2009 long-range plan (NIDRR, 2006b). NIDRR's definition of KT, below, is adapted from the Canadian Institutes of Health Research (CIHR), which describes KT as "the exchange, synthesis, and ethically-sound application of knowledge" (CIHR, 2004, p. 4; NCDDR, 2005b).

> For NIDRR, KT is a multidimensional process designed to ensure that new, research-based knowledge ultimately improves the lives of people with disabilities. The process is active; it accumulates information, filters it for quality, rigor and relevance, and recasts it in language that is easily understood by and accessible for the intended audience. KT includes the transfer of products and devices from the research and development setting to the commercial marketplace. (NIDRR, 2006a)

NIDRR's KT definition and program are efforts to apply KT concepts beyond the parameters of medical and health-care research. To provide additional insight on KT from an international perspective, this issue of *Focus* summarizes the KT process as described by several international authors.

## KT Rationale

In the United States and abroad, knowledge translation is frequently characterized as an approach to managing the increasing volume of published and unpublished scientific research information and its in-depth appraisal, synthesis, and application by influential end-users (Ohlsson, 2002). Underutilization of research findings can present dire consequences for consumers, students, patients, and recipients of social services or special education programs. While most KT literature focuses on the problems of underutilization, KT is also germane to problems of overutilization or misuse of research-based practice. For example, several international scholars and physicians have described "useless or harmful" medical treatments that are used by physicians despite strong evidence of ineffectiveness (ABC Radio National, 2006). For example, Ian Harris, the

SOUTHWEST EDUCATIONAL DEVELOPMENT LABORATORY

**Southwest Educational Development Laboratory • 211 E. 7th St., Suite 200, Austin, TX 78701-3253**

The National Center for the Dissemination of Disability Research (NCDDR) is a project of the Southwest Educational Development Laboratory (SEDL). It is funded by the National Institute on Disability and Rehabilitation Research (NIDRR).

Director of Orthopaedic Surgery at Liverpool Hospital, noted that patients that receive arthroscopic surgery for knee osteoarthritis are no better off than those receiving a "sham treatment"; however, many surgeons continue to recommend and conduct arthroscopies. Thus, for scholars such as Harris, research alone is not sufficient to generate change. KT must represent a process that addresses systematic change in practice behavior (ABC Radio National, 2006).

KT is also relevant for nonindustrialized countries, particularly in the medical and health-care arenas (Garner, Kale, Dickson, Dans, & Salinas, 1998; Santesso & Tugwell, 2006). For example, Aaserud and colleagues (2005) describe the application of KT principles in an effort to synthesize and move research on treatment of pre-eclampsia into practice. Pre-eclampsia is a common, but treatable, complication of pregnancy that accounts for 90% of maternal pregnancy-related deaths in developing countries (Frias & Belfort, 2003).

KT is also necessary to address the underutilization of evidence-based findings among government policymakers, according to Landry, Lamari, and Amara (2003). Their research on Canadian governmental entities' use of research evidence indicated that utilization of research was surprisingly small, with 53% of government officials surveyed stating that research results have rarely or never influenced their decisions in policymaking (Landry et al., 2003). The authors conclude that research utilization depends in part on users' efforts; the nature of the research translation; the linkage between the researcher and end users; and organizational and contextual factors. Though counterintuitive, these results suggest that users' needs were not a strong determinant of research utilization. Indeed, Smith (2001), describing KT issues in Australia, noted that research evidence represents only a small part of the decision-making process for policymakers. Policymakers also rely on political, social, or economic indicators (Smith, 2001). The contributions of Landry et al. (2003) and Smith (2001) suggest the benefit of involving stakeholders in assessing the utility and application of research findings for evidence-based use.

## KT Process

While the rationales for KT are relatively easy to understand, the question of how to plan and conduct knowledge translation is a concern researchers and practitioners express frequently (NCDDR, 2005b). Several international authors have outlined recommendations or strategies for understanding and planning the movement of evidence-based research into practice settings (Boissel, Amsallem, Cucherat, Nony, & Haugh, 2004; Canadian Institutes of Health Research, 2004; Grol & Grimshaw, 2003; Jacobson, Butterill, & Goering, 2003; Lavis, Robertson, Woodside, Mcleod, & Abelson, 2003; Logan & Graham, 1998). These models specifically mention KT or invoke KT concepts, and differ from the traditional dissemination or diffusion techniques. The vast majority of these approaches can be summarized as consisting of multiple stages or steps for the implementation of evidence-based research, although the terminology in these models varies. The six stages of a hypothetical KT process, listed below, are described in the following sections:

1. Identification of quality information/research findings
2. Assessment of research findings for target system
3. Program development; program/content adaptation
4. Program implementation
5. Evaluation of knowledge utilization
6. Sustainability; capacity building

### *Identification of Quality Information/ Research Findings*

The knowledge translation process depends on the conduct and availability of high-quality research information. Quality research most commonly refers to the scientific process encompassing all aspects of study design; in particular, it pertains to the judgment regarding the match between the questions and methods of data collection and analysis, selection of subjects, measurement of outcomes, and protection against systematic bias, nonsystematic bias, and inferential error (NCDDR, 2005a). The initial stages of KT involve the identification of a relevant and well-defined question on which to base a systematic review. Identification of quality research in the KT process requires strategies for evaluating standards of research quality (Boissel et al., 2004). Most KT-related articles, particularly in the health-care fields, use the rank-order index (Figure 1) to evaluate the potential contribution of research findings for evidence-based use.

While quantitative approaches and randomized controlled trials are typically considered most relevant for KT, many scholars suggest that qualitative research is valuable and can contribute to translating research into practice (Campbell Collaboration Methods Group, 2006;

Cochrane Collaboration Methods Group, 2002). Like quantitative research, qualitative research must also be reviewed and evaluated for quality. However, there are few specific international authors that have elaborated on the role of qualitative research in the KT process.

### *Assessment of Research Findings for Target System*

While the initial stage of KT focuses squarely on formulating an answerable question and/or establishing the available evidence, the second stage pertains to the aggregation and quality assessment of research, particularly through use of systematic reviews, meta-analyses, and registries of evidence-based guidelines (Choi, 2005; Graham et al., 2006; Grol & Grimshaw, 2003). Systematic reviews involve tightly focused and specific review questions with specific inclusion and exclusion criteria (Cook, Greengold, Ellrodt, & Weingarten, 1997). Many scholars suggest that in considering the evidence, communicators should assess the quality of the research and consider what works, for whom, under what conditions, and why (Lavis et al., 2003). Many strategies for reviewing and assessing evidence are discussed in the literature, including use of research utilization committees and interdisciplinary consensus panels, such as the Cochrane Collaboration (http://www.cochrane.org/) and Campbell Collaboration (C2) (http://www.campbellcollaboration.org), that evaluate evidence, set standards, and conduct systematic reviews. The Campbell Collaboration is an international and volunteer network of policymakers, researchers, practitioners, and consumers who endeavor to prepare, maintain, and disseminate systematic reviews of studies of interventions in the social and behavioral sciences (i.e., criminal justice, social welfare, and education). The Cochrane Collaboration conducts and maintains systematic reviews of health-care and medical interventions. Many scholars have identified Cochrane and C2 as invaluable for building and maintaining evidence-based knowledge.

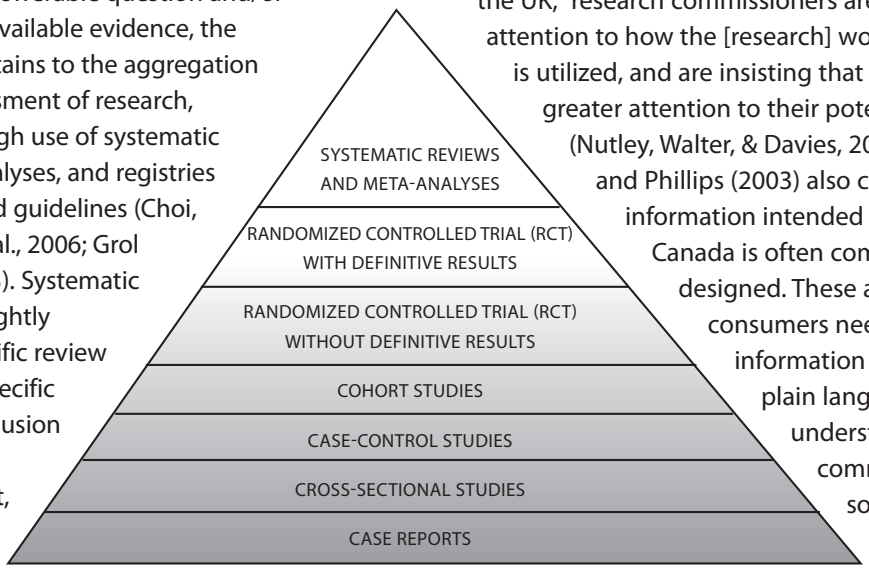


**Figure 1. Rank-order index to evaluate the contribution of research findings for evidence-based use**

### *Program Development; Program/Content Adaptation*

The results of a systematic review can provide evidence to support program development, evidence-based guidelines, or other practice strategies. These programs or initiatives, however, must be developed in a manner that is appropriate for a specific target audience. Several scholars have noted the problems of ineffective KT content and program development. In Canada and the UK, "research commissioners are paying increasing attention to how the [research] work they commission is utilized, and are insisting that researchers pay far greater attention to their potential user audience" (Nutley, Walter, & Davies, 2003, p. 126). Norris and Phillips (2003) also caution that research information intended for consumers in Canada is often complex and poorly designed. These authors note that consumers need evidence-based information that is written in plain language and readily understood. When research communication and social marketing efforts are ineffective, consumers and families often struggle to apply scientific findings to their specific needs.

To address KT program development needs, Jacobson et al. (2003) recommend that planners conduct an audience analysis by considering a set of questions regarding the user group, the issue, the research, the KT relationship, and dissemination strategies. Lavis et al. (2003) note that asking and answering questions about the target system and the attributes of the specific user group, such as the user group's formal structure and system of accountability, can provide insight for closing the research to practice gap. The authors' study on use of policy research suggests that planners should consider learning:

- who can act on the knowledge,
- who can influence those who can act,
- which audience will generate the most success, and
- which message pertains most directly to each of them.

### *Program Implementation*

Program implementation typically pertains to communication strategies, social marketing techniques, knowledge brokering, or collaboration approaches that are designed to facilitate use of evidence-based recommendations or practices in a specific context or setting (Canadian Institutes of Health Research, 2004). For example, research on Manitoba's The Need to Know Project provides an example of consumer involvement in a KT initiative (Bowen & Martens, 2005). This project involved an effort to engage rural health authorities (i.e., stakeholders) and promote collaborative research to support decision making. Participatory and collaborative efforts may facilitate relationship building and trust in the KT process (Lindstrom, 2003). In addition to research utilization, Bowen and Martens (2005) report that collaborative KT strategies often produce the formation of networks and partnerships. These authors suggest that KT consumer-participation approaches should include efforts to:

- create an environment of interest and openness to research;
- provide opportunities for collaborative research;
- develop and use a shared vocabulary and conceptual base;
- offer a forum for sharing;
- facilitate an understanding of research findings;
- foster an understanding of implications for practice;
- apply and utilize research findings; and
- devise strategies for the sustainability of interventions.

### *Evaluation of Knowledge Utilization*

The evaluation of KT strategies typically pertains to practitioners' use of evidence-based knowledge and consumer-related outcomes (i.e., student, patient, and economic) as a primary measure of successful application or implementation (Logan & Graham, 1998; Ohlsson, 2002). Although there is a keen interest in measuring KT outcomes, there is also a noticeable absence of published articles on KT measurement. For example, a recent search of the Health and Psychosocial Instruments (HAPI) database indicates no instruments specifically identified for measuring KT.

Boissel and colleagues (2005), French researchers supported by the Scientific Council of French Medicine Agency, are among the few published researchers that specifically use the language of KT to elaborate on this topic. Boisell makes the critical point that in KT there is an assumption that a difference (i.e., gap) between what is known and what is done 1) exists and 2) can be measured. Thus, a reasonable KT measurement activity should consist of "gap analysis" and "gap closure." While Boissel's comments are insightful, it is important to note that his focus is pharmacology. For Boissel, gap analysis also questions the assumption that a gap is inherently bad or hazardous. In his field of study, the notion of a "gap" depends on the notion of "absolute confidence in treatment or intervention," and thus there are limitations to generalizing his approach to all aspects of disability and rehabilitation research (Boissel, Nony, Amsallem, Mercier, Esteve, & Cucherat, 2005). While Boissel et al. do not provide all of the answers, they offer an interesting perspective on KT.

### *Sustainability; Capacity Building*

Sustainability of KT pertains to ensuring that evidence-based practices continue (CIHR, 2004). Ohlsson (2002) notes that KT typically requires ongoing surveillance to assess implications of new knowledge use. Because KT is a complex and ongoing undertaking, many authors are calling for KT professionals to help fill the emerging roles (Davis, 2001). Kate Hughes, an administrator charged with fostering research and industry links at Warwick University, notes that dissemination of research is a core activity that must be supported and capacity-building efforts are needed to recruit and retain KT professionals (Davis, 2001). Smith (2001) also mentions the benefit of using the "research brokers" to encourage and promote communication and exchange between and among researchers and user communities, as they represent different cultural perspectives.

## Critiques of the KT Concept

While KT is increasing in popularity and use, it is not without its detractors. Some members of the medical community view KT as reductionist and suggest that evidence-based practice must be considered on an individualized basis (Genuis & Genuis, 2006). Similarly, scholars in the field of education research have expressed concerns about comparing medical research and contexts to educational settings (Riehl, 2006). In particular, Riehl (2006) echoes questions regarding the universality of medical standards such as the emphasis on randomized controlled trials for establishing evidence (i.e., the "gold standard") and evaluating quality research.

Other constructive criticisms of KT pertain to its emphasis on quantitative research methodologies. Barbour (2001) argues that the topic and use of qualitative research is frequently lost in the discussion on research quality, synthesis, and reporting. She notes that many topics cannot be understood with positivist paradigms and that standardized reporting checklists that are deemed necessary for high-quality systematic review may be too prescriptive for qualitative research designs and methods.

In addition, many quantitative methodologists have expressed concerns over the development and management of systematic reviews. Conducting systematic reviews is a challenging undertaking. In particular, they note that the systematic reviews that establish evidence pools must be of high quality and must be kept current in order to be of value for use (Grimshaw, Santesso, Cumpston, Mayhew, & McGowan, 2006).

## Conclusion

Viewing knowledge translation from an international perspective suggests many insights for applying KT concepts to disability and rehabilitation research. Several models and strategies are described in the literature that elaborate on the KT process. These models may be useful as a starting point to formulate KT plans or efforts addressing disability and rehabilitation research. It is clear from the literature, however, that KT is a complex and lengthy process, one that requires innovative and dedicated action at the local and national levels to commit time and resources, synthesize research knowledge, and incorporate findings into systems of practice. Thus, KT must be planned and context-bound (Kerner, 2006).

While there are beneficial insights, there are also concerns about applying the KT approach. Of particular concern are questions regarding the systematic review process and framework for research that does not conform to randomized controlled trials. Various quantitative and qualitative approaches are used in disability and rehabilitation research to generate knowledge and inform practice. In addition, consumer input and participation is a hallmark of NIDDR-sponsored research. While many KT projects note the benefit of participation, few elaborate on the role of consumers' knowledge, values, or perspectives in the translation process. NIDRR's research portfolio includes development activities, and there is a need to adapt and apply the KT concept for work conducted by rehabilitation engineering research centers. These areas of concern must be addressed in a KT process for disability and rehabilitation research.

## References


**Aaserud, M., Lewin, S., Innvaer, S., Paulsen, E. J., Dahlgren, A. T., Trommald, M., et al. (2005). Translating research into policy and practice in developing countries: A case study of magnesium sulphate for pre-eclampsia [Electronic Version]. *BMC Health Services Research, 5*. Retrieved October 5, 2006, from http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=1298297&blobtype=pdf**

**ABC Radio National. (2006). *Facing the evidence* [Electronic Version]. Retrieved October 8, 2006, from http://www.abc.net.au/rn/healthreport/stories/2006/1735075.htm#transcript**

**Barbour, R. (2001). Checklists for improving rigour in qualitative research: A case of the tail wagging the dog? *British Medical Journal, 322*, 1115–1117.**

**Boissel, J. P., Amsallem, E., Cucherat, M., Nony, P., & Haugh, M. (2004). Bridging the gap between therapeutic research results and physician prescribing decisions: Knowledge transfer, a prerequisite to knowledge translation. *European Journal of Clinical Pharmacology, 60*(9), 609–616.**

**Boissel, J. P., Nony, P., Amsallem, E., Mercier, C., Esteve, J., & Cucherat, M. (2005). How to measure non-consistency of medical practices with available evidence in theraputics: A methodological framework. *Fundamental & Clinical Pharmacology, 19*, 591–596.**

**Bowen, S., & Martens, P. (2005). Demystifying knowledge translation: Learning from the community. *Journal of Health Services Research & Policy, 10*(4), 203–211.**

**Brandt, E. N., & Pope, A. M. (Eds.). (1997). *Enabling America: Assessing the role of rehabilitation science and engineering.* Washington, DC: National Academy Press.**

**Campbell Collaboration Methods Group. (2006). *Implementation process methods group* [Electronic Version]. Retrieved October 9, 2006, from http://www.campbellcollaboration.org/MG/ProcImplGroup.asp**

**Canadian Institutes of Health Research. (2004). *Knowledge translation strategy 2004–2009: Innovation in action.* Ottawa, ON: Author.**

**Choi, B. C. (2005). Understanding the basic principles of knowledge translation. *Journal of Epidemiology and Community Health, 59*(2), 93.**

**Cochrane Collaboration Methods Group. (2002). *Proposal to establish a Cochrane qualitative methods group* [Electronic Version]. Retrieved October 9, 2006, from http://www.joannabriggs.edu.au/cqrmg**

**Cook, D. J., Greengold, N. L., Ellrodt, A. G., & Weingarten, S. R. (1997). The relation between systematic reviews and practice guidelines.** ***Annals of Internal Medicine, 127*****(3), 210–216.**

**Davis, C. (2001, October 3). Call for cash boost to drive knowledge-transfer activity.** ***Times Higher Education Supplement,*** **p. 9.**

**Davis, D., Evans, M., Jadad, A., Perrier, L., Rath, D., Ryan, D., et al. (2003). The case for knowledge translation: Shortening the journey from evidence to effect.** ***British Medical Journal, 327*****(7405), 33–35.**

**Frias, A. E., Jr., & Belfort, M. A. (2003). Post magpie: How should we be managing severe preeclampsia?** ***Current Opinion in Obstetrics and Gynecology, 15*****(6), 489–495.**

**Garner, P., Kale, R., Dickson, R., Dans, T., & Salinas, R. (1998). Getting research findings into practice: Implementing research findings in developing countries.** ***British Medical Journal, 317*****(7157), 531–535.**

**Genuis, S. K., & Genuis, S. J. (2006). Exploring the continuum: Medical information to effective clinical practice. Paper I: The translation of knowledge into clinical practice.** ***Journal of Evaluation in Clinical Practice, 12*****(1), 49–62.**

**Graham, I. D., Logan, J., Harrison, M. B., Straus, S. E., Tetroe, J., Caswell, W., et al. (2006). Lost in knowledge translation: Time for a map?** ***The Journal of Continuing Education in the Health Professions, 26*****(1), 13–24.**

**Grimshaw, J. M., Santesso, N., Cumpston, M., Mayhew, A., & McGowan, J. (2006). Knowledge for knowledge translation: The role of the Cochrane Collaboration.** ***The Journal of Continuing Education in the Health Professions, 26*****(1), 55–62.**

**Grol, R., & Grimshaw, J. (2003). From best evidence to best practice: Effective implementation of change in patients' care.** ***Lancet, 362*****(9391), 1225–1230.**

**Grol, R., & Jones, R. (2000). Twenty years of implementation research.** ***Family Practice, 17,*** **S32–S35.**

**Institute of Medicine. (2001).** ***Crossing the quality chasm: A new health system for the 21st century.*** **Washington, DC: National Academy Press.**

**Jacobson, N., Butterill, D., & Goering, P. (2003). Development of a framework for knowledge translation: Understanding user context.** ***Journal of Health Services Research & Policy, 8*****(2), 94.**

**Kerner, J. F. (2006). Knowledge translation versus knowledge integration: A "Funder's" Perspective.** ***The Journal of Continuing Education in the Health Professions, 26*****(1), 72–80.**

**Landry, R., Lamari, M., & Amara, N. (2003). The extent and determinants of the utilization of university research in government agencies.** ***Public Administration Review, 63*****(2), 192–205.**

**Lavis, J. N., Robertson, D., Woodside, J. M., Mcleod, C. B., & Abelson, J. (2003). How can research organizations more effectively transfer research knowledge to decision makers?** ***Milbank Quarterly, 81*****(2), 221–248.**

**Lindstrom, R. R. (2003). Evidence-based decision-making in healthcare: Exploring the issues though the lens of complex, adaptive systems theory.** ***Healthcare Papers, 3*****(3), 29–35.**

**Logan, J., & Graham, I. D. (1998). Toward a comprehensive interdisciplinary model of health care research use.** ***Science Communication, 20*****(2), 227.**

**National Center for the Dissemination of Disability Research. (2005a). What are the standards for quality research?** ***FOCUS: A Technical Brief*** **(9).**

**National Center for the Dissemination of Disability Research. (2005b). What is knowledge translation?** ***FOCUS: A Technical Brief*** **(10).**

**National Institute on Disability and Rehabilitation Research. (2006a).** ***News From NIDRR*** **[Electronic Communication].**

**National Institute on Disability and Rehabilitation Research–Notice of final long-range plan for fiscal years 2005–2009, 71 Fed. Reg. 8165 (Feb. 15, 2006b).**

**Norris, S. P., & Phillips, L. M. (2003). The public understanding of scientific information: Communicating, interpreting, and applying the science of learning.** ***Education Canada, 43*****(2), 24–27.**

**Nutley, S., Walter, I., & Davies, H. T. O. (2003). From knowing to doing: A framework for understanding the evidence-into-practice agenda.** ***Evaluation, 9*****(2), 125–148.**

**Ohlsson, A. (2002). Knowledge translation and evidence-based perinatal/neonatal health care.** ***Neonatal Network, 21*****(5), 69–74.**

**Riehl, C. (2006). Feeling better: A comparison of medical research and education research.** ***Educational Researcher, 35*****(5), 24–29.**

**Santesso, N., & Tugwell, P. (2006). Knowledge translation in developing countries.** ***The Journal of Continuing Education in the Health Professions, 26*****(1), 87–96.**

**Scullion, P. A. (2002). Effective dissemination strategies.** ***Nurse Researcher, 10*****(1), 65–77.**

**Smith, C. S. (2001).** ***The impact of research on decision-making by practitioners and managers.*** **Unpublished manuscript.**




NCDDR'S scope of work focuses on developing systems for applying rigorous standards of evidence in describing, assessing, and disseminating outcomes from research and development sponsored by NIDRR. The NCDDR promotes movement of disability research results into evidence-based instruments such as systematic reviews as well as consumer-oriented information systems and applications.

*FOCUS: A Technical Brief From the National Center for the Dissemination of Disability Research* was produced by the National Center for the Dissemination of Disability Research (NCDDR) under grant H133A060028 from the National Institute on Disability and Rehabilitation Research (NIDRR) in the U.S. Department of Education's Office of Special Education and Rehabilitative Services (OSERS).

SOUTHWEST EDUCATIONAL DEVELOPMENT LABORATORY