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13 Committee on External Evaluation of NIDRR and its Grantees

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15 Jeanne C. Rivard, Mary Ellen O'Connell, and David H. Wegman, *Editors*
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1 NIDRR key processes.

2 We would also like to thank all of the participants in the evaluation who lent us
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8 (PIs) of the NIDRR grants which were reviewed. Participation on their part required a
9 substantial amount of time and effort on their parts, especially for large center grants
10 which produce many outputs. The PIs identified and submitted outputs for the
11 committee's review and completed a set of questions concerning each output. For many
12 PIs this involved coordination with other team members who had been involved in their
13 projects. In addition the committee asked the PIs to respond to a separate set of questions
14 regarding how they managed their grants and what other projects had been generated
15 from their grants and outputs. Finally, the PIs were also asked to comment on key
16 NIDRR processes (priority setting, peer review, and grant monitoring) that may influence
17 their work. Some grantees also extended themselves by setting up special demonstrations
18 of their outputs via teleconference or websites.

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12 This report has been reviewed in draft form by individuals chosen for their
13 diverse perspectives and technical expertise, in accordance with procedures approved by
14 the National Research Council's Report Review Committee. The purpose of this
15 independent review is to provide candid and critical comments that will assist the
16 institution in making its published report as sound as possible and to ensure that the
17 report meets institutional standards for objectivity, evidence, and responsiveness to the
18 study charge. The review comments and draft manuscript remain confidential to protect
19 the integrity of the deliberative process. We wish to thank the following individuals for
20 their review of this report: [Insert names and affiliations of reviewers listed alphabetically].

21 Although the reviewers listed above provided many constructive comments and
22 suggestions, they were not asked to endorse the content of the report nor did they see the

1 final draft of the report before its release. The review of this report was overseen by John
2 Bailar of the University of Chicago and William Howell of Arizona State University.
3 Appointed by the National Research Council, they were responsible for making certain
4 that an independent examination of this report was carried out in accordance with
5 institutional procedures and that all review comments were carefully considered.
6 Responsibility for the final content of this report rests entirely with the author and the
7 institution.

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David H. Wegman, *Chair*

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Jeanne C. Rivard, *Co-Study Director*

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Mary Ellen O'Connell, *Co-Study Director*

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Committee on External Evaluation of NIDRR and its Grantees

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Summary

The mission of the National Institute of Disability and Rehabilitation Research (NIDRR) is to generate new knowledge and to promote its effective use to improve the abilities of people with disabilities to perform activities of their choice in the community, and also to expand society's capacity to provide full opportunities and accommodations for its citizens with disabilities. The agency addresses its mission through funding research, training, and related activities. NIDRR was established by the 1978 amendments to the Rehabilitation Act of 1973 and is located within the Office of Special Education and Rehabilitative Services in the Department of Education.

NIDRR takes prides in proactively establishing program performance measures and developing accountability data systems to track their results and grantee progress. In 2009, NIDRR requested the National Research Council to conduct an evaluation of NIDRR and its grantees, focused on outputs. The charge to the Committee included two major components. The first component, termed the "process evaluation," involved examining NIDRR's priority-writing process, its practices for the peer review of grant applications, and the planning and budgetary processes used by grantees. The second component, termed the "summative evaluation," involved the assessment of the quality of grantee outputs. The key questions posed by NIDRR that were addressed in each of these components are highlighted in the sections below. In

1 addition, the committee was charged to assess the methods they developed in conducting the
2 summative evaluation and to make recommendations for conducting future evaluations.¹ The
3 evidence leading to the committee's recommendations is summarized here, but expanded upon in
4 the actual report.

6 PROCESS EVALUATION

7 To address questions related to NIDRR's priority writing, peer review, and grant
8 management processes, existing documents were reviewed (e.g., legislation, Federal Register
9 notices, NIDRR and the Department of Education policies and procedures) and executive-level
10 representatives of NIDRR were interviewed to get a more thorough and cohesive understanding
11 of the processes. Additional insight into NIDRR's peer review process was gained through
12 listening to teleconferences of three panels as they conducted their reviews of different
13 competitions. Original data were also collected through surveys of NIDRR staff, stakeholder
14 organizations, NIDRR peer reviewers, and NIDRR grant principal investigators.

15 Priority Setting

16 *To what extent is NIDRR's priority writing process conducted in such a way as to enhance the*
17 *quality of the final results?*

18 NIDRR uses the term priority writing to encompass all aspects of priority setting
19 including gathering input from multiple sources (e.g., researchers, universities, stakeholder
20 organizations, grantees, other agencies), developing a long-range (5-year) plan for agency
21 priorities, determining annual priorities for funding, and publishing requests for proposals on
22 these priorities. The term priority setting is used synonymously with priority writing in this

¹ This aspect of the charge was summarized in an earlier letter report provided to NIDRR in July 2011 and is also contained in Chapter 6 of this report.

1 evaluation to clarify that the focus was on this larger priority setting process.

2 The quality of NIDRR's programs, grants, and grantee outputs is the product of multiple
3 complex factors including the priority writing process, the funding level, the peer review process,
4 and scientific quality of the grantees. While the committee concluded that it is clear that the
5 NIDRR priority setting process has a positive impact on the quality of the final results, they
6 noted areas where improvement is indicated.

7 The committee concludes that more needs to be done to inform and engage stakeholders
8 in NIDRR's long range planning and priority-setting processes. As part of the committee's
9 assessment, a survey was conducted of NIDRR stakeholder organizations (N=72), that included
10 other federal agencies, professional associations, and advocacy organizations. Although results
11 were generally positive, 25% or greater of respondents replied to several items that they did not
12 know about key aspects of NIDRR's long range planning and priority setting processes (e.g.,
13 transparency of the processes, responsiveness to stakeholder feedback, use of NIDRR grantee
14 products).

15 Priority setting not only reflects the agency's intent to influence the advancement of
16 research in targeted areas but also offers specific funding opportunities for potential grant
17 applications to the agency. The announced priorities should therefore be developed and
18 communicated in a manner that attracts the best researchers to participate in disability and
19 rehabilitation research. Attracting the largest pool of applications from which to select proposals
20 increases the chances for the highest quality results. When establishing its priorities the agency
21 needs to balance continuity from funding cycle to cycle, as well as identify future research
22 challenges and societal needs. The committee offered specific recommendations in three areas to
23 strengthen NIDRR's long range planning and priority setting processes.

1 **Advisory Council**

2 NIDRR has a broad and diverse mission that makes it challenging to set priorities that are
3 responsive to the current state of the science and the needs of the stakeholder community.

4 Currently, NIDRR relies on staff, the portfolio of existing projects, recent findings from
5 completed grants, current research literature, as well as guidance from federal partners to provide
6 input to the priority setting process. Title II, section 205 instructs NIDRR to establish a standing
7 Rehabilitation Research Advisory Council to advise the Director on research priorities and the
8 development of the Long Range Plan. While NIDRR has formed ad hoc advisory bodies to
9 support the development of Long Range Plans, a standing body has never been formed.

10 **Recommendation: NIDRR should form and utilize a Rehabilitation Research**
11 **Advisory Council to guide the priority setting process and provide input for**
12 **priority setting (3.1).**

14 **Best Practices**

15 NIDRR is a relatively small agency with a broad and diverse mission and has multiple
16 stakeholders including the scientific community and consumer groups. It is important to have a
17 consistent mechanism to gather information and input to inform the strategic planning process.
18 NIDRR does utilize input from multiple sources such as stakeholder input, federal agencies, the
19 Interagency Committee on Disability Research (ICDR), review of current literature, and state of
20 the science conferences. However, negative comments from the field generated by the last Long
21 Range Plan coupled with the plan's subsequent delay, which caused NIDRR to operate under the
22 prior plan for several years beyond its intended time frame, suggest a breakdown in NIDRR's
23 priority development process. The lack of a permanent director also hampers and delays
24 NIDRR's priority development process.

1 **Recommendation: NIDRR should apply a consistent set of best practices in**
2 **the strategic planning process that is inclusive and incorporates the views of**
3 **stakeholders leading to the development of long-range plans (3.2).**

4 5 **Standard Calendar**

6 For many program mechanisms NIDRR has been unable to establish a regular schedule
7 for drafting, approving, and disseminating priorities and grant competition announcements to the
8 field. The Department of Education has an unduly lengthy review and approval process for
9 obtaining clearance for release of priority areas and notices inviting applications (NIA). The
10 length of the process impacts the timing of the release of NIAs. This in turn affects NIDRR's
11 ability to widely inform individuals when a request for proposal will be placed in the Federal
12 Register or when the grant will be due. Posting in the Federal Register on a changing schedule
13 does not inform researchers optimally about grant opportunities, especially when the grant is due
14 60 days after posting. This timeline may result in not getting the best investigators to submit
15 applications. Established application submission and review dates with variable final decision
16 and start dates are more desirable than variable application announcements, as it might
17 discourage new applicants from competing for grants.

18 **Recommendation: NIDRR should establish a standard calendar for the**
19 **setting of priorities, requests for proposals and submission of grants to**
20 **improve the efficiency of the process (3.3).**

21 22 **Peer Review**

23 *To what extent are peer reviews of grant applicants done in such a way as to enhance the*
24 *quality of final results?*

1 NIDRR's peer review process includes developing a technical review plan, recruiting and
2 training reviewers, conducting the review, and approving the awards. As stated above in relation
3 to priority setting, it is challenging to directly link peer review with specific results because the
4 quality of the resulting portfolio, grants, and outputs is the product of multiple complex factors.
5 However, it is clear that the peer review process used by NIDRR contributes significantly to the
6 success of the grant award program and the quality of the outputs.

7 As part of its analysis of NIDRR's peer review process, the committee conducted a
8 survey of peer reviewers (N= 121) who were asked a series of closed- and open-ended questions
9 to inquire about: their experiences and perspectives on the NIDRR peer review process, how it
10 compares to other federal research agencies' peer review processes, and their suggestions for
11 enhancements to the process. Survey responses were largely positive. While the Committee
12 agrees that NIDRR's peer review process is generally good, opportunities for further
13 enhancement exist that would likely improve the quality of final results. The Committee offers
14 recommendations to improve NIDRR's peer review process as it relates to the peer reviewer
15 experience and to the use of consumers on panels.

17 **Enhancing the Peer Review Process**

18 The Committee believes that NIDRR's peer review process is hampered by a limited pool
19 of potential reviewers. The Committee recognizes the care with which NIDRR Competition
20 Managers assemble and facilitate review panels. NIDRR staff spends considerable time
21 recruiting and screening potential reviewers. Competition Managers regularly have to manage
22 potential conflict of interest and rule out qualified reviewers. Despite the effort of the staff
23 responsible for peer review, there was some evidence that a number of panels are smaller than
24 NIDRR's recommended size, reviewers are added so close to the meeting date they don't have

adequate time to prepare, and reviewers possibly lacking necessary scientific expertise are participating in the process.

Forming more standing panels would reduce the recruiting burden on NIDRR staff and provide reviewers more experience with the process, both of which would lead to more consistent and high quality reviews. Reviewers reported inconsistent training quality; further enhancing training would be a simple and effective way to increase the quality of the process. Finally, considerable variation exists between competitions in the manner in which NIDRR staff facilitate panel discussions, resulting in variable discussion quality. Inconsistency between competitions can result in confusion and negatively influence overall quality.

Recommendation: NIDRR should enhance the peer review process by expanding the potential reviewer pool, establishing standing panels for the appropriate granting mechanisms, enhancing reviewer training, and improving the consistency of the feedback and management provided by NIDRR's staff (4.1).

Quality Improvement Plan

It is apparent that participating in NIDRR's peer review process is a significant burden for a large percentage of reviewers. Many reviewers spend more time than they wish to preparing, and review days themselves are long and intense. The Committee believes that the process is so burdensome to peer reviewers as to threaten the quality of the process. Reviewers reported sometimes receiving insufficient time to review the proposals, which could affect the quality of review discussions. The significant time commitment prior to and during the review makes it less likely that qualified and experienced reviewers will participate.

Recommendation: NIDRR should develop and institute a quality improvement

1 plan to enhance and streamline the review process, reduce the burden on peer
2 reviewers, and assure that high-quality reviewers are selected (4.2).

4 **Consumer Peer Reviewers**

5 Finally, NIDRR faces challenges related to the participation of consumers on peer review
6 panels. To address its mission, NIDRR makes concerted efforts to include qualified individuals
7 with disabilities or representatives of individuals with disabilities. However, NIDRR at times has
8 difficulty placing appropriate consumers on panels. While some consumers who regularly serve
9 are scientists, many individuals with disabilities who serve on NIDRR review panels do not have
10 research experience or the expertise required to conduct rigorous scientific reviews. Nonetheless,
11 consumers without scientific backgrounds are asked to score grants on all review criteria,
12 including addressing scientific merit. The Committee believes that consumers without scientific
13 knowledge can make an important contribution to the peer review process, but asking such
14 consumers to evaluate science may compromise the quality of the review.

15 **Recommendation: NIDRR should systematically assess how consumers without**
16 **scientific expertise should best be included in the review process and develop**
17 **procedures to better guide such participation (4.3).**

19 **Grants Management**

20 *What planning and budgetary processes does the grantee use to promote high quality outputs?*

21 The committee considered grantee planning and budgetary processes in the larger context
22 of NIDRR's structure and processes that support grant management. Study methods included: a)
23 reviewing existing documentation on Department of Education and NIDRR's grant management
24 and monitoring processes, b) gathering information from principal investigators about the

1 processes they use for managing grants, and c) interviewing NIDRR staff to gather their
2 perspectives on how grant monitoring facilitates grantees' efforts to manage their grants for
3 successful results.

4 NIDRR appears to have a good plan and momentum in place for upgrading their routine
5 monitoring and for identifying and monitoring grants that are at risk of noncompliance with the
6 new monitoring plan. On the whole it appears that grantees appreciate aspects of NIDRR's grant
7 management processes that facilitate their own grant management strategies. While grantees'
8 generally commented that NIDRR grant management processes were effective in helping them in
9 their own grant management processes, they offered some suggestions that would help them
10 further.

11 Suggestions for improvement from NIDRR staff focused on strengthening their capacity
12 to monitor grants and to help their grantees stay on course in implementing their grants and
13 meeting performance expectations. Among other suggestions, they expressed the need for
14 smaller grant caseloads, additional travel funds for on-site monitoring of grants that require
15 higher levels of technical assistance, more training for new project officers to promote
16 consistency and quality in their monitoring processes, and a freer flow of communication
17 between project officers and the NIDRR planning staff in relation to financial information.

18
19 **Recommendation: NIDRR should continue to focus efforts on improvements**
20 **to their grant monitoring procedures and specific elements of their overall**
21 **grant management system that impact grantee-level planning, budgets, and**
22 **the quality of outputs (5.1).**

23
24 From the grantee interviews the committee also learned that some grants that are

1 developing innovations in new technologies may not fit well with a management template that
2 calls for strict upfront planning and adherence to original design and time tables. Similarly,
3 grants funding large, multi-site studies may require more or different supervision, monitoring,
4 and technical assistance than a more focused or limited study. These grantees expressed the need
5 for a greater degree of flexibility in management to allow them to stay on the cutting edge of
6 technology or more easily adapt to changing needs of multi-site research projects.

7 **Recommendation: NIDRR management should review the requirements**
8 **placed upon technical innovation grants and large multi-site studies to assure**
9 **that planning, reporting, supervisory, and technical assistance requirements**
10 **fit their particular circumstances. (5.2)**
11

12 *To what extent are the results of the reviewed research and development outputs used to*
13 *inform new projects by both the grantee and NIDRR?*

14 To address this study question the Committee gathered information from NIDRR
15 executive representatives about how they use the results of their grantees research and collected
16 information from grantees about new projects that have been generated from their grants.

17 From the information gathered from grantees, the committee found that the results of the
18 reviewed research and development projects are used to generate new projects by grantees to a
19 great extent. Twenty-four out of 30 grants reviewed in the evaluation reported generating over 50
20 new research and development projects. In addition, grantees reported substantial numbers of
21 new collaborations with other researchers and organizations (n=19); transfers of data,
22 instruments, or models to other projects (n=22); and commercialization of technology products
23 (n=5).
24

SUMMATIVE EVALUATION

The committee reviewed the outputs of 30 grants that were sampled from NIDRR's portfolio². These grants represented nine NIDRR program funding mechanisms, including Model Systems (Burn, Traumatic Brain Injury, and Spinal Cord Injury), Rehabilitation Research and Training Centers, Rehabilitation Engineering and Research Centers, Disability and Rehabilitation Research Projects, Field Initiated Projects, Small Business Innovation Research - Phase II, and Switzer Fellowships. Four different types of outputs were reviewed, which included 1) publications; 2) tools, measures, and intervention protocols; 3) technology products and devices; and 4) informational products.

In assessing the quality of outputs the committee used the following four criteria, stemming from their definition of quality: 1) technical quality; 2) advancement of knowledge or the field; 3) likely or demonstrated impacts (on science, consumers, provider practice, health and social systems, social and health policy, and the private sector/commercialization); and 4) dissemination according to principles of appropriate knowledge translation. The committee used a 7-point scale to rate each output submitted by grantees.

The committee reviewed 148 outputs from the 30 grantees. Ratings on each of the four criteria were distributed fairly symmetrically along a 7-point quality scale with the largest proportions of scores falling at the midpoint of 4, and with most being slightly skewed toward the higher end of the quality scale. Although close to 75 percent of the outputs rated were found to be in the higher range of the quality scale (i.e., with mean rating of 4 or greater), across all of the criteria one quarter of the outputs reviewed were found to be in the lower quality range. Based on the evidence, the committee offers NIDRR two recommendations to assist their grantees in continuously improving the quality of their outputs.

² Random sampling of grants was undertaken at the level of program funding mechanism.
Summary

1 Improving Quality of Outputs

2 The quality of outputs is the product of multiple complex factors that involve the priority
3 writing process, the funding level, the peer review process, the quality of the proposed
4 science/research and the grantees, and ultimately the quality of the research findings. For
5 grantees that are not performing optimally, NIDRR may conduct ongoing formative reviews with
6 experts to identify strategies for improvement, increase their grant monitoring activities, and
7 require additional grantee reporting. Grantees perceive that NIDRR's oversight and reporting
8 functions foster successful grants and high quality outputs by: assisting them in adhering to their
9 budget and timeline, providing an external quality assurance mechanism for their project
10 management, and prompting them to maintain their focus on project goals for high quality
11 products.

12 **Recommendation. Although close to 75 percent of outputs were rated as high**
13 **quality (ie., 4 or higher on the 7-point quality scale), NIDRR should increase**
14 **expectations for all grantees to achieve high levels of quality in their outputs. (6.1)**
15

16 Despite limitations in using bibliometrics³, it is a valuable and objective set of metrics
17 that can be used in combination with other assessment strategies. NIDRR has conducted
18 bibliometric analyses in the past, but has not routinely incorporated use of these metrics into its
19 performance measurement.

20 **Recommendation: NIDRR should consider undertaking bibliometric analyses of its**
21 **grantees publications on a more routine basis for performance measurement. (6.2).**
22

³ Common bibliometric measures include the impact factor of journals in which articles are published and the number of times an article is cited in other articles.

1
2 **ASSESSMENT OF THE METHODS USED BY THE COMMITTEE FOR OUTPUT**
3 **REVIEW AND RECOMMENDATIONS FOR FUTURE EVALUATIONS**

4 The committee developed and implemented an evaluation process for assessing the
5 outputs of NIDRR's grantees and identifying varying levels of quality and the characteristics
6 associated with these outputs. Considerable time was spent selecting and refining the criteria
7 used to assess quality. While there was some variation in the independent scoring among
8 subgroup members, it was rarely extreme, particularly after group discussions. Although the
9 specific content area expertise to assess every output could not be ensured for the diversity and
10 breadth of the outputs reviewed, the committee thinks that, collectively, the subgroups were able
11 to adequately assess all the outputs. However, the committee encountered several challenges and
12 limitations during the course of their work that limited the generalizability of the findings from
13 this evaluation and restricted what could be said about the totality of outputs generated by all
14 NIDRR grantees.

15
16 **Defining Future Evaluation Objectives**

17 The primary focus of the summative evaluation was on assessing the quality of outputs
18 produced by grantees and did not allow for in-depth examination or comparison of the larger
19 context of the funding programs, grants, or projects in which the outputs were produced.
20 However, the committee was asked to produce an overall grant rating based on the outputs
21 reviewed and the information available about the grant from the APR. Results at the grant level
22 were subject to limitations given the general lack of information about how the outputs did or did
23 not interrelate; whether, and if so how, grant objectives were accomplished; and the relative
24 priority placed on the various outputs. In addition, for larger more complex grants such as Center

1 Grants, a number of grant expectations, such as capacity building, dissemination, outreach,
2 technical assistance, and training, are unlikely to be adequately reflected in the approach used,
3 which focused exclusively on specific outputs. The relationship of outputs to grants is more
4 complex than this approach could detect.

5 **Recommendation: NIDRR should determine whether assessment of the quality of**
6 **outputs should be the sole evaluation objective for their grantees. (6.3)**

8 **Strengthening the Output Assessment**

9 The committee was able to create a reasonably reliable and valid system for evaluating
10 the outputs of NIDRR grantees. With refinements, it could be applied to evaluate future outputs
11 even more effectively. In implementing the output level assessment, particular challenges and
12 issues arose that related to the diversity of outputs, the timing of evaluations, sources of
13 information, and reviewer expertise.

15 **Diversity of Outputs**

16 The quality rating system used in the summative evaluation worked very well for
17 publications in particular, which comprised 70 percent of the outputs reviewed. Using the four
18 criteria developed by the committee the reviewers were able to identify and describe varying
19 levels of quality and the characteristics associated with each of these. However, each of the
20 quality criteria were not as easily applied to outputs such as websites, conferences, and
21 interventions; these outputs require more individualized criteria for assessing specialized
22 technical elements, and sometimes more in-depth evaluation methods. Applying one set of
23 criteria, even though broad and flexible, could not guarantee sufficient or appropriate
24 applicability to every type of output.

Timing of Evaluations

The question arises as to when best to do an assessment of outputs. Evaluation of outputs during the final year of an award may not allow sufficient time for them to have full impact. For example, some publications will be in press and others will not have had sufficient time to have an impact. The tradeoff of waiting a year or more after the end of a grant is the likelihood that staff involved with the original grant may not be available, recollection of grant activities may be compromised, and engagement or interest in demonstrating results may be reduced. However publications can be tracked regardless of access to the grantee. Outputs other than publications, such as technology products, could be assessed in an interim evaluation in order to examine the development and evolution of outputs.

Sources of Information

In addition to reviewing the outputs directly, committee members considered information from two other sources to rate the quality of outputs: information submitted through the grantee's APR and information provided in a supplemental questionnaire developed by the committee. It is important to note that both of these sources involved grantee self-reports, which could be susceptible to social desirability bias. Moreover, the APR is designed as a grant-monitoring tool rather than as a source of information for a program evaluation. The committee is concerned that the information supplied on the APR and the questionnaire was not always sufficient to inform the quality ratings.

Reviewer Expertise

The committee was directed to assess the quality of four types of pre-specified outputs. While the most common output type was publications, NIDRR grants produce a variety of other complex, varied outputs including tools and measures, technology devices and standards, and informational products. These outputs vary widely in their complexity and the investment

1 needed to produce them. To assess the quality of outputs, the committee used criteria that were
2 based on the cumulative literature reviewed and their own research expertise in diverse areas of
3 rehabilitation and disability research, medicine, and engineering, as well as expertise in
4 evaluation, economics, knowledge translation, and policy. However, the combined expertise of
5 the panel did not necessarily include every possible content area in the broad field of disability
6 and rehabilitation research.

7 **Recommendation: If future evaluations of output quality are conducted, the process**
8 **developed by the committee should be implemented with refinements to strengthen**
9 **the design related to the diversity of outputs, timing of evaluations, sources of**
10 **information, and reviewer expertise. (6.4)**

11

12 **Improving Use of the Annual Performance Report**

13 The Annual Performance Report (APR) data set provided the Committee by NIDRR at
14 the outset of the evaluation was very helpful in profiling the grants for our sampling and in
15 listing all of the grantees' projects and outputs. The APR format includes a range of variables for
16 reporting on the four different types of grantee outputs. NIDRR also provided grantees' narrative
17 APRs from the last year of their grants as well as their final reports. These narratives were very
18 useful for the committee in compiling descriptions of the grants. However, the quality of the
19 information contained in these narrative annual reports varied.

20 **Recommendation: NIDRR should consider revising its APR to better capture**
21 **information needed to routinely evaluate the quality and impacts of outputs, grants,**
22 **or funding mechanisms. They might consider efforts such as consolidating existing**
23 **data elements or adding new elements to capture the quality criteria and dimensions**
24 **used in the present summative evaluation. (6.5)**

1
2 **Recommendation: NIDRR should investigate ways to work with grantees to ensure**
3 **the completeness and consistency of information provided in the APR. (6.6)**
4

5 In sum, the committee believes that NIDRR grants have produced valuable research,
6 tools, and other outputs for advancing the field of disability and rehabilitation research.
7 Improvements to NIDRR's priority setting, peer review, and grant management practices; as well
8 as consideration of alternate evaluation goals and strategies will further strengthen the quality of
9 these process, their results, and the institute's efforts to improve the lives of individuals with
10 disabilities.
11

Chapter 1. Introduction

The National Institute of Disability and Rehabilitation Research (NIDRR) is located within the Office of Special Education and Rehabilitative Services in the Department of Education (NIDRR, 2009). It is the principal Federal agency supporting applied research and development to improve the lives of individuals with disabilities. NIDRR is one of multiple federal agencies that invest in disability and rehabilitation research, but with a broader mandate than other agencies. Established by the 1978 amendments to the Rehabilitation Act of 1973, NIDRR's mission is to generate new knowledge and to promote its effective use to improve the abilities of people with disabilities to perform activities of their choice in the community, and also to expand society's capacity to provide full opportunities and accommodations for its citizens with disabilities. NIDRR's mission is addressed through funding research and related activities to maximize the full inclusion, social integration, employment and independent living of individuals of all ages with disabilities (NIDRR, 2009).

NIDRR prides itself in being proactive in establishing program performance measures and developing accountability data systems to track grantee progress. An electronic annual reporting system is used to collect data from grantees on many aspects of grant operation and outputs. Various formative and summative evaluation approaches have been used to assess the quality of portfolio and grantee performance and results. Prompted by the need to provide more data on its program results, in 2009 NIDRR

1 requested the National Research Council to conduct an external evaluation of some of
2 NIDRR's key processes and to assess the quality of outputs produced by NIDRR grantees
3 (NIDRR, 2009).

4 This chapter introduces the report of the external evaluation by first introducing
5 the Committee's charge (Part A). In Part B we provide background information about
6 NIDRR including its unique legislative mandate, the types of research it funds and its
7 grant funding mechanisms, the agency's role in coordinating disability and rehabilitation
8 research among other federal agencies, and its budget and staff. Part C summarizes
9 approaches NIDRR has used in the past to evaluate its grantees and distinguishes this
10 from the current study questions and methods being used by the committee. Finally, Part
11 D provides an overview of the other chapters in the report.

12 **A. THE COMMITTEE'S CHARGE**

13 An ad hoc committee, with oversight by the National Research Council's (NRC)
14 Board on Human-Systems Integration (BOHSI), was charged with developing and
15 implementing a framework and evaluation design for the purpose of: 1) reviewing
16 NIDRR's priority writing and grant review processes (process evaluation), and 2)
17 assessing the quality of grantee outputs for a sample of grants that represent the NIDRR
18 portfolio (summative evaluation). Additionally, the committee was charged to assess the
19 design and implementation of the evaluation process which they used and to make
20 recommendations for additional evaluation cycles that may be performed subsequent to
21 this effort. The evaluation was to be conducted over a period of two years between
22 October 2009 and September 2011. The results of the external evaluation are intended to
23 provide NIDRR with a better understanding of the quality of its grantees' outputs and

1 how it can best manage an important and evolving research portfolio that meets its
2 strategic goals and objectives, while regularly assessing and improving its performance as
3 required by the Government Performance and Results Act (GPRA) of 1993 (OMB,
4 2009a).

5 The specific questions guiding the evaluation were as follows.

6 **Process Evaluation**

7 1. To what extent is NIDRR's priority writing process conducted in such a way as
8 to enhance the quality of the final results?

9 2. To what extent are the peer reviews of grant applications done in such a way
10 to enhance the quality of the final results?

11 3. What planning and budgetary processes does the grantee use to promote high
12 quality outputs?

13 **Summative Evaluation:**

14 4. To what extent are the final outputs from NIDRR grants of high quality?

15 5. To what extent are the results of the reviewed research and development
16 outcomes used to inform new projects by both the grantee and NIDRR?

17 This external evaluation was independently designed and conducted by the NRC
18 Committee. However, it was funded by NIDRR and the contract stipulated in advance
19 certain features and parameters for the design of the summative evaluation component
20 (Study Questions #4 and #5) as follows:

21 **Level of analysis**

1 The level of analysis was specified to be grantee outputs. The outputs to be assessed
2 included four types as defined by NIDRR: a) publications; b) tools, measures, and
3 intervention protocols; c) technology products and devices; and d) informational products.

4 **Sampling of grants**

5 A minimum of 30 grants was to be included in the sample and selection criteria
6 that need to be considered were: grant size, representation across all program funding
7 mechanisms, and grants in their last year of award funding.

8 **Number of outputs to be reviewed**

9 It was specified that two outputs were to be reviewed for each project that was
10 being carried out in each grant selected for review. The number of projects depended on
11 the size of the grant and varied from one project for small investigator initiated grants to
12 10 for large center grants.

13 The ultimate objective of the output review for NIDRR was to gain an
14 understanding of what was produced by the end of grants, in terms of value added for the
15 disabilities community and new knowledge produced for the field. Because the focus of
16 the summative evaluation was primarily on the quality of outputs produced by the
17 sampled grants it is important to clarify what was not included in the charge. Outside of
18 the parameters of the current evaluation was a larger focus on the dynamics of how the
19 grants were implemented with respect to their original objectives and whether the
20 objectives were achieved, how the outputs of the various projects were linked and how
21 they developed over time, and how the quality of outputs differed across the various
22 NIDRR program funding mechanisms.

B. BACKGROUND ON NIDRR

NIDRR was established by the 1978 amendments to the Rehabilitation Act of 1973. Originally called the National Institute on Handicapped Research in the 1978 amendments, the Institute's name was changed to the National Institute on Disability and Rehabilitation Research by the 1986 amendments to the Act.

NIDRR's purpose is to "... provide for research, demonstration projects, training, and related activities to maximize the full inclusion and integration into society, employment, independent living, family support, and economic and social self-sufficiency of individuals with disabilities of all ages ...; promote the transfer of rehabilitation technology to individuals with disabilities through research and demonstration projects ...; ensure the widespread distribution, in usable formats, of practical scientific and technological information ...; identify effective strategies that enhance the opportunities of individuals with disabilities to engage in employment ...; and increase opportunities for researchers who are members of traditionally underserved populations, including researchers who are members of minority groups and researchers who are individuals with disabilities" (The Rehabilitation Act, 1973).

NIDRR's UNIQUE ROLE

The multidimensional challenges faced by individuals with disabilities in employment, housing, public accommodations, education, transportation, communication, recreation, health services, institutionalization, voting, and public services, as outlined in the Rehabilitation Act of 1973, as amended, mandate a comprehensive, holistic approach to NIDRR's mission (NIDRR 2009). Across NIDRR's agenda, the central focus is on the

1 whole person with a disability, whose ability to function and quality of life are dependent
2 on the complex interaction of personal, societal, and environmental factors.

3 NIDRR is one of the three major disability-focused research sponsors in the
4 federal government¹. It plays a unique role in federally-funded research activities
5 because its target population includes all disability types and all age groups. (See the
6 Rehabilitation Act of 1973 as amended for a complete list of NIDRR's mandated
7 responsibilities.) Unlike other federal research entities that fund prevention, cure, and
8 acute rehabilitation research, NIDRR invests in rehabilitation research that is more
9 closely tied to longer-term outcomes such as independence, community participation, and
10 employment. NIDRR's unique role in supporting research and development as distinct
11 from other research agencies also can be understood within the context of the World
12 Health Organization's International Classification of Functioning, Disability and Health
13 (ICF) (World Health Organization, 2001). The ICF is a framework for classifying
14 disability and health along a continuum from body function and structure, to activities
15 and participation, in the context of environment and personal factors. In these terms,
16 NIDRR's research is primarily concerned with activities and participation. Specifically,
17 the NIDRR role is to fund activities that increase the self-determination and participation
18 of individuals with disabilities in the home, community, school, and workplace, as

¹ One of the other major sponsors is the National Center for Medical and Rehabilitation Research (NCMRR) which is located within the National Institute of Child Health and Human Development of the U.S. Department of Health and Human Services. NCMRR funds research to develop scientific knowledge to enhance the health, productivity, independence, and quality of life of people with disabilities. The other major sponsor is the U. S. Department of Veterans Affairs, which through its Veterans Administration Rehabilitation Research and Development Service (VA RR&D), funds extramural basic research and biomedical research and an intramural research program in 13 rehabilitation centers.

1 defined in the ICF.

2 NIDRR's Research Domains

3 Table 1.1 summarizes the varied types of research that NIDRR funds in five
4 outcome domains of: employment, participation and community living, health and
5 function, technology for access and function, and disability demographics (NIDRR, 2009,
6 p. 3-6). Although most grants address more than one domain, the second column of the
7 table notes the number of grants in NIDRR's portfolio as of January 2009 whose primary
8 research domain was in these five areas.

9 **TABLE 1-1** NIDRR Research Domains and Topics

Research Domain	Number of Awards in January 2009	Research Topics
Employment	16 (7%)	• Career planning, job entry, advancement, and retention, transitions in moving from financial dependency to self-sufficiency, or from underemployment into work that is consistent with the individual's strengths, abilities, and interests. • Methods to integrate the unique needs of employers and disability populations to improve employment outcomes across the life span, such as methods, costs, and results of services by rehabilitation programs or supported employment, including studies of natural supports at work as they relate to employment outcomes. • The role of personal assistance services in the workplace, and application of rehabilitation technology, universal design principals, environmental adaptations, and engineering solutions to enhance personal function and address barriers confronted by people with disabilities in employment.
Participation and community living	39 (17%)	• Development and evaluation of strategies for services, interventions, products and modifications to the built and social environments that would allow individuals with all types of disabilities to live and participate in their communities • Develop new and improved theories about, and measures of, participation and community living that will enable the impact of specific strategies and interventions to be more accurately determined.
Health and function	93 (39%)	<i>Individual Level:</i> • Ongoing research and clinical efforts to produce a wide variety of programs, interventions, and products aimed at enhancing the health and function of individuals with disabilities. • The study of new technologies that improve diagnosis and measurement of disabling conditions, and devices to support enhanced function. • Research that will help to prevent secondary conditions from developing among people with disabilities and will explore the implications of nonmedical interventions, such as

Research Domain	Number of Awards in January 2009	Research Topics
		exercise, in this context. <u>Systems Level:</u> • System level policies and practices that exacerbate or ameliorate disability-related disparities in access to health care services. • Accurate assessment of the health status of individuals with disabilities to increase understanding of the impact of the health care delivery system on their health and wellness. • Studies to classify specific interventions in medical rehabilitation in order to better define and measure the effectiveness of the multitude of rehabilitation interventions.
Technology for access and function	81 (34%)	• At the individual level, the primary focus is on assistive technology devices that enhance the physical, sensory, and cognitive abilities of people with disabilities and assist them in participating and functioning more independently in the home, at work, in recreational settings, and at cultural and community events. • At the systems level, the emphasis is on applying technology R&D in ways that enhance community integration, independence, productivity, competitiveness and equal opportunity by mitigating or eliminating barriers found in large social systems such as public transportation, telecommunications, IT, and the built environment. • Exploration of how recent, breakthrough advances in biomaterials research, composite technologies, information and telecommunication technologies, nanotechnologies, micro electro-mechanical systems (MEMS), sensor technologies and the neurosciences can be incorporated into future rehabilitation technology research.
Disability demographics	8 (3%)	• Studies to generate new information that can be used by individuals with disabilities, service providers, policymakers, and others working to identify and eliminate disparities in employment, participation and community living, and health and function. • Studies that mine data to address the full range of social, health, and economic facets of disability and that compare findings across data sources. • Research to understand the variances in levels of participation by individuals with disabilities and to evaluate strategies or interventions that may help bridge the gap between preference and feasibility in an existing environment. • Establishment of a center on disability demographics and statistics
Total number of awards as of January 2009	237	

1 Source: NIDRR Briefing Book (2009): NIDRR Research Domains, p. 3-6

2 NIDRR Grant Mechanisms

3 NIDRR has eight primary mechanisms for awarding grants defined by the Code
4 of Federal Domestic Assistance (CFDA) numbers (NIDRR, 2009). These eight
5 mechanisms distribute funds through 14 competitions. The Disability and Rehabilitation

1 Research Projects (DRRP) mechanism awards funds through five separate competitions
2 and the Small Business Innovation Research mechanism awards two types of grants:
3 phase I grants designed to demonstrate proof of concept and phase II grants which
4 develop products envisioned in a phase I grant.

5 **1. Disability and Rehabilitation Research Projects (DRRPs; CFDA # 84.133A)**

6 emphasize research and development projects, training, and knowledge translation on
7 rehabilitation topics. DRRPs are subcategorized to include:

- 8 • *Disability Business Technical Assistance Centers (DBTACs)* comprise a
9 network of 10 regional centers and one Coordination Outreach and Research
10 Center that provide information and referral, technical assistance, public
11 awareness, and training on all aspects of the Americans with Disabilities Act;
- 12 • *Traumatic Brain Injury Model Systems*. The aim of the program is to
13 demonstrate the benefits of a coordinated system of neurotrauma and
14 rehabilitation care and to conduct innovative research on all aspects of care for
15 those who sustain traumatic brain injuries. The mission of the TBIMS is to
16 improve the lives of persons who experience traumatic brain injury by
17 creating and disseminating new knowledge about the course, treatment and
18 outcomes relating to their condition.
- 19 • *Disability and Rehabilitation Research Projects (DRRP)* program funds
20 projects with special emphasis on research, demonstrations, training,
21 dissemination, utilization, and technical assistance. Projects may include
22 combinations of these activities. These projects may develop methods,
23 procedures and rehabilitation technology to assist in achieving the full

1 inclusion and integration into society, employment, independent living, family
2 support, and economic and social self-sufficiency of individuals with
3 disabilities, especially individuals with the most severe disabilities, or to
4 improve the effectiveness of services authorized under the Rehabilitation Act.

- 5 • *Knowledge translation (KT)* projects range from investigating models,
6 methods, strategies, and mechanisms that could contribute to the successful
7 KT of disability and rehabilitation research and products, to synthesizing,
8 disseminating, and promoting the use of existing knowledge and products to
9 improve the lives of individuals with disabilities.
- 10 • *Burn Model Systems.* These centers establish innovative projects for the
11 delivery, demonstration, and evaluation of comprehensive medical, vocational,
12 and other rehabilitation services to meet the wide range of needs of
13 individuals with burns.
- 14 • *The Section 21* program focuses on research capacity building for minority
15 entities such as Historically Black Colleges and Universities (HBCU) and
16 institutions serving primarily Hispanic, Asian and American Indian students;
17 and non-minority entities with an interest in improving understanding about
18 the needs and outcomes of individuals with disabilities from minority
19 populations. Program activities include assisting minority entities with
20 networking that supports enhanced collaboration between minority entities
21 and non-minority entities, and the exchange of expertise and advanced
22 training across program areas.

23 **2. Rehabilitation Research and Training Centers (RRTCs; 84.133B) conduct**

1 coordinated and integrated advanced research to alleviate or stabilize disabling conditions,
2 promote maximum social and economic independence of people with disabilities, or
3 improve rehabilitation methodology or service delivery systems. RRTCs operate in
4 collaboration with institutions of higher education and providers of rehabilitation services
5 and serve as national centers of excellence in rehabilitation research.

6 **3. Rehabilitation Engineering Research Centers (RERCs; 84.133E)** conduct programs
7 of advanced engineering and technical research designed to apply technology, scientific
8 achievement, and psychological and social knowledge to solve rehabilitation problems
9 and remove environmental barriers. RERCs are affiliated with institutions of higher
10 education or non-profit organizations.

11 **4. Switzer Research Fellowships Program (84.133F)** gives individual researchers an
12 opportunity to develop new ideas and gain research experience. Fellows design and work
13 for one year on an independent research project.

14 **5. Field Initiated Projects (FIPs; 84.133G)** provide funding to address rehabilitation
15 issues in promising and innovative ways. As the name implies, topics for these projects
16 are chosen by the applicants. Awards are based upon merit and potential impact on the
17 field of rehabilitation.

18 **6. The Spinal Cord Injury Model Systems Centers (84.133N)** program studies the
19 course of recovery and outcomes following the delivery of a coordinated system of care
20 for individuals with SCI. Under this program, SCIMS centers provide comprehensive
21 rehabilitation services to individuals with SCI and conduct spinal cord research, including
22 clinical research.

1 of Education, the Secretary of Veterans Affairs, the Director of the National Institutes of
2 Health, the Director of the National Institute of Mental Health, the Administrator of the
3 National Aeronautics and Space Administration, the Secretary of Transportation, the
4 Assistant Secretary of the Interior for Indian Affairs, the Director of the Indian Health
5 Service, and the Director of the National Science Foundation.

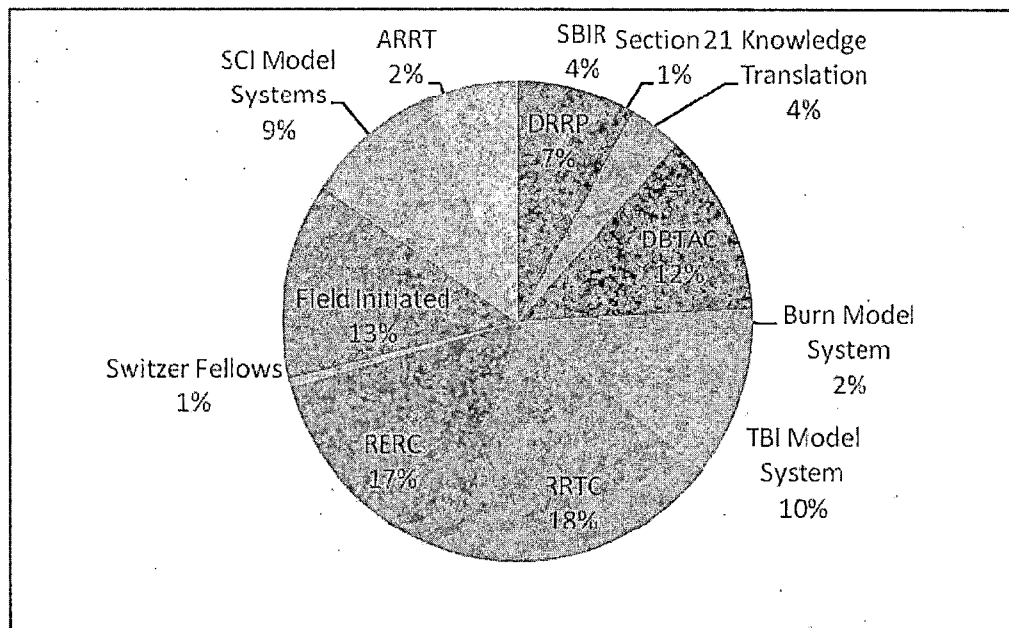
6 In operation, the ICDR does not have responsibilities to prescribe to other
7 agencies. Their role is more to describe what the various agencies are doing and to
8 identify and provide opportunities for information sharing and partnerships on various
9 initiatives that the agencies are engaged in. ICDR works in the "interstices" to cross-
10 fertilize ideas in an organic way; "promotes the dialogue" (Swenson & Pledger, 2011).
11 Activities of the ICDR are organized and undertaken through the structure of five
12 subcommittees covering medical rehabilitation, employment, technology, education, and
13 disability statistics.

14 **NIDRR Budget**

15 The Rehabilitation Act states that NIDRR's Director will lay out funding
16 priorities and covered activities in a five-year plan that will be published in the Federal
17 Register, and that the plan will utilize at least 90% of NIDRR funds for extramural
18 research. Additionally, Section 21 of the Rehabilitation Act mandates that 1% of NIDRR
19 appropriations be set aside to address traditionally underserved populations. Finally, the
20 SBIR Development Act (2000) requires agencies with R&D budgets in excess of \$100
21 million, such as NIDRR, to set aside a certain percentage of their funds for SBIR. The
22 current set aside is 2.5% of the R&D budget.

23 NIDRR's 2009 budget for grants and contracts was \$109 million. Of this,

1 \$99,904,000 (U.S. Department of Education, 2011) was dedicated to grants with the
2 remainder going to contracts and project support. Figure 1-1 illustrates NIDRR's
3 distribution of its funds for grants across mechanisms in 2009 (NIDRR, 2009).



4
5 **FIGURE 1-1** Distribution of NIDRR Funds Across Grant Mechanisms FY 2009
6 Source: NIDRR Briefing Book, 2009, p.32
7

8 NIDRR's budget for research and development grants has remained fairly
9 constant in nominal terms in the last decade. As stated above the budget for grants in
10 2009 was \$99 million; in 2008 it was \$97 million; and in 2007 it was also \$97 million
11 (U.S. Department of Education, 2010, 2011). Prior to this a report of the Institute of
12 Medicine (2007) showed that the agency's overall funding had been fairly steady since
13 2002. Although inflation has been reasonably low in recent years, steady funding in
14 nominal terms implies a reduction in the research that can be conducted.

15 NIDRR Staff

16 NIDRR's most recent organizational chart (2011) shows an acting director, a

1 detailed deputy director, and two main divisions which are: 1) Research Sciences and 2)
2 Program, Budget, and Evaluation. Both divisions have directors and supervisors. In the
3 Research Sciences division there are 14 positions classified as rehabilitation specialists,
4 which are the project officer positions that interact directly with grantees and perform
5 grant monitoring functions. Four of these positions were vacant at the time of this
6 reporting. There are 10 positions in the Program, Budget, and Evaluation Division.

7 **C. HISTORY OF NIDRR ASSESSMENTS**

8 **NIDRR Performance Assessment under GPRA**

9 In compliance with the Government Performance and Results Act (GPRA) (OMB,
10 2009), NIDRR developed the following performance measures to assess its key outcomes
11 (NIDRR, 2009, p. 78-79).

- 12 • "The percentage of NIDRR-supported fellows, post-doctoral trainees, and
13 doctoral students who publish results of NIDRR sponsored research in
14 refereed journals
- 15 • The number of accomplishments (new or improved tools, methods,
16 discoveries, standards, interventions, programs, or devices) developed or
17 tested with NIDRR funding that has been judged by expert panels to be of
18 high quality and to advance the field
- 19 • The percentage of NIDRR-funded grant applications that receive an average
20 peer review score of 85 or higher
- 21 • The percentage of NIDRR grants that assess the effectiveness of interventions,
22 programs, and devices using rigorous methods

- 1 • The number of new or improved NIDRR-funded assistive and universally
2 designed technologies, products, and devices, transferred to industry for
3 potential commercialization
- 4 • The average number of publications per award based on NIDRR-funded
5 research and development activities in refereed journals
- 6 • The percentage of NIDRR competitions announced by October 1
- 7 • The percentage of NIDRR grant awards issued within six months of the
8 competition closing date
- 9 • The percentage of NIDRR-funded research projects identified as having an
10 employment focus (This is a measure required by the Department of
11 Education, Office of Special Education and Rehabilitation, not a GPRA
12 measure)."

13 Under the GPRA requirements at the time², NIDRR's 2005 PART Assessment
14 showed excellent scores in Program Purpose and Design (100%), Strategic Planning
15 (90%) and Program Management (90%). However, Program Results and Accountability
16 was rated Ineffective (42%)³.

² In July of 2002, the Director of the Office of Management and Budget announced development of a tool for formally evaluating the effectiveness of federal programs, called the Program Assessment Rating Tool (PART). The Program Assessment Rating Tool (PART) is a diagnostic tool used to assess the performance of Federal programs and to drive improvements in program performance. Once completed, PART reviews help inform budget decisions and identify actions to improve results. (http://www.john-mercier.com/omb_part.htm. Accessed 1/27/11). Expectations for performance measurement are currently being amended by the GPRA Modernization Act of 2010 (<http://evaluationcenter.net/Documents/CRS%20Summary%20of%20GPRA%20Modernization%20Act.pdf>. Accessed 2-4-11)

³ ExpectMore.gov: National Institute on Disability and Rehabilitation Research Page 8 of 15
<http://www.whitehouse.gov/omb/expectmore/detail/10001041.2005.html> 4/30/2010

NIDRR's Annual Performance Assessment Expert Review

NIDRR's Annual Performance Assessment Expert Review (APAER) process was implemented in 2005 and 2006 to evaluate NIDRR's portfolio of grants in three areas: 1) health and function, 2) employment, and 3) technology. The objectives of the APAER were to provide NIDRR with an independent assessment of: the quality and relevance of NIDRR-funded research and the extent to which research outputs and outcomes were contributing to the agency's long-term performance goals and measures; the quality and relevance of the agency's management of research directions and award decisions; and the strengths and weaknesses of the portfolios, including recommendations to ensure accomplishment of NIDRR's goals and objectives. To conduct the APAER, NIDRR assembled three panels of expert reviewers, one to review each portfolio (NIDRR, 2006a; NIDRR, 2006b; NIDRR, 2007).

Similar to the present evaluation, grantee outputs were also reviewed as part of the portfolio evaluation. Grantees submitted up to five accomplishments, defined as "outputs" or "outcomes", that the grantee considered to be the most important that occurred or matured during the current reporting period. "Outputs" included publications or presentations of significant findings; products, including tools, devices, written products; or completed services as part of training or capacity building. "Outcomes" could be either short term (referring to documented changes or advancements in knowledge, understanding, or skills); or intermediate (referring to documented changes in policy, practice, behavior, or systems capacity. The accomplishments were scored on a scale of 1-3 with 1 being "little to no contribution to the field", 2 being a "substantial contribution", and "3" being an "outstanding contribution". A rating of "0" was used for

1 “unable to determine.”

2 Key findings from the 3 reports include:

3 **APAER- Employment (Sept. 2005)** (NIDRR, 2006a): (Included RRTC, DRRP,
4 FIP funding mechanisms) Overall, the panel found the research ideas in the portfolio to
5 be of very high quality. However, they expressed concern about: (1) the apparent lack of
6 scientific rigor behind the identified outputs, (2) the lack of sufficient information on the
7 methodologies used by grantees; (3) the lack of evidence supporting many of the claims
8 made by grantees in their Supplemental Information Reports, and (4) the lack of peer
9 reviewed publications. The panel was not able to rate the grantee accomplishments given
10 the limited information they received.

11 **APAER-Technology (Oct. 2005)** (NIDRR, 2006b): (Included RERC, DRRP, and
12 FIP funding mechanisms) While a number of exciting accomplishments were identified
13 in each cluster area, the panel agreed that overall, there were not enough high-quality
14 research and development outputs and outcomes that advance scientific knowledge,
15 considering NIDRR’s level of investment. The panel noted the lack of sufficient evidence
16 supporting the claims made in the reports it examined. They rated 54% of the grantee
17 accomplishments as substantial or outstanding.

18 **APAER – Health and Function Research (Oct. 2006)** (NIDRR, 2007):
19 (Included multiple funding mechanisms). The panel commended NIDRR on its long-
20 standing, productive portfolio in health and function research, and recognized NIDRR’s
21 success in building infrastructure and capacity in disability and rehabilitation research.
22 The panel noted several achievements of grantees, but felt limited in making judgments

1 based on information covering only one year or less on multi-year awards. They rated
2 67% of the grantee accomplishments as substantial or outstanding.

3 **Current Evaluation:** Methods used in the summative component of the current
4 evaluation were somewhat similar to those used in the APAER with regard to the
5 assessment of accomplishments, but can be distinguished in several ways. First, only the
6 category of "outputs" was reviewed. Second, the study question focused on the quality of
7 outputs. So rather than assigning one rating of the extent to which the outputs contributed
8 to the field as in the APAER, the committee examined and rated each output in a multi-
9 dimensional way using four sets of criteria, including technical quality, advancement of
10 the knowledge base or field, likely or demonstrated impact, and dissemination. Third, the
11 committee itself served as the expert panel of reviewers. Finally, the committee assessed
12 the methods used in the summative evaluation and made recommendations to improve
13 future assessments of outputs. A full description of the methods used to assess outputs is
14 presented in Chapter 6.

15 **D. HOW THE REPORT IS ORGANIZED**

16 Following this introduction, Chapter 2 describes the scope of the evaluation and
17 methods used. Chapters 3, 4, and 5 present results of the review of NIDRR's priority
18 writing, peer review, and grantee planning and budgetary processes. The chapters
19 summarize NIDRR's policies and procedures with regard to these key processes and
20 summarize results of additional information gathered from sources such as: interviews
21 with staff; questionnaires completed by grantees; and surveys of NIDRR stakeholder
22 organizations, other federal agencies, and NIDRR peer reviewers. Chapter 6 summarizes
23 the committee's findings of the assessment of grantee outputs based on a sample of 30

1 grants and discusses the assessment of the summative evaluation process designed by the
2 committee. Conclusions and recommendations for improving NIDRR's key processes,
3 the quality of grantee outputs, and for conducting future evaluations are included at the
4 end of chapters 3 to 6. Chapters 2, 4, 5, and 6 also each include a chapter appendix.

5 The report appendices provide background information. Appendix A contains
6 summaries of the 30 grants that participated in the evaluation; these include descriptions
7 of the outputs reviewed. Appendix B contains the questionnaires and rating sheets used in
8 the process and summative evaluation components. Appendix C lists the acronyms used
9 in this report. Appendix D contains the committee and staff biosketches.

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11

Chapter 2. Scope and Methods

SCOPE OF EVALUATION

This chapter explains the parameters of the evaluation through a conceptual framework that guided the study. The different methods that were used to address the major process and summative study questions are described next under the major headings of design, sources of information and data collection, and analysis. The scope of the study and potential limitations of findings are discussed in order to clarify the extent to which the results can be generalized and utilized by NIDRR to enhance its processes of priority setting, peer review, and grants management.

In designing the evaluation, the committee used NIDRR's published logic model (Federal Register, Feb. 15, 2006, p. 8173-8175) as a starting point. In their model NIDRR investments in grants aimed at capacity building, research and development, and knowledge translation are intended to produce discoveries; theories, measures and methods; and interventions, products, devices, and environmental adaptations (i.e., short term outcomes) that will promote the adoption and use of knowledge leading to changes in policy, practice, behavior, and system capacity (i.e., intermediate outcomes) for the ultimate benefit of persons with disabilities in domains of employment, participation and community living, and health and function (i.e., long term outcome arenas). NIDRR holds itself accountable primarily for the generation of knowledge in the short-term outcome arena, and it is this arena that is the focus of the external evaluation.

1 The committee examined how NIDRR grant funding is prioritized for these
2 investment areas; the processes used for reviewing and selecting grants, and the quality of
3 the manifested research and development outputs, as depicted in the conceptual
4 framework below.

5 Figure 2-1 presents the conceptual framework which the committee developed to
6 guide the NRC evaluation effort. The boxes with the double frames, and labeled as Q1 to
7 Q5 (i.e., Study Questions #1 to #5), were the “direct” foci of the evaluation (i.e.,
8 NIDRR’s two sets of process and summative questions). Other inputs, contextual factors,
9 and implementation considerations shown in the figure were also considered important to
10 review in the evaluation because they are likely to influence the processes and short-term
11 outcomes. The figure shows that the measurable elements of the short-term outcomes are
12 what NIDRR considers to be the array of grant outputs (Q4) generated by grantees, which
13 are expected to inform and generate new projects (Q5). Also shown are the expected
14 long-term outcomes that would include: an expanded knowledge base, improved
15 programs and policy, and reduced disparities for people with disabilities in employment,
16 participation and living, and health and function. However, these long-terms outcomes
17 were beyond the scope of the current evaluation.

18 In summary, the scope of the evaluation was on key NIDRR processes of priority
19 setting, peer review, and grants management; and on the summative results of the quality
20 of grantee outputs. It is important to point out that the scope of the summative evaluation
21 did not include a larger explicit focus on assessing the overall performance of individual
22 grants or NIDRR portfolios (e.g., Did grants achieve their proposed grant objectives; did
23 the various research and development portfolios operate as intended to produce the

1 expected results?). However, in examining subsets of outputs generated by a sample of
 2 grants that were funded under various portfolios, the evaluation results did provide
 3 descriptive information about these larger categories (e.g., mean ratings of outputs at
 4 grant and portfolio levels). Finally, although capacity building is major thrust of NIDRR's
 5 center and training grants, the current evaluation did not include assessment of outputs
 6 related to capacity building (e.g., number of trainees moving into research positions),
 7 which would have required different methods.

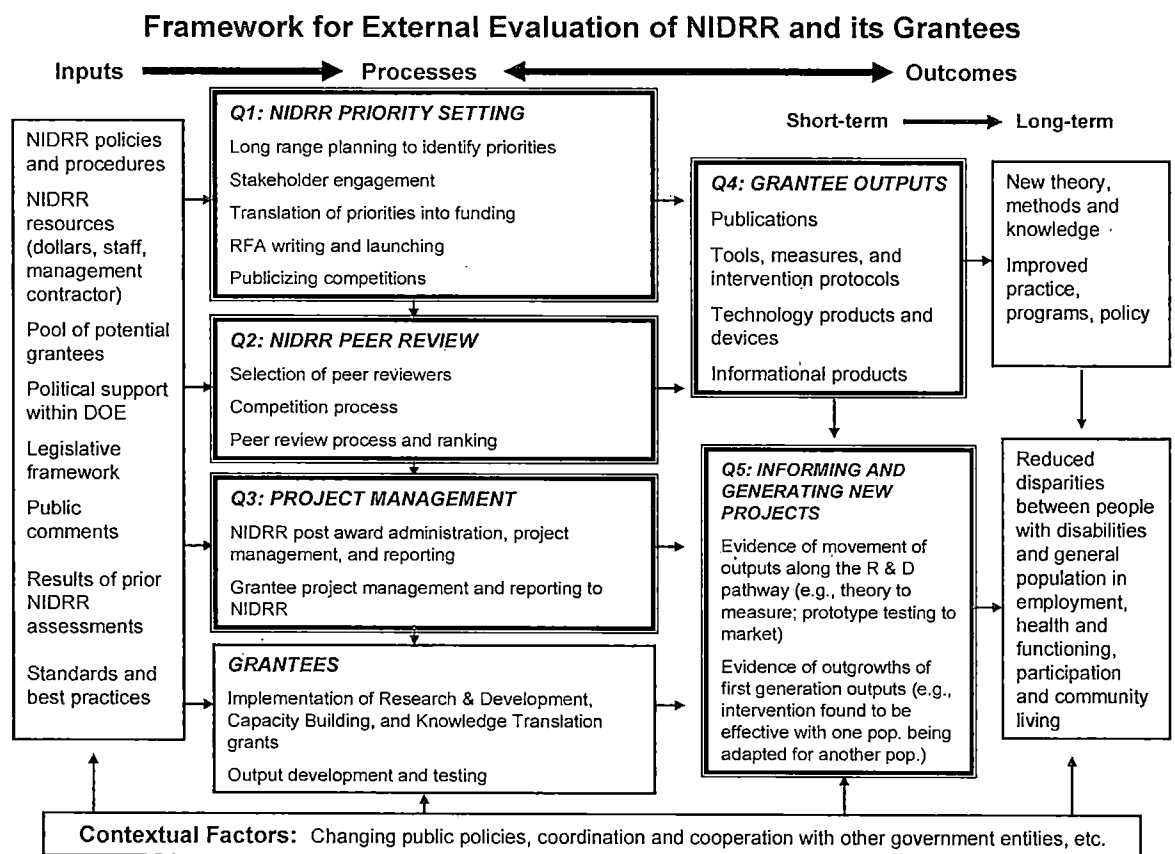


FIGURE 2-1 Conceptual Framework of the External Evaluation of NIDRR and its Grantees

Defining Quality

The evaluation focused on the *quality* of key NIDRR processes of priority writing, peer review, and grants management; and on the quality of the outputs generated by grants. A review of the literature on evaluating federal research programs showed that the term quality is operationalized in a variety of ways. For example, The NRC and IOM (2007) developed a framework and suggested measures for assessing multiple research programs across the National Institute for Occupational Safety and Health (NIOSH). The approach refers to criteria for assessing “outputs” and “intermediate outcomes”. Many of the intermediate outcomes related to transferability and were considered *quality criteria* by the NIDRR external advisory committee. Within a return on investment framework (Panel on Return on Investment in Health Research, 2009), the Canadian Academy of Health Sciences (CAHS) developed a menu of indicators that can be used for evaluating research programs. *Quality criteria* were included as an indicator of “Advancing Knowledge” along with activity (also called outputs), and outreach (also called transfer).

A framework and web-based survey approach was developed by Rand (Ismail, 2010; Wooding et al., 2009; Wooding & Starkey, 2010) for measuring outputs and impacts of research programs for the Arthritis Research Campaign (UK), and has been applied to the Medical Research Council (UK) and the Canadian Institute of Health Research-Institute of Musculoskeletal Health and Arthritis. The survey contains a series of questions for grantees that are focused on stages of research and development and possible impacts. And an approach, developed in Taiwan for assessing a wide range of federal research programs, refers to quality-related criteria as “performance attributes” in these areas: academic achievement, technology output, knowledge services, technology

1 diffusion and services (Chien et al. 2009). Appendix 2-1, which is included at the end of
2 this chapter, shows the various quality criteria and dimensions that were used across these
3 studies, as well as those which were compiled by a NIDRR expert panel (2008) that was
4 convened to provide guidance in planning this external evaluation. Most of these
5 dimensions and criteria were used in the summative evaluation as can be seen in the
6 output quality rating form that was used by the committee and which is also included in
7 Appendix B, located at the end of the report.

8 In keeping with the literature and approaches to evaluating federal research
9 programs, the committee used a broad concept of quality as attributes which lead to the
10 selection of grants, and eventual grant results, that: 1) Meet technical and professional
11 standards of science and technology; 2) Will advance the knowledge base or the field of
12 research, policy, or practices; 3) Are likely to have, or have demonstrated impacts, on
13 science, consumers, provider practice, health and social systems, social and health policy,
14 and the private sector/commercialization; and 4) Are disseminated according to principles
15 of appropriate knowledge translation.

16 **METHODS**

17 **Design**

18 A cross-sectional mixed methods design was used to address the two sets of study
19 questions in two distinct phases (i.e., process and summative evaluation phases). The first
20 phase involved review of existing documentation and collection of testimonial data to
21 examine how NIDRR through its policies and procedures, and in practice: develops its
22 research and funding priorities, reviews and evaluates submitted proposals, makes

1 decisions and awards grants based on these reviews, and manages grant-supported
2 activities. The second phase of the evaluation used expert panels to assess the quality of
3 the grant outputs. The following sections present the study methods that were used to
4 address each set of questions in the two phases. Data collection took place between July
5 2010 and January 2011

6 **Sources of Information, Data Collection, and Analysis**

7 **Process Evaluation**

8 To address questions related to NIDRR's priority writing, peer review, and
9 management processes, existing documentation were reviewed (e.g., legislation, Federal
10 Register, NIDRR and the Department of Education policies and procedures) and
11 executive-level representatives of NIDRR were interviewed to get a more thorough and
12 cohesive understanding of the processes. Additional insight into NIDRR's peer review
13 process was gained through listening to teleconferences of three panels as they conducted
14 their reviews of different competitions. Original data were also collected from the
15 following key informant groups.

16 ***NIDRR staff and contractors*** NIDRR executive staff provided the NRC committee with
17 a list of NIDRR administrative and program management staff who had sufficient
18 knowledge, experience, and responsibilities in the NIDRR priority-setting, peer review,
19 and grants management processes to respond to the interview questions. Sixteen NIDRR
20 staff from this staff list were interviewed in person to gather information on their roles
21 and perspectives on priority writing, peer review, and grants management processes. The
22 interview questions were open-ended and the interviews were recorded and transcribed.
23 A manager from a NIDRR contractor that assists NIDRR in the logistics of convening

1 peer review panels was interviewed by telephone to learn about the contractor perspective
2 related only to the peer review processes.

3 ***NIDRR Stakeholder Organizations*** A list composed of 130 organizations that operate in
4 NIDRR's arena was provided by: 1) NIDRR which consisted of professional and
5 advocacy associations considered to be stakeholder organizations, and by 2) the
6 Interagency Committee on Disability Research (ICDR), which contained federal agencies
7 that are statutory members of the ICDR, or non-statutory members that have participated
8 in ICDR special committees. Invitations to participate in an on-line survey were sent to
9 the entire list of 130 organizations, and were addressed specifically to the Executive
10 Directors of the professional and advocacy organizations and to the named
11 representatives of the federal agencies. Prospective respondents were asked to either
12 complete the survey themselves, or to forward it to a member of their organization who
13 would be knowledgeable about their organization's relationships with NIDRR. The
14 invitations were sent in an email letter that provided a link to the on-line survey and a
15 password for logging onto the secure website. If respondents were not able to access the
16 survey online or preferred another method, we offered to send them the survey in a hard
17 copy or to conduct the survey by telephone. The survey contained a series of closed and
18 open-ended questions to inquire about the organizations' role in the NIDRR planning and
19 priority setting process, their perspectives on the process, benefits their agencies derived
20 from NIDRR grants or outputs, and suggestions for enhancements to the priority-setting
21 process. Seventy-two agencies responded to the survey with a response rate of 55%.

22 ***NIDRR Peer Reviewers*** Invitations to complete a survey were sent to 156 individuals
23 that had served on NIDRR peer review panels during FY2008-2009. The invitations were

1 sent in an email letter that provided a link to the on-line survey and a password for
2 logging onto the secure website. If respondents were not able to access the survey online,
3 or preferred another method, we offered to send it to them in a hard copy or to conduct
4 the survey by telephone. The survey contained a series of closed and open-ended
5 questions to inquire about their experiences and perspectives on NIDRR peer review,
6 how it compares to other federal research agencies' peer review processes, and
7 suggestions for enhancements to the peer review process. Four potential respondents
8 were deleted from the list because their email addresses were undeliverable even after a
9 concentrated search. Out of those successfully invited (N=152), 122 individuals
10 responded to the questionnaire, with a resulting response rate of 80%.

11 ***Principal Investigators (PI) of NIDRR grants*** Thirty PIs whose grants were randomly
12 selected for review in the summative phase of the evaluation (See methods for addressing
13 summative questions below and in Chapter 6) were also invited to respond in writing to a
14 special set of questions that were focused on NIDRR's priority setting, peer review, and
15 grant management processes. One set of questions focused specifically on the third major
16 study question which related to planning and budgetary processes used by grantees to
17 promote high quality outputs. Twenty-eight of the 30 grantees opted to respond to this set
18 of process questions.

19 **Analysis of Process Data**

20 Narrative data gathered for the process evaluation that asked for factual responses
21 (e.g., questions to NIDRR staff representatives such as: What processes does NIDRR use
22 to create priorities from input gathered?) were collated across respondents and
23 summarized. Process data gathered from questions that were based on individuals'

1 opinions or perspectives (e.g., Questions asked of NIDRR staff, stakeholders, and peer
2 reviewers such as: What are the strengths and weakness of NIDRRs priority-setting
3 processes?) were analyzed using standard qualitative analysis techniques (Miles and
4 Huberman, 1994), which involved coding the narrative content to identify common
5 themes, topics, and categories. Quantitative data from the on-line survey items
6 (stakeholders and peer reviewers) were analyzed descriptively to examine frequencies
7 and measures of central distribution. The analyses that were conducted are discussed in
8 more detail in the following chapters that describe the results of the evaluation.

9 **Summative Evaluation**

10 The summative study questions focused on the quality of outputs generated by
11 NIDRR grantees, and the potential for the outputs to lead to further research and
12 development. Chapter 6, which summarizes the results of the summative evaluation, also
13 describes the sampling, measurement, and data collection methods that were used to
14 conduct the assessment of outputs in great detail. Therefore here we will only briefly
15 describe these methods. The committee as a panel of experts reviewed the outputs of 30
16 grants that were sampled from NIDRR's portfolio. These grants represented nine of
17 NIDRR program funding mechanisms, including Model Systems (Burn, Traumatic Brain
18 Injury, and Spinal Cord Injury), Rehabilitation Research and Training Centers,
19 Rehabilitation Engineering and Research Centers, Disability and Rehabilitation Research
20 Projects, Field Initiated Projects, Small Business Innovation Research - Phase II, and
21 Switzer Fellowships.

22 Four different types of outputs were reviewed, which included 1) publications
23 (e.g., research reports and other publications in peer-reviewed and non-peer reviewed

1 publications); 2) tools, measures, and intervention protocols (e.g., instruments or
2 processes created to acquire quantitative or qualitative information, knowledge, or data
3 on a specific disability or rehabilitation issue; or to provide a rehabilitative intervention);
4 3) technology products and devices (e.g., industry standards/guidelines,
5 software/netware, inventions, patents/licenses/patent disclosures, working prototypes,
6 product(s) evaluated or field tested, product(s) transferred to industry for potential
7 commercialization, product(s) in the marketplace); and 4) informational products (e.g.,
8 training manuals or curricula, fact sheets, newsletters, audiovisual materials, marketing
9 tools, educational aids, Web sites or other Internet sites that were produced in
10 conjunction with research and development, training, dissemination, knowledge
11 translation, and/or consumer involvement activities).

12 In assessing the quality of outputs the committee used the following four criteria,
13 stemming from their definition of quality (referred to earlier on p. 5): 1) technical quality;
14 2) advancement of knowledge or the field; 3) likely or demonstrated impacts (on science,
15 consumers, provider practice, health and social systems, social and health policy, and the
16 private sector/commercialization); and 4) dissemination according to principles of
17 appropriate knowledge translation.

18 Data from the summative evaluation were analyzed using frequency distributions
19 and measures of central tendency for reporting the quality of outputs in aggregate by:
20 Output type (e.g., publications, tools, measures, etc.), quality criteria assessed, and
21 program funding mechanism.

22 Table 2.1 summarizes the data collection and measurement methods described
23 above.

1

2 TABLE 2-1 Summary of Data Collection and Measurement

Study Questions	Measure/Instrument	Data Source	Data Collection Method
Process (July to Sept., 2010)			
1. To what extent is NIDRR's priority writing process conducted in such a way as to enhance the quality of the final results?	<u>Existing Data:</u> - Rehabilitation ACT of 1973, as amended and other related regulations (EDGAR, ED Handbook for the Discretionary Grant Process) - NIDRR briefing documents (descriptive and procedural) - Current and proposed NIDRR Long Range Plans - Notices Inviting Application (NIA) and Application Kits by funding mechanism (2009 and 2010) (relevant to funded priorities) - NIDRR Assessments: OMB PART Assessment (2005); Annual Portfolio Assessments Expert Panel Reviews (APAER pilot reports 2005, 2006) - NIDRR External Advisory Group Report	NIDRR and Federal Register	Extract relevant detail from documentation
	<u>Questions for Process Evaluation Interviews</u> (Forms tailored for NIDRR Representatives and NIDRR Staff) <u>Web-based Survey</u> - (Form tailored for NIDRR Stakeholders)	NIDRR Personnel; and Stakeholders such as: consumer and advocacy organizations	Semi-structured face to face and telephone interviews Web-based survey (self-administered)
2. To what extent are peer reviews of grant applications done in such a way as to enhance the quality of the final results?	<u>Existing data:</u> As above in #1, plus - NIDRR descriptive and procedural documents on peer review: Applicant Technical Review Plan; Peer Reviewer Instructions. - Notices Inviting Application (NIA) and Application Kits by funding mechanism (2009 and 2010) (relevant to criteria for rating grants) - Analysis of peer review tracking data base (Synergy, 2008)	NIDRR and Federal Register	Extract relevant detail from documentation
	<u>Questions for Process Evaluation Interviews</u> (Forms tailored for NIDRR Representative, and NIDRR Staff) <u>Web-based Survey</u> - (Form tailored for Peer Reviewers)	NIDRR Personnel; and Peer Reviewers	Semi-structured face to face and telephone interviews Web-based survey (self-administered)
3. What planning and budgetary processes does the grantee use to promote high quality	<u>Questions for Process Evaluation Interviews</u> <u>Grantee Questionnaire</u>	NIDRR Personnel; NIDRR Grantees (PI)	Semi-structured face to face, telephone interviews, self-administered

Study Questions	Measure/Instrument	Data Source	Data Collection Method
outputs?			questionnaire
Summative (October 2010 to January 2011)			
4. To what extent are the final outputs from NIDRR grants of high quality?	<u>Existing data:</u> NIDRR Annual Program Review (APR) Data Base to describe and summarize the outputs.	NIDRR	Extract data from APR
	<u>Grantee Questionnaire</u> with items that classify and describe the type of outputs, which describe features of the outputs that reflect quality criteria, and which describe future research and development as an outgrowth	Grantees (PI)	Self-administered questionnaire
	<u>Quality of Outputs: Committee Member Rating Sheet</u> - Based on criteria such as: • Technical quality • Knowledge advancement • Potential impact • Dissemination	NRC Committee Peer Review Scores	Peer review of materials from APR, Grantee Questionnaire, and telephone interviews and site visits as needed.
5. To what extent are the results of the reviewed research and development outputs used to inform new projects by both the grantee and NIDRR?	<u>Questions for Process Evaluation Interviews</u> What were these?	NIDRR Personnel	Semi-structured face to face
	<u>Grantee Questionnaire</u> – same questionnaire as in #4 above, re: items related to the generation of new research and outputs- was this part of our instrument or a separate question?	Grantees (PI)	Self-administered questionnaire

1

2 Potential Limitations

3 Although the committee applied as rigorous methods as possible to conduct the
4 process and the summative evaluation, results may have been affected by a number of
5 potential limitations which are discussed below.

6 Based on the project scope, the committee was limited to directly evaluating only
7 grant outputs. Evaluation of grants was done only as a second step through synthesis of
8 output evaluation. Additionally, several grant mechanisms were not evaluated due to the
9 timing of their funding cycles against the time of this project.

1 *Measurement validity* is concerned with the degree to which the study indicators
2 accurately portray the concept of interest (Newcomer, 2011). For the process evaluation,
3 the committee gathered information from different sources (i.e., existing documentation,
4 interviews, observation, surveys), but the interviews relied on the accuracy of the
5 memories and perceptions of individuals which could be susceptible to recall or social
6 desirability biases. For example, it is possible that the NIDRR staff who were interviewed
7 may have felt pressed to give positive input on the processes. However, NRC staff who
8 conducted the interviews believe all NIDRR staff members were candid in their
9 comments.

10 To assess the quality of outputs in the summative evaluation the committee used
11 sound criteria which were based on the cumulative literature reviewed and their own
12 research expertise in diverse areas of rehabilitation and disability research, medicine,
13 engineering, and the social sciences; as well as expertise in evaluation, economics,
14 knowledge translation, and policy. However, the accuracy of assessing the quality of the
15 outputs could have been affected by a number of potential limitations. For example, the
16 combined expertise of the panel did not necessarily include every possible content area in
17 such a broad field as disability and rehabilitation research. Because of the diversity of the
18 field the grants and outputs were vastly different, so applying one set of criteria, even
19 though broad and flexible, could not guarantee the accurate applicability to every output.
20 For example, training curricula, therapeutic interventions, and educational outreach
21 services ideally required additional evaluation methods tailored to those types of outputs.
22 The limitations and challenges encountered in conducting the output assessment are

1 discussed in more detail in Chapter 6 in the section describing the committee's self-
2 assessment of the methods used.

3 *Measurement reliability* is concerned with the extent to which a measurement can
4 be expected to produce similar results on repeated observations of the same condition or
5 event (Newcomer, 2011). The expert review methods used to assess the quality of grantee
6 outputs could pose a threat to measurement reliability in that they relied on subjective
7 assessments of different expert reviewers. To address this limitation, the committee
8 members frequently discussed how they were applying the criteria and interpreting the
9 anchors of the rating scale so they could calibrate their ratings. The committee members
10 independently rated the outputs then discussed results and determined overall ratings
11 which reflected consensus scores. Results of an inter-rater reliability analysis are
12 presented in Chapter 6, which provide evidence that there was an acceptable level of
13 inter-rater reliability in applying the criteria.

14 Although the committee's charge was not intended to establish causal links
15 between the NIDRR processes examined (process evaluation) and the quality of the
16 outputs (summative evaluation), it is important to point out limitations that could have
17 affected findings of both of these evaluation components. With regard to the process
18 evaluation, it is possible that the respondents choosing to respond to the two online
19 surveys of stakeholders and peer reviewers may differ from those who declined to
20 participate. However, the response rates were respectable on both (80% on the peer
21 reviewer survey and 55% on the stakeholder survey), and results of those two surveys
22 also appeared to be balanced and not biased.

1 Results of the summative evaluation can not be generalized because of the small
2 sample size and the small number of outputs reviewed. A total of thirty grants were
3 reviewed across nine funding mechanisms out of a pool of 111 grants. As stated earlier,
4 only two outputs were reviewed for each project within grants and the number of projects
5 for each grant varied depending on the size, from one for small field initiated grants to 10
6 on larger center grants. Therefore, results of the output ratings should not be generalized
7 beyond those reviewed. Another threat to the generalizability of the findings stems from
8 the fact that most of the grants reviewed ended in 2009. Because of the length of time it
9 takes to publish research articles, grantees may not have been able to share their most
10 important work with the committee.

11 **Review of the Evaluation Plan**

12 Prior to implementing the evaluation plan it was reviewed by two leading experts
13 in the field who provided suggestions to strengthen the methods used. In addition the
14 evaluation plan was reviewed and approved by the Institutional Review Board of the
15 National Academies under the category of Expedited Review as meeting all criteria
16 related to data confidentiality, security and final disposition; informed consent; and
17 potential risks and benefits to human subjects.

18 **CONCLUSION**

19 In summary, the committee used a conceptual framework (see Figure 2.1)
20 developed around the study questions and a definition of quality drawn from the literature
21 as the foundation of the evaluation. The project was conducted with a cross-sectional
22 mixed methods design. The Process Evaluation included review of existing

1 documentation, interviews, online surveys, and written questionnaires. The Summative
2 Evaluation included expert panel review of outputs from randomly selected grantees.
3 While the nature of the evaluation itself and the methods used suggest several potential
4 limitations to the work, the committee strove to address these limitations where possible
5 and acknowledge cases in which it was not possible.

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Appendix 2-1

"Quality Criteria and Dimensions"	NIDRR External Advisory Group (US)	NIOSH (US)	CAHS Indicators (CA)	Rand (UK, CA)	Chien et al. (Taiwan)
Stage of Development of the Research and of the Output (depending on type of research): • Research (e.g., basic, clinical services, health services delivery, output development) • Output – what stage of output development was carried out during the grant? (e.g., prototype development, initial testing, regulatory approval, on the market, trialing in a new context, etc.) • Movement along research and/or development pathway				x	
Peer Recognition of Output					
Number of peer-reviewed articles (e.g., using measures such as "Journal Impact Factor" for assessing relative quality, or counting publications in high quality journals/publishers)	x	x	x	x	x
• Number of original research articles • Number review articles		x x			
Number of research reports	x	x	x		x
Number of conference papers published	x		x		x
Number of citations in peer-reviewed articles (e.g., using measures such as "Crown Indicator", "Highly Cited Publication counts", "H-Index").	x	x	x	x	
Citations assimilated into clinical guidelines				x	
Quantity of citations indicates "breakthrough" results		x		x	
Measures of esteem (Number of awards and honors received)	x		x	x	
Number of patents awarded	x	x		x	x
Number of web downloads or hits	x	x	x		
Number of reprints or books sold	x				
Multiple and Interdisciplinary Audience Involvement in Output Development					
Multiple consumer input/collaboration in all	x	x			

"Quality Criteria and Dimensions"	NIDRR External Advisory Group (US)	NIOSH (US)	CAHS Indicators (CA)	Rand (UK, CA)	Chien et al. (Taiwan)
stages (other researchers, clinicians, policy-makers, manufacturers, intellectual property brokers) and evidence of their involvement					
Appropriate targeting of audience	x				
Output Meets Acceptable Standards of Science and Technology					
Appropriate methodology for answering research questions	x				
Output is well-defined and implemented with integrity	x				
Well-documented conclusions, supported by literature	x	x			
Ability for the document to stand alone	x				
Meets human subject protections requirement	x				
Meets ethical standards	x				
Applies concepts of universal design and accessibility	x				
Research was done on the need and development of the instrument or device	x				
Measurement instruments were tested and found to have acceptable type and level of validity	x				
Measurement instruments were tested and found to have acceptable level of reliability	x				
Pilot testing was conducted with consumers and adaptations made as indicated	x				
Theoretical underpinnings and evidence-base (what is the level of evidence per APA, AMA, etc.) were used and well documented	x				
Output has Potential to Improve Lives of People with Disabilities					
Valued by consumers	x				
Evidence of beneficial outcomes (i.e., How does the output improve abilities of people with disabilities to perform activities of their choice in the community, and also expand society's capacity to provide full opportunities and accommodations?)	x				
Output Usability					
Builds upon person-environment interaction and human-system integration paradigm	x				
Ability to reach target population	x				
Adheres to principles of knowledge translation	x				
Readability; information translated into consumer language that is easy to understand and implement	x	x			

"Quality Criteria and Dimensions"	NIDRR External Advisory Group (US)	NIOSH (US)	CAHS Indicators (CA)	Rand (UK, CA)	Chien et al: (Taiwan)
Can be used effectively, repeatedly as intended by design	x				
Feasibility	x				
Accessibility	x				
Acceptability	x				
Generalizability	x				
User friendly	x	x			
Ease of use (for measures: ease of scoring and administration)	x				
Flexibility	x				
Scalability (for measures)	x				
Adoptability	x				
Affordability and repair cost (for devices)	x				
Cost benefit	x				
Financing available	x				
Compatibility and durability	x				
Sustainability	x				
Safety issues considered	x				
Output Utility and Relevance					
Addresses high priority area	x	x			
Addresses NIDRR mission, ICF Model, and the Rehabilitation Act	x				
Addresses practical problem	x				
Importance of contribution to the field (i.e., Results expand the knowledge base, advance understanding define issues, fill a gap)	x	x			
Significance and magnitude of impact within and outside of field (i.e., Does output help build internal or extramural institutional knowledge? Does output transcend boundaries? Does output produce effective cross-agency, cross-institute, internal /external collaboration?)	x	x	x	x	x
Transferability (Number of technology output transfers, number of companies transferred to, technology transfer is sustained; source of citations in other fields)	x	x	x	x	x
Focuses on innovation or emerging technologies	x				
Ability to stimulate new research, new knowledge, or new products	x	x			
Perceived as useful to practitioners; has changed practice	x	x			
Perceived as useful to consumers	x				
Outputs are actually used in the field (e.g., adoption of guidelines/protocols/interventions; acceptance of outputs via publications/conference proceedings; manufacture license, product available in marketplace; % of target audiences that have	x	x		x	x

"Quality Criteria and Dimensions"	NIDRR External Advisory Group (US)	NIOSH (US)	CAHS Indicators (CA)	Rand (UK, CA)	Chien et al. (Taiwan)
adopted; example of implementation in the field)					
Outputs provide evidence to support state level changes to policies and/or practices	x				
Output recommendations have been implemented by policy makers	x	x		x	
Requests for expert testimony, participation in national advisory roles	x			x	
Dissemination of Outputs	x				
Evidence of efforts to disseminate (e.g., dissemination plan and activities)	x				
Timely dissemination	x				
Depth and breadth (e.g., percent of target group that has used/adopted and duration of use)	x	x			
Dissemination of research in practice literature and conferences for transfer potential	x			x	
Use of multi-media and emerging technology (Rand survey asks about specific sources for different audiences)	x			x	
Mode of dissemination matches target audience	x				
Counts of products distributed (e.g., manuals, newsletters, curricula, etc)	x	x			
Evaluation plan and consumer reviews	x				
Scope of training - topics covered, number of training events, hours of training, participant hours, participant characteristics	x				
Technical assistance/consultation provided	x				x
Number of sponsored conferences and workshops, with documented sponsorship, number and composition of attendees, products of the event, assessment of the event	x	x			x
Dissemination of research through databases	x	x	x	x	

1

Chapter 3. NIDRR's Priority Writing Processes

This chapter addresses the following key study question:

Key Question #1. To what extent is NIDRR's priority writing process conducted in such a way as to enhance the quality of the final results?

NIDRR uses the term priority writing to encompass all aspects of priority setting including gathering input from multiple sources (e.g., the field, stakeholder organizations, grantees, other agencies, etc.), developing a long-range (5-year) plan for agency priorities, determining annual priorities for funding, and putting out requests for proposals on these priorities. The term priority setting is used synonymously with priority writing in this evaluation to clarify that our focus was on this larger priority setting process.

Priority setting not only reflects the agency's intent to influence the advancement of research in targeted areas but also offers specific funding opportunities for potential grant applications to the agency. The announced priorities should therefore be developed and communicated in a manner that attracts the best researchers and encourages participation in disability and rehabilitation research areas. Attracting the largest pool of applications from which to select proposals increases the chances for the highest quality results. When establishing its priorities the agency needs to balance continuity from funding cycle to cycle, as well as identifying future research challenges and societal needs.

1 In the context of this committee's work it is challenging to directly link priority
2 writing with specific output quality. The quality of NIDRR's resulting portfolio, grants,
3 and outputs is the product of multiple complex factors including the priority writing
4 process, the funding level, the peer review process, and scientific quality of the grantees.
5 However, it is clear that the NIDRR priority writing process has a positive impact on the
6 quality of the final results. In this chapter we review and assess NIDRR's priority setting
7 process and make recommendations for improving that process.

8 The chapter has three major parts. In Part A we describe NIDRR's priority setting
9 processes based on existing documentation and interviews with NIDRR executives. In
10 Part B we present results of data gathered from NIDRR staff, grantees, and other
11 stakeholder organizations concerning their assessment of NIDRR's priority setting
12 processes. Finally, in Part C we provide our conclusions and recommendations.

13 **A. DESCRIPTION OF NIDRR'S PRIORITY SETTING PROCESSES**

14 The descriptive information on NIDRR's processes was compiled from existing
15 documentation, such as legislation, the Federal Register, NIDRR and the Department of
16 Education policies and procedures, NIDRR's Long Range Plan, and Notices Inviting
17 Applications. In addition executive-level representatives of NIDRR and the Department
18 of Education were interviewed to get a more thorough and cohesive understanding of the
19 processes.

20 **Legislative Foundation**

21 The Rehabilitation Act (2006) authorizes the formula grant programs of
22 vocational rehabilitation, supported employment, independent living, and client

1 assistance. Title II¹ – Research and Training – authorizes the majority of NIDRR’s
2 research activities, while Section 21 of The Act and The SBIR Development Act require
3 NIDRR to reserve small portions of its budget for those two specific funding programs.
4 Section 202 of Title II states that NIDRR’s Director will lay out funding priorities and
5 covered activities in a 5-year plan that will be published in the *Federal Register*. The plan
6 will utilize at least 90% of NIDRR funds for extramural research. Chapter 1 provides a
7 description of NIDRR’s funding mechanisms.

8 **The Long-Range Plan**

9 Title II, section 202(h) of the Rehabilitation Act (2006) states that starting in
10 October 1998, and every subsequent fifth October (i.e. October 2003, October 2008, etc.),
11 the NIDRR Director shall develop and publish in the Federal Register for public
12 comment a draft the Long-Range Plan, or LRP, that outlines NIDRR’s priorities, explains
13 the basis for such priorities, and provides a broad framework for funding research aimed
14 at meeting the priorities. Every fifth subsequent June (i.e. June 1999, June 2004, June
15 2009, etc.), after consideration of public comments, the final LRP will be submitted to the
16 appropriate members of Congress. Revisions to the LRP must also be submitted to the
17 appropriate members of Congress.

18
19
¹ The other six titles are Title I- Vocational Rehabilitation Services; Title III- Professional Development and Special Projects and Demonstrations; Title IV- National Council on Disability; Title V- Rights and Advocacy; Title VI- Employment Opportunities for Individuals with Disabilities; and Title VII- Independent Living Services and Centers for Independent Living.

1 The LRP is required to:

- 2 • “Identify any covered activity that should be conducted under
3 section 202 (NIDRR) and section 204 (Research and Other
4 Covered Activities) respecting the full inclusion and integration
5 into society of individuals with disabilities, especially in the area
6 of employment;
- 7 • Determine the funding priorities for covered activities to be
8 conducted under section 202 and section 204; and
- 9 • Specify appropriate goals and timetables for covered activities to
10 be conducted under this section and section 204 (p.99).”

11 In developing the five-year plan the Director must also consider input from the
12 Commissioner of the Rehabilitation Services Administration (RSA), the Commissioner of
13 the Administration on Developmental Disabilities, the National Council on Disability
14 (NCD), the Interagency Committee on Disability Research (ICDR), people with
15 disabilities and their family members, organizations representing people with disabilities,
16 researchers, service providers, and other appropriate entities. Additionally, Title II,
17 section 205 states that a Rehabilitation Research Advisory Council should advise the
18 director on the development and revision of each Long-Range plan, but NIDRR has never
19 formed such a Council.

20 According to NIDRR Executive Representatives (2010), NIDRR’s first LRP was
21 developed in 1998 by key management staff after the reauthorization of the
22 Rehabilitation Act. The content of the plan was drawn from commissioned papers as well
23 as contributions from staff members. The major innovations in the 1998 Plan included the

1 “paradigm of disability” (which emphasizes the contextual nature of disability as a
2 product of individual and societal factors), and the five research domains (Employment
3 Outcomes, Health and Function, Technology for Access and Function, Independent
4 Living and Community Integration, and Associated Disability Research Areas). The first
5 plan also encouraged participatory action research, which generated a lot of positive
6 feedback. According to their Executive Representatives, NIDRR was able to accomplish
7 95% of the goals described in the first plan. However, the next presidential
8 administration (in 2000) criticized that Long-Range Plan as not being written in
9 outcomes-oriented terms.

10 The development of the second five-year plan, in 2003, was somewhat different
11 than the development of the first. Staff utilized considerable outside assistance, including
12 hiring a contractor to conduct teleconference meetings around the country to gather input
13 from the public, and forming an advisory committee. Sub-teams of the staff wrote
14 sections of the plan corresponding to the research domains and capacity building. The
15 major innovation contained in the second plan was the logic model, which supported and
16 provided a structure for more outcomes-oriented work.

17 NIDRR Executive Representatives (2010) also stated that development of the
18 third five-year plan, in 2008, followed a similar process as the second plan in 2003,
19 including use of a contractor and an advisory committee. However, staff turnover with
20 the change in presidential administrations resulted in NIDRR having significantly less
21 time to develop the third plan than the previous two. The development process was
22 shorter, and the third plan itself was less elaborate than previous plans had been. The plan
23 increased the focus on employment. The plan received about 100 comments, many of

1 which were critical of the increased focus on employment. Due to the negative reaction
 2 from the field, and the departure of NIDRR's director, the third plan was put on hold
 3 pending the appointment of a new director. Unfortunately, the director position at NIDRR
 4 has been vacant for three years and NIDRR is still operating on the second LRP. At the
 5 time of this writing, a new LRP is under development but has not yet been published for
 6 public comment.

7 Annual Priority Writing Process

8 In order to meet the objectives laid out in the Long-Range Plan, NIDRR annually
 9 formulates priorities for research grants and development projects that generate new
 10 knowledge and products, along with supporting knowledge translation and capacity
 11 building activities (U.S. Office of Management and Budget, 2006). Figure 3.1 illustrates
 12 the stages and general time line of NIDRR's annual priority setting process.

13 **Figure 3.1 NIDRR Priority Setting Process Timeline**

	Months													
Priority Writing Steps	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Identify Grant Priorities (3-5 Months)	■	■	■	■	■									
Develop and Publish Notice of Proposed Priority (2-4 Months)						■	■	■	■					
Public Comment (1-2 Months)										■	■			
Develop Notice of Final Priority (2-3 Months)												■	■	■
Develop Notice Inviting Applications (1-2 Months)													■	■
Develop Application Kit (1-2 Months)													■	■
Publish NFP and NIA in Federal Register (1 Month)														■

14

1 Each year, NIDRR considers changes in their budget, as well as the funding level
2 of expiring grants, and determines the amount of money that will be available for grant
3 competitions (NIDRR, 2009). While NIDRR has standard procedures for priority writing,
4 described below, the length of time it takes to get new proposed priorities through ED
5 approval and clearance stages varies (NIDRR Representatives, 2010).

6 To inform new competitions, NIDRR's Research Sciences Division (RSD)
7 considers the LRP, other strategic and performance goals, the portfolio of existing
8 projects, recent findings from completed grants, current research literature, as well as key
9 guidance documents from Federal partners, professional associations, and consumer
10 organizations (NIDRR, 2009; U.S. Office of Management and Budget, 2006). They also
11 look at expiring NIDRR grants and determine if the area is productive, whether more
12 work remains to be done, or if the topic area has been exhausted. They may ask
13 contractors to conduct specific literature searches and factor in feedback from the field in
14 response to prior grant cycles. From these sources, RSD identifies emerging opportunities
15 and ongoing needs which are developed into research priorities and recommended to the
16 Office of Special Education Programs (OSEP). In addition, the NIDRR Director and ED
17 Assistant Secretary often identify potential priority topics of high importance (NIDRR,
18 2009).

19 According to NIDRR's briefing material (NIDRR, 2009) supplied to the NRC,
20 annual research priorities must:

- 21 • "Reflect and incorporate state-of-the-science in a specific area;
- 22 • Fulfill a demonstrated need for new knowledge;

- 1 • Build upon prior research-based-knowledge and advance the stage
- 2 of knowledge development in specific areas;
- 3 • Have real world relevance to individuals with disabilities;
- 4 • Prioritize meeting the knowledge needs of individuals with
- 5 disabilities from minority backgrounds;
- 6 • Support the NIDRR mission;
- 7 • Reflect the thinking and guidance of the current LRP; and
- 8 • Be relevant to improving employment outcomes (p. 58).”

9 Additionally, throughout the development process, NIDRR subjects potential
10 priorities to the following Key Questions:

- 11 • “What knowledge gap is being filled?
- 12 • What critical capacity is being strengthened (for centers that are to
- 13 engage in capacity building)?
- 14 • What policies or practices might be improved by this work?
- 15 • How is this topic relevant to the lives of people with disabilities?
- 16 • How can the new knowledge generated be of use to our
- 17 Rehabilitation Services Administration (RSA) or Office of Special
- 18 Education Programs (OSEP) colleagues?
- 19 • Are we building upon past NIDRR investments, or are we going in
- 20 a new direction?
- 21 • Why is this the best choice at this time?
- 22 • Why is NIDRR the best source of funding for this research
- 23 /capacity building / KT activity? (NIDRR, 2009, p. 59-60) ”

1 According to interviews with the Representatives (2010), NIDRR may add a new
2 priority area (e.g., ergonomics) if they have additional funding, new technology or
3 science suggests new areas for research, experts from the field suggest new areas, or new
4 priorities are suggested by the administration. NIDRR funded State of the Science
5 Conferences generate potential new priority areas and the NIDRR Director and the ED
6 Assistant Secretary can also suggest priorities. The Interagency Committee on Disability
7 Research (ICDR) helps facilitate information sharing and partnerships that can contribute
8 to identifying topic areas (NIDRR Representatives, 2011). However, it is not the function
9 of the ICDR to guide priority setting or recommend topic areas. Congress rarely gives
10 NIDRR directives about priorities, though on a couple of occasions Congress was active
11 in causing grants to be refunded although they that had been set to expire (NIDRR
12 Representatives, 2010). NIDRR may drop a priority area if a project is at a logical ending
13 point (e.g., the end of a DRRP), the agency has less funding available, the area has been
14 unproductive, or in response to changing priorities on the part of the administration.

15 **Identifying Grant Priorities**

16 As shown in Figure 3.1, the first stage in NIDRR's annual priority setting process
17 is to identify the candidate priorities. NIDRR staff members continually monitor the
18 literature in their areas of expertise to stay current, to identify areas for potential funding,
19 determine field capacity, and identify active researchers who may serve as peer reviewers
20 of proposals (NIDRR Representatives, 2010). NIDRR has sufficient resources to support
21 travel to one meeting per staff member per year, such as Rehabilitation Engineering and
22 Assistive Technology Society of North America (RESNA), American Congress of
23 Rehabilitation Medicine (ACRM), American Public Health Association (APHA),

1 Disability Forum, Gerontological Society of America (GSA), or the National Council of
2 Rehabilitation Educators.

3 To identify potential areas for funding priorities, RSD management asks staff to
4 utilize their knowledge of relevant literature and the field in developing succinct, one-
5 paragraph descriptions of potential topics, along with rationales and recommendations as
6 to which ones to compete. The format for proposing priority topic areas asks staff to
7 address the following questions (NIDRR, 2009):

- 8 • If this priority topic addresses one particular population or condition group,
9 provide information about the incidence and prevalence of the condition to be
10 targeted.
- 11 • What is the state of the science in this particular topic area?
- 12 • How does the proposed priority topic build upon the state of the science in this
13 topic area?
- 14 • If applicable, describe NIDRR's investment in this topic area. How long have
15 we funded grants in this area? What are key findings from NIDRR
16 investments in this area? How does the proposed priority topic build upon
17 these investments?
- 18 • How does the proposed priority topic relate to the work of our relevant
19 Federal partners, or other organizations that fund research?
- 20 • Are there any key guidance documents (e.g., the IOM's Future of Disability in
21 America) that point to the need for research and related activities in this area?
- 22 • What is the real-world relevance of this topic to people with disabilities?

- 1 • How will this priority emphasize meeting the knowledge needs of individuals
- 2 with disabilities from minority backgrounds?
- 3 • What language from the NIDRR LRP can be used to support this priority?
- 4 • Within the new (not yet approved) NIDRR LRP (in the Federal Register on
- 5 January 15, 2009), under which goals, objectives, and strategies does this
- 6 priority fit?

7 RSD staff then presents potential topics to the NIDRR Director, who places the

8 topics in order of preference and presents them to the ED Assistant Secretary, who makes

9 the final decision on NIDRR's yearly priorities that are to be published. The ED Assistant

10 Secretary is actively involved in the annual priority development process. The process of

11 identifying annual funding priorities generally takes 3-5 months.

12 **Notices of Proposed Priority**

13 After priority topics have been identified, the second stage in NIDRR's process

14 is to draft and publish Notices of Proposed Priority (NPP). NIDRR staff members follow

15 a template to draft the final topics into Notices of Proposed Priority, which are NIDRR's

16 first notice to the research community about each grant solicitations (NIDRR

17 Representatives, 2010). The Notices explain the nature of the problem and describe what

18 NIDRR wants the grantee to do. As NIDRR does not consider itself to be an expert in all

19 areas, several years ago they shifted the style of their Notices from more to less

20 prescriptive.

21 Each NPP is reviewed and cleared at multiple levels within NIDRR, OSERS and

22 ED [including the Office of General Council (OGC), Budget, Office of the Deputy

23 Secretary (ODS), and Executive Secretary (ES)] (NIDRR, 2009). The staffs of Budget

1 and ODS often submit extensive comments, and three rounds of comments is not
2 uncommon (NIDRR Representatives, 2010). The degree of contradictory comments can
3 cause substantial delays in the process. The resulting NPP is published in the Federal
4 Register and during a response period the public may submit comments on the proposed
5 priorities. The NPP development and clearance process often takes 2-4 months, while the
6 public comment period lasts for 1-2 months.

7 **Notices of Final Priority**

8 After the close of the public comment period NIDRR staff review comments on
9 the NPP and develop a Notice of Final Priority (NFP) (NIDRR Representatives, 2010;
10 NIDRR, 2009). Each public comment must be addressed in the NFP. The draft NFP is
11 reviewed and cleared at several levels within NIDRR, OSERS and ED, much like the
12 NPP. Again, extensive comments are not uncommon. Development of the NFP generally
13 takes 2-3 months. While NIDRR is required by statute to develop the NPP before the
14 NFP, other research divisions in the Department of Education are not required to develop
15 an NPP and can begin their priority setting with development of the NFP.

16 **Notices Inviting Applications, and Application Kits**

17 Concurrently with the NPP, NIDRR drafts the Notice Inviting Applications (NIA)
18 and develops an application kit for each priority (though development of these materials
19 generally only takes 1-2 months each) (NIDRR, 2009). The NIA contains information
20 about the grant competition, such as deadlines, dollar amounts, and how to submit an
21 application. The NIA goes through the same clearance process as the NPP and is
22 published in the Federal Register with the NPP. The application kit contains application
23 forms, the NFP and NIA, regulations, and the peer review criteria. The application kit is

1 not published in the Federal Register, but is available on NIDRR's website. The standard
2 period between publication of the NFP and NIA and the application deadline is 60 days,
3 although that may be shortened toward the end of the fiscal year to 45 days or fewer
4 (NIDRR Representatives, 2010). NIDRR sends announcements of grant competitions to a
5 list they keep of individuals, grantees, associations/organizations, and others who have
6 contacted them and asked to be included. They have recently added a space on their
7 website for individuals to add their names to this list.

8 For each competition, NIDRR convenes a pre-application technical assistance
9 meeting for potential applicants (NIDRR Representatives, 2010). Upon request, staff
10 members are also available for individual consultation. The staff cannot discuss content
11 with applicants, however, only the application process. NIDRR does not track whether
12 people who participate in assistance events go on to apply for grants. Every NIDRR
13 competition has received at least one application, which is all that is required to conduct
14 the peer review process. Not every competition has resulted in a grant being funded.
15 (Chapter 4 provides information on the number of competitions between 2006 and 2009.)

16 **Priority Setting at Other Relevant Agencies**

17 This section presents examples of other relevant agency processes including NIH,
18 NSF, and NIOSH.

19 According to the IOM report *Scientific Opportunities and Public Needs:*
20 *Improving Priority Setting and Public Input at the National Institutes of Health* (1998),
21 NIH criteria for priority setting are based on-

- 22 • public health needs,

- 1 • scientific quality of the research,
- 2 • potential for scientific progress (the existence of promising pathways and
- 3 qualified investigators),
- 4 • portfolio diversification along the broad and expanding frontiers of research,
- 5 and
- 6 • adequate support of infrastructure (human capital, equipment and
- 7 instrumentation, and facilities).

8 Based on these criteria, priorities are then established together through (1) the
9 budget-setting process, (2) by the authority of the director, through participation in the
10 annual budget process, the use of blue ribbon panels to recommend new or reorganized
11 programs, and the use of budgetary authority to launch crosscutting areas of research
12 emphasis, (3) at the specific institute level, (4) by public input, through advocacy groups
13 and interactions with various constituencies, and (5) through congress, by way of the
14 annual appropriations process as well as the creation of new institutes or other
15 organizational entities. Each institute has a National Council or a Board of Scientific
16 Counselors, which provides advice on priority setting. There is also an Advisory
17 Committee to the Director. Among their findings, the IOM Committee recommended that
18 NIH should better clarify its mechanisms for implementing its criteria for setting
19 priorities and should evaluate their use and effectiveness.

20 As of the writing on this report, NIH also follows a strategic planning Roadmap
21 for Medical Research, first proposed in 2002 by then Director Elias Zerhouni and
22 launched in 2004. The Roadmap, seeks, "to address roadblocks to research and to
23 transform the way biomedical research is conducted by overcoming specific hurdles or

1 filling defined knowledge gaps (NIH, 2011, <http://commonfund.nih.gov/aboutroadmap.aspx>). The strategic planning process used by the Roadmap includes identifying and
2 aspx)". The strategic planning process used by the Roadmap includes identifying and
3 collecting representative input from both scientific and public sources. Initiatives based
4 on the Roadmap address 12 roadblocks organized into three themes: New Pathways to
5 Discovery, Research Teams of the Future, and Reengineering the Clinical Research
6 Enterprise.

7 NSF's priority setting is influenced by factors such as, "scientific and engineering
8 opportunity and importance, technical feasibility, affordability, and balance with existing
9 programs (1998, <http://www.nsf.gov/about/budget/fy1998/kpf04.htm>)". NSF receives
10 input into their priority setting process from sources such as advisory committees, the
11 National Science Board, the National Research Council, workshops, and task forces, site
12 visits, and professional meetings, reports and conferences Utilizing this input, NSF staff
13 create priorities both for the agency as a whole, and for individual disciplines and
14 programs. Concerning priority setting, the NSF website states,

15 NSF's task of identifying and funding work at the frontiers of science and engineering is not a
16 "top-down" process. NSF operates from the "bottom up," keeping close track of research around
17 the United States and the world, maintaining constant contact with the research community to
18 identify ever-moving horizons of inquiry, monitoring which areas are most likely to result in
19 spectacular progress and choosing the most promising people to conduct the research
20 (2010, <http://www.nsf.gov/about/how.jsp>).

21 Additionally, in 2004 the NRC Committee on Setting Priorities for NSF-
22 Sponsored Large Research Facility Projects recommended that NSF establish a roadmap
23 for the next 10-20 years. The basis of the roadmap should be formed by, "broad inputs
24 from the scientific community". The roadmap should provide a "precise funding agenda"

1 for the near term (0-10 years), which provides guidance for continuing to fund existing
2 projects versus yearly potential new projects. The roadmap also provides a more broad
3 “vision of the future” of NSF in 10 to 20 years. Yearly funding decision should take into
4 account whether or not they advance the work of NSF toward the vision. In this way the
5 roadmap could assist in balancing NSF’s short term funding decisions and long term
6 goals.

7 Finally, the National Institute for Occupational Safety and Health (NIOSH)
8 established the National Occupational Research Agenda through a two year process
9 (Rosenstock, L., Olenec, C., Wagner, G.R., 1998). The goal of the process was to
10 develop priorities that would guide research in both the public and private sectors, as well
11 as decision makers, scientists, and safety and health professionals. NIOSH emphasized
12 openness and inclusiveness in collecting input on their Agenda from working groups,
13 written comments, and oral comments made at deliberations and public and town
14 meetings. The process resulted in a broad-based list of priorities that, like the
15 recommended NSF roadmap, “attempt to consider both current and emerging research
16 needs (p. 356),” and understand and account for priorities that may evolve over time. In
17 addition to the Research Agenda, NIOSH receives input from their Board of Scientific
18 Counselors (NIOSH, 2008).

19 As with NIDRR, NIH, NSF, and NIOSH priorities are grounded in broad
20 frameworks (NIDRR Long-Range Plan, NIH and NSF Roadmaps, NIOSH National
21 Occupational Research Agenda) from which annual priorities are derived. All
22 organizations consider such factors as health needs of relevant populations, state of the
23 science, and tradeoffs between established and innovative research when creating

1 priorities. All organizations receive input on priority setting from sources such as their
2 staff, convened working groups, professional conferences, and public meetings. In
3 addition to these sources of input, NIH, NSF, and NIOSH have standing advisory boards
4 to assist in priority setting, while NIDRR does not.

5 **B. RESULTS OF THE ASSESSMENT OF NIDRR'S PRIORITY WRITING** 6 **PROCESS**

7 The following section summarizes the results of interviews and surveys of
8 NIDRR staff, grantees, and other stakeholder organizations concerning their views of
9 NIDRR's priority writing processes. We first report on NIDRR staff and grantees'
10 perspectives on the priority-setting process including challenges and suggestions for
11 change. We then report on stakeholder organization perspectives, including their
12 relationship with NIDRR, their involvement and views of NIDRR's priority-setting
13 process, their perception and use of NIDRR products, and their suggestions for enhancing
14 NIDRR's priority-setting process.

15 **Perspectives of NIDRR Staff**

16 In personal interviews 16 NIDRR staff (n=16) were asked open-ended questions
17 about their roles in the priority-setting process, their perspectives on the quality of the
18 process, and if they had any suggestions for enhancing the process. Interviewees mainly
19 consisted of project officers from the Research Sciences Division, while a few
20 representatives from the Planning, Budget, and Evaluation Division were also
21 interviewed. One-third of the interviewees held management or supervisory positions.

1 The perspectives of staff coalesced around two major topics: their assessment of the
2 priority setting and grants announcement process and the challenges in priority setting.

3 **Assessment of the priority and grant announcement process**

4 Staff commented on the specific process NIDRR uses for priority writing,
5 including challenges to getting priorities finalized and approved and to getting good
6 response from the field to solicitations. Half the staff mentioned that the immense
7 bureaucracy of the clearance process slows down the process of moving priorities into the
8 grant announcement phase. For example, changes can occur as a proposed priority
9 advances through the various organizational clearance levels (e.g., the meaning is
10 changed, terminology is changed, substantive changes sometimes). Some suggested that
11 it is easier to get the large centers through the clearance process compared to smaller
12 innovative grants (n=1). Other research divisions of the Department of Education have
13 statutory authority to bypass the "Notice of Proposed Priorities" process, which
14 significantly speeds up the clearance process (n=1).

15 Additionally, several staff mentioned that NIDRR's processes have improved over
16 time and that they are more regularized and more data driven now (n=5). The current
17 priority setting process involves more feedback from previous grant results than in the
18 past. However, to inform priority setting more data sources are needed than just the
19 previous years' Annual Program Report (n=2). It was also suggested that more systematic
20 information should be collected on grant stages of development, movement rates, and life
21 cycles (n=1).

22 Also, some commented that the nature of certain priorities limits the number of
23 researchers who would be eligible to apply (e.g., Model systems grants), whereas

1 programs with field driven priorities have large applicant pools (e.g., Field Initiated
2 Program). A concern was expressed that grant announcements are not reaching the
3 largest intended audience and that there needs to be broader dissemination of priorities
4 through listserves and routine dissemination to universities (n=4).

5 **Challenges in Priority Setting**

6 Several NIDRR staff members mentioned, in funding research not funded by any
7 other agency NIDRR faces challenges in setting priorities for its broad mission that
8 includes all disability groups and ages (n=5). This broad mission relative to its limited
9 budget creates an environment of competing priorities that can slow down progress in the
10 field (n=1). Political influence has been seen in several cases when NIDRR ended a grant
11 program, but it was then reinstated through political pressure (n=4). There has historically
12 been a tension between NIDRR's priority setting being scientifically-driven versus more
13 disability rights driven (n=1). There is also some frustration with NIDRR's reliance on
14 longstanding program grants (e.g., SCI, TBI, or RRTC) (n=2). It was suggested that more
15 of a balance could be achieved through funding driven by specific problems in the field
16 than funding driven by target groups or program mechanism (n=1). There was also some
17 perceived tension between staff-written priorities and field- suggested priorities (n=2),
18 and it was suggested that NIDRR should gather information from the field more regularly
19 to inform priority writing. One other interviewee commented that NIDRR could benefit
20 from a National Advisory Board with more diverse disability research expertise to inform
21 its priority setting process. Some commented on the resistance to change in large
22 bureaucratic organizations that impacts forward movement (n=3).

23 From all the staff interviews it appears that some NIDRR project officers play an

1 active role in proposing priorities, whereas others choose to have a more limited role.
2 This appears to be based on interest, expertise, and time allocated in their duties for
3 priority setting activities. Staying well informed and current with the relevant literature
4 entails a substantial time demand on the part of project officers (n=2). This is particularly
5 challenging considering that staffing levels have fallen over the years (n=4).

6 **Perspectives of NIDRR Grantees**

7 As part of the questionnaire dealing primarily with outputs that grantees
8 submitted to the committee for review, we asked grantees to share any perspectives they
9 might have on NIDRR's priority setting processes. Fourteen out of 30 grantees that were
10 involved in the output assessment of the evaluation commented.

11 One set of comments applauded NIDRR's periodic formulation of five-year long-
12 range plans, which solicit significant field input and increases the likelihood that
13 priorities established and resulting outputs will have the greatest potential impact (n=4).
14 Consistent with the background section of this chapter, one grantee stated that priorities
15 are less prescriptive than in the past and that they were free to explore areas that were of
16 importance to consumers that would not have been addressed otherwise. Another grantee
17 emphasized that their relationships with NIDRR have been very productive and that their
18 studies would not have been funded by other agencies in the early stages. NIDRR
19 funding allows important developmental studies to be incubated before other agencies
20 will pick them up and extend them.

21 One grantee noted problems in the priority finalization and implementation
22 process due to competing field interests and internal bureaucratic protocols for approval
23 (n=1). Of broader concern was a particular difficulty encountered with shifting priorities.

1 Changes in priorities cycle to cycle reduces the pool of applicants (n=1). Some
2 researchers thought that this could affect the quality of research (n=1), that they had no
3 opportunity to propose further work in their area as an independent researcher (n=1), or
4 that new grant activity requirements meant that they would not qualify when earlier they
5 had qualified (n=1).

6 These respondents also commented on areas where they thought priorities should
7 be focused, including: treatment and intervention studies in the rehabilitation process,
8 which has received little attention (n=2), economic empowerment (n=1), and individual
9 fellowship grants (similar to NIH F series for predoctoral and postdoctoral training) for
10 capacity building in many areas of research covered by NIDRR that do not neatly map
11 onto NIH priorities (n=1). Another suggested that NIDRR should continue to focus on
12 projects over and above what the medical rehabilitation research funded by NIH
13 (NDMRR) has to offer.

14 **Perspectives of NIDRR Stakeholder Organizations**

15 Responding representatives of stakeholder organizations were asked closed and
16 open-ended questions to inquire about their role in the NIDRR planning and priority
17 setting process, their perspectives on the process, benefits their agencies derived from
18 NIDRR grants or outputs, and suggestions for enhancements to the priority-setting
19 process.

20 **Methods**

21 Invitations to participate in the survey were sent to 130 organizations that were
22 identified through a list provided by NIDRR of professional and advocacy associations

1 considered to be stakeholder organizations, and through a list of federal agencies,
2 provided by the Interagency Committee on Disability Research (ICDR), which are
3 statutory members of the ICDR or non-statutory members that have participated in ICDR
4 special committees. Seventy-two agencies responded to the survey with a response rate of
5 55%. Of the 72 organizations responding to the survey 26% (n=19) described themselves
6 as professional associations, 31% (n= 22) as advocacy organizations, and 43% (n=31) as
7 federal agencies. The questionnaire is attached in the Appendix.

8 Results of the quantitative survey items are presented first to summarize these
9 stakeholder organizations' relationships with NIDRR, how they were involved in
10 NIDRR's priority setting processes and their perspectives of these processes, and the
11 extent to which NIDRR grants are perceived as beneficial and their products are used.
12 Next, their responses to the open-ended questions are summarized by the major topics
13 that emerged.

14 **Summary of Quantitative Responses**

15 ***Relationships with NIDRR*** Many of the respondents interacted with NIDRR in multiple
16 ways, but not all of the survey respondents had the same level of familiarity with NIDRR.
17 On a 5 point scale from 1 (not at all) to 5 (very much), 28% of the stakeholder
18 organizations stated that they were "somewhat" familiar with NIDRR, 31% that they
19 were "more than somewhat" familiar, and 40% that they were "very much" familiar with
20 NIDRR. More than half of the organizations reported having interacted with NIDRR in
21 the following ways: using NIDRR website or related information sources to search for
22 information, tools or resources for working with consumers (61%) or to search for
23 information about grants (56%); speaking with NIDRR about professional issues (63%),

1 attending NIDRR trainings, workshops, or conferences (58%). With regard to
 2 collaboration, 51% reported having participated in general planning and special purpose
 3 meetings convened by NIDRR, 38% as having collaborated with NIDRR as a member of
 4 a consortium or professional association, and 29% as having coordinated activities with
 5 NIDRR to support joint priorities and/or to avoid duplication.

6 *Stakeholder Organization Involvement and Perspectives on NIDRR Priority Setting*

7 Stakeholders were asked about their involvement in NIDRR's priority setting process
 8 through submission of comments and review of the LRP and/or funding priorities. Sixty-
 9 three percent of the responding organizations stated that they had opportunities to review
 10 and comment on NIDRR's long range plan or funding priorities. Approximately one third
 11 reported that their organizations had submitted comments to NIDRR.

12 Table 3-1 presents stakeholders' perspectives on the extent to which they
 13 considered NIDRR's long range planning and priority-setting processes reflected
 14 important attributes of priority-setting. Results are shown as the proportion of
 15 respondents that characterized NIDRR's priority setting at the various points along the
 16 scale for each attribute.

17 **Table 3-1. Distribution of Ratings of the Extent to which NIDRR's Processes Reflect**
 18 **Important Attributes of Priority-setting**

Priority Setting Attributes	N	Scale					Don't know
		Not at all	Less than somewhat	Some-what	More than somewhat	Very Much	
Transparent	70	3%	7%	34%	21%	9%	26%
Publicized	71	1%	11%	28%	25%	13%	21%
Relevant to your organization	69	1%	9%	17%	26%	30%	15%
Responsive to emerging issues in disability rehabilitation/research	71	--	10%	28%	25%	16%	21%

Welcoming of stakeholder org. feedback	70	--	4%	34%	16%	14%	31%
Responsive to stakeholder org. feedback	70	--	16%	27%	11%	6%	40%

1

2 A relatively large proportion of respondents stated that they didn't know, which in
3 part reflects the 28% of organizations that stated they were only somewhat familiar with
4 NIDRR and the 37% that said they did not have opportunity to review or comment on
5 NIDRR's LRP or funding priorities (above).

6 For five out of six of these important attributes, roughly one-third or more
7 respondents said that NIDRR's priority-setting process "more than somewhat" or "very
8 much" reflected the attributes. However, substantial proportions of respondents also said
9 that NIDRR's priority-setting process only "somewhat" reflected each of these attributes,
10 ranging from about one-fifth to one-third.

11 The attribute "relevant to your organization" had the highest favorable response,
12 with 56% of respondents reporting "more than somewhat" or "very much". The attribute
13 "responsive to emerging issues in disability rehabilitation and research" was second
14 highest, with 41% of respondents giving these rankings. The priority-setting attribute
15 that respondents thought NIDRR's process least reflected was "responsive to stakeholder
16 organization feedback". Only 17 percent responded "more than somewhat" or "very
17 much", and 16 percent responded "less than somewhat". A large number (40 percent) of
18 respondents answered they did not know for this attribute, larger than for the other
19 attributes.

20 Another question on the survey asked how NIDRR's long range planning and
21 priority setting processes compare with that of other federal research agencies. Twenty-

one percent of the respondents stated that they were about the same; 19% stated that NIDRR's processes were stronger, and 11% reported they were weaker. Close to half (49%) stated they did not know.

Extent to which grants are perceived as beneficial and products are used As part of assessing the extent to which NIDRR's priority-writing process enhances the quality of final results, we asked stakeholders to weigh in on whether they perceive NIDRR grants as beneficial and whether they use NIDRR products. Results are presented in Table 3-2.

Table 3-2. Distribution of Ratings of the Extent to which NIDRR's Grants are Perceived as Beneficial and Products are Used

	Scale							
		Not at all	Less than some what	Some-what	More than some what	Very Much	DK	NA
Question	N	1	2	3	4	5		
How well are the grants that NIDRR funds advancing the field in a direction that is beneficial for your organization, and the members and consumers that you represent?	72	3%	13%	29%	21%	11%	19%	4%
To what extent are the products of the grants that NIDRR funds (e.g., publications, websites, training or training materials, tool, devices, measures, interventions, etc.) used by your organization?	72	7%	24%	26%	11%	11%	18%	23%

The first row shows that 29% of the respondents from stakeholder organizations perceived that the grants that NIDRR funds are "somewhat" advancing the field in a direction that is beneficial for their organizations, and the members and consumers that they represent, and 32% stated the grants are "more than somewhat" to "very much" beneficial.

1 The survey also asked organizations and agencies to rate the extent to which grant
2 products are used (e.g., publications, websites, training materials, tools, devices,
3 measures, interventions, etc.). Twenty-six percent of the respondents from stakeholder
4 organizations reported that the products of NIDRR-funded grants are used "somewhat",
5 and 22% stated they are used "more than somewhat" to "very much".

6 In summary, the pattern across items shows that roughly one-third of the
7 stakeholders see NIDRR's priority setting processes "somewhat" reflecting important
8 positive attributes of priority setting and benefiting their agencies; one-third perceive
9 these traits to a stronger degree; and another third perceive these traits to a lesser degree,
10 or they don't know. Results indicate that further work is needed to inform and engage
11 stakeholders about these NIDRR processes. The relatively large proportion of Don't
12 Know responses across several items was somewhat surprising in a sample of NIDRR
13 identified stakeholder organizations. A post-hoc analysis of the results by type of
14 stakeholder organization (i.e., professional association, advocacy organization, and
15 federal agency) showed that the Don't Know responses could not be systematically
16 attributed to any one types of stakeholder organization, though respondents from
17 professional associations tended to have somewhat greater proportions of Don't Know
18 responses on several items.

19 **Summary of Qualitative Responses**

20 Four open-ended questions asked respondents to elaborate on their responses to
21 the previous questions and additionally to comment on suggestions they might have for
22 enhancing NIDRR's long range planning and priority setting processes:

- 1 • Please use the space below to comment on the above, or any other types of
- 2 interactions, your organization has had with NIDRR.
- 3 • What types of grants have served your organization, and the members and
- 4 consumers that you represent?
- 5 • What are the three most important NIDRR-funded products used by your
- 6 organization?
- 7 • What three things might NIDRR do to enhance its long range planning and
- 8 priority setting processes?

9 Seventy-six percent of respondents answered one or more of the four open-ended
10 questions. It is important to mention that the qualitative analysis of this narrative data set
11 results in findings that represent the views of the subset of respondents who volunteered
12 to respond to the open-ended questions, not the study population as a whole. The
13 narrative data were analyzed using standard qualitative analysis techniques involving
14 three distinct phases. The first phase involved summarizing the data, developing a
15 preliminary list of topic codes, and preliminarily sorting the data accordingly. The second
16 phase involved reducing the number of topic codes and completing the final data sort.
17 The third phase involved finalizing the topics and completing the analysis. The results
18 were broken out by the various stakeholder organization types and then further collapsed
19 into five major topics common to all of the stakeholders. These major topics included: 1)
20 the types of interactions that stakeholder organizations have with NIDRR, 2) the
21 uniqueness and strengths of NIDRR's mission and research, 3) enhancing collaboration
22 with federal agencies, 4) strengths and needs related to outreach and dissemination, and 5)

1 policies and practices related to priority setting. A summary of the stakeholders' narrative
2 responses is presented under each of these topic headings.

3 *Types of interactions the stakeholder organizations had with NIDRR* Respondents from
4 five federal agencies remarked that they have had strong collaboration with NIDRR over
5 the years on activities such as coordinating research priorities, co-funding grants,
6 participating in working groups on topics of mutual interest, and sharing information and
7 expertise. Respondents from nine of the federal agencies stated that they participate in the
8 work of the Interagency Committee on Disability research (ICDR). Respondents from
9 federal agencies also stated that they participate in other types of working groups, panels
10 and meetings to give NIDRR feedback about research priorities and long range plans
11 (n=7). For example, representatives from two federal agencies commented on the
12 strength of their collaboration with NIDRR:

13 “The synergy of the two agencies working together for 30 years may be a study of
14 braiding funding and staff which is unique to the Federal Government. Sharing
15 similar values and principles that reflect our individual Departments and what the
16 field reflects is unusual.”

17 “We have extensive scientific and strategic interaction with NIDRR. We have
18 coordinated research priorities with NIDRR plans and given presentations at each
19 other’s venues. We and NIDRR officials have served on each other’s technical
20 working groups, shared technical information and expertise that is relevant for
21 both groups.”

22 Professional associations and advocacy organizations remarked that they meet
23 with NIDRR staff to prepare materials to advocate for NIDRR funding with Congress

1 (n=3) and that NIDRR staff attend their meetings and forums to inform members about
2 funding mechanisms and research priorities (n=6).

3 *Uniqueness and strengths of NIDRR's mission and research* Respondents from seven
4 federal agencies emphasized the benefits of NIDRR's specialized mission as the
5 touchstone for all of the funding mechanisms and grants and commented that their unique
6 mission among all federal agencies, requires grantees to use the state of the art ICF as a
7 framework for all research, training, and demonstration projects. They also emphasized
8 the benefits of NIDRR's specialized scope of research, which also targets persons with
9 psychiatric disabilities and mental health issues for people of all ages and comparative
10 effectiveness research focused on health services for persons with disabilities (n=9).

11 Respondents from twelve of the other stakeholder organizations and eight federal
12 agencies commented that specific funding mechanisms which were perceived as
13 beneficial to their organizations included the Model System, FIPs, RRTCs, RERCs, and
14 DRPPs. Respondents from seven professional associations and advocacy organizations
15 applauded the funding of grants aimed at increasing accessibility for people with
16 disabilities (PWD), as exemplified by grants related to communication for deaf and hard-
17 of-hearing; availability of assistive technology; and physical and programmatic access to
18 health care, education, housing, employment. Respondents from twelve of these same
19 organizations also emphasized the benefits of grants that focus on community
20 participation, such as employment and delivery of services to PWD who are seeking
21 employment; information technology issues that prevent PWD from getting jobs;
22 outcomes research related to community participation, personal assistants, and aging with
23 developmental disabilities; and education and workforce development research.

1 ***Enhancing collaboration with federal agencies*** Respondents from four professional
2 associations and advocacy organizations commented on the need to develop stronger
3 collaborations with current federal agencies and entities, and to expand the number of
4 new potential collaborators (e.g., more coordination of priorities with institutes at NIH
5 and the Department of Veterans Affairs). Respondents from two federal agencies
6 suggested that NIDRR should make more effective use of ICDR members in their
7 strategic planning and priority setting processes, for example by delivering presentations
8 to the group with specific review requests to members. Federal agency respondents also
9 commented on the need to expand the depth and breadth of collaboration with agencies,
10 co-funding research projects with new agencies (n=3). They also suggested that an
11 important quality improvement initiative would be for NIDRR staff to become more
12 knowledgeable about the relevant research efforts and products of other agencies to seek
13 opportunities and avoid duplication of effort (n=4). Respondents from several of the other
14 stakeholder organizations also suggested establishing quality improvement initiatives
15 related to priority setting, for example, in the form of investigating how other federal
16 agencies establish priorities, communicate the details of the process, and incorporate
17 feedback (n=8).

18 ***Strengths and needs related to outreach and dissemination*** Although respondents from
19 four professional associations and advocacy organizations stated that they were unaware
20 of available NIDRR products, eight other professional associations and advocacy
21 organizations commented that NIDRR's website and linked sources provide easy access
22 to information, resources, technical assistance and research results (e.g., National
23 Rehabilitation Information Center (NARIC), assistive technology use, evidence-based

1 information on employment, national leadership in disability statistics, guidelines for
2 accessible digital media). Federal agency respondents (n=11) also commented that
3 NIDRR's website and linked sources provide easy access to research-based articles, other
4 reports, resources and products, such as NARIC, Center for International Rehabilitation
5 Research Information and Exchange (CIRRIE), Repository of Recovery Resources,
6 RERCs, RTCs, RRTC's, health promotion for PWD, accessibility guidelines, and ADA
7 technical assistance.

8 However there were several suggestions on ways to enhance NIDRR's outreach
9 and dissemination activities to inform their planning and priority setting. For example,
10 respondents from five federal agencies recommended expanding and refining NIDRR's
11 outreach plan by including experts in a wider variety of disciplines and heads of research
12 and evaluation departments of other federal agencies. For greater outreach, some federal
13 agency respondents (n=4) suggested increasing stakeholders' awareness of NIDRR
14 accomplishments by initiating a new public relations campaign using "bragsheets" and
15 disseminating information about companies and vendors who use products based on the
16 results of NIDRR-funded projects. Seven professional association and advocacy
17 organization respondents commented on the need to develop better user-friendly ways for
18 NIDRR to receive feedback from stakeholders (e.g., provide summaries of larger
19 planning documents, develop electronic capacity to insert comments directly into Long
20 Range Plans undergoing public review and comment). In addition, several respondents of
21 these same stakeholder organizations (n=12) encouraged NIDRR to make more effective
22 use of the disability communities via enhanced communication approaches such as
23 webinars and presentations at already existing annual meetings.

1 *Policies and practices related to priority setting* Finally, federal agency respondents
2 commented that NIDRR should review and adapt its current policies and practices that
3 guide the processes to include standardizing timelines for planning and priority setting
4 processes and reviewing progress half way through five year plans (n=4). One of the
5 federal respondents proposed a specific set of guidelines for priority setting which:

6 "(a) point to a national vision for research that is aspirational; (b) capture the
7 imagination and support of the disability community at-large; (c) based on the
8 best available evidence and information; (d) require projects to produce
9 measurable outcomes and results; (e) promote initiatives that are supported over
10 an appropriate timeframe; (f) are multidisciplinary in nature; and (g) stimulate a
11 collaborative approach to solutions among stakeholders."

12 Respondents from three other federal agencies commented in general that NIDRR
13 should increase funding for planning and priority setting. With regard to how grants are
14 structured, respondents from four professional associations and advocacy organizations
15 remarked that NIDRR should refine the inclusion of policies and practices in funded
16 studies and projects to ensure that grants which plan to include PWDs as collaborators or
17 partners actually follow through. In this same vein, one federal agency respondent
18 commented that NIDRR's "diversity" criteria used to score applications should be
19 critically reviewed to consider requirements for including consumers in the planning and
20 implementation phases of all projects.

C. CONCLUSIONS AND RECOMMENDATIONS

1. Advisory Council

NIDRR has a broad and diverse mission that makes it challenging to set priorities that are responsive to the current state of the science and the needs of the stakeholder community. Currently, NIDRR relies on staff, the portfolio of existing projects, recent findings from completed grants, current research literature, as well as guidance from Federal partners to provide input to the priority setting process. Title II, section 205 instructs NIDRR to establish a standing Rehabilitation Research Advisory Council to support their priority setting. While NIDRR has formed ad hoc advisory bodies to support the development of Long Range Plans, a standing body has never been formed.

Recommendation 3.1: NIDRR should form and utilize a Rehabilitation Research Advisory Council to guide the priority setting process and provide input for priority setting.

A Rehabilitation Research Advisory Council is an efficient way to obtain expert input from the diverse constituency as well as expertise from the scientific community, and is utilized by most federal funding agencies. At NIH, each institute receives advice on intramural research from a National Council or a Board of Scientific Counselors, and advice on extramural research from a Board of Scientific Advisors (IOM, 1998). There is also an Advisory Committee to the Director. The work of the NSF is supported by the National Science Board, and the work of NIOSH is supported by the Board of Scientific Counselors. NIDRR should likewise have an advisory committee. NIDRR should follow

1 a similar process as was used in forming the ad hoc advisory bodies that supported the
2 development of the Long-Range Plans to form the standing body.

3 **2. Best Practices**

4 Secondly, NIDRR is a relatively small agency with a broad and diverse mission
5 and has multiple stakeholders including the scientific community and consumer groups. It
6 is important to have a consistent mechanism to gather information and input to inform the
7 strategic planning process. Strategic planning should utilize input from multiple sources
8 such as an advisory board, stakeholder input, federal agencies, the ICDR, review of
9 current literature, and state of the science conferences. Negative comments from the field
10 generated by the last Long Range Plan coupled with the plan's subsequent delay, which
11 caused NIDRR to operate under the old plan for several years beyond its intended time
12 frame, suggest a breakdown in NIDRR's priority development process. The lack of a
13 permanent director also hampers and delays NIDRR's priority development process.

14 **Recommendation 3.2: NIDRR should apply a consistent set of best practices**
15 **in the strategic planning process that is inclusive and incorporates the views**
16 **of stakeholders leading to the development of long-range plans.**

17 The committee suggests NIDRR consult the following resources for examples of
18 best practices.

19 In 2008, the World Health Organization (WHO) convened a workshop on Priority
20 Setting Methodologies in Health Research. The workshop, "(1) reviewed the main
21 priority setting methodologies utilized to date; (2) reviewed and assessed case studies of
22 priority setting in various countries and for various topic areas; and (3) developed a

1 framework of guiding principles and a practical approach to priority setting (p.2).” The
2 workshop identified, and the workshop report describes, three core domains for good
3 practices in priority setting for research in health:

4 “A. Processes for initiating priority setting based upon the principles of legitimacy
5 and fairness;

6 B. General guiding principles for the application of methods and tools for health
7 research priority setting; and

8 C. Effective follow up of commitments and outcomes.”

9 Additionally, Annex 1 of the workshop report summarizes three commonly used
10 research priority setting methods, including their strengths and weaknesses.

11 Building off the 2005 workshop report, Viergever et al (2010) propose a checklist
12 of nine common themes for good practice in health research priority setting. The nine
13 themes were derived from, “a literature review and an analysis of WHO health research
14 priority setting exercises taking place since 2005 (p.1).” The nine themes are Context,
15 Use of a Comprehensive Approach, Inclusiveness, Information Gathering, Planning for
16 Implementation, Criteria, Methods for Deciding on Priorities, Evaluation, and
17 Transparency. The checklist explains how to establish context, reviews available
18 approaches, describes criteria, and encourages well-planning for implementation,
19 evaluation, and transparency.

20 Additionally, in 2010 the Canadian Institutes of Health Research (CIHR)
21 commissioned the development of a Knowledge Translation module on Deliberative
22 Priority Setting (Campbell, 2010). This method of priority setting places increased

1 emphasis on identifying the proper inclusive, representative group to participate in the
2 process, and then *deliberating* on the nature of the priorities in substantive, interactive
3 dialogues. Campbell provides an extensive literature review as evidence that this kind of
4 process can result in high quality priorities.

5 Turning to the particular issue of stakeholder engagement, the committee thought
6 NIDRR could enhance its efforts. The following resources provide examples that NIDRR
7 should consider.

8 According to *Scientific Opportunities and Public Needs: Improving Priority*
9 *Setting and Public Input at the National Institutes of Health* (IOM, 1998), NIH received
10 public input mainly through advocacy directed at Congress and at the institution itself,
11 through standing advisory committees and boards, and through working groups and ad
12 hoc panels established to engage specific issues. The committee concluded that NIH did
13 not have adequate channels through which the public could provide input into the NIH
14 priority-setting process. The committee recommended that NIH establish an Office of
15 Public Liaison in the Office of the Director, establish a Director's Council of Public
16 Representatives, and appoint members to advisory groups from a broad range of public
17 constituencies.

18 Additionally, the Canadian Institutes of Health Research (CIHR) has recently
19 created a Citizen Engagement (CE) Framework to guide them in, “developing a cohesive
20 and consistent approach to engaging citizens in its research processes, including
21 participating in decision-making and informing strategic priorities (CIHR, 2010b).” To
22 implement the Framework, CIHR created a Citizen Engagement Handbook (2010a)
23 which outlines the Decision Tree Model used to determine why, when, who, what, and

1 how stakeholders should be included in strategic planning and priority setting. Based on
2 these answers the CE Handbook then provides guidance on developing an Engagement
3 Plan for involving citizens or stakeholders. The CE Handbook also has an extensive
4 summary of potential approaches and plans.

5 **3. Standard Calendar**

6 Finally, for many program mechanisms NIDRR has been unable to establish a
7 regular schedule for drafting, approving, and disseminating priorities and grant
8 competition announcements to the field. As stated earlier in the section on Annual
9 Priority writing, the Department of Education has an unduly lengthy review and approval
10 process for obtaining clearance for release of priority areas and notices inviting
11 applications. The variability in length of the process impacts the timing of the release of
12 NIAs. This in turn affects NIDRR's ability to widely inform individuals when a request
13 for proposal will be placed in the federal register or when the grant will be due. Posting in
14 the Federal Register on a changing schedule does not inform researchers optimally about
15 grant opportunities, especially when the grant is due 60 days after posting. This timeline
16 may result in not getting the best investigators to submit applications. Established
17 application submission and review dates with variable final decision and start dates are
18 more desirable than variable application announcements, as it might discourage new
19 applicants from competing for grants.

20 **Recommendation 3.3: NIDRR should establish a standard calendar for the**
21 **setting of priorities, request for proposals and submission of grants to**
22 **improve the efficiency of the process.**

1 NIDRR has made efforts to standardize the schedule for their regulatory priorities,
2 such as FIP, SBIR, ARRT, and Switzer. These NIAs are generally published at the end of
3 summer. NIDRR has not been able to standardize the schedule for their additional
4 mechanisms. Even within the constraints of NIDRR's long review process for publishing
5 NIAs, a standardized calendar should be formed. The committee suggests that
6 mechanisms competed on a yearly basis could establish a consistent annual schedule
7 when grant submissions are submitted and reviewed. For multi-year grants the committee
8 recommends that NIDRR establish a long-range operational plan that lists projected
9 future grant submission dates, pending funding availability in that fiscal year. With a
10 submission timeline, NIDRR can establish when proposals need to be published for
11 public comment and when a final proposed priority should be finalized.

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Chapter 4. NIDRR's Peer Review Process

This chapter addresses the following key study question:

Key Question #2. To what extent are peer reviews of grant applicants done in such a way as to enhance the quality of final results?

NIDRR uses the phrase *peer review process* to encompass all aspects of the process including developing a technical review plan, recruiting and training reviewers, conducting the review, and approving the awards. In the context of this committee's work it is challenging to directly link peer review with specific output quality. The quality of outputs is the product of multiple complex factors including the priority writing process, the funding level, the peer review process, and scientific quality of the grantees. However, it is clear that the peer review process used by NIDRR contributes significantly to the success of the grant award program and the quality of the outputs. Moreover, as described in *The Future of Disability* (IOM, 2007), during the last decade significant opportunities were identified to further enhance the quality of NIDRR's portfolio by strengthening the peer review process. In this chapter, we review and assess NIDRR's current peer review process and make recommendations to further improve the process. The chapter has three major parts. Part A describes NIDRR's peer review process. Part B presents results from the assessment of the peer review process. Finally, Part C provides conclusions and recommendations.

A. DESCRIPTION OF NIDRR'S PEER REVIEW PROCESS

The descriptive information on NIDRR's process was compiled from existing documentation, including legislation, the *Federal Register*, NIDRR and the Department of Education policies and procedures, NIDRR's Long Range Plan, Notices Inviting Applications, etc. In addition executive-level representatives of NIDRR and the Department of Education were interviewed to get a more thorough and cohesive understanding of the process. A short summary of the peer review process is presented below. See Appendix 4-1, located at the end of this chapter, for more a more detailed description of the process.

Legislative and Departmental Foundation

Title II, section 202 of the Rehabilitation Act (2006) states that NIDRR shall perform scientific peer review of all applications for research, training, and demonstration projects. The peer review is to, "be conducted by scientists or other experts in the rehabilitation field, including knowledgeable individuals with disabilities, and the individuals' representatives (p.98)." Federal employees are not allowed to be peer reviewers. NIDRR shall provide training for peer reviewers as is deemed necessary and appropriate.

Title 34 of the Code of Federal Regulations (CFR) states, "the purpose of peer review is to insure that activities supported by NIDRR are of the highest scientific, administrative, and technical quality, and include all appropriate target populations and rehabilitation problems (p.217, Disability and Rehabilitation Research Projects and Centers Program, 2009)." Applications for awards of \$60,000 or more must be reviewed by a peer review panel, with the exceptions of applications related to evaluation, dissemination of information, or conferences.

In addition, NIDRR follows the peer review requirements of the Department of Education. Per the Department Handbook for the Discretionary Grant Process, for each

1 competition NIDRR must develop an Application Technical Review Plan (a description of the
2 processes for identifying and involving reviewers, resolving conflicts of interest, working with
3 the panels, and selecting applications for funding), a Grant Program Competition File (a
4 collection of all information, decisions, or documentation related to a competition), and annually
5 evaluate and update the peer review process (Department of Education, 2009).

6 **NIDRR Grant Selection and Peer Review Process**

7 NIDRR's grant selections and peer review process consists of 11 stages (See Box 4-1 for
8 a list of all stages and Appendix 4-1 for full details). A summary of process components is
9 presented below.

10 **Box 4-1: Steps in NIDRR's Peer Review Process**

- 11 1. Peer Review Kick-off Meeting
- 12 2. Receipt of Applications
- 13 3. Recruiting Peer Reviewers
- 14 4. Peer Reviewer Training
- 15 5. Pre-Panel Correspondence
- 16 6. Panel Discussion
- 17 7. Site Visits
- 18 8. Prefunding Meeting
- 19 9. Preparation and Finalization of Slate
- 20 10. Slate Review
- 21 11. Slate Approval and Award

Competition Manager

After publication of an application kit, NIDRR holds a competition kick-off meeting and assigns a Competition Manager, a NIDRR staff member (generally the individual who wrote the description of the priority area, see Chapter 3) responsible for all aspects of the review process (NIDRR, 2010b; NIDRR, 2010c). The Competition Manager arranges for participation of additional NIDRR staff as necessary, recruits reviewers, confirms receipt of all applications, and performs a final screen of eligibility and responsiveness. NIDRR generally errs on the side of inclusivity, only ruling out applications that are ineligible or nonresponsive, allowing peer reviewers to judge the merit of all remaining applications (NIDRR Representatives, 2010).

Panel Monitor

The Competition Manager can also be the Panel Monitor. Duties of the Panel Monitor include managing logistics of panel review with assistance from NIDRR's contractor Synergy, monitoring the progress of individual reviews, and overseeing and facilitating discussion at the panel meeting (NIDRR Representatives, 2010). Competitions involving multiple panels typically employ additional Panel Monitors from NIDRR, but can include Panel Monitors drawn from across OSERS.

Synergy Enterprises, Inc.

Since 2005 NIDRR has contracted with Synergy Enterprises, Inc. (SEI) to provide support for the grant application and review process (Synergy Enterprises, Inc, 2008). SEI performs an initial screen of applications' eligibility and responsiveness prior to the Competition Manager's final screen; provides logistical support for the panel meetings; manages the post

1 meeting survey of the reviewers; collects reviewer, application, panel, and score data for NIDRR;
2 and occasionally is contracted to analyze it (an example of SEI analysis is described below).

3 **Recruiting Peer Reviewers**

4 NIDRR establishes peer review panels of three to seven members, but typically five
5 members, to review each submitted grant application (U.S. Office of Management and Budget,
6 2006; NIDRR, 2009a; NIDRR, 2010b). Large center grant competitions (RERCs, RRTC's)
7 consist of panels ranging from five to seven reviewers, depending on the kinds of expertise a
8 panel requires (NIDRR, 2010b). NIDRR utilizes standing panels for the Field Initiated Program
9 and uses core groups, defined cohorts from which reviewers are nominated for up to three years
10 in a row, for AART, SBIR, and Switzer and forms ad hoc panels for all other competitions
11 (NIDRR Representatives, 2011). Standing panels consist of seven reviewers who serve as Peer
12 Reviewers for up to three consecutive years following their initial appointment (NIDRR, 2010b).

13 The composition of each review panel is custom matched to competition requirements by
14 the Competition Manager to ensure the panel includes the expertise needed for the review
15 (NIDRR, 2010b). As part of the recruiting process, the Competition Manager screens potential
16 reviewers for conflict of interest. Due to the relative smallness of the disability and rehabilitation
17 research field, Competition Managers are often forced to rule out many qualified individuals due
18 to conflict of interest. It is not uncommon for 20 or more recruitment calls to be made in order to
19 find 5 reviewers (NIDRR Representatives, 2010). Additionally, conflicts of interest can develop
20 subsequent to the initial screening requiring reviewers to withdraw and be replaced. NIDRR also
21 strives to include qualified individuals with disabilities, or authorized representatives of
22 individuals with disabilities, as well as individuals from underrepresented populations. However,
23 as the number of individuals with disabilities who have the scientific credentials to conduct

reviews is quite small, it can be difficult to represent the views of the various disability constituencies. At times, NIDRR will include a non-expert individual with disabilities to review from the perspective of a consumer if a particularly relevant constituency will not otherwise be included.

Grant Scoring Criteria

Selection criteria applied by peer reviewers are drawn from Title 34 of the Code of Federal Regulations. Each competition includes 100 possible points allocated across the criteria and subcriteria. With the exception of the Spinal Cord Model Systems Program, where the point allocation is pre-specified, the distribution of points across the selected criteria is recommended by NIDRR staff and approved by the Secretary for publication in application packages. Box 4.2 provides an example of a DRRP competition scoring criteria. The *absolute or competitive priority* refers to those requirements that applicants must address to demonstrate their responsiveness to the requirements of the grant mechanism (e.g., DRRP) or to the specific topic (e.g., telerehabilitation).

Box 4-2

Selection Criteria Used for Assessing Applications from 2010 DRRP Application Kit

Requirement for DRRP Projects:

To meet this priority, the Disability and Rehabilitation Research Projects (DRRP) must—

- (a) Coordinate on research projects of mutual interest with relevant NIDRR-funded projects, as identified through consultation with the NIDRR project officer;
- (b) Involve individuals with disabilities in planning and implementing the DRRP's research, training, and dissemination activities, and in evaluating its work; and
- (c) Identify anticipated outcomes (i.e., advances in knowledge or changes and improvements in policy, practice, behavior, and system capacity) that are linked to the applicant's stated grant objectives.

Specific Criteria for this Competition:

The following selection criteria are used to evaluate applications under the DRRP program. The maximum score for all of these criteria is 100 points. The maximum score for each criterion is indicated in parentheses.

(a) Importance of the problem. (6 points total).

- (1) The Secretary considers the importance of the problem.
- (2) In determining the importance of the problem, the Secretary considers the following factors:
 - (i) The extent to which the applicant clearly describes the need and target population **(3 points)**.

1 (ii) The extent to which the proposed project will have a beneficial impact on the target population
2 (3 points).

3
4 **(b) Responsiveness to an absolute or competitive priority (6 points total).**

5 (1) The Secretary considers the responsiveness of the application to an absolute or competitive priority
6 published in the Federal Register.

7 (2) In determining the application's responsiveness to the absolute or competitive priority, the Secretary
8 considers the following factors:

9 (i) The extent to which the applicant addresses all requirements of the absolute or competitive priority
10 (3 points).

11 (ii) The extent to which the applicant's proposed activities are likely to achieve the purposes of the absolute
12 or competitive priority (3 points).

13
14 **(c) Design of research activities (46 points total).**

15 (1) The Secretary considers the extent to which the design of research activities is likely to be effective in
16 accomplishing the objectives of the project.

17 (2) In determining the extent to which the design is likely to be effective in accomplishing the objectives of
18 the project, the Secretary considers the following factors:

19 (i) The extent to which the research activities constitute a coherent, sustained approach to research in the
20 field, including a substantial addition to the state-of-the-art (8 points).

21 (ii) The extent to which the methodology of each proposed research activity is meritorious, including
22 consideration of the extent to which-

23 (A) The proposed design includes a comprehensive and informed review of the current literature,
24 demonstrating knowledge of the state-of-the-art (7 points).

25 (B) Each research hypothesis is theoretically sound and based on current knowledge (6 points).

26 (C) Each sample population is appropriate and of sufficient size (8 points).

27 (D) The data collection and measurement techniques are appropriate and likely to be effective (8 points);
28 and

29 (E) The data analysis methods are appropriate (9 points).

30
31 **(d) Design of dissemination activities (8 points total).**

32 (1) The Secretary considers the extent to which the design of dissemination activities is likely to be
33 effective in accomplishing the objectives of the project.

34 (2) In determining the extent to which the design is likely to be effective in accomplishing the objectives of
35 the project, the Secretary considers the following factors:

36 (i) The extent to which the methods for dissemination are of sufficient quality, intensity, and duration
37 (4 points).

38 (ii) The extent to which the information to be disseminated will be accessible to individuals with
39 disabilities (4 points).

40
41 **(e) Plan of operation (8 points total).**

42 (1) The Secretary considers the quality of the plan of operation.

43 (2) In determining the quality of the plan of operation, the Secretary considers the following factor:

44 (i) The adequacy of the plan of operation to achieve the objectives of the proposed project on time and
45 within budget, including clearly defined responsibilities, and timelines for accomplishing project tasks (8 points).

46
47 **(f) Adequacy and reasonableness of the budget (4 points total).**

48 (1) The Secretary considers the adequacy and the reasonableness of the proposed budget.

49 (2) In determining the adequacy and the reasonableness of the proposed budget, the Secretary considers the
50 following factors:

51 (i) The extent to which the costs are reasonable in relation to the proposed project activities (2 points).

52 (ii) The extent to which the budget for the project, including any subcontracts, is adequately justified to
53 support the proposed project activities (2 points).

54
55 **(g) Plan of evaluation (8 points total).**

56 (1) The Secretary considers the quality of the plan of evaluation.

- 1 (2) In determining the quality of the plan of evaluation, the Secretary considers the following factors:
2 (i) The extent to which the plan of evaluation provides for periodic assessment of progress toward-(A)
3 Implementing the plan of operation (4 points); and
4 (B) Achieving the project's intended outcomes and expected impacts (4 points).
5
6 (h) Project staff (10 points total).
7 (1) The Secretary considers the quality of the project staff.
8 (2) In determining the quality of the project staff, the Secretary considers the extent to which the applicant
9 encourages applications for employment from persons who are members of groups that have traditionally been
10 underrepresented based on race, color, national origin, gender, age, or disability (4 points).
11 (3) In addition, the Secretary considers the following:
12 (i) The extent to which the key personnel and other key staff have appropriate training and experience in
13 disciplines required to conduct all proposed activities (3 points).
14 (ii) The extent to which the commitment of staff time is adequate to accomplish all the proposed activities
15 of the project (3 points).
16
17 (i) Adequacy and accessibility of resources (4 points).
18 (1) The Secretary considers the adequacy and accessibility of the applicant's resources to implement the
19 proposed project.
20 (2) In determining the adequacy and accessibility of resources, the Secretary considers the following
21 factors:
22 (i) The extent to which the applicant is committed to provide adequate facilities, equipment, other
23 resources, including administrative support, and laboratories, if appropriate (2 points).
24 (ii) The extent to which the facilities, equipment, and other resources are appropriately accessible to
25 individuals with disabilities who may use the facilities, equipment, and other resources of the project (2 points).
26

27 Peer Reviewer Training

28 The NIDRR Competition Manager conducts a competition-specific training session for
29 all reviewers (NIDRR, 2010b). The session is conducted via telephone within a few days of
30 reviewers' receipt of applications and review materials. The session is set up by SEI and
31 generally lasts one hour. The session includes an overview of the review process, a review of the
32 selection criteria to be used in evaluating each application, a discussion of reviewers'
33 responsibilities, tips for conducting a good review, and inquiries to determine if any reviewer has
34 developed a conflict of interest.

1 Panel Meeting¹

2 The Technical Review of applications consists of two parts: individual review of
3 applications, followed by Panel review via teleconference (Kolobe, 2010; Loprest, 2010; NIDRR,
4 2009a; NIDRR, 2009b; Rivard, 2010). The review generally takes place via teleconference and
5 e-Reader over two or three days. Individual written reviews from each member of the review
6 panel, and a summary recommendation of the panel documenting an application's strengths and
7 weaknesses, are required before a grant may be awarded.

8 Grant applications are mailed to reviewers at least two weeks in advance of the review
9 whenever possible (Department of Education, 2009). Reviewers independently score and
10 comment on each application in *Technical Review Forms* (TRF) which are accessed and saved
11 electronically via e-Reader. Scores (whole numbers only) are assigned to each factor of each
12 criterion. Peer reviewers may adjust their own scores before or immediately following the
13 reviewer teleconference. A score of less than the maximum point value must be accompanied by
14 a written rationale. A maximum score does not require a written rationale, but reviewers are
15 encouraged to include comments.

16 In addition to the general review of all applications, each member of the panel is assigned
17 to be the Primary Reviewer and the Secondary Reviewer of certain applications. The Primary
18 Reviewer presents the application for discussion and writes a summary of that discussion. The
19 Secondary Reviewer provides commentary on the application and assists the Primary in writing
20 the summary.

¹ Panel Discussion procedures described here are a synthesis of written sources provided by NIDRR (NIDRR, 2009a; NIDRR, 2009b), and direct observation of panel discussions by committee members Thubi Kolobe (Kolobe, 2010), Pamela Loprest (Loprest, 2010), and co-study director Jeanne Rivard (Rivard, 2010).

1 All panel members participate in the discussion of each proposal (NIDRR, 2009a;
2 NIDRR, 2009b). Each application is discussed in turn with each reviewer, beginning with the
3 primary reviewer, presenting scores and rationale for each criterion. Differences in scores
4 between reviewers are discussed until the panel reaches a consensus score. If a panel can't come
5 to consensus on a criterion, the primary reviewer submits a description taken from the discussion
6 as to why.

7 During the teleconference, the Panel Monitor facilitates the discussion; helps the panel
8 maintain consistency criterion to criterion and application to application; reviews scores,
9 comments, and summaries for adequacy and accuracy; and provides information concerning
10 policy, regulations, selection criteria, technical review forms, conflict of interest, and
11 confidentiality. The Panel Monitor does not participate in the substantive discussion of
12 applications or related research issues.

13 For participating, NIDRR provides peer reviewers an honorarium of \$200 a day,
14 generally for one day of preparation and three days of reviewing (Doris Werwie, NIDRR,
15 personal communication, April 14, 2011). NIDRR monitors the compensation for conducting
16 peer review provided by other Federal agencies and believes they are competitive.

17 **Application Approval and Award**

18 Following peer review NIDRR holds a Prefunding Meeting involving the NIDRR
19 Director, deputy director, the two division directors, NIDRR's scientific advisor, competition
20 manager, and interested NIDRR staff to discuss the rank order of the applications and summary
21 information from the review, and develop specific funding recommendations (NIDRR, 2009a).
22 Only in rare cases do the recommendations not follow the rank order established in peer review.
23 The recommendations are then formally written up and forwarded to the NIDRR Director, the

1 OSERS Assistant Secretary, and the Office of the Secretary of Education (NIDRR, 2010c). After
2 gaining all necessary approvals the Program, Budget, and Evaluation Division obligates the
3 funds. Additionally, following a review NIDRR provides comments and suggestions for
4 improvement to unsuccessful applicants.

5 **NIDRR Competitions from 2006-2009**

6 NIDRR also provided general data on the competitions held from 2006 through 2009
7 including the number of competitions held per NIDRR grant mechanism, applications received
8 per competition, applications reviewed per competition, and awards made per competition
9 (NIDRR, 2010a). See Table 4-1. Over the four year span NIDRR held an average of 25
10 competitions each year, received an average of 492 applications each year. NIDRR reviewed
11 between 48% (RERC 2006 competition) and 100% (12 different competitions) of applications
12 received for each competition, and awarded between 8% (FIB 2009 competition) and 83% (Burn
13 2007 competition) of applications reviewed for each competition. However, the number of
14 submitted applications, reviewed applications, and awards appear to vary greatly across years
15 within mechanisms. FIR and FID are by far the most competitive of the mechanisms. Even SBIR
16 competitions, which are similar to FIP competitions, seem to be significantly less competitive.
17 Burn and DBTAC (two mechanisms which held competitions in only a year of the analyzed data)
18 are the least competitive. The changes in the numbers for the remaining mechanisms may depend
19 more on factors related to the particular topic of the competition, or the particular group of
20 applicants in a given year, than to the mechanism itself.

Table 4-1. NIDRR Competitions from 2006-2009

Mechanism	2006			2007			2008			2009		
	# of Competitions	Apps Received	Reviewed (% of received)	Awarded (% of reviewed)	# of Competitions	Apps Received	Reviewed (% of received)	Awarded (% of reviewed)	# of Competitions	Apps Received	Reviewed (% of received)	Awarded (% of reviewed)
21	-	-	-	-	-	-	-	-	-	-	-	-
Burn	-	-	-	-	2	8	6 (75%)	5 (83%)	1	13	8 (62%)	3 (38%)
DBTAC	2	27	22 (81%)	11 (50%)	-	-	-	-	-	-	-	-
DRRP	7	50	44 (88%)	8 (18%)	2	15	10 (67%)	2 (20%)	7	32	31 (97%)	7 (23%)
KT	3	12	7 (58%)	3 (43%)	-	-	-	-	2	13	9 (69%)	2 (22%)
TBI	1	2	2 (100%)	1 (50%)	1	25	22 (88%)	14 (64%)	2	13	12 (92%)	4 (33%)
RRTC	1	7	7 (100%)	1 (14%)	1	3	3 (100%)	1 (33%)	8	36	18 (50%)	8 (44%)
RERC	4	25	12 (48%)	3 (25%)	8	40	32 (80%)	5 (16%)	8	28	22 (79%)	7 (32%)
Switzer	1	55	48 (87%)	8 (17%)	1	35	31 (89%)	8 (26%)	1	33	27 (82%)	8 (30%)
FIR	1	137	129 (94%)	12 (9%)	1	125	118 (94%)	16 (14%)	1	97	93 (96%)	14 (15%)
FID	1	149	143 (96%)	8 (6%)	1	100	97 (97%)	9 (9%)	1	74	72 (97%)	8 (11%)
SCI	1	34	32 (94%)	15 (47%)	-	-	-	-	-	-	-	-
ARRT	1	7	7 (100%)	1 (14%)	1	8	8 (100%)	3 (38%)	1	9	9 (100%)	4 (44%)
SBIR I	1	90	90 (100%)	12 (13%)	1	25	16 (64%)	6 (38%)	1	61	57 (93%)	16 (28%)
SBIR II	1	22	22 (100%)	7 (32%)	1	12	12 (92%)	5 (45%)	1	16	16 (100%)	5 (31%)

Synergy Data Collection and Analysis

NIDRR contractor SEI collects and manages the data from peer reviews and about peer reviews, including the peer review scores themselves and peer reviewer feedback on the process. In 2008, NIDRR asked SEI to analyze the scoring data they had collected for the 18 competitions that occurred in 2007 (Synergy Enterprises, Inc, 2008). SEI made three notable conclusions. First, SEI concluded there appeared to be no bias for the type of individuals and organizations who receive NIDRR funding. Institutes of Higher Educations (IHE) are being funded slightly more often than non-IHEs. Second, SEI reported that some competitions, such as those under the DRRP and RERC funding mechanisms, had a noticeably higher rate of ineligible applications. Finally, while all funded applications received at least an overall score of 77, SEI observed a lack of consistency across the language for the scoring criteria in each mechanism, and no consistency in the number of points assigned to each scoring criteria within a mechanism.

SEI also surveys peer reviewers for feedback after every panel using the OSERS Panel Review Logistics Evaluation Form (Synergy Enterprises, Inc., 2010). Peer Reviewers evaluate the Pre-Review and Review Process, Logistical Support Provided by SEI, Special Needs (completed only if any special accommodation was received), and Suggestions for Future Reviews. Reviewers use a five point scale from Poor (1) to Excellent (5) to rate dimensions of the first three areas and provide comments on all areas.

NIDRR provided NRC with a summary and data collected from 147 of the 163 panel members participating in FY 2008-2009 peer reviews. Response forms indicate the 18 specific competitions they relate to, but reviewer names are not included. Of note, five panels contain fewer reviewers than NIDRR procedure recommends. To supplement NIDRR's summary, NRC conducted a reanalysis of the Pre-Review and Review Process, Special Needs, and Suggestions

1 for Future Reviews data. Data on Logistical Support Provided by SEI were not analyzed and
2 summarized by NIDRR nor the committee.

3 The Pre-Review and Review Process contains five rated dimensions, Completeness of
4 Materials, Quality of Materials, Time Allowed for Initial Review, Assistance provided by Staff,
5 and Participation by Staff. The average rating for all dimensions was between Excellent (5) and
6 Very Good (4), except for the dimension Time Allowed which rated 3.5, between Very Good (4)
7 and Good (3). The range of peer reviewer average ratings of the process per competition for all
8 dimensions runs between 3.3 and 5, except again for Time Allowed for which the range runs
9 from 1.7 to 4.8 and contains six ratings lower than the lowest rating (3.3) given to any of the
10 other four dimensions. While still, most likely, a quality rating, Time Allowed is rated
11 significantly lower overall than the other four dimensions, and for some competitions reviewers
12 seemed very dissatisfied.

13 Additionally, comments on The Pre-Review and Review Process indicated that peer
14 reviewers spent an average of 27 hours preparing for reviews, and an average of 20 hours
15 participating in the reviews. Total time spent on reviews (combined preparation and
16 participation time) ranged from a low of 15 average hours to a high of 60 average hours. It
17 should be noted, however, that some peer reviewers reported both lower amounts of time spent
18 preparing and low ratings for Time Allowed for Initial Review, indicating they had less time to
19 prepare than they wished.

20 The last question on The Pre-Review and Review Process asked reviewers to indicate if
21 the total time spent participating (preparation time plus panel time) was more than, less than, or
22 about as much time as they expected to spend. Fifty-five percent of reviewers indicated they

1 spent about as much time as they expected, 42% indicated they spent more time than they
2 expected, and 3% indicated they spent less time than they expected.

3 The Panel Review Logistics Evaluation Form also contains a section on Special Needs,
4 which includes space to rate Interpreter services, CART services, Alternate format materials,
5 Readers or scribes, and Other personal assistance, if any of these were requested. Only six
6 reviewers used this section of the form, with five rating Alternate format materials, Readers or
7 scribes, and Other personal assistance as excellent (5), and one rating Alternate format materials
8 as fair (2).

9 Finally, many reviewers provided Suggestions for Future Reviews. The most common
10 suggestion by far was to reduce reviewer time commitment, such as through reducing the length
11 of proposals, the number of proposals per competition, and/or the number of criteria. Additional
12 comments included observations about logistical support, and recognition of good work done by
13 NIDRR staff.

14 **B. RESULTS OF THE ASSESSMENT OF NIDRR'S PEER REVIEW PROCESS**

15 We first describe committee member and NRC staff observations of peer review panels.
16 We then report NIDRR staff and grantee perspectives on the peer review process including
17 challenges and suggestions for change. Finally, we relate peer reviewers' experiences,
18 perspectives, and suggestions for enhancing NIDRR's peer review process. Information was
19 gathered from: 1) observations of three peer review panels, 2) interviews with NIDRR staff
20 members, 3) surveys of NIDRR grantees, and 4) surveys of peer reviewers identified as having
21 reviewed in 2009.

1 In designing the assessment NRC staff reviewed such sources as the NSF Committee of
2 Visitors peer review model (NSF, 2011), the NIH 2007-2008 *Peer Review Self-Study* (NIH,
3 2008), and the RAND report *Evaluating Grant Peer Review in the Health Sciences* (Ismail,
4 Farrands, and Wooding, 2009). The NSF Committee of Visitors reviews the quality and
5 effectiveness of NSF's review process, the consistency of use of the review criteria, and the
6 quality and balance of the reviewers. The NIH *Peer Review Self-Study* recommended reducing
7 administrative burden, enhancing the rating system, enhancing review and reviewer quality,
8 optimizing support for different career stages and different types and approaches to science,
9 reducing the stress on the support system of science, and continuous review of peer review.
10 *Evaluating Grant Peer Review in the Health Sciences* discussed Efficiency Criteria, such as
11 bureaucratic burden and cost, Effectiveness Criteria, such as reliability, accountability, and
12 timeliness, and options for modifying peer review, such as improving efficiency through
13 moderating demand, and supporting innovation and translational research, improving fairness
14 through blinding, and strengthening reliability through improved training.

15 **Committee Observations of NIDRR Peer Reviews**

16 Two committee members and one NRC staff member individually observed three peer
17 review panels (Kolobe, 2010; Loprest, 2010; Rivard, 2010). Selected panels were mutually
18 convenient for NIDRR and the observers. Two of the observed panels consisted of fewer
19 members than recommended by NIDRR procedure. However, one Competition Manager did
20 note that having only four reviewers made for a faster review, lessening the burden on all. Two
21 of the panels dealt with conflict of interest issues resulting in smaller panels and one reviewer
22 being added only a few days before the review. One panel was under time pressure to complete
23 its work before the end of the fiscal year, so all reviewers had less than two weeks to read the

1 applications. The ED Handbook (2009) suggests that applications be mailed at least two weeks
2 in advance of the review whenever possible. One panel reviewed six applications, one panel
3 reviewed five applications, and the third panel reviewed three applications. One panel included
4 two consumers, one of whom was also a researcher.

5 NRC committee and staff members observed the process to have a high degree of
6 integrity. The panel members they observed were generally appropriately knowledgeable in the
7 field of disability and rehabilitation research and the discussions and deliberations were quite
8 thorough and probing. There was notable strength in the way they directly addressed the
9 disagreements in ratings.

10 Each panel was led by the Competition Manager/Panel Monitor, who ably guided the
11 panel members through a thoughtful and consistent review following the peer review procedures
12 outlined above. The Competition Manager was observed providing such help as reminding panel
13 members they could not use other information outside of the proposal to rate the applications,
14 should not deduct points from multiple criterion areas for the same flaw, should apply criteria
15 consistently across applications, and needed to justify all scores adequately. While operating
16 within the scope of the NIDRR procedures, differences did appear in the specific ways the
17 different panel monitors facilitated each meeting. One Panel Monitor asked for reviewers to first
18 share overall scores, then proceed to discussion of the criteria. Another Panel Monitor asked the
19 group to begin with the criteria and build to the overall scores. The preference of the Panel
20 Monitor appears to determine the specific manner in which the panel enters into their discussion
21 and reaches consensus.

22 Committee members and the NRC staff member observed that the work load for
23 reviewers seemed to be quite burdensome. Many reviewers reported spending considerable time

1 prior to the meeting reviewing and rating the applications. One reviewer said it took him seven
2 hours to review one application. One of the teleconferences started each day at 10AM and ended
3 each of three days at 4PM or 5PM. Discussion of each application generally took two hours
4 (though one application was reviewed in as little as 45 minutes). There was a two hour lunch
5 break each day, but most reviewers used a significant part of that time to revise and finalize
6 TRFs and panel summary statements. Reviewers also reported spending time in the evenings
7 between review days completing TRFs and summary statements. Throughout the calls the
8 reviewers referred to their tendency to score higher on the last applications or to rate lower due
9 to frustration and fatigue if later applications were poorly organized.

10 The applications themselves were a source of burden at times. The project narrative
11 section of the application is recommended to be no longer than 125 double-spaced pages, but
12 some narratives are longer than this. There is no page limit for other sections of the application
13 such as budget, assurances and certifications, resumes, and letters of support. The organization
14 and clarity varies greatly between applications, with the best organized clearly by criterion.
15 Some reviewers had trouble finding content in poorly organized applications, and lowered scores
16 because of this. On several occasions, a reviewer needed to point out information missed by
17 another reviewer in order to prevent an unjustified lower score. One reviewer suggested it would
18 be good if NIDRR required applicants to organize application following the order of the criteria.

19 NRC observers came away with the sense that the selection criteria were well understood
20 overall, with several exceptions, possibly due to the nature of these particular competitions.
21 Criteria such as "importance of the problem," "responsiveness to the priority," and "research
22 hypothesis" engendered some discussion between the panel members and the Competition

1 Managers. Also, one panel noticed some redundancy in several items that address access and
2 diversity.

3 Additionally, NRC observers noted two areas of potential concern. One area was the
4 relatively low number of received and reviewed applications, which could be related to the
5 publicizing of the grant announcements or the application forms themselves. Another area is the
6 structure of the panel summary which, as mostly of a list of strengths and weaknesses, lacked an
7 overall explanatory component as to why the application was or was not funded.

8 **Perspectives of NIDRR Staff and Grantees**

9 NIDRR staff members and grantees were asked open-ended questions about their
10 perspectives on NIDRR's peer review processes. Staff (n=16) were interviewed in person and
11 shared information about their roles in the process, their perspectives on the quality of the
12 processes, and suggestions for enhancing the processes. Interviewees mainly consisted of project
13 officers from the Research Sciences Division, and a few representatives from the Planning,
14 Budget, and Evaluation Division were also interviewed. One-third of the interviewees held
15 management or supervisory positions. Grantees (n=28) were asked to share their perspectives on
16 NIDRR's peer review processes through one item on a written questionnaire. Narrative data were
17 analyzed using standard qualitative analysis techniques. Following are the major findings that
18 emerged from an analysis of the narrative data.

19 **Quality and consistency**

20 Most of the interviewed NIDRR staff participates in NIDRR's peer review process as
21 competition managers and/or panel monitors. Half of the staff (n=8) thought that the process is
22 very strong. Four staff members stated that the Department of Education's grant administration

1 handbook is an important facilitator of successful and consistent peer reviews. Another
2 commented on the need for within-NIDRR standard operating procedures to promote greater
3 consistency in competitions involving multiple panels, such as FIP. Four staff members
4 suggested that panel monitors need better training to increase consistency. NIDRR is aware of
5 questions about consistency, and has recently started debriefing competition managers and panel
6 monitors after reviews for multi-panel competitions to help promote consistency.

7 **Challenges for Staff**

8 Nearly one-third of staff members described reviews as incredibly time consuming for
9 NIDRR staff, both in terms of finding reviewers and then running the panels (n=6). Two
10 respondents said the small field makes it difficult to find reviewers (n=2). A searchable database
11 assists in recruiting reviewers, but is somewhat dated and has a broad content focus designed to
12 meet the larger department's needs (n=2). One staff person suggested that a database more
13 tailored to NIDRR's needs would be useful. Additionally, panels don't have enough minorities
14 or individuals with disabilities (n=2) and panels need more active recruitment within and outside
15 of the disability field to build capacity (n=1). One staff member suggested that creating more
16 standing panels, as well as more up front support from SEI, could help alleviate the recruiting
17 burden.

18 **Reviewer burden**

19 About one-third of staff members noted how burdensome reviews are on the reviewers
20 (n=6). One remarked: "There is something like 32 items and sub-items that have that have to be
21 scored individually. And our applications are long and so it is a strenuous process for reviewers."
22 Another commented, "I think every other review I will have somebody leave the review saying I

1 can't review for NIDRR again. Not because they didn't enjoy the process. Not because they
2 didn't enjoy reading the applications but because it was too time consuming, too burdensome,
3 and it doesn't have to be to get good peer review results." One staff member stated that peer
4 reviewers are also under-compensated, even compared to other ED programs, and suggested
5 their honorarium be increased.

6 NIDRR is tackling problems identified in the peer review process through a continuous
7 quality improvement pathway (n=5). One respondent expressed a need for improved electronic
8 peer review systems for putting panels together, tracking reviewers and expertise, and managing
9 meetings and ratings. However, at the time of the interviews the environment was somewhat
10 turbulent, as a critical data system was being replaced during an extraordinarily busy review
11 schedule. A new online system for managing scores was found to be unusable, and was being
12 temporarily replaced by an email based system.

13 **Peer review scoring system**

14 The grantees' main focus was on the scoring system. For example, one grantee noted that
15 the current point scoring system puts very little attention on the effort to accelerate translation
16 and use, or to consider the implications for policy change, changes in system design, or service
17 delivery interventions. Grantee suggestions for changes to the system include amending the
18 process so that the lowest score for a proposal is discarded (n=1), using a scoring system similar
19 to that used by NIH with greater emphasis on innovation (n=1), and awarding more points to
20 applications that explain how the costs associated with the project are reasonable when
21 considered against the likely benefit to the nation of the project's outputs (n=1).

Perspectives of NIDRR Peer Reviewers

Following are the findings from a survey of peer reviewers who were asked a series of closed- and open-ended questions to inquire about: (1) their experiences and perspectives on the NIDRR peer review process, (2) how it compares to other federal research agencies' peer review processes, and (3) their suggestions for enhancements to the process.

Invitations to participate in the survey were sent to 156 individuals who served on NIDRR peer review panels during FY2008-2009². NIDRR provided names and contact information, but not the competitions they reviewed. Four potential respondents were deleted from the list because their email addresses were undeliverable even after a concentrated search. Out of those successfully invited (N=152), 121 individuals responded to the survey, with a resulting response rate of 80%. Not all of the respondents elected to answer the two open-ended questions. Fifty-eight percent responded to the first question, and 82% responded to the second question.

Quantitative data from the closed-ended survey items were analyzed descriptively to examine frequencies and measures of central distribution. The narrative data were analyzed using standard qualitative analysis techniques as described below. Results of the quantitative and qualitative analysis of responses to the 10 closed-ended items and the 2 open-ended questions follow.

Panel Participation Rates and Types of Funding Mechanisms

² The difference between this count of 156 and SEI's earlier count of 163 is likely due to a few individuals serving on multiple review panels, thereby legitimately submitting multiple forms to SEI.

From 2005 through 2010, respondents served on a median number of 3.5 review panels with a range of 1 to 18 panels (16 individuals had served on one panel and 1 individual had served on 18 panels). The most common types of program funding mechanisms reviewed were Field Initiated Projects-Research Grant (by 69% of respondents), Field Initiated Projects-Development Grants (52%), Rehabilitation Research and Training Centers (RRTC) (37%), Disability and Rehabilitation Research Projects (DRRP) - General (28%), Small Business Innovation Research - Phase I (23%) and Phase II (13%), and Rehabilitation Engineering Research Centers (RERC) (17%). Less than 6% of peer reviewers served on competitions for Model Systems Centers (Traumatic Brain Injury, Burn, and Spinal Cord Injury). From 9% to 12% of reviewers served on panels for fellowship and training grants (Switzer Research Fellowship Program and Advanced Rehabilitation Research Training Grants).

Rating the Quality of NIDRR's Peer Review Processes

Peer reviewers were asked to rate Key Elements of the NIDRR peer review processes using a scale of 1 to 5 where 1 = poor, 3 = adequate, and 5 = excellent. Table 4.2 presents the percentage of reviewers who gave each rating (1 to 5) to each element. The table is arranged from most favorably rated element (largest percentage to rate 4 and 5) at the top, to least favorably rated element (largest percentage to rate 1 and 2) at the bottom.

Table 4.2: Peer Reviewers' Perceptions of Key Elements (n=121)

Key Elements	N	1 Poor	2	3 Adequate	4	5 Excellent
Support and facilitation of the review panel by NIDRR staff	120	1%	4%	18%	28%	50%
Integrity of the peer review process overall	117	2%	3%	20%	41%	35%
Thoroughness of the deliberation (i.e., grant scoring and discussion) during the meeting.	121	0	3%	24%	31%	41%

Use of reviewers' time during the panel meeting	118	1%	8%	20%	41%	31%
Level of expertise of the peer review panel members	118	2%	9%	21%	36%	32%
Guidance in writing reviewer comments	117	1%	7%	28%	44%	21%
Quality of the training to prepare for the review	117	0	4%	32%	39%	25%
Consistency in the overall quality of the peer reviews across panels (if you have served on three or more panels).	84	1%	17%	21%	41%	20%
Appropriateness of the evaluation criteria to applications under review	119	4%	9%	26%	40%	20%
Ease of applying scoring system to applications	119	1%	16%	34%	35%	14%
Clarity of the criteria when applying them to applications	119	4%	10%	34%	41%	11%
Appropriateness of scoring system to applications under review	120	4%	21%	21%	39%	15%
Adequacy of time for review of materials before the meeting	120	8%	18%	32%	27%	16%

Approximately 80% to 90% of respondents rated all of the elements as ranging from adequate to excellent (3 to 5). Fifty percent of the respondents rated *support and facilitation of the review panel by NIDRR staff* as excellent (rating of 5), the largest percentage of reviewers to give any one rating to any element. Elements rated as more than adequate to excellent (4 to 5) by 61% or greater of the respondents included: *support and facilitation of the review panel by NIDRR staff* (78%), *integrity of the peer review process overall* (76%), *thoroughness of the deliberation* (72%), *use of reviewers' time during the panel meeting* (72%), *level of expertise of the peer review panel members* (68%), *guidance in writing reviewer comments* (65%), *quality of*

1 the training to prepare for the review (64%), consistency in the overall quality of the peer
2 reviews across panels (61%), and appropriateness of the evaluation criteria to applications
3 under review (60%). Peer reviewers surveyed by SEI likewise gave highly favorable ratings to
4 Assistance provided by Staff in the review process, and Participation by Staff in the review
5 process (supporting the NRC finding *support and facilitation*) and Completeness of Materials
6 and reviewer orientation, and Quality of Materials and reviewer orientation (supporting the NRC
7 finding on *quality of the training to prepare for the review*).

8 Additionally, two elements appear to have been rated as adequate. The same proportion
9 of respondents (34%) rated *ease of applying scoring system to applications* and *clarity of the*
10 *criteria when applying them to applications* as adequate (3), the two largest percentages of
11 respondents to give a rating of adequate (3).

12 The remaining two elements received a significantly larger percentage of poor to less
13 than adequate ratings (1 to 2) than all other elements. Twenty-six percent of respondents rated
14 *adequacy of time for review of materials before the meeting* as poor to less than adequate (1 to 2),
15 and 25% of respondents rated *appropriateness of scoring system to applications under review*
16 was also rated as poor to less than adequate (1 to 2). These are the largest percentages of
17 respondents to give ratings of poor and less than adequate, with the remaining percentages
18 ranging from 3% to 18%. Also, 43% of respondents, the smallest percentage of these ratings for
19 any element, rated *adequacy of time for review of materials before the meeting* as more than
20 adequate to excellent (4 to 5). Similarly, 54% of respondents, among the smallest percentages of
21 reviewers to give these ratings, rated *appropriateness of scoring system to applications under*
22 *review* as more than adequate to excellent (4 to 5). Peer reviewers surveyed by SEI likewise gave
23 their least favorable ratings to Time Allowed for Initial Review.

An additional survey question asked reviewers who had served on multiple panels since January 1, 2005 if, generally speaking, the quality of NIDRR peer review processes had changed over time. Twenty-four percent responded that quality had increased, 52% stated that quality is about the same, and 24% answered that quality has decreased.

On related survey items dealing with the perceived burden of reviewers' workload, 44% stated that they have more applications to review than they would like to on a given panel, and 44% stated that they spend more time on each panel than they would like to. However, on both of these items over 50% responded that the amount of time is about right. Additionally, reviewers were asked about the quality of in-person meetings vs. teleconferences, with 51% responding that in-person meetings were of higher quality, 43% responding that quality was the same, and 5% responding that teleconferences were of higher quality.

A final survey question about the NIDRR process was posed to the subset of peer reviewers (55%) who had experience with other federal agency peer review processes. Table 4.3 shows that close to half of these respondents considered the selected characteristics of NIDRR's peer review process to be about the same as other federal agencies. More than one-quarter thought NIDRR's processes were stronger to some degree; slightly less than a quarter considered NIDRR's processes to be weaker.

Table 4.3. Peer Reviewers' Perceptions of How the NIDRR Peer Review Process Compares to Other Agencies (n=64)

	N	NIDRR's are much weaker than other agencies	NIDRR's are somewhat weaker than other agencies	About the same	NIDRR's are somewhat stronger than other agencies	NIDRR's are much stronger than other agencies
Quality of the review process	63	6%	21%	37%	21%	16%

Quality of the proposals reviewed	62	2%	19%	47%	16%	16%
Transparency of the review process	61	8%	13%	46%	16%	16%
Fairness of the review process	62	7%	16%	48%	15%	15%
Reliability of the ratings	60	8%	20%	43%	15%	13%
Expertise of the panel members	62	7%	19%	50%	7%	18%

We noted that the 55% of respondents who had other federal agency review experience showed few differences from the others when the two groups were stratified according to their perceptions of Key Elements (listed in Table 4.3) The order of the Key Elements from most favorable to least favorable remained the same, though the overall percentages of more than adequate (4) and excellent (5) ratings were slightly smaller, and the overall percentages of poor (1) and less than adequate (2) were larger for those with other agency experience.

Peer Reviewers' Perceptions about NIDRR's Peer Review Processes

Peer reviewers responded to the following open-ended questions:

- Any additional comments you may have on NIDRR's peer review processes would be useful. Please use the space below. [This question followed a table asking respondents to rate Key Elements of NIDRR's peer review process.]
- What three things would you suggest to enhance NIDRR's peer review processes?

Qualitative analysis of this narrative data set involved three distinct phases. The first phase involved summarizing the data, developing a preliminary list of topic codes, and sorting the data accordingly. The second phase involved reducing the number of topic codes and completing the final data sort. The third phase involved finalizing the themes and completing the analysis. Two

1 overarching themes emerged during the qualitative data analysis. Theme I, "*Increase Peer*
2 *Reviewer Role Satisfaction*," focuses on the impact of the processes on respondents' perceived
3 levels of role satisfaction. Theme II, "*Develop Quality Improvement Initiatives*," focuses on
4 respondents' suggestions for enhancing NIDRR's peer review processes. Both themes present
5 aspects of peer review that affect the quality of final results.

6 ***Theme 1: Increase Peer Reviewer Role Satisfaction***

7 Respondents identified six sources of role dissatisfaction during the pre-meeting phase of
8 the peer review process that may negatively affect the quality of the results: (1) the time provided
9 to read and review applications; (2) the number of applications to read and review per panel
10 meeting; (3) the length of applications; (4) the lack of choice in format to view applications; (5)
11 the compensation rate; and (6) the of the online software used to comment and score applications.
12 Comments on each of these factors are summarized below and listed in Table 4.4.

13 ***Increase the amount of time to review applications prior to panel meeting***

14 Eleven respondents expressed strong concern about receiving applications too close to
15 the meeting date and advised NIDRR to send applications more than a few weeks before the
16 panel meeting, possibly as much as one (n=2) or two months (n=5). Additionally, four other
17 respondents contended that there was a link between three of the six sources of peer reviewer
18 role dissatisfaction; as articulated by one, "either give reviewers more time to review, or reduce
19 the number of applications each person has to review, and increase the compensation rate." The
20 quantitative data supports peer reviewers comments on dissatisfaction with the amount of time
21 given to review applications prior to a meeting. Ratings for *adequacy of time for review of*
22 *materials before the meeting* received the largest percentage of poor to less than adequate ratings
23 (26%), and the smallest percentage of better than adequate to excellent ratings (43%).

1 ***Decrease the number of applications reviewed per panel meeting***

2 Eight respondents also suggested that NIDRR needed to reduce the number of
3 applications each panel reviews; four of them contended that excessive numbers reduced the
4 quality of the reviews, and two of the four believed the numbers discouraged busy, experienced
5 reviewers from participating. The four suggested that decreased numbers would lead to more
6 time per application, as well as more detailed comments (stated by 2 of the 4) and useable
7 feedback (stated by 1 of the 4). Potential solutions suggested include determining, “the
8 maximum number of applications to review according to the complexity of each funding
9 mechanism,” (n=3) and enhanced pre review screening to eliminate very weak applications (n=3)

10 These comments on the burdensome number of applications assigned to each reviewer
11 echo the qualitative data, which revealed that 45% of respondents thought they received more
12 applications than they would like to review.

13 ***Reduce page length of applications***

14 Nine respondents stated that another way to reduce work load would be stricter page
15 limits. Four of the nine suggested a limit of 25 pages, and one suggested 50 pages. The
16 remaining four did not mention a specific limit. Three of the nine respondents mentioned that,
17 “NIH has already limited the page length of applications to 12 pages.” One of the nine noted the
18 additional need of page limits for appendices without offering a specific limit.

19 ***Provide reviewers with a choice of formats to review applications***

20 Eight respondents suggested that reviewers should be able to choose the format of the
21 applications they review based on their preferences, such as printed copies, on CD, or through a
22 password protected website. Respondents noted that PDF files would allow them to use the

1 search function and WORD files version would allow them to embed comments through track
2 changes.

3 *Increase the compensation rate*

4 Eleven respondents were concerned about NIDRR's compensation rate. One respondent
5 thought, "there were simply too many applications to review for the amount of reimbursement
6 provided." Four respondents were concerned that experienced reviewers may decline invitations
7 to serve based on the amount of time spent and the relatively low compensation rates.

8 Respondents suggested NIDRR increase compensation to match the rate paid in other federal
9 agencies (n=3), or increase compensation to better match the amount of time actually spent
10 preparing and reviewing (n=3). One respondent suggested increased compensation might
11 encourage experienced researchers to participate.

12 *Improve the online scoring software*

13 Fifteen respondents were concerned by the lack of user-friendly online software for
14 completing reviews. Eleven of the fifteen described the new G5 software as cumbersome with,
15 "excessively convoluted navigations". One stated, "the G5 is inaccessible for reviewers with
16 visual impairments..... [and that] my primary task should be to lend expertise to the analysis and
17 scoring of the applications... the logistical problems detract from the integrity of the review
18 process."

19 In addition to the issues mentioned above, respondents provided specific suggestions for
20 improving the software such as placing one criterion and all sub-components on a single screen
21 (n=5), allowing reviewers to enter critiques and scores for each application in one file (n=4),
22 accepting both PDF and DOC formats (n=3), adding a search/find command so reviewer can

1 more easily edit or re-score an application (n=3), and two others noted by one respondent each
 2 listed in the table below.

3 Table 4.4 lists all comments and number of respondents per topic covered under Theme I.

4 **Table 4.4 Summary of Open-Ended Responses by Number of Respondents**

THEME I: INCREASE PEER REVIEWER ROLE SATISFACTION	Number of Respondents
Increase the amount of time to review applications prior to panel meeting	
Not enough time	11
Send applications two months in advance	5
Either give reviewers more time to review the applications or reduce the number of applications and increase compensation rate	4
Send applications one month in advance	2
There is never enough time to review	1
Decrease the number of applications to review per panel meeting	
Current numbers are too high	8
Excessive numbers reduce the quality of the review	4
If the numbers were decreased, reviewers might take more time per application	4
Determine maximum number for each funding mechanism	3
Strategy to decrease numbers: pre-screen applications and reject those of poor quality or unresponsive to RFP	3
High number of applications and low compensating rate may discourage experienced researchers from participating	2
If numbers were decreased, reviewers might provide applicants with more usable feedback	1
Convene a second panel meeting when applications reach 15-20	1

Reduce page length of applications	
Reduce reviewers work load by limiting the number of pages per application	9
Decrease page number to 25 or 50	4
Consider NIH limit of 12 pages	3
Decrease page limit of appendices	1
Provide reviewers with a choice of formats to review applications	
Prefer to access PDF or WORD versions of applications online in password protected files	5
Prefer a printed copy of the applications or uploading them to a CD	3
Increase the compensation rate	
Provide a more realistic amount given the amount of time to read and score the application and participate in review panels	7
Experienced, busy researchers may decline invitations to participate on panels due to the amount of time spent and the low compensation rate	4
Match compensation rate of other federal agencies	3
Increase compensation to better match the amount of time actually spent preparing and reviewing	3
Too many applications to review for the amount provided	1
Increased compensation might encourage experienced researchers to participate	1
Improve the online scoring software	
Lack of user-friendly online scoring software	15
Navigations are cumbersome and unwanted time outs occur	11
Place one criterion and all sub-components on a single screen	5
Allow reviewers to enter critiques and scores for each application in one file	4

Accept both PDF and DOC formats	3
Add a search/find command so reviewer can more easily edit or re-score an application	3
Verify that files are fully accessible by engaging consultants with impaired vision to test the system	1
Make sure the training manual includes keyboard commands and descriptive text, so that reviewers unable to use mouse commands or see pictures can use the manual as an instructional device	1
Software is inaccessible for reviewers with visual impairments	1

Theme 2: Develop Peer Review Quality Improvement Initiatives

Respondents identified seven areas where quality improvement would likely increase the integrity and quality of the peer reviewer processes and the quality of outputs: (1) expertise of peer reviewers; (2) pre-meeting orientation and training; (3) evaluation criteria used to score applications; (4) scoring process; (5) guidance and group facilitation provided by NIDRR staff; (6) the panel discussions; and (7) feedback to applicants. Comments on each of these phases are summarized below and listed in Table 4.5.

Enhance the level of peer reviewer expertise

Three respondents stated that the level of expertise has greatly improved over the years. However, six respondents held a mixed view of panel members' level of expertise and reported variation in reviewers' knowledge of the research process, areas of scientific methods and statistics (n=4 of the six), current rehabilitation medicine research and practice literature (n=2 of the six), or disability policy (n=1 of the six). Additionally, four of the six respondents mentioned experiences in which lack of sufficient expertise in primary or secondary reviewers significantly affected the process. One respondent also mentioned a lack of equity in the number of primary or secondary reviews assigned, with some reviewers receiving twice as many as others.

1 Suggestions to address these issues included expanding peer reviewer recruitment (n=7)
2 to include more outside the NIDRR network (n=3) and federally funded researchers (n=1),
3 boosting the responsibility of the secondary reviewer to balance out a potentially inexperienced
4 primary reviewer (n=1), asking reviewers to select applications for which they could serve as a
5 primary or secondary review (n=1), bringing in an ad-hoc topic or methods expert if necessary
6 for an application (n=1).

7 Three respondents mentioned the unintended consequences of inviting people with
8 disabilities who do not have research expertise to serve as peer reviewers; one of them stated,

9 “I have served on several different panels in which reviewers did not have any
10 research training, and were clearly not qualified to conduct research reviews. While I
11 appreciate the need for consumer input into the grant process, these individuals
12 fundamentally weaken the integrity of the review process because of their inability to
13 evaluate the rigor of research designs.”

14 Two of the three concluded that, “there is an urgent need to include a greater number of
15 experienced researchers with disabilities to serve on panels.”

16 While the comments on expertise are mixed, 68% of respondents rated *level of expertise*
17 *of the peer review panel members* as more than adequate or excellent, with only 11% rating poor
18 to less than adequate.

19 ***Improve the quality of pre-meeting orientation and training***

20 Ten respondents urged NIDRR to institute several quality improvement initiatives to
21 increase the effectiveness of pre-meeting training. Seven of the ten stated that both experienced
22 and novice reviewers could benefit from additional training to better understand the qualities of

1 excellent, moderate, and poor quality reviews. Suggestions include developing examples of
2 excellent, average, and poor reviews of practice applications (n=5), creating separate and
3 additional training sessions for novice reviewers and others who need additional training (n=4),
4 providing separate training for non-researchers (n=3), developing online training modules which
5 would be available at all times for reviewers to use as-needed (n=2), providing a list of each
6 application's investigators, consultants, and institutional affiliations (n=2), providing training
7 throughout the calendar year (n=1), assigning first time reviewers with mentors (n=1), providing
8 brief bio-sketches for each panel member (n=1),

9 Eight respondents suggested that training sessions and pre-meeting materials need to
10 include more information about, how to distinguish one criterion from another (n=8), how to
11 translate the scoring criteria to actual applications (n=7), how to use the online software (n=6),
12 the purposes of the priority to be funded (n=3), how the panel will be facilitated by NIDRR staff
13 (n=2), the specifics of what each criterion measures (n=1).

14 Despite these suggestions of improving training, the quantitative data suggests NIDRR
15 already has high quality training. No respondents rated training as poor, only 4% of respondents
16 rated training as less than adequate, 96% rated training as adequate to excellent, and 64% rated
17 training as more than adequate to excellent.

18 ***Improve the evaluation criteria used to score applications***

19 Thirteen respondents expressed varying degrees of frustration that the criteria were
20 "ambiguous, overlapping, and redundant." One of the thirteen captured the views of the twelve
21 others, "the distinctions between criteria are too subtle and are very difficult for reviewers to
22 distinguish one criterion from another." Five of these thirteen suggested the redundant and
23 ambiguous criteria could lead to inconsistent interpretation, wider discrepancies between

1 reviewers, decreased ability to identify the best applications, all of which diminish the quality of
2 the review.

3 Six additional respondents stated that the criteria did not adequately evaluate innovation,
4 feasibility, and scientific merit. One of the six found the criteria to be “less scientific and more
5 political” in orientation. Three respondents believed that the “plan of evaluation” criterion was
6 overemphasized. Finally, two respondents described frustration that participation by both ethnic
7 minorities and persons with disabilities was not adequately being measured by the “diversity”
8 criterion.

9 In order to address the repetitive, ambiguous nature of the criteria, nine respondents
10 advised NIDRR to “combine duplicative criteria,” and to “specify what each criterion measures.”
11 In order to address the scientific inadequacy of the criteria, respondents suggested better
12 matching of criteria and funding mechanism (n=4), developing new and innovative ways for
13 applicants to demonstrate that “diversity” is considered in staffing configurations and
14 contributions to diverse communities (n=2), adding a new criterion, “impact on the field” (n=1).
15 One respondent also suggested that reviewers should not evaluate budgets.

16 While the peer reviewer comments highlighted faults with the criteria, the data provided
17 by peer reviewers suggest the evaluation criteria are generally seen as adequate. Sixty percent of
18 reviewers rated *appropriateness of the evaluation criteria to applications under review* as more
19 than adequate to excellent, and 34% of reviewers rated *clarity of the criteria when applying them*
20 *to applications* as adequate.

21 ***Improve the scoring process used to rate the criteria***

1 Ten respondents agreed there is considerable variation in how reviewers apply the
2 scoring system to evaluate applications. Two of these respondents noted extreme cases of
3 reviewers scoring much higher or much lower than all other panel members for all applications.
4 One respondent attributed this to the steep learning curve reviewers experience during their first
5 meeting.

6 Additionally, eight respondents were critical of how NIDRR weights the importance of
7 some criteria. Members of this group thought that in some cases primary issues were not given
8 enough weight (n=1), minor details were given too much weight (n=1), and the weighting
9 approach was not flexible enough to be adjusted between competitions (n=1). One respondent
10 also expressed concern that, "there are some criteria that are allotted a total of 1 point --- that is
11 really splitting hairs and is not significant."

12 To achieve greater scoring consistency among reviewers, five respondents advised
13 NIDRR to "develop a standardized set of scoring procedures" and a set of training "materials
14 using concrete examples of how to score applications appropriately." These materials would help
15 reviewers translate the scoring criteria to the actual applications (n=1). Four respondents
16 suggested ways to improve the user-friendliness of the scoring system, such as through adopting
17 a 0-10 scale for each criterion (n=1), beginning, "with the lowest scoring applications to practice
18 scoring as a group (n=1)." Additionally, two suggested that more weight be added to the criterion,
19 "implementation and outcomes", while another advised NIDRR to give more weight to the,
20 "significance of the project and the track record of the applicant", and less to researcher
21 qualifications as, "most applications have qualified personnel."

22 Finally, two respondents expressed diametrically opposed views about the weight given
23 to the "diversity" criterion. One respondent stated too much weight is given for diversity such

1 that the application's scientific rigor could be diluted, and the other stated far too little weight is
2 given to diversity such that applications could be approved with only token representation.
3 Common ground could possibly be reached by following the suggestion, described in the
4 previous section, that NIDRR develop new and innovative ways to demonstrate diversity.

5 Quantitative data on *appropriateness of scoring system to applications under review*
6 supports the peer reviewer comments, as 25% of respondents rated this element as poor to less
7 than adequate (the second largest percentage to give such a rating). However, 34% of
8 respondents rated *ease of applying scoring system to applications* as adequate, the largest
9 percentage to give such as rating.

10 *Address the inconsistent quality of the guidance and group facilitation provided by NIDRR*
11 *staff*

12 Six respondents noted the high quality of staff guidance. However, ten respondents
13 thought the quality of staff guidance varied, with some staff being more knowledgeable about the
14 process (n=4), more organized (n=1), and more efficient than others (n=1). Nine respondents
15 stated that the NIDRR panel monitors they interacted with lacked sufficient skills in guidance
16 and facilitation. Two of these nine also noted confusing inconsistency in the direction given by
17 different NIDRR staff members, for example, "some staff advocate for reviewers to start from
18 zero and add points for positive features, whereas others say one should start from the maximum
19 number of points and subtract for specific weaknesses or problems." Also, five of the nine
20 respondents were concerned that staff didn't have the knowledge base or skill set to recognize
21 and manage reviewer bias.

22 Suggestions to improve the quality of guidance and facilitation include developing new
23 training and materials on, "managing situations where one reviewer dominates the discussion"

(n=4), "including all reviewers in the discussion", (n=2), "insisting on courteous behavior at all times" (n=2), and encouraging discussion and allowing for disagreements (n=2). While these are reasonable suggestions, it must be noted that *support and facilitation of the review panel by NIDRR staff* was the element rated most favorably in the perceptions of peer reviewer data.

Reduce variation in the quality of the panel discussions

Reviewers noted several factors that affect discussion quality, including discussion venue, unprepared reviewers, weak applications, and reviewer bias. The most frequent topic raised by respondents was face-to-face meetings vs. teleconferences (n=19). Fourteen respondents noted only the benefits of their preferred venue, while five others described the trade-offs. Three respondents were mindful of the current and future cost-savings of using teleconferences, but were against their exclusive use. One of the three advised NIDRR to use face-to-face meetings for "large Center applications and all 5-year award programs." Two respondents hoped that, "video-conference calls would help to bridge the gap between the pros and cons of each venue."

Among the 19 respondents, many held differing views on the effectiveness of meeting by teleconference. Opinions ranged from "teleconferencing is very adequate" (n=6), to "it's possible to have an engaged teleconference, it's just more difficult" (n=1), and finally, "teleconference reviews are a failed experiment" (n=6). The nineteen respondents identified three pros, such as, "The quality of the reviewers increase because there is no need for people to travel and significantly disrupt work and family schedules sign," (n=4) and nine cons such as, "The quality and depth of the panel discussions has deteriorated since teleconferences have been substituted for in-person meetings," (n=9) of teleconference panel meeting. See Table 4.5 for the complete list. Respondents also identified seven pros of face-to-face meetings, such as, "Discussions are of a higher quality" (n=12). See Table 4.5 for the complete list. Respondents did not specifically

1 mention any cons of face-to-face meetings, but they are implicit in several of the pros of
2 teleconference meetings.

3 Additionally, four respondents reported frustration with unprepared reviewers. Three
4 respondents expressed frustration at discussing very weak applications, which two suggested
5 interfered with discussion of more worthy applications in greater depth. Three respondents were
6 concerned by reviewer bias, one noting, “individual biases and not having the ‘right’ people at
7 the table for the type of review being conducted unfortunately tend to influence the final
8 outcome.”

9 Five respondents offered ideas to better ensure reviewer preparedness, including
10 requiring all reviewers to write summaries of each application (n=2), and requiring all reviewers
11 to submit their comments and scores before the meeting (n=1). One respondent advised NIDRR
12 to disqualify weak applications, leaving reviewers to evaluate, “only those applications that have
13 potential for good scores.” Two reviewers shared the idea that expanding the peer reviewer
14 recruitment pool would help combat bias and inject objectivity into the process. Three
15 respondents suggested forming more standing panels could increase the consistency and quality
16 of individual competition reviews as panel members would have more experience. One of the
17 three noted that standing panels could also improve quality across competition years as the same
18 reviewers would evaluate re-submitted applications (n=1). Two respondents suggested limiting
19 the number of discussion hours per day, or scheduling more days but fewer hours, or possibly
20 even holding panel meetings only during academic breaks (n=1) as ways to improve quality and
21 lower reviewer fatigue.

22 Concerns about the quality of the panel discussions were not as evident in the quantitative
23 data. Seventy-two percent of respondents rated *thoroughness of the deliberation* as more than

adequate or excellent, and 72% of respondents rated *use of reviewers' time during the panel meeting* as more than adequate or excellent. Only 3% of respondents rated *thoroughness of the deliberation*, and 8% of respondents rated *use of reviewers' time during the panel meeting* as poor or less than adequate. Additionally, 53% of survey respondents thought panels generally took the right amount of time. However, 52% of survey respondents thought that quality of peer reviews is better in-person, 40% of respondents believed that quality is similar between in-person reviews and teleconferences, and 8% replied that teleconference reviews are better quality than in-person reviews.

Improve the quality of feedback provided to applicants

While one respondent stated that, "reviewers' comments to applicants seem useful," four others shared the view that the "format and quality of the feedback to applicants lacks depth and specificity." Improvement in the quality and consistency of feedback to applicants could contribute to building capacity in the field (n=2).

Five respondents suggested NIDRR develop strategies to increase the quality of the feedback given to applicants including, providing comments from all or most of the panel members and a discussion summary, similar to NIH procedure (n=2), reviewers taking turns being note-takers (n=1), and standardizing the format of the feedback (n=1).

Concerns about the quality of feedback to applicants are not supported by the quantitative data. Sixty-five percent of respondents rated *guidance in writing reviewer comments* as more than adequate or excellent, one of the larger percentages to rate an element as more than adequate or excellent. Only 8% of respondents rated *guidance in writing reviewer comments* as poor or less than adequate, one of the smaller percentages of respondents to rate an item as poor or less than adequate.

- 1 Table 4.5 lists all comments and number of respondents per topic covered under Theme
- 2 II.
- 3 **Table 4.5 Summary of Open-Ended Responses by Number of Respondents**

THEME II DEVELOP QUALITY IMPROVEMENT INITIATIVES	Number of Respondents
Enhance the level of peer reviewer expertise	
Expand the peer reviewer recruitment pool	7
Mixed view of reviewers' level of expertise	6
Too much variation in reviewers' knowledge of the research process, especially in methods and statistical analysis	4
Primary and secondary review assignments sometimes don't match the reviewers' knowledge base and skill set and the quality of the discussion is diminished	4
Over the years, the level of expertise has greatly increased	3
Unintended consequences of inviting reviewers who do not have the knowledge base or skills to evaluate the methodology of applications diminish the rigor of the review	3
Seek reviewers who are outside of the NIDRR network to increase the objectivity of reviews	3
Urgent need for reviewers with disabilities who have research expertise	2
Some reviewers are not familiar with current rehabilitation medicine research and practice literature	2
Some reviewers are not familiar with disability policy	1
Provide reviewers with abstracts of applications during the training period and ask them to check the applications where they are qualified to serve as primary or secondary reviewer	1
When primary or secondary level of expertise is missing among panel members, invite ad-hoc reviewers	1
Lack of equity in number of primary and secondary responsibilities per review panel	1
Seek reviewers who have received federal funding	1
Boost the responsibility of the secondary reviewer to balance out a potentially inexperienced primary reviewer	1
Improve the quality of pre-meeting training and orientation	
Quality improvement initiatives are needed to increase the effectiveness of training	10
Training on how to distinguish one criterion from another	8
First and second time reviewers and somewhat more experienced reviewers would benefit from training sessions focused on increasing their knowledge of excellent, average and poor reviews of two sample applications	7

Training on how to translate the scoring criteria to actual applications	7
Training on how to use the online software	6
Develop examples of excellent, average and poor reviews of two sample applications and design online training modules to guide these reviewers through the decision making processes	5
Separate training sessions should be provided for first time reviewers and other reviewers needing additional training	4
Separate training sessions should be provided to non-researcher to instruct them in the basics of scientific inquiry and how their perspectives can contribute to the evaluation process	3
Training on the purposes of the priority to be funded	3
Develop online training modules which would be available at all times for reviewers to use as-needed	2
To avoid conflicts of interest, as soon as reviewers receive the applications, provide them with a list of investigators, consultants and university affiliations for each application	2
Training on how the panel will be facilitated by NIDRR staff	2
Provide introductory training sessions for potential reviewers throughout the calendar year	1
Provide first time reviewers with mentors to guide them through the process	1
Training materials should include brief bio-sketches of each panel member to encourage congeniality	1
Training on the specifics of what each criterion measures	1
Improve the evaluation criteria used to score applications	
Criteria are ambiguously defined, overlap and are redundant	13
Combine duplicative criteria and define what each criteria Measures	9
Criteria should primarily evaluate innovation, feasibility and scientific merit	6
Redundant and ambiguous criteria lead to inconsistent interpretation, wider discrepancies between reviewers, and decreased ability to identify the best applications.	5
Adjust criteria for each funding mechanism	4
The "plan of evaluation" is the most poorly defined criteria	3
Frustration with diversity criteria	2
Develop new and innovative ways for applicants to demonstrate that "diversity" is considered in staffing configurations and contributions to diverse communities	2
"the distinctions between criteria are too subtle and are very difficult for reviewers to distinguish one criterion from another."	1
Criteria are "less scientific and more political" in orientation	1
It is not appropriate for reviewers to evaluate budgets	1
Add a new criteria "impact on the field"	1
Improve the scoring process used to rate the criteria	
There is variation in how reviewers apply the scoring system	10

Current weighting of criteria is inappropriate	8
"develop a standardized set of scoring procedures"	5
Increase user-friendliness of the system	5
Variation in how reviewers apply scoring system can lead to extreme higher and lower scores	2
Current weighting of "diversity" criteria is problematic	2
Add more weight to the criterion, "implementation and outcomes"	2
Primary issues were not given enough weight	1
Minor details were given too much weight	1
Weighting approach was not flexible enough to be adjusted between competitions	1
"there are some criteria that are allotted a total of 1 point --- that is really splitting hairs and is not significant."	1
Variation due to steep learning curve reviewers experience during their first meeting.	1
Training materials would help reviewers translate the scoring criteria to the actual applications.	1
Adopting a 0-10 scale for each criterion	1
Begin, "with the lowest scoring applications to practice scoring as a group."	1
More weight to the, "significance of the project and the track record of the applicant", and less weight to, "most applications have qualified personnel."	1
Address the inconsistent quality of guidance and group facilitation provided by NIDRR staff	
The guidance and group facilitation was of a mixed quality, e.g., ranged from excellent to very poor; lacked sufficient knowledge about the review process to be able to answer concrete questions; some only read the printed directions to reviewers out loud	10
Lacked sufficient group facilitation skills and guidance strategies	9
Staff provided high quality guidance and group facilitation	6
Train staff to recognize the most common forms of bias and how to manage obviously biased reviewers during the discussion	5
There is variation in the quality of staff guidance, with some staff being more knowledgeable about the process	4
Develop training materials on, "managing situations where one reviewer dominates the discussion"	4
Confusing inconsistency in the direction given by different NIDRR staff members	2
Develop training materials on, "including all reviewers in the discussion"	2
Develop training materials on, "insisting on courteous behavior at all times"	2
Develop training materials on encouraging discussion and allowing for disagreements	2
There is variation in the quality of staff guidance, with some staff being more organized than others.	1
There is variation in the quality of staff guidance, with some staff being more efficient than others.	1

Reduce variation in the quality of the panel discussions	
The best meeting venue – teleconferences vs. face-to-face meetings --- was debated	19
“teleconferencing is very adequate”	6
“teleconference reviews are a failed experiment”	6
Teleconferences save costs, but should not be used exclusively	3
“video-conference calls would help to bridge the gap between the pros and cons of each venue.”	2
“it’s possible to have an engaged teleconference, it’s just more difficult”	1
Use face-to-face meetings for “large Center applications and all 5-year award programs.”	1
<i>Pros of Teleconferences</i>	
“The quality of the reviews increase because there is no need for people to travel and significantly disrupt work and family schedules sign”	4
“Teleconferences are a huge time and money saving venue”	3
“There is more flexibility in scheduling meeting days and times”	1
<i>Cons of Teleconferences</i>	
“The quality and depth of the panel discussions has deteriorated since teleconferences have been substituted for in-person meetings” (	9
“Valuable face-to-face interactions are missing”	5
“The evaluation process is more difficult and very difficult with larger committees”	4
“The overall expectation of spending two 7 hour days on a phone is a bit much”	3
“Some reviewers believe they are still at work at their usual job, e.g., some reviewers take phone calls during meetings”	2
“There is a loss of group cohesion which at times allow one individual to dominate the discussion”	1
“It’s easier to do a poor job reviewing applications when people don’t have to interact with each other face-to-face”	1
“Time zones can interfere with teleconferences”	1
“Reviewers focus well when serving as primary or secondary reviewers; with the other applications they are not nearly as focused”	1
<i>Pros of Face-to-face</i>	
“Discussions are of a higher quality”	12
“Face-to-face interactions are valuable”	8
“When reviewers are away from their working environments they can focus 100% on the process”	5
“There are more in-depth conversations during formal meetings and during breaks with in-person meetings”	4
“Reviewers seem more engaged most of the time”	4
“There is higher quality discussion and dialogue around design and methodology”	2
“Are better for some reviewers with severe disabilities”	1
High level of frustration when reviews come to the meeting unprepared, e.g.	4

without reading or scoring all of the proposals	
Too much time is wasted reviewing very poor applications; reduce by disqualifying applications of little merit	3
Concern with the amount of reviewer bias	3
Form more standing panels	3
Discussing very weak applications interferes with discussion of more worthy applications in greater depth	2
Require all reviewers to write summaries of each application	2
Expand the peer reviewer recruitment pool	2
Limit the number of discussion hours per day	2
Require all reviewers to submit their comments and scores before the meeting	1
Disqualify weak applications	1
Standing panels would allow reviewers to evaluate resubmitted applications over several years	1
Hold panel meetings only during academic breaks	1
Improve the quality of feedback provided to applicants	
Develop strategies to increase the quality of the feedback	5
Lack depth and specificity	4
NIDRR could build capacity in the field by increasing the quality of feedback	2
Provide comments from all or most of the panel members and a discussion summary, similar to NIH procedure	2
Seem to be useful	1
Reviewers should take turns being note-takers	1
NIDRR should standardize the format of the feedback	1

C. CONCLUSIONS AND RECOMMENDATIONS

Of the reviewers who had experience with reviews for other funders (55% of respondents), the largest percentage (37-50%) believe that NIDRR's peer review process is about as strong as the peer review process of other agencies. A respectable percentage of reviewers (24-37%) view NIDRR's peer review process as stronger than the process used by other agencies. On the other hand, a significant number of reviewers (21-28%) think that NIDRR's review process is weaker than the process used by other agencies. The Committee agrees that NIDRR's peer review process is generally good; nonetheless, significant opportunities for further enhancement exist which would likely improve the quality of final results. The Committee believes improvements can be made to NIDRR's process, to the peer reviewer experience, and to the use of consumers on panels.

1. Enhancing the Peer Review Process

The Committee believes that NIDRR's peer review process is hampered by a limited pool of potential reviewers. The Committee recognizes the care with which NIDRR Competition Managers assemble and facilitate review panels. NIDRR staff spends considerable time recruiting and screening potential reviewers. Competition Managers regularly have to manage potential conflict of interest and rule out qualified reviewers. Unfortunately, despite the effort of NIDRR's staff, a number of panels are smaller than recommended size, a number of reviewers are added so close to the meeting date they don't have adequate time to prepare, and primary, secondary, and general reviewers possibly lacking necessary scientific expertise are participating in the process.

1 The Committee concluded that improving the following areas of NIDRR's peer review
2 process would likely enhance quality of outputs: increased use of standing panels, enhanced
3 reviewer training, and greater consistency in the feedback and management provided by
4 NIDRR's staff. Forming more standing panels would reduce the recruiting burden on NIDRR
5 staff and provide reviewers more experience with the process, both of which would lead to more
6 consistent and high quality reviews. While some reviewers reported quality training, the
7 Committee thinks that further enhancing training would be a simple and effective way to
8 increase the quality of the process. Finally, as panel monitors have different preferences as to
9 how panels should be run and different amounts of experience guiding panels, considerable
10 variation exists between competitions. The Committee believes that inconsistency between
11 competitions, even if all competition managers adhere to NIDRR rules, results in confusion and
12 negatively influences overall quality.

13 **Recommendation 4.1: NIDRR should enhance the peer review process by expanding**
14 **the potential reviewer pool, establishing standing panels for the appropriate**
15 **granting mechanisms, enhancing reviewer training, and improving the consistency**
16 **of the management provided by NIDRR's staff.**

17 Examples of possible ways to increase the reviewer pool include formally reaching out to
18 new groups of researchers, such as individuals who review for NCMRR, NIH and AHRQ. The
19 Committee recognizes that, per Title II of the Rehabilitation Act, federal employees are not
20 allowed to be peer reviewers. However, in other peer review settings federal employees are not
21 necessarily prevented from serving as reviewers depending on their agency regulations. For
22 example, with supervisor approval NIH employees can serve as peer reviewers for other federal
23 agencies as an Official Duty Activity provided the competitions did not involve any NIH funds

1 (see, <http://www.niehs.nih.gov/about/od/ethics/duties/oda/index.cfm>). [NOTE: Unsuccessfully
2 tried to find something similar about VA scientists. Any help would be appreciated] NIDRR
3 should consider investigating if Title II could be amended to allow for federal peer reviewers.

4 NIDRR has made efforts to use standing committees for FIP competition and core groups
5 AART, SBIR, and Switzer. While use of standing committees would be more challenging for
6 other mechanisms, the committee believes NIDRR should consider further expanding the use of
7 standing committees (so that fewer new panels are established each year). The use of standing
8 committees for the other grant mechanisms will require careful thought but should be possible
9 and would ease both reviewer and staff burdens.

10 Training enhancements could include sharing the reviews of successful grant applications,
11 providing concrete examples of how to translate scoring criteria to applications, and requiring
12 trainees to observe panels before they become official reviewers.

13 **2. Quality Improvement Plan**

14 Secondly, it is apparent that participating in NIDRR's peer review process is a significant
15 burden for a large percentage of reviewers. Many reviewers spend more time than they wish to
16 preparing, and review days themselves are long and intense. The Committee believes that the
17 process is so burdensome to peer reviewers as to threaten its quality. Insufficient time to review
18 all proposals prevents reviewers from participating in quality review discussions. The significant
19 time commitment prior to and during the review makes it less likely that qualified and
20 experienced reviewers will participate.

1 **Recommendation 4.2: NIDRR should develop and institute a quality improvement**
2 **plan to enhance and streamline the review process, reduce the burden on peer**
3 **reviewers, and assure that high-quality reviewers are selected.**

4 NIDRR should reduce burden by implementing page length restrictions, simplifying the
5 application format, scoring criteria and software, and limiting the number of proposals a single
6 panel is to review. Formats for the same awards mechanism should be standardized.
7 Additionally, the Committee believes NIDRR's requirement to write a rationale only when
8 giving sub-maximum scores is a potential disincentive for reviewers to give less than maximum
9 points. NIDRR should consider options to address the written rationale potential disincentives as
10 well as to reduce scoring complexity (with the exception of Spinal Cord Model systems grants,
11 for which scoring criteria are defined in the CFR). NIDRR is already taking actions to improve
12 the software used to score proposals; these efforts should continue. NIDRR should consider
13 improving the quality of reviewers by providing reviewers with more time to review proposals,
14 and improve transparency by publishing the names of peer reviewers for each competition as is
15 common practice in other federal agencies. NIDRR should also monitor how peer reviewers
16 perform so that ineffective reviewers are counseled on review procedures and/or not invited to be
17 on subsequent panels. The committee urges NIDRR to consult with other federal agencies that
18 have similar peer review panels, such as the National Institutes of Health (NIH) and the National
19 Science Foundation (NSF) for guidance on actions they have taken to assure that reviewers are
20 of high quality.

21 **3. Consumer Peer Reviewers**

22 Finally, NIDRR faces challenges related to the participation of consumers on peer review
23 panels. To address its mission, NIDRR makes concerted efforts to include qualified individuals

1 with disabilities or representatives of individuals with disabilities. However, NIDRR at times has
2 difficulty placing appropriate consumers on panels. While many consumers who regularly serve
3 are scientists, not all individuals with disabilities who serve on NIDRR review panels have the
4 research experience or the expertise required to conduct rigorous scientific reviews. Nonetheless,
5 consumers without scientific backgrounds are asked to score grants on all review criteria,
6 including addressing scientific merit. The Committee thinks that consumers without scientific
7 knowledge can make an important contribution to peer review, but asking such consumers to
8 evaluate science may compromise the quality of the review.

9 **Recommendation 4.3: NIDRR should systematically assess how consumers without**
10 **scientific expertise should best be included in the review process and develop**
11 **procedures to better guide such participation.**

12 NIDRR should consider policies and practices for obtaining meaningful and scientifically
13 appropriate input from consumers during peer reviews. Potentially, consumers without scientific
14 expertise could be instructed to review only certain aspects of proposals. The committee suggests
15 NIDRR consult the following resources for examples of ways to evaluate and obtain consumer
16 input.

17 Andejeski et al (2002) evaluated the impact of having nonscientist consumers participate
18 in peer reviews of breast cancer research proposals. Researchers compared and analyzed
19 consumer versus scientist scores, and collected opinions from consumers and scientists on
20 perceived advantages and disadvantages of consumer participation. Analysis of the scores
21 revealed no substantial differences in consumer scoring verses scientist scoring. The vast
22 majority of both consumer and scientist respondents perceived consumer participation as highly

1 advantageous and the proportion generally increased postpanel vs. prepanel. Perhaps NIDRR
2 could engage in a similar study of the impact consumers have on their review process.

3 Additionally, Shea et al (2005) describe how the Cochrane Musculoskeletal Group
4 (CMSG) strategically involves consumers in their priority setting, peer review, and knowledge
5 translation processes. Specific to peer review, CMSG involved consumers in improving and
6 refining their process and criteria to better allow consumer participation. Each review now
7 includes one consumer. CMSG trains consumers, both in terms of general relevant scientific
8 knowledge and specific knowledge of review procedures, through one-on-one coaching,
9 consumer workshops, and as part of annual symposiums.

10 Also, Saunders et al (2008) designed a training program through which nonscientist
11 consumers could learn to independently review health and medical research. In this program,
12 consumer review is designed to take place subsequent to and in support of scientific review. The
13 two day training involves an introduction to the scope of health and medical research, a general
14 discussion of the review process, an overview of relevant research disciplines, a detailed review
15 of the specific procedures and criteria the consumers will use, and a practice review involving
16 individual scoring, group discussion, and consensus building on a rank order of applications.
17 Testing of the training resulted in consumers confidently and strictly applying the scoring criteria,
18 and correctly rank ordering reviewed test applications.

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2 **APPENDIX 4-1**

3 **ADDITIONAL INFORMATION ON NIDRR'S PEER REVIEW PROCESS**

4 This appendix provides a more detailed description of the peer review process of the
5 National Institute on Disability and Rehabilitation Research (NIDRR). As summarized above,
6 the descriptive information on NIDRR's process was compiled from legislation, the Federal
7 Register, NIDRR and the Department of Education policies and procedures, NIDRR's Long
8 Range Plan, Notices Inviting Applications, and interviews with executive-level representatives of
9 NIDRR and the Department of Education.

10 **LEGISLATIVE FOUNDATION**

11 Title II, section 202 of the Rehabilitation Act (2006) states that NIDRR will perform
12 scientific peer review of all applications for research, training, and demonstration projects. The
13 peer review is to, "be conducted by scientists or other experts in the rehabilitation field,
14 including knowledgeable individuals with disabilities, and the individuals' representatives"
15 (p.98). Federal employees are not allowed to be peer reviewers. NIDRR will provide training for
16 peer reviewers as is deemed necessary and appropriate.

17 Title 34 of the Code of Federal Regulations (CFR) states, "the purpose of peer review is
18 to insure that activities supported by NIDRR are of the highest scientific, administrative, and
19 technical quality, and include all appropriate target populations and rehabilitation problems"
20 (Disability and Rehabilitation Research Projects and Centers Program, 2009. p. 217).
21 Applications for awards of \$60,000 or more must be reviewed by a peer review panel, with the
22 exceptions of applications related to evaluation, dissemination of information, or conferences.

DEPARTMENT OF EDUCATION PEER REVIEW PROCEDURES

In addition to the Rehab Act and Title 34 of the CFR, NIDRR must also adhere to the peer review policies, standards, and procedures of the Department of Education (ED), which are contained in their Handbook for the Discretionary Grant Process (Department of Education, 2009). The peer review process described in the Handbook supports ED in recruiting well-qualified reviewers and conducting fair and efficient application reviews. For each discretionary grant competition NIDRR must develop an Application Technical Review Plan, maintain a grant program competition file, recruit reviewers, receive and screen applications, fund applications, and annually evaluate and update the peer review process.

Application Technical Review Plan

Each program office in ED (e.g. NIDRR) is charged to develop and follow an Application Technical Review Plan (ATRP). The ATRP includes panel information and description of the processes for identifying and involving application reviewers, resolving conflicts of interest, working with the panels, and selecting applications for funding. The ATRP is reviewed annually, and updated as necessary.

Grant Program Competition File

The Grant Program Competition File contains, "all information, decisions, or documentation related to a specific grant program competition or a group of related or multiple competitions within a grant program (Department of Education, 2009, p. 27)." The file includes,

- "Relevant sections from the authorizing statute;
- Program regulations, if applicable;
- Federal Register Notices;

- 1 • Any legal opinions or policy decisions relevant to the competition;
- 2 • Application package;
- 3 • Application Technical Review Plan;
- 4 • Application log(s);
- 5 • List of reviewers;
- 6 • Reviewer agreements and evaluations of the application review process;
- 7 • Documentation if any reviewers have been replaced;
- 8 • Funding slates and funding slate transmittal memoranda;
- 9 • Documentation of any rejection of funding slate recommendations and copies of
- 10 amended slates;
- 11 • Documentation of any funding decisions unique to particular applications; and
- 12 • Records of any discussions between the program staff and specific reviewers or panels
- 13 that had an effect on the outcome of the review (Department of Education, 2009, p. 27-29).”

14 The competition file is stored securely until the grant has been closed out.

15 **NIDRR GRANT SELECTION AND PEER REVIEW PROCESS**

16 NIDRR’s grant selections and peer review process consists of 11 stages beginning with
17 specification of selection criteria, and concluding with an evaluation of the process.

18 **Criteria Selection**

19 Selection criteria applied by peer reviewers are drawn from Title 34 of the Code of
20 Federal Regulations. Each competition includes 100 possible points allocated across the criteria
21 and subcriteria. With the exception of the Spinal Cord Model Systems Program, where the point
22 allocation is pre-specified, the distribution of points across the selected criteria is recommended

1 by NIDRR staff and approved by the Secretary for publication in application packages. While
2 criteria selected and point distribution change over time and between competitions, generally
3 NIDRR staff recommend a substantial percentage of the points Box 4.2 provides an example of a
4 DRRP competition scoring criteria. The absolute or competitive priority refers to those
5 requirements that applicants must address to demonstrate their responsiveness to the
6 requirements of the grant mechanism (e.g., DRRP) or to the specific topic (e.g.,
7 telerehabilitation).

8 **Kick-off Meeting**

9 After publication of the application kits NIDRR holds a kick-off meeting. During the
10 kick-off meeting, NIDRR staff determines dates of panel discussion and other key dates leading
11 up to competition, discusses the division of labor for recruiting peer reviewers, and a
12 Competition Manager and Panel Monitors are assigned (NIDRR, 2010c).

13 **Competition Manager**

14 Each competition is under the direction of a Competition Manager, a NIDRR staff
15 member (generally the individual who wrote the description of the priority area, see Chapter 3)
16 responsible for all aspects of the review process (NIDRR, 2010b; NIDRR, 2010c). The duties of
17 the Competition Manager include coordinating with and involving additional NIDRR staff as
18 necessary, recruiting reviewers, confirming receipt of all applications, and performing a final
19 screen of the eligibility and responsiveness of the applications.

20 **Panel Monitor**

21 The Competition Manager can also be the Panel Monitor. Duties of the Panel Monitor
22 include managing the logistics of panel review with assistance from NIDRR's contractor

1 Synergy Enterprises, Inc. (SEI), monitoring the progress of individual reviews, and overseeing
2 and facilitating discussion at the panel meeting (NIDRR Representatives, 2010). Competitions
3 involving multiple panels typically employ additional Panel Monitors from NIDRR, but can
4 include Panel Monitors drawn from across the Office of Special Education and Rehabilitative
5 Services (OSERS).

6 **Synergy Enterprises, Inc.**

7 Since 2005 NIDRR has contracted with Synergy Enterprises, Inc. (SEI) to provide
8 support for the grant application and review process (Synergy Enterprises, Inc, 2008). SEI
9 performs an initial screen of applications' eligibility and responsiveness prior to the Competition
10 Manager's final screen; provides logistical support for the panel meetings; manages the post
11 meeting survey of the reviewers; collects reviewer, application, panel, and score data for NIDRR;
12 and occasionally is contracted to analyze the data they collect.

13 **Receipt of Applications**

14 Following the deadline for submission, the Department of Education's Application
15 Control Center (ACC) logs in all applications for a given grant competition, assigns each
16 submission an official application number, and determines if the application was submitted prior
17 to the closing date (NIDRR, 2010b). SEI then screens each application against ED eligibility
18 requirements, as well as the required criteria of the competition. The Competition Manager
19 performs the final screen of the applications. When the NIDRR Competition Manager
20 determines that an application is ineligible, his or her supervisors review and confirm the
21 judgment and SEI returns the application with an accompanying explanation. The Competition
22 Manager generally creates a very thorough explanation, which is reviewed by NIDRR's program
23 attorney before being sent to an applicant. The explanation is also included in the Competition

1 File, and ineligible applications are noted in the funding memorandum. NIDRR staff generally
2 err on the side of inclusivity, only ruling out applications that are nonresponsive (NIDRR
3 Representatives, 2010). It is then the task of the peer reviewers to judge the merit of all
4 responsive applications. The screening process generally takes 2-3 weeks.

5 **Recruiting Peer Reviewers**

6 NIDRR establishes peer review panels of three to seven members, but typically five
7 members, to review each submitted grant application (U.S. Office of Management and Budget,
8 2006; NIDRR, 2009a; NIDRR, 2010b). Large center grant competitions (RERCs, RRTC's)
9 consist of panels ranging from five to seven reviewers, depending on the kinds of expertise a
10 panel requires (NIDRR, 2010b). NIDRR utilizes standing panels for the Field Initiated Program
11 and uses core groups, defined cohorts from which reviewers are nominated for up to three years
12 in a row, for AART, SBIR, and Switzer and forms ad hoc panels for all other competitions
13 (NIDRR Representatives, 2011). Standing panels consist of seven reviewers who serve as Peer
14 Reviewers for up to three consecutive years following their initial appointment (NIDRR, 2010b).
15 The number of ad hoc peer panels per competition is determined by the Competition Manager, in
16 consultation with his or her supervisors, "based upon the number of discrete topic areas,
17 specialized expertise required for each panel, and the number of applications received (NIDRR,
18 2010b, p 4-5)".

19 The Competition Manager, in consultation with supervisors, determines the necessary
20 composition of each review panel, generally including reviewers with topical knowledge and
21 experience, methodological expertise, clinical/provider expertise, and consumer representation
22 (NIDRR, 2010b). Qualities such as level of scientific or technical education, specific research,
23 development, demonstration, training, knowledge translation, technical assistance, or disability

1 and rehabilitation expertise, level of engagement with high quality scientific, technical, or
2 administrative activities appropriate to the category of applications, and scientific awards and
3 honors received are custom matched to competition requirements (NIDRR, 2010b; Disability and
4 Rehabilitation Research Projects and Centers Program, 2009).

5 NIDRR also strives to include qualified individuals with disabilities, or authorized
6 representatives of individuals with disabilities, as well as individuals from underrepresented
7 populations. However, as the number of individuals with disabilities who have the scientific
8 credentials to conduct reviews is quite small, it can be difficult to represent the views of the
9 various disability constituencies. At times, NIDRR will include a non-expert individual with
10 disabilities to review from the perspective of a consumer if a particularly relevant constituency
11 will not otherwise be included.

12 NIDRR Competition Managers identify potential reviewers through the Peer Review
13 System (PRS), a searchable database containing information and resumes for thousands of
14 potential peer reviewers maintained at the OSERS level, as well as through literature searches,
15 networking at conferences, and personal connections (NIDRR, 2010b; NIDRR Representatives,
16 2010). Competition Managers then arrange for SEI to contact potential reviewers, though many
17 Competition Managers make a majority of the contacts themselves. NIDRR screens reviewer
18 assignments before distributing applications to ensure that no conflict of interest exists (NIDRR,
19 2009a). The Handbook (Department of Education, 2009) defines conflict of interest as being an
20 employee or consultant of the applicant, having financial interest in the outcome of the
21 competition, having assisted in the preparation of the application, or having a relationship with
22 the applicant that includes a financial interest or is intimately personal. Should a conflict of
23 interest develop after the initial screening, reviewers are responsible for reporting it to NIDRR as

1 soon as possible. Additionally, no panel may include two reviewers from the same organization
2 or institution. It is not uncommon for 20 or more recruitment calls to be made in order to find 5
3 reviewers (NIDRR Representatives, 2010). The Competition Manager ensures that his or her
4 Supervisor is informed regarding the qualifications of the reviewers and approves their inclusion
5 on the peer review panel (NIDRR, 2009a).

6 The Competition Manager, with assistance as necessary for other NIDRR staff, assigns
7 applications to panels (NIDRR, 2010b). When assigning applications, the Competition Manager
8 attempts to match the content of the applications with the expertise of the reviewers while
9 equally distributing applications in general, applications from both new and returning potential
10 grantees, and applications from the same location or application, between the panels.

11 **Peer Reviewer Training**

12 The NIDRR Competition Manager conducts a one hour training session for each panel by
13 phone within a few days of the reviewers' receiving their applications (NIDRR, 2010b). This
14 training session generally covers the following topics, "(a) the purpose(s) of the authorizing
15 statute; (b) the purpose of the specific program under which the applications were submitted; (c)
16 the purpose of the review; (d) an overview of the review process; (e) the selection criteria to be
17 used in evaluating each application; (f) reviewers' responsibilities; (g) tips for conducting a good
18 review; (h) the need for ensuring the absence of conflict-of-interest; (i) the need to keep their
19 participation in the review process and the review proceedings confidential (NIDRR, 2010b, pp.
20 10-11)."

Pre-Panel Correspondence

Subsequent to the training session, and prior to the review, the Competition Manager and/or Panel Monitor will correspond with the reviewers (NIDRR, 2010c). The correspondence is to make sure reviewers have everything needed to complete the review, that they are progressing through their initial reading of the applications, and that they are entering their initial scores and comments into the E-Reader system.

Panel Meeting³

The Technical Review of applications consists of two parts: individual review of applications, followed by Panel review via teleconference (Kolobe, 2010; Loprest, 2010; NIDRR, 2009a; NIDRR, 2009b; Rivard, 2010). The review generally takes place via teleconference and e-Reader over two or three days. Individual written reviews from each member of the review panel, and a summary recommendation of the panel documenting an application's strengths and weaknesses, are required before a grant may be awarded.

Grant applications are mailed to reviewers at least two weeks in advance of the review whenever possible (Department of Education, 2009). Reviewers independently score and comment on each application in *Technical Review Forms* (TRF) which are accessed and saved electronically via e-Reader. Scores (whole numbers only) are assigned to each factor of each criterion. Peer reviewers may adjust their own scores before or immediately following the reviewer teleconference. A score of less than the maximum point value must be accompanied by

³ Panel Discussion procedures described here are a synthesis of written sources provided by NIDRR (NIDRR, 2009a; NIDRR, 2009b), and direct observation of panel discussions by committee members Thubi Kolobe (Kolobe, 2010), Pamela Loprest (Loprest, 2010), and co-study director Jeanne Rivard (Rivard, 2010).

1 a written rationale. A maximum score does not require a written rationale, but reviewers are
2 encouraged to include comments.

3 NIDRR instructs peer reviewers that their comments should:

- 4 • “Be specific;
- 5 • Evaluate rather than merely describe;
- 6 • Document the evaluation with specific page references;
- 7 • Be tactful and constructive and avoid pejorative comments;
- 8 • Provide specific references to the selection criteria; and
- 9 • Use proper grammar, spelling and complete sentences (NIDRR, 2009 p.4)”.

10 NIDRR also states that inadequate comments:

- 11 • Provide too little documentation;
- 12 • Cannot be clearly related to a scoring factor;
- 13 • Are inconsistent with scores or recommendations;
- 14 • Are inaccurate;
- 15 • Are facetious, pejorative, or otherwise inappropriate or unprofessional; or
- 16 • Are outside the scope of responsibility of the reviewer (NIDRR, 2009, p.4).

17 In addition to the general review of all applications, each member of the panel will be
18 assigned to be the primary reviewer of one or more applications (NIDRR, 2009). The primary
19 reviewer must: 1) Prepare a one-page abstract unless the application includes one; 2) Present the
20 application for discussion during the teleconference; and 3) Complete a Summary of Panel
21 Discussion, summarizing the strengths and weaknesses of the application and any significant
22 disagreement between reviewers concerning the application.

1 Also, each member of the panel will be assigned to be the Secondary Reviewer of one or
2 more applications. Like the Primary Reviewer, the Secondary Reviewer must prepare detailed
3 comments on an application. The Secondary Reviewer also assists the Primary Reviewer in
4 completing the Summary.

5 Additionally, the review panel can include a panel chair, a reviewer with significant
6 experience participating in NIDRR's review process, has general knowledge of the program
7 under review, and/or is believed to have significantly more expertise in the topic than the other
8 reviewers (Department of Education, 2009). The panel chair performs duties similar to those of
9 the panel monitor. Currently, panel chairs are only occasionally used in FIP competitions
10 (NIDRR Representatives, 2010).

11 All panel members participate in the discussion of each proposal (NIDRR, 2009a;
12 NIDRR, 2009b). Each application is discussed in turn with each reviewer, beginning with the
13 primary reviewer, presenting scores and rationale for each criterion. Reviewers are able to
14 change scores, and supporting comments, as a result of the discussion. Differences in scores
15 between reviewers are discussed until the panel reaches a consensus score. If a panel can't come
16 to consensus on a criterion, the primary reviewer submits a description taken from the discussion
17 as to why. After the panel has completed its discussion the Primary Reviewer presents the
18 Summary of Panel Discussion for feedback and verbal approval. Additionally, should the
19 competition need a site visit reviewers will discuss potential questions to be asked during the
20 visit and identify which of them will attend.

21 During the teleconference the Panel Monitor provides information concerning peer
22 review and grants management policy, regulations, selection criteria, peer review technical
23 review forms, conflict of interest, and confidentiality. The Panel Monitor does not participate in

1 the substantive discussion of the merits of applications or related research issues and cannot
2 answer questions about applicants. The Panel Monitor also checks completed Technical Review
3 Forms for adequacy and accuracy and ensures that the panel has thoroughly considered each
4 application. The peer review process generally takes 2-3 months.

5 For participating, NIDRR provides peer reviewers an honorarium of \$200 a day,
6 generally for one day of preparation and three days of reviewing (Doris Werwie, NIDRR,
7 personal communication, April 14, 2011). NIDRR monitors the compensation for conducting
8 peer review provided by other Federal agencies and believes they are competitive.

9 All peer review materials are reviewed by NIDRR Staff and maintained by NIDRR to
10 verify that the applications have been reviewed accurately and that review procedures and
11 resulting awards are consistent with program goals and regulations (NIDRR, 2009a). At the end
12 of the year NIDRR compiles a list of all reviewers who have served during the year that is made
13 available upon request.

14 Site Visits

15 Title II of the Rehabilitation Act requires a pre-award one day site visit in those
16 competitions in which an award or awards of more than \$500,000 will be made. The site visit is
17 considered a part of the peer review process (NIDRR Representatives, 2010). When a pre-award
18 site visit is necessary, the NIDRR Director approves such visits to the highest rated applicant.
19 Multiple site visits occasionally occur when the highest rated applicants are within 1 point of
20 each, or if a visit to the highest rated applicant results in concerns such that the next highest rated
21 applicant must instead be considered for funding. Site visits are conducted shortly after the
22 review and include one member of the review panel and one NIDRR staff member (NIDRR,
23 2010c). Shortly before the visit, the NIDRR staff member submits questions to the applicant

1 developed by the peer reviewers and by NIDRR staff. Applicants respond to the questions in
2 writing prior to the visit or during the visit.

3 **Prefunding Meeting**

4 Following peer review NIDRR holds a Prefunding Meeting involving the NIDRR
5 Director, deputy director, the two division directors, NIDRR's scientific advisor, competition
6 manager, and interested NIDRR staff to discuss the rank order of the applications and summary
7 information from the review, and develop specific funding recommendations (NIDRR, 2009a).
8 At the meeting, the Panel Monitor and/or the Competition Manager presents the rank order of the
9 applications as well as summary information on the peer review process, including information
10 from the site visit, with emphasis on the peer reviewer comments (NIDRR, 2010b). Additionally,
11 applicants' proposed project activities, budgets, and past performance are discussed. From this
12 discussion, program staff develop specific funding recommendations. Only in rare cases do the
13 recommendations not follow the rank order established in peer review (NIDRR Representatives,
14 2010).

15 **Preparation and Finalization of Slate**

16 After the Prefunding Meeting the Competition Manager transfers the recommendations
17 into a departmental form called a Slate (NIDRR, 2010c). The Slate is then forwarded to the
18 NIDRR Director for approval. The Director is not bound by the rank order of the applications
19 resulting from the peer review process (NIDRR, 2010b). However, a strong written justification
20 from the Director is required in order for a deviation from rank order to be approved.

Final Slate Review

After the Director's award decision, the Slate is forwarded to the Assistant Secretary of OSERS. At this stage the Slate includes: "(1) Purpose of the Program; (2) The Review process; (3) Special Information or Issues that Arose During the Review; (4) Recommendations and, (5) Signatures. The following attachments are also included: (A) List of reviewers; (B) Table of Funding; (C) Scores; (D) Abstracts; (E) Reasons for Ineligibility of Applications (if applicable) and (F) Copy(ies) of the Federal Register notice(s) (NIDRR, 2010b, p. 14)". After the Assistant Secretary approves the Slate, it is forwarded to Secretary of Education for final approval.

Slate Approval and Award

After final approval of the slate by the Office of the Secretary of Education, the Competition Manager organizes a funding package for approval by the NIDRR Division Directors and the NIDRR Deputy Directory (NIDRR, 2010b). The documentation contained in the funding package, "ensures that all steps have been completed, that issues raised in the funding process have been followed, and that award details and negotiation points are accurate (NIDRR, 2010b, p. 15)." Notification of new awards is then sent to the Office of Legislation and Congressional Affairs, and after a five day waiting period to new grantees.

Chapter 5. Grant Management

This chapter addresses the following two key study questions:

Key Study Question #3. What planning and budgetary processes does the grantee use to promote high quality outputs?

Key Question #5. To what extent are the results of the reviewed research and development outputs used to inform new projects by both the grantee and NIDRR?

These questions are addressed together within the larger framework of grant management in this chapter because the information gathered indicated they are interrelated. A firm foundation of grant management processes at the agency and grant level (in terms of planning, quality assurance, reporting, and managing resources) sets the stage for successful grant implementation and production of outputs, which in turn can influence the likelihood of informing new projects.

Part A describes how grants are managed by NIDRR through its agency structure and processes, what planning and budgetary processes grantees use in managing their grants to promote high quality results, and how NIDRR's grant monitoring efforts facilitate grantees' planning and budgetary processes. Part B summarizes information from grantees concerning how the results of their research and development outputs have been used to inform new projects and collaborations and how NIDRR uses the results of grantees' research. Conclusions and recommendations to enhance management processes are presented at the end of each part.

A. GRANT MANAGEMENT PROCESSES

To address the planning and budgetary processes used by grantees, it is necessary to examine these grantee level processes and requirements in the larger context of the structure and processes that support grant management at NIDRR and to obtain the perspectives of both NIDRR grantees and NIDRR staff. Therefore, the study methods included reviewing existing documentation on NIDRR's grant management and monitoring processes, gathering information from principal investigators about the processes they use for managing grants, and interviewing NIDRR staff to gather their perspectives on how grant monitoring facilitates grantees' efforts to manage their grants for successful results. These are discussed in the following three sections.

1. NIDRR's Grant Management Structure and Processes

NIDRR uses Department of Education (ED) post award grant management procedures and activities (2009), as well as their own procedures and activities to establish working partnerships with grantees and monitor projects for performance and financial compliance. Grant management activities are supported by the ED data systems, which include: 1) GAPS (Grant Administration and Payment System); 2) the G5 System, which contains budgets, history of administrative actions, and an electronic grants file system (TRIM).

Site Visits

For grant awards of \$500,000 or higher NIDRR conducts site visits that are considered a part of the peer review process. These are carried out by a NIDRR staff and a member of the peer review panel to discuss the research plan and to confirm resource

1 availability and institutional support. Questions generated by the peer review panel
2 during their proposal review are also addressed on the site visit.

3 **Setting the Stage for Individual Grant Management**

4 The planning and budgetary processes that grantees use evolve directly from
5 NIDRR procedures concerning the grant selection criteria, peer review process, and
6 negotiated post award grant management activities (NIDRR, 2010). The evaluation of
7 grant proposals includes rating elements such as plans of operation and evaluation as well
8 as adequacy and reasonableness of the budget and adequacy and reasonableness of
9 resources. Within 30 days of an award NIDRR project staff conducts a post award
10 conference with the grantee (Department of Education, 2009). The purpose of the
11 conference is to:

- 12 • Establish a mutual understanding of the expected performance outcomes;
- 13 • Establish a mutual understanding of the measures for assessing the project's
14 progress and results;
- 15 • Clarify the frequency and method for monitoring and ongoing communication
16 between NIDRR and the grantee;
- 17 • Discuss other technical assistance that NIDRR or other service providers will
18 provide;
- 19 • Review and clarify specific regulatory or statutory requirements affecting the
20 grantee's performance, if applicable; and
- 21 • Review and clarify any project activity or budget issues or concerns.

1 NIDRR staff generally conducts the conference via telephone, but the conference
2 may also take place in person, through workshops, via e-mail, or written communications.
3 They use a standard checklist that covers items such as the Grant Award Notification,
4 contents of Initial Award Letter, proposal contents, peer review comments and any
5 concerns, progress toward IRB approval, where applicable, relevant performance
6 measures, expectations regarding NIDRR's online Annual Performance Report (APR),
7 and outcomes planning and reporting. NIDRR staff document the content of the
8 conference and all subsequent contacts with the grantee in the official grant file.

9 **NIDRR Grant Monitoring**

10 NIDRR written procedures call for establishing working partnerships with
11 grantees to monitor projects for performance and financial compliance (Department of
12 Education, 2009). Following the post award conference periodic monitoring is done as
13 appropriate to achieve results specific to the application and any revisions as well as
14 progress against established performance measures that were discussed in the conference
15 and according to a basic set of monitoring procedures. Monitoring tools include
16 electronic quarterly fiscal reporting and annual monitoring reports of activities
17 undertaken during the previous fiscal year. Recipients of multi-year discretionary awards
18 must complete and submit an Annual Performance Report (APR) to NIDRR.

19 ***Fiscal monitoring*** As part of the monitoring process, the program staff is required to pay
20 particular attention to grantee's fiscal activities (Department of Education, 2009). The
21 program staff review grantees' expenditure information on a quarterly basis (more
22 frequently when the grantee is experiencing performance problems). Reviewing this
23 information in GAPS is the primary method of determining if the rate of cash draws is

1 consistent with the expected expenditure pattern for a project's approved scope of work
2 and project milestones.

3 **Annual Performance Report (APR)** Additionally, recipients of multi-year discretionary
4 awards must submit an Annual Performance Report (APR) to their program officers
5 which provides data on the status of the funded project that corresponds to the scope and
6 objectives established in the approved application and any approved amendments.

7 NIDRR has developed the APR as a web-based online survey and reporting system
8 (NIDRR, 2009, NIDRR Representatives, 2010). The APR system contains sections on
9 general information, award abstract, budget, funding, descriptions of research and
10 development projects, output summaries, and descriptions of the most important outputs.

11 Grantees also report on their progress in implementing their disability-focused research,
12 development, training, technical assistance, and knowledge translation projects. Grantees
13 also use the APR to report on the results or accomplishments of this work. According to
14 NIDRR documentation their APR system exceeds the minimum ED requirements for
15 reporting (NIDRR, 2010). Project Officers use their grantees' APRs for grantee
16 monitoring and tracking grantee progress and results. The APR is maintained by an
17 external contractor who also performs analyses of the data for management and reporting
18 according to specifications provided by NIDRR.

19 **Formative Reviews** NIDRR annually conducts formative reviews with a subset of
20 grantees to provide an opportunity for the grantees to discuss their proposed or on-going
21 research methodology with a panel of experts in their field. The experts then provide
22 suggestions for improving the grantees research plan. Generally grantees in high-interest
23 topic areas, or grantees who have been identified as needing additional assistance, are

1 selected for formative review. The review is generally done by teleconference or webinar
2 (NIDRR Representatives, 2010).

3 ***Monitoring At-Risk Grants*** The processes stated above pertain to routine monitoring of
4 grants. In response to a recent initiative of the Department of Education, NIDRR is
5 presently instituting a new process and a tool for identifying grants at risk of failure to
6 comply with program requirements, reach performance goals, comply with grant
7 administration and financial management requirements, and/or account for past
8 performance (NIDRR, 2010). At risk grants may be identified at different points. One
9 point could be during the peer review process. Although a grant application could receive
10 a fundable score in peer review, there could also be concerns about certain elements of
11 the application (e.g., feasibility of achieving sample size projected). At risk grants may
12 also be identified at the post funding conference, through routine teleconferences, or
13 through the grantees' APRs. Criteria for grants that may be at risk for not reaching
14 performance goals include: prior performance; peer reviewer concerns; site visit concerns;
15 staff concerns regarding feasibility issues related to staffing, resources, or design; slow
16 start up; failure to hire key staff; slow subject enrollment; loss of key collaborator; or
17 failure to report progress. Criteria that relate to administrative and financial criteria
18 include: failure to draw down funds, excessive draw down, or other financial disclosure
19 or deviation that demonstrates failure to adhere to Department guidelines. Additional
20 strategies for monitoring at risk grants have been established that will be used as needed
21 and in consultation with NIDRR management. These include: formative review,
22 establishing performance targets and regularly scheduled frequent written or oral updates,

1 monitoring site visits, changing the status of a grant to a cooperative agreement, and/or
2 delaying continuation awards (NIDRR, 2010).

3 **2. Grantee Perspectives on their Grant Management Processes**

4 To obtain grantee perspectives on their grant management processes, the 30
5 grantees who participated in the summative evaluation were asked to complete a set of
6 written questions asking them to describe what types of planning, project management,
7 and budgetary processes were used to promote high quality outputs. They were asked to
8 consider the following questions when crafting their statements:

- 9 • Which processes you used were useful and how? How could they be improved?
- 10 • Did you dedicate funds for quality assurance activities?
- 11 • How did you track progress and spending against your original plans for the
12 grant?
- 13 • If grants or projects were jointly funded by NIDRR and other extramural or
14 intramural sources, how did you ensure that NIDRR resources were used
15 exclusively for NIDRR-funded activities?
- 16 • How do NIDRR grant management processes influences quality of outputs?

17 This set of questions on grant management were asked at the end of a longer
18 questionnaire which described the grantees' outputs that were to be reviewed by the
19 committee in the summative evaluation. Principal investigators of twenty-eight of the
20 thirty grantees that participated in the summative evaluation responded to this set of
21 questions. Because respondents did not necessarily answer all the questions, or answer
22 the questions the same way, the number of respondents for each answer varies. Content

1 analysis was performed on the responses and these are summarized below. The number
2 of grantees that responded to each set of questions is noted in the summary heading.

3 **Consensus Views**

4 Except for new product development projects and complex multicenter studies,
5 grantees found the current NIDRR requirements for planning, project management and
6 budgets generally helped ensure quality outputs. Several commented on the positive trend
7 in process change effecting rigor over the years. For example, one grantee cited the
8 changes made during the grant under study:

9 *In Years 1 and 2 of the grant they were required to report more of*
10 *an "output count" methodology. In year 3 a different reporting method*
11 *was introduced focused on the development of short-term and long-term*
12 *goals. Then 'accomplishment nuggets' were to be nominated, with*
13 *rigorous reporting for each nomination, relating back to one of the*
14 *outcome goals. Finally, in Years 4 and 5 NIDRR stabilized on a*
15 *somewhat less rigorous, more easily understood reporting of "most*
16 *important" outputs, tied to one of up to four outcome oriented*
17 *goals....NIDRR has been making good progress in recent years on*
18 *stabilizing its evaluation protocols and procedures."*

19 **Planning (N=14)**

20 The bulk of planning for the full range of projects was done in the proposal-
21 writing stage, for which NIDRR has detailed requirements. As one respondent explained:

1 *"The NIDRR requirements are quite detailed and extensive...In the*
2 *sense that the plans are well developed, the NIDRR grants make planning*
3 *and management fairly routine since we are carrying out the commitments*
4 *made in the proposal."*

5 It was also noted that having an evaluation plan was particularly helpful, as was
6 having a quality assurance plan.

7 Planning was not only a function of upfront efforts but was continuous for more
8 complex grants by way of using regular planning meetings and consulting with other
9 researchers as needed. Although the many requirements were off-putting for some in the
10 beginning, they proved to be helpful (except for new product development).

11 *"NIDRR built in the development of outputs into planning. This made us*
12 *more thoughtful. We used to be able to get away with having a good idea."*

13 Success in implementing their plans was attributed to a number of factors
14 including: having no overambitious goals; a high degree of oversight by the project
15 director, using feedback from multisite study investigators, and putting development of
16 outputs into planning.

17 Respondents also noted difficulties in creating and maintaining an adequate plan,
18 which may be instructive in designing and implementing changes to the process.

19 Examples given for when difficulties occur included:

- 20 • Projects deviating from more standard NIDRR research projects. For example,
21 new product development was viewed as a fundamentally different type of

1 project than other academic research efforts, around which NIDRR processes
2 were developed, so many requirements and metrics did not fit these projects.

- 3 • A complex, multi-site project for which there were no planning models or
4 where fidelity of implementation over large numbers of sites caused
5 management and budget issues.
- 6 • Projects that were adequately planned under procedures in effect at the start of
7 the grant, but plans had to be changed when NIDRR processes changed mid-
8 project, such as new reporting requirements.
- 9 • When unpredictable events impacted staffing. For example, in one case
10 project staff were jointly funded with funds for another project. When they
11 lost the funds for the other project, the staff left the NIDRR project as well.
- 12 • Progress on programs was tracked against the original proposal although due
13 to various circumstances, the plans had to be adjusted. For example, a
14 dissemination plan was changed from pamphlets and booklets to a website.

15 **Project Management (N=24)**

16 The variety of the projects themselves resulted in a range of management
17 complexity, from a single action on small individual grants (e.g., Switzer fellowships)--
18 writing one check to the university which oversaw the dispersal of salary funds--to highly
19 complex protocols for larger center grants requiring complex management and fidelity in
20 implementation across many sites for success.

21 Key project management elements specified by one or more respondents included:

- 1 • The Annual Program Report (APR) was noted as particularly helpful in
- 2 “helping to keep to both the budget and the timeline”. However, the APR may
- 3 not reflect accomplishments like journal articles not in the original plan and
- 4 put off until the end.
- 5 • Quarterly meetings with NIDRR project officer
- 6 • Quality of NIDRR project managers
- 7 • Weekly, monthly, and annual meetings of project staff
- 8 • Specifying quality assurance responsibilities and tasks of project staff and
- 9 committees
- 10 • Annual meetings of project advisory boards
- 11 • Online project planning tools such as commercial or Project Management
- 12 Report System used by another research center or an online management tool
- 13 provided by the institution
- 14 • Task analytic project management
- 15 • Sufficient training and supervision for complex, multisite grant implementers
- 16 • Use of institutional grants management and budget management services
- 17 where available
- 18 • Frequent and constant project monitoring
- 19 • Quality of investigators and technical staff

1 **Dedicated Quality Assurance Funds (N=14)**

2 Of the 14 respondents who addressed this issue, only 8 reported separating out
3 quality assurance activities from the rest of their budget. Quality assurance activities were
4 generally an integral part of the planned project. To the extent that oversight was part of
5 staff responsibilities, salary for that staff was obligated for quality assurance activities. A
6 few respondents mentioned dedicated quality assurance funds to bring in external experts
7 on their oversight committee, for funding audio taping and ongoing data reports during
8 the study, for monitoring implementation visits, for conference calls, and for traveling to
9 NIDRR and Principal Investigator meetings. One respondent said that their institution
10 would not allow budgeting for quality assurance activities. However, it was not clear how
11 “QA activities” were defined by the institution.

12 **Budgetary Processes (N=20)**

13 It was often the case that expenditure and budget monitoring was done by
14 institutional grants management or accounting divisions or through use of project
15 management software. Others tracked the budget as part of the project monitoring
16 process by the project director. When asked specifically about what procedures grantees
17 took to ensure that in jointly funded projects, only NIDRR funds were used to fund
18 NIDRR activities, only three grantees indicated the use of joint funding. One grantee
19 stated that they worked with their NIDRR project officer to make sure there was no
20 double billing of time with supplemental funds. Another reported that the PI and Project
21 Director identified for the university financial office how NIDRR resources were used,
22 exclusively for NIDRR funded activities, and to track in kind and other funding.

23

1 **How NIDRR Grant Management Processes Influence Results (N=18)**

2 When asked how NIDRR grant management processes influence grant results,
3 topics that were cited most often in regard to fostering successful grants and high quality
4 outputs related to: interactions with NIDRR project officers, reporting requirements,
5 flexibility in management and budgeting, and timing of the grant application process.
6 Following are some of the responses.

7 *Interactions with NIDRR Project Officers*

- 8 • Attitude (high standards and emphasis on quality) of NIDRR project manager
9 has greatest impact on quality, having had experience with 3 managers.
- 10 • One grantee stated it would have been useful to have more regular contacts or
11 reporting opportunities earlier in the final design and proceduralization stages
12 of the study.

13 *Reporting requirements*

- 14 • The APR requires that budget information be provided by the accounting
15 department which has been very useful for us.
- 16 • The detailed tracking requirements of the on-line APR, although quite time
17 consuming and burdensome, does motivate us to keep focused on our overall
18 project goals for high quality products.
- 19 • Quarterly reports are helpful as a quality assurance mechanism.
- 20 • One grantee praised NIDRR for its recently implemented goal and objective
21 oriented reporting scheme. This scheme is far superior to previous schemes.

1 The grantee did note though that the new scheme limits reporting of
2 accomplishments, meaning some good work is not being reported.

- 3 • One grantee suggested that reports should focus more on how the work of the
4 grant is either succeeding or failing to bring effective and practical new
5 services and/or devices to market.
- 6 • Another commented that methods should be developed for capturing outputs
7 produced at the end, or shortly after the end, of the project.

8 *Flexibility in funding and management*

- 9 • One grantee commented that NIDRR needs more flexibility to extend its
10 research and development grants and adapt budgets to fit not only the initial
11 scope of a project but to accommodate project discoveries and opportunities
12 that are encountered during the course of the project.
- 13 • Need different management tools designed for new product development
14 rather than academic research (including APR).
- 15 • Level of funding of model system grants is disproportionate to what is
16 expected of grantees, For example the insufficient funding is a major limiting
17 factor for collaborative research efforts which need to be well planned to carry
18 out scientifically rigorous treatment and intervention studies with adequate
19 sample sizes.

20 *Timing*

- 21 • Need standard deadlines for grant applications. Having pre-determined dates
22 of application submissions would improve timely notification of application

1 availability to give PI's more time to prepare and consequently submit higher
2 quality plans and applications.

3 • Applications submitted in January should receive notification of application
4 status and award in the spring to avoid inadequate staffing at the start of the
5 project and subsequent protracted timelines.

6 **3. NIDRR Staff Perspectives on Grant Monitoring and Grantee Management (N=15)**

7 NIDRR project officers provide an important bridge between the Department of
8 Education's and NIDRR's policies and procedures on grant management and the grantees'
9 management of their grants. They carry out the grant monitoring functions, described in
10 the first section of this chapter, that are aimed at identifying issues related to performance
11 and fiscal compliance with grant requirements¹. NIDRR procedures emphasize that
12 monitoring activities are conducted in working partnerships with grantees. Comments
13 made by grantees above referred to some of the ways that NIDRR's procedures and
14 processes assist grantees in managing their grants and influence the results of their grants
15 (e.g., APR's help in keeping them focused on goals and products, quarterly reports serve
16 as quality assurance mechanism, some project officer's promote high standards and an
17 emphasis on quality).

¹ In addition to grant monitoring, project officers have duties related to peer review and priority setting (These are covered in other chapters of this report). Depending on their own areas of expertise some also have responsibilities in coordinating activities for certain grant programs such as the field initiated project grants or model systems grants, and in developing special initiatives such as in knowledge translation. There are currently 14 project officer positions (NIDRR Organizational Chart, 2011), but four were vacant at the time of this reporting. In Fiscal Year 2009 there were a total of 230 grants funded by NIDRR (U.S. Department of Education, 2011).

1 To learn more about this important interface between NIDRR's grant monitoring
2 processes and grantees' management of their grants, 15 NIDRR project staff were
3 interviewed in person and asked a series of open-ended questions about their activities
4 and specific questions that related to grantee planning and budget processes to improve
5 quality. Not all of the interviewees were project officers; some were in supervisory and
6 other management roles. We have organized the discussion of these qualitative data into
7 issues and initiatives that could relate to the processes used by grantees to assure quality.

8 **Issues related to time**

9 One issue that may be tangentially related to the amount and quality of grantee
10 processes to promote high quality outputs is the NIDRR staff time spent in monitoring
11 activities. Staff reported a wide variation in the amount of time spent in monitoring grants:
12 from 35% to 80% of their time. As stated above NIDRR staff have other responsibilities
13 to different degrees in addition to grant monitoring which accounts for this wide variation.
14 However, staff commented that the large workload of project officers (approximately 20
15 to 25 grants) often does not allow for as much attention to grantees as needed. Also as
16 reported in NIDRR's Fiscal Year 2010 Monitoring Plan NIDRR has had a 25% reduction
17 in staff over the last six years (NIDRR 2010) which would impact caseload size.

18 **Issues related to type and frequency of communication with grantees**

19 Staff reported that the type and frequency of communications with grantees also
20 varies depending largely on grantee needs and issues related to performance and fiscal
21 compliance. A variety of monitoring procedures are used, including periodic phone
22 conversations, emails that ask questions or provide consultation information,
23 teleconferences, quarterly written report, and the Annual Performance Review (APR). It

1 was commented that NIDRR forms and reporting are not easy for grantees because of the
2 complexity of federal rules, so staff often spend time translating these for new grantees.
3 Staff reported that the structured post-award teleconference has been helpful in
4 proactively setting up expectations for grantee performance and preventing potential
5 problems in complying with these federal rules. Staff commented that limited travel
6 funds have not permitted sufficient on-site monitoring for grants that require higher levels
7 of technical assistance. Again this was confirmed in the 2010 Monitoring Plan (NIDRR,
8 2010) which stated that the number of on site monitoring visits and formative reviews are
9 affected by the budget.

10 **Issues related to budget**

11 One issue that was mentioned by several respondents, which is not uncommon
12 with research grants in general, was that grantees often under spend their budgets
13 especially during start up, which then extends their grants and changes the time frame for
14 output development and project completion. One suggestion made here was that staff
15 might be able to identify potential problems and work with grantees more on this issue if
16 they had project level budget data, in addition to grant level data, especially for the larger
17 grants that have multiple projects starting and ending at different points. A related
18 comment was that there is a need for improved ongoing communication between project
19 officers and other NIDRR planning staff who have access to all of the financial
20 information. Finally, there was another suggestion that it would be helpful to have
21 standard forms to request cost extensions.

1 **Issues related to consistency**

2 Although it was stated that the frequency of reporting depends upon grantee needs,
3 it was commented that there is a need for more consistency across project officers in the
4 schedule of grantee reporting between Annual Performance Reports. A point was also
5 made that new project officers need more training to foster more consistency in grant
6 monitoring across grantees.

7 **Initiatives**

8 Staff mentioned that several initiatives are ongoing to improve and facilitate the
9 grants monitoring process. A data group is working on developing new management
10 reports on grant status to help project officers. Efforts are being made to help train new
11 grants managers by sharing experiences and advising each other informally. In addition,
12 staff commented that parts of their regular staff meetings are also being used to consult
13 about grants that present special monitoring challenges.

14 **Conclusions and Recommendations Related to Grant Management Processes**

15 To address the key study question of what planning and budgetary processes are
16 used by grantees to promote high quality outputs, the committee considered these grantee
17 level processes in the larger context of NIDRR's structure and processes that support
18 grant management. Study methods included: a) reviewing existing documentation on
19 Department of Education and NIDRR's grant management and monitoring processes, b)
20 gathering information from principal investigators about the processes they use for
21 managing grants, and c) interviewing NIDRR staff to gather their perspectives on how
22 grant monitoring facilitates grantees' efforts to manage their grants for successful results.

1 With regard to the larger agency context, NIDRR's 2011 Grant Monitoring Plan
2 has stemmed from initiatives related to grant monitoring at the Department of Education.
3 In 2009, the GAO reported on a study of grant monitoring within the Department of
4 Education, which included the Office of Special Education and Rehabilitation Services.
5 The report recommended that ED should continue their department-wide efforts to
6 disseminate guidance on risk assessment, to develop new grantee risk assessment tools,
7 and work with the program offices to ensure these tools are implemented. It also
8 recommended that ED should implement a strategy to ensure that program offices have
9 staff with sufficient financial monitoring expertise to conduct or assist other program
10 specialists in conducting financial compliance reviews. Finally, the GAO report
11 recommended that ED should develop an easily accessible mechanism for sharing
12 information across offices about grantees' past and present performance, and an
13 accessible forum for sharing promising practices in grant monitoring to ensure all
14 program offices are able to effectively and efficiently perform all of their duties and
15 responsibilities.

16 In the context of this larger department initiative, NIDRR has developed new risk
17 management assessment and monitoring procedures for grants at risk of failure to comply
18 with program requirements, to reach performance goals, or to comply with grant
19 administration and financial management requirements (NIDRR, 2010). A follow-up
20 interview with NIDRR executives in April 2011 showed that they are enthusiastically
21 incorporating the risk management approach which will assist them in determining how
22 much and what type of monitoring may be needed. To identify grants at risk NIDRR is

1 using a Department of Education recommended rubric with information tailored for
2 NIDRR grantees and drawn from the peer review, the APR, and project monitors.

3 NIDRR appears to have a good plan and momentum in place for upgrading their
4 routine monitoring and for identifying and monitoring grants that are at risk of
5 noncompliance with the new monitoring plan. On the whole it appears that grantees
6 appreciate aspects of NIDRR's grant management processes which facilitate their own
7 grant management strategies. Grantees commented that NIDRR's detailed proposal
8 requirements facilitate their planning, that NIDRR builds output development into the
9 planning via the post award conference, that the APR helps grantees adhere to both the
10 budget and the time frame, that the quarterly reports facilitate quality assurance, and that
11 NIDRR project officers with high standards and emphasis on quality contributed to
12 successful grant results. While grantees' generally commented that NIDRR grant
13 management processes were effective in helping them in their own grant management
14 processes, they offered some suggestions that would help them further.

15 Suggestions for improvement from NIDRR staff focused on strengthening their
16 capacity to monitor grants and to help their grantee's stay on course in implementing their
17 grants and meeting performance expectations. Among other suggestions, they expressed
18 the need for more workable size grant caseloads, additional travel funds for on-site
19 monitoring of grants that require higher levels of technical assistance, more training for
20 new project officers to promote consistency and quality in their monitoring processes,
21 and a freer flow of communication between project officers and the NIDRR planning
22 staff in relation to financial information.

23

1 **Recommendation 5.1: NIDRR should continue to focus efforts on**
2 **improvements to their grant monitoring procedures and specific elements of**
3 **their overall grant management system that impact grantee-level planning,**
4 **budgets, and the quality of outputs.**

5 Particular emphasis should be placed on continuing to implement the new
6 procedures for monitoring at risk grants. Given the budget constraints placed on the
7 number of on site monitoring visits and formative reviews, referred to earlier in the
8 section on staff interviews, there will of course be tensions in this area. However,
9 allocation of limited resources to effectively monitor grantees planning, budget and
10 outcomes should be a critical area in overall resource allocation decisions.

11 Attention should also be placed on grantee and staff suggestions on improving
12 elements of NIDRR's overall grant management system that could impact grantee
13 planning, budgets and the quality of outputs. In particular NIDRR should consider:

- 14 • How timing of grant applications and notification impact planning and quality
15 of grant implementation and indirectly the quality of outputs subsequently
16 produced;
- 17 • Methods NIDRR staff can use when monitoring large multi-project grant
18 budgets to identify project-level variation that could be impacting the overall
19 grant budget (e.g., personnel costs);
- 20 • The need for improved communication between project officers and other
21 NIDRR planning staff who have more access financial information;

- 1 • More focused reporting in the Annual Performance Report (APR) on new
2 product development, stages of output development, and how the work of
3 grants is bringing effective and practical new services and/or devices to the
4 field or to the market;
- 5 • Methods for capturing information on outputs produced at the end, or shortly
6 after the end, of the grants so that the quality and impact of these products can
7 be assessed;
- 8 • The need for more consistency across project officers in the schedule of
9 grantee reporting between Annual Performance Reports; and
- 10 • The extent to which new project officers are trained to promote consistency in
11 expectations regarding standards of quality.

12

13 From the grantee interviews we also learned that some grants which are
14 developing innovation in new technologies may not fit well with a management template
15 that calls for strict upfront planning and adherence to original design and time tables.
16 Similarly, grants funding large, multi-site studies may require more or different
17 supervision, monitoring, and technical assistance than the more focused or limited study.
18 These grantees expressed the need for a greater degree of flexibility in management to
19 allow them to stay on the cutting edge of technology or more easily adapt to changing
20 needs of multi-site research projects.

21 **Recommendation 5.2: NIDRR management should review the requirements**
22 **placed upon technical innovation grants and large multi-site studies to make**

- 1 **sure that planning, reporting, supervisory, and technical assistance**
- 2 **requirements fit their particular circumstances.**

B. USE OF GRANT RESULTS/OUTPUTS TO INFORM FUTURE PROJECTS

In its logic model NIDRR depicts its short-term outcomes to be the array of grant outputs generated by grantees, which are expected in turn to inform and generate new projects (Federal Register, 2005). The fifth main study question of this evaluation was:

To what extent are the results of the reviewed research and development outputs used to inform new projects by both the grantee and NIDRR? To address this study question the Committee gathered information from NIDRR executive representatives about how they use the results of their grantees research and collected information from grantees about new projects that have been generated from their grants. The Principal Investigators (PI) of the grants reviewed in the summative evaluation provided this supplemental information on the questionnaire which grantees completed in submitting their outputs to be reviewed by the committee.

The specific question asked of grantees was: Have the results of the research and development outputs from this grant, or your prior NIDRR grants, been used to inform the development of new grant applications or other kinds of projects? The objective here was not to assess grantee's individual or aggregate productivity, but rather to describe the extent to which NIDRR grants generate new projects and products. In this vein the committee asked not only about their present grants, but also about what was generated from prior NIDRR grants because of the length of time it takes, for example, to get technology products through various stages of development to commercialization, or the time to develop collaborations that evolve into new projects. The information gathered from grantees is presented first.

Use of Research and Development Results/Outputs by Grantees

Of the 28 respondents, 24 indicated that the results of their current, or prior NIDRR grants, had been used to inform the development of new grant applications or other kinds of projects, funding opportunities, or collaborations. Table 5-1 summarizes the number and type of new projects reported. Each project could have multiple results.

TABLE 5-1 Number and Type of New Projects Resulting From 24² Grants

Type of New Projects	Successful Applications	Pending Applications	Other
New Grants (source):			
CDC	1		
DOD	4	1	
DOL	2		
HHS	1		
NIDRR	19	1	
NIH	3	3	
NIOSH	1		
SSA	1		
Foundations	2		
Other (university, state, corporation)	17+	1+	
Collaborations with other researchers and organizations			19+
Application of data/instruments/model to other projects			22
Commercialization of technology products			5
Used as basis for convening a major conference or defining and supporting larger agenda			5
TOTAL	51+	6+	51+

+ Some respondents indicated "multiple" rather than giving a specific listing or number.

² The four other grantees (out of the 28 grants that responded to this question) indicated that their results were not used to inform the development of new grant applications and other kinds of projects. These included one study whose purpose, according to the PI, was not to start a new study but to end decades of confusion; one that was still in the grants cycle but fully expected to inform the development of new grant applications and projects; and one who commented that since NIDRR's priorities have shifted, it did not offer an opportunity to propose further work in his specific line of research as an independent researcher. Another offered no explanation.

1 As can be seen in the table these 24 grants generated funding from more than 50
2 other sources for new projects stemming from their original grant. Nineteen of the new
3 projects were NIDRR-funded; but 13 were funded by other federal agencies. In
4 accompanying open-ended remarks one PI praised NIDRR for encouraging and funding
5 innovative work that is often picked up and expanded by other federal research agencies.
6 Appendix 5-1, located at the end of this chapter, contains a table that shows more details
7 about the nature of the new projects that were generated from existing NIDRR grants.
8 That table is organized by type of NIDRR funding mechanism and separates the grants
9 into rows within the funding mechanisms. As an example the table in Appendix 5-1
10 shows new projects that were generated from one Rehabilitation Research and Training
11 Center grant and the various funding sources of the new projects that included NIDRR,
12 NIOSH, CDC, and a private foundation. Table 5-1 above also shows that these 24 grants
13 spun off more than 19 new collaborations. The table in the Appendix shows examples of
14 these such as: participants of a Burn Model Systems Grant being invited to participate in
15 another university study, networking among NIDRR-funded centers, and collaborating
16 with national level organizations. Table 5-1 shows that another type of spin-off project
17 was applying specific outputs, in terms of data, instruments, or models to other projects.
18 Examples of these were: transferring newly gained knowledge on stroke rehabilitation
19 interventions to hip and knee replacement rehabilitation in different types of treatment
20 settings, translating and testing surveys in other languages, and studying the efficacy and
21 effectiveness of a telephone-based problem-solving treatment for a different population
22 of service members after deployment. Commercialization of technology products, is a
23 concrete example of grant outputs that have generated new types of outputs and projects.

1 One example of this is the evolution of assistive technology devices.

2 **Use of Research and Development Results by NIDRR**

3 NIDRR executive representatives informed the committee during early interviews
4 about how the agency uses the results of their grantees work. It is used in performance
5 monitoring and evaluation, in priority setting, and in dissemination all of which in some
6 way inform new projects such as shaping priorities and making funding decisions. As
7 stated in the first part of this chapter NIDRR's Annual Performance Report system
8 collects routine information from grantees on their outputs and accomplishments. In
9 addition to monitoring grantee performance this information is used for NIDRR's GPRA
10 performance reporting and in annual reports to Congress through the Department of
11 Education. These reports influence funding of new projects among other considerations.
12 Information about grant outputs and accomplishments was also used in a series of
13 portfolio evaluations that NIDRR carried out in 2005 to 2006, and outputs are the focus
14 of the summative evaluation being carried out by the committee.

15 In their annual priority setting process NIDRR considers the knowledge that has
16 been gained from the products of their various program mechanisms as one key input of
17 that process. This information is gained from NIDRR project officers, from the APR
18 system, from State of the Science conferences that are organized by center grants, and
19 from other grantee meetings during the year.

20 Knowledge dissemination and transfer is at the core of NIDRR's logic model. As
21 such, they have incorporated requirements in grant applications for grantees to
22 disseminate the knowledge and information about outputs they have produced. This is
23 done in various ways such as through publication, conferences, workshops, and websites.

Conclusions on Use of Results and Outputs of NIDRR Grants

The key study questions of the External Evaluation of NIDRR and its Grantees were phrased in terms of: to what extent are NIDRR's key processes (i.e., priority setting, peer review, and grant management) conducted in such a way as to enhance the quality of its final results. Final results can be viewed in several different ways--as the quality of a research portfolio resulting from priority setting processes, as the quality of grants resulting from peer review, or as the quality of outputs resulting from multiple influences such as the scientific characteristics of the researchers, and key agency processes of priority setting, peer review, and grant management. This final section of the chapter on grant management examines "final results" in terms of NIDRR's intermediate or short term outcomes (i.e., the extent to which grants and their products generate new projects and/or are used to inform NIDRR priorities).

From the information gathered from grantees and presented at the start of Part B above, the committee found that the results of the reviewed research and development projects are used to generate new projects by grantees to a great extent. That 24 grants generated twice as many new projects is evidence of "adoption and use of knowledge" which again is a core tenet of NIDRR's mission.

Of course the projects that were generated vary in purpose, scope, and funding levels. In the present evaluation we were only able to take a brief snapshot of this type of NIDRR short-term outcome (i.e., generation of new projects). We asked grantees to tell us briefly in writing about what new projects or products were spun off from their current grants at the end of completing a long questionnaire with detailed information about the quality of their outputs. But the volume and substance of the information they provided

1 begs to be further explored, for example, in more deeply examining the pathway and
2 evolution of knowledge/product development for individual grants, and for sets of grants
3 in different NIDRR portfolios. Tracing the pathway of grants and outputs would be
4 helpful in answering questions about NIDRR's impact.

5

6

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APPENDIX 5-1

SUMMARIES OF NEW GRANTS OR OTHER TYPES OF PROJECTS

GENERATED BY NIDRR GRANTEES (N=24)

Grantees were asked to briefly describe what new grant applications, other projects, funding opportunities, or collaborations have resulted from the grant that was reviewed by the committee or prior NIDRR grants. The following table corresponds to Table 5-1 in the chapter and provides additional details about the new projects for each grantee. The table is organized by funding mechanism and grantee. Under "New Grants," "X" refers to funded grants; "X*" refers to grant applications/proposals that have not, or not as yet, been funded. An X or X* may refer to more than one grant.

Funding Mechanism	Nature of New Projects	Types of Projects				
		New grant	Basis for conference or new agenda	Collaboration	Application of output to other projects	Commercialization
BURN MS	New NIDRR grant to evaluate social skills training program to overcome social anxiety during community re-entry.	X				
	A study evaluating the effects of skin grafting on the ability of individuals to improve temperature regulation.	X		X		
	Burn Research State of the Science Conference in Washington, DC in 2006 under the leadership of model systems and American Burn Association.		X			
	Funding from Fetzer Institute and American Burn Association to hold a consensus meeting on social skills training program.		X			
	Participants in the NIDRR longitudinal database have participated in another study University of Texas Medical Center and Institute for Exercise and Environmental Medicine at Texas Health Presbyterian Hospital Dallas.			X		
	Video led to strengthened collaborations with national level organizations, such as the Phoenix Society for Burn Survivors.			X		
	Burn survivor involvement in model system activities resulted in an active SOAR (survivors offering assistance				X	

Funding Mechanism	Nature of New Projects	Types of Projects				
		New grant	Basis for conference or new agenda	Collaboration	Application of output to other projects	Commercialization
	in recovery) in the burn center.					
DRRP	Proposal on Self-Stigma and Seniors with Dual Sensory Loss with the University of Montreal.	X*				
	Proposed FIP projects in 2005/6/7 on low vision service delivery models for older blind and dual sensory impaired seniors.	X*				
	RRTC funded project for employment for persons who are blind or visually impaired.	X				
	Contacted National Eye Institute and NIH about need to have videos developed about various eye conditions that are presented in American Sign Language. They were responsive to need but nothing developed as yet.			X	X	
	Good interactions and brainstorming with RERC on Hearing Enhancement at Gallaudet and several Veteran Centers for the Blind.			X		
	Collaboration with Helen Keller National Center on one project.			X		
DRRP	Led to successful application and awards to translate and test surveys in Spanish and for a field test with California Medicaid plans and a home and community based waiver program.				X	
	PI serving on two federal advisory panels			X	X	
DRRP	DoD funding to study the efficacy and effectiveness of a telephone based problem-solving treatment in service members after deployment. The study uses detailed, scripted, and modular intervention focusing on problem solving treatment and behavioral activation and involves collaborating with two military bases and separate data center.	X		X		
	Using lessons learned from this study and successful single center studies.				X	
DRRP	Preliminary support by NIDRR has led to annual funding of Real Economic Impact Tour by major private corporate foundations such as Bank of American, AT&T and Walmart of over \$500K.	X				
	The preliminary research framework on advancing economic self-sufficiency for people with disabilities led to the development of curriculum and training programs in 6 states, and funding from state developmental disability councils and Medicaid Infrastructure grants.	X				
	On an annual basis, the \$300K from NIDRR leveraged to support program development, additional research, expansion of financial service options and an inclusive economic empowerment model in over 100 cities.	X			X	
	EQUITY newsletter, which is received by over 20,000 individuals in the disability community monthly, has received additional support from multiple private foundations to help expand its reach.	X				

Funding Mechanism	Nature of New Projects	Types of Projects				
		New grant	Basis for conference or new agenda	Collaboration	Application of output to other projects	Commercialization
	NIDRR funding has led to new funding from SSA, DoL, HHS, Assets for Independence Act and Treasure.	X				
	PI on project has become the Chair of the Consortium for Citizens with Disabilities Asset Development Work Group, including representatives from over 15 national organizations. At the local level, CCD involves over 750 community groups, financial institutions, government agencies, and businesses that are working together to advance new options for financial stability and mobility for working age adults with disabilities.			X		
FIP	•New NIDRR grant for RRTC on Employer Practices Related to Employment Outcomes. •Collaboration across the university and with professional associations to provide new knowledge about differences in employer practices in hiring retaining, and advancing individuals with disabilities and the relationship between these practices and employment outcomes, leading to design of targeted interventions.	X		X		
FIP	•SBIR funding by one of our strategic partners.	X				
FIP	•Project has helped define and support a larger long range development agenda for applications that support self-management and community living.		X			
FIP	•NIH grant on training methods for improving the intelligibility of speech in a noisy environment.	X				
	Grant submitted to NIH on methods of noise reduction in hearing aids is in review.	X*				
	• Opened a whole new line of research in the US on the relationship of multifocal lenses and falling and related crises.		X			
	•Many possibilities of new lines of research regarding worker safety, falling prevention, and other related health issues.		X			
	• Led to support of University intramural research.	X				
FIP	• NIH applications regarding safety, falling prevention and the health of individuals related to the optics and brain function of adapting to multifocal lenses.	X*				
	NIDRR proposals regarding safety, falling prevention and the health of individuals related to the optics and brain function of adapting to multifocal lenses.	X*				
FIP	•Help edit a special 12 article supplement to the original stroke study that appeared in December 2005 issue of the Archives of PM&R			X		
	•Help fund a research utilization conference in 2006.		X			
	• Leveraged a Fulbright Scholar grant from Brussels for an international data analysis.	X				
	•Applied approach to other issues, e.g., a comparative effectiveness study of hip and knee replacement rehab in skilled nursing facilities and inpatient rehab facilities.				X	

Funding Mechanism	Nature of New Projects	Types of Projects				
		New grant	Basis for conference or new agenda	Collaboration	Application of output to other projects	Commercialization
	•Used the same study design for Improving Spinal Cord Injury Rehab Outcomes (NIDRR funded)	X				
FIP	•This grant application arose from a grant to study driving after traumatic brain injury, which was funded as part of the TBI Model Systems. We expanded on the methodology as well as the theoretical concepts we addressed in that first NIDRR-funded project.	X				
RERC	•RERC on Telerehabilitation	X				
RERC	•The Universal Remote Console work has informed work of a wide range of both commercial and research projects. These have involved over 100 different partners in over a dozen countries totaling over \$50 million.	X		X		X
	•The virtual assistive technology work has evolved into an international collaborative effort involving over 40 partners on every continent except Antarctica. It has influenced grants to NSF, NIDRR, the Canadian government and European Commission, among others	X		X		
	• The Work on Web Content Accessibility Guidelines has influenced policy throughout the world and led to large number of research and development projects internationally.	X			X	
	•The work on the touch screen interfaces was used to inform the development of one of the project areas in the current RERC.				X	
	• EZ Access cross-disability interface work has influenced both federal regulations and commercial product design.				X	X
	• The user needs work has influenced international policy and standards design.				X	
	•The Brain Computer Interface work led to follow-up work on practical use of brain control interface to communicate for people with "locked in" syndrome, which paralyzes the body, except for the eyes, but leaves the mind alert. This invention uses only thought and electrodes attached to the skull to enable the thinker to spell out a message on Twitter. This invention was recognized as one of Time Magazine's 50 best inventions of 2009.	X			X	
RRTC	•New RRTC on Secondary Conditions after SCI funded by NIDRR.	X				
	•DoD funding of two projects: activity based rehabilitation after SCI and secondary conditions in the first 2 years post -SCI .	X				
	•This project was used to support 2006 funded application for an SCI Model System.	X				
	•NIDRR funding to continue Center as RRTC to support three research areas - improving access to PAS (Personal Assistance Services) by individuals; providing the workforce to support individuals with disabilities, and	X				

Funding Mechanism	Nature of New Projects	Types of Projects				
		New grant	Basis for conference or new agenda	Collaboration	Application of output to other projects	Commercialization
	understanding the economics of PAS. NIDRR grant resulted in two articles.					
	• NIOSH funding of collaboration to studies injury among PAS Workers.	X				
	• CDC contract to report on trainings and health promotion for PAS workforce.	X				
	• Multiple Kaiser Family Foundation grants.	X				
	• Successful RRTC proposals (3) for the RRTC on Employment Policy and People with Disabilities (2004 & 2009)(2010 - RRTC on Employer Practices to Employment Outcomes: Testing and research on consortium-designed instruments and approaches).	X				
	• 2009 grant on National Technical Assistance, Policy and Research Center for Employers on Employment of People with disabilities (TA for DoLs EARNWORKs website).	X				
	• Stats RRTC (Rehabilitation Research and Training Center on Disability Statistics and Demographics) to utilize census data to inform disability advocacy and policies.				X	
	• Copied the Status Report model for use New York Medicaid Infrastructure grant.	X			X	
SBIR II	• Focus on audio-tactile cartography in TMAP has informed designs for a series of public access talking map and campus model kiosks at locations around the country.				X	X
	• Ongoing work with SBIR to develop "STEM Binder," a virtual collection of scientific, technical, economic and mathematical images such as the periodic table, scientific calculator, Sudoku game and classic science images such as cells and machinery, all designed to work in conjunction with the Talking Tactile Pen (a pen-shaped device that reads aloud when passed along lines of print or special "dots" on a page).				X	X
SBIR II	• Results have provided the opportunity for commercialization of the device.					X
	Results have provided opportunities for new research in transportation		X			
Spinal Cord Injury MS	• Small funding (\$50K) to do more with testosterone research.	X				
	• Two Collaborative research projects, "Collaboration on Upper Limb Pain in SCI" and "Pharmacological Management of Dyslipidemia and Cardiovascular Disease in Persons with Chronic Cervical SCI."	X		X		
	• The Model System increased visibility and has provided the infrastructure for conducting research, allowing us to partner with a VA medical center. Networking efforts resulted in a wider range of patient and physician and other clinician participation.			X	X	
	• Secured a comprehensive network of collaborative	X		X		

Funding Mechanism	Nature of New Projects	Types of Projects				
		New grant	Basis for conference or new agenda	Collaboration	Application of output to other projects	Commercialization
	partnerships resulting in a successful NIH R-01 application.					
SWITZER	•NIDRR FIR grant.	X				
	•Three separate grants from separate funders using prospective data to test social network analysis. Grants by Francis E. Parker Memorial Home, Inc., to evaluate sociocentric approach to data collection and social network analysis for long term care; Institute on Aging, University of Pennsylvania a study of social networks in long term care; and K-12 mentored scholar (75%) institutional training grant to Duke for developing scholars in comparative effectiveness research.	X				
	•NIH R24 pilot award and collaborations with three specialists in three different institutions (Medical College of Wisconsin, Palo Alto VA and Northwestern University Medical School).	X		X		
SWITZER	•Using the lessons learned from this study, we have been funded by DoD to study the efficacy (and effectiveness) of a telephone based problem solving treatment in service members after deployment, focusing on problem solving treatment and behavioral activation aimed at persisting post-concussion symptoms and level of distress. We are working with two military bases and a separate data center.	X		X	X	
Traumatic Brain Injury MS	•Applied for DoD funding, awaiting reply but still collaborating with TBI and SCI Model System Centers on this study.	X*		X		
	•Formed the basis for the primary local research project being advanced in the current TBIMS cycle.	X			X	

1

Chapter 6. Summative Evaluation

This chapter addresses the following key study question:

Key Question #4. To what extent are the final outputs from NIDRR grants of high quality?

It answers this central question and in addition provides an assessment of the methods used. The scope and methods used to conduct the External Evaluation of NIDRR and its Grantees were described earlier in Chapter 2 of the report. Part A of this chapter elaborates on the methods developed by the Committee to evaluate the quality of outputs. Part B describes the results of the assessment of grant outputs and provides recommendations for improving the quality of outputs. Part C presents the committee's self assessment of the methods and recommendations for future evaluations.

SUMMARY OF METHODS DEVELOPED FOR ASSESSING THE QUALITY OF OUTPUTS

The methods and procedures developed by the committee, described below, involved first determining the criteria and dimensions that would be used to assess the quality of outputs. Second, a questionnaire was developed to assist grantees in nominating outputs to be reviewed and to elicit supplemental descriptive information about their outputs. Third, a sampling plan was developed to select grantees who would be invited to participate in the evaluation. Fourth, the committee staff worked with grantees who agreed to participate in the evaluation and gathered and cataloged the outputs and supplemental information that were submitted for the committee's review. Fifth, the committee assessed the outputs through an expert review process.

Quality Criteria Development

A key element of the summative evaluation was to respond to NIDRR's request to develop criteria for assessing the quality of its grantees' outputs. In developing the criteria, the committee drew on its own research expertise, recommendations of the external advisory group convened by NIDRR while planning this NRC evaluation (National Institute on Disability and Rehabilitation Research, 2008), and methods used in other NRC and international studies that have evaluated federal research programs (Bernstein et al., 2007; Chien, Chen, and Chen, 2009; Ismail, Tiessen, and Wooding, 2010; National Research Council, 2007; Canadian Academy of Health Sciences, 2009; Wooding, Nason, Starkey, Haney, and Grant, 2009; Wooding and Starkey, 2010). The committee developed four criteria which are described below: (1) technical quality of the output, (2) advancement of knowledge or the field, (3) likely or demonstrated impact, and (4) dissemination.

Technical quality of output. The technical quality of outputs was assessed using dimensions that include applying standards of science and technology, appropriate methodology (quantitative or qualitative design and analysis), and degree of accessibility and usability.

Advancement of knowledge or the field (e.g., research, practice, or policy as relevant). The dimensions used to assess advancement of the knowledge base or of the field include scientific advancement of methods, tools, and theory; developing new information or technologies; closing an identified gap; and using methods and approaches that were innovative or novel.

Likely or demonstrated impact. This criterion was used to assess the likely or demonstrated impact of outputs on science (impact, citations); consumers (for people with disabilities: health, quality of life, participation), provider practice, health and social systems, social and health policy, or the private sector or commercialization.

1 *Dissemination.* Dimensions of dissemination assessed include the identification and
2 tailoring of materials for reaching different audience/user types; collaboration with
3 audience/users in identifying content and medium needs/preferences; delivery of information
4 through multiple media types and sources for optimal reach and accessibility; evaluation of
5 dissemination efforts and impacts; and commercialization/patenting of devices, if applicable.

6 A 7-point scale was used to rate the criteria at varying levels of quality; where 1 indicated
7 poor quality, 4 indicated good quality, and 7 indicated excellent quality. A rating of 4 meant that
8 the output solidly fell in the range of meeting expectations for good quality; see Box 6-1 for
9 examples of quality indicators for each criterion. These examples are not intended to be
10 exhaustive, but to illustrate the attributes of outputs that would be rated at 4 or higher on the 7-
11 point quality scale. In rating the outputs, committee members drew from their scientific expertise
12 to consider the output's quality with respect to the dimensions within each criterion (see
13 discussion above). (More information on the review process is described below in Box 2, and
14 the review procedures guide and output rating sheet used by committee members are included in
15 Appendix B at the end of the report.)

16 **Box 6-1. Examples of Quality Indicators**

Technical Quality

- Strong literature review and framing of issues
- Competent design, considering the research question and other parameters of the study
- Good measurement planned and described
- Sound analytic methods and interpretation; recommendations for change were drawn clearly from the analysis
- Good description of feasibility, usability, accessibility, and consumer satisfaction testing

Advancement of Knowledge/Practice

- Ground-breaking and innovative approach
- Formal test of a hypothesis regarding a technique used widely in the field to improve practice
- Significant advancement and clear improvement to current classification systems
- Provides a useful descriptive base of information about factors associated with a condition
- Reveals new ways of studying a condition that can be applied to developing new models, training, or research

Likely or Demonstrated Impact

- Relatively well cited or has promise to be (for newer articles)
- Clear potential to improve the lives of persons with disabilities through increasing accessibility

- Possibly transformative clinical and policy implications
- Potential for building capacity, lowering costs, commercialization, etc.
- Demonstrated influence on the direction of research, use in the field, or capacity of the field

Dissemination

- Appropriate method and scope of dissemination
- Good description of the evidence of dissemination (e.g., numbers distributed to different audiences);
- Strategic dissemination to target audiences when needed
- Evidence of reaching the target audience
- As appropriate, dissemination used multiple media outlets such as webinars, TV coverage, senate testimony, website, DVD, and/or social network sites.

Grantee Questionnaire

NIDRR supplied the committee with information gathered from grantees in their Annual Performance Report (APR) (Research Triangle International (RTI), 2009). Grantees are required to complete APRs annually to report on their progress. At the end of a grant, they must complete a final report. To supplement the APR information provided by NIDRR, the committee developed a grantee questionnaire (See Appendix B at the end of the report). The first part of the questionnaire asked grantees to list each of the projects under the grant and nominate the top two outputs from each project that reflected their grants' best achievements. The questionnaire specified that outputs were to be drawn from the four categories defined in NIDRR's Annual Performance Report (RTI, 2009):

- a. Publications (e.g., research reports and other publications in peer-reviewed and nonpeer-reviewed publications).
- b. Tools, measures, and intervention protocols (e.g., instruments or processes created to acquire quantitative or qualitative information, knowledge, or data on a specific disability or rehabilitation issue; or to provide a rehabilitative intervention).
- c. Technology products and devices (e.g., industry standards/guidelines, software/netware, inventions, patents/licenses/patent disclosures, working prototypes, product(s) evaluated

1 or field-tested, product(s) transferred to industry for potential commercialization,
2 product(s) in the marketplace).

- 3 d. Informational products (e.g., training manuals or curricula, fact sheets, newsletters,
4 audiovisual materials, marketing tools, educational aids, websites or other Internet sites
5 that were produced in conjunction with research and development, training,
6 dissemination, knowledge translation, and/or consumer involvement activities).

7 The instructions indicated that the committee would prefer to review one publication and
8 one other type of output for each project, but that grantees could select two publications if that
9 was the only type of output for a project. The questionnaire asked the grantees to submit the
10 actual outputs for the committee's review. If the output was a website, a tool, or a technology
11 device that had to be demonstrated, grantees were asked to provide descriptive information,
12 pictures, or links to websites for the committee's direct review.

13 The second part of the questionnaire included a series of questions to elicit more in-depth
14 descriptions of the outputs when needed and to provide supplemental evidence of the output's
15 technical quality, how it advanced knowledge or practice, its likely or demonstrated outputs, and
16 about how it was disseminated. This type of information needed for a comprehensive assessment
17 of the output would not always be apparent in reviewing the output in isolation. For *technical*
18 *quality*, grantees were asked to describe examples, such as the approach or method used in its
19 development; relevant peer recognition; receipt of a patent, approval by the Food and Drug
20 Administration, or use of the output in standards development; and evidence of the usability and
21 accessibility of the output. For *advancement of knowledge or the field*, grantees were asked to
22 discuss the importance of the original question or issue and describe how the output had
23 advanced knowledge in such arenas as making discoveries; providing new information;

1 establishing theories, measures, and methods; closing gaps in the knowledge base; and
2 developing new interventions, products, technology, and environmental adaptations. For *likely*
3 *or demonstrated impact*, grantees were instructed to describe the output's potential or actual
4 impact on science, people with disabilities, provider practice, health and social systems, social
5 and health policy, private sector/commercialization, capacity building, and any other relevant
6 arenas. Under *dissemination*, grantees were asked to describe the stage and scope (e.g., local,
7 regional, national) of dissemination efforts, specific dissemination activities, any identification
8 and tailoring of materials for particular audiences, efforts to collaborate with particular audiences
9 or user communities to identify content and medium needs and preferences, and the delivery of
10 information through multiple media types. Grantees were also asked to provide information
11 from evaluations they may have conducted of their dissemination efforts and impacts (e.g.,
12 results of audience feedback or satisfaction surveys).

13 The Committee piloted the questionnaire on one NIDRR grant that had ended in 2008
14 and was outside the sampling pool (described below). Subgroups of the committee assessed five
15 outputs of this grant which consisted of publications, an assessment package, a working
16 prototype, and a fact sheet, discussed results, and adapted the questionnaire by collapsing some
17 of the dimensions from an original six criteria into the four final criteria¹.

18 To further supplement the grantee questionnaire in assessing the likely impact of
19 published articles, the committee also used such sources as Scopus and the Web of Science to
20 determine the journal impact factor and the number of citations of a particular article.

¹ An original criterion on output usability was collapsed into the final Technical Quality criterion. Another original criterion on consumer and audience involvement was restructured as dimensions of the other criteria. For example the Technical Quality criterion now includes a dimension on "evidence of usability and accessibility". The Impact criterion includes a dimension on "impact on people with disabilities". The Dissemination criterion includes a dimension on "tailoring materials to audiences" and "collaboration with users"

Sampling

NIDRR provided the committee with a data set of grantee information that consisted of all grants ending in years 2006 - 2010 (N = 248). Table 6-1 shows, within each program mechanism: the number of grants and the corresponding proportion of all NIDRR grants, the mean duration of grants, and the total funds expended and proportion of all funds expended. The last five columns of Table 6-1 show the number of grants that ended in the years of 2006 to 2010. Highlighted in these last five columns is a subset of 111 grants which were included in the sampling pool from which 30 grants were randomly sampled for the summative evaluation. The rationale for using this smaller subset of all NIDRR grants as the sampling pool was based on the following. The committee was directed by the charge to draw a sample of 30 grants ending in 2009 that was representative of NIDRR's 14 program mechanisms. However, as displayed in Table 1, several program mechanisms did not have at least two grants ending in 2009: the three Model Systems (MS) mechanisms, Disability Business Technical Assistance Centers (DBTAC), Disability and Rehabilitation Research Projects—Knowledge Translation (DRRP-KT), Advanced Rehabilitation Research Training (ARRT), and DRRP-Section 21.

Because the MS grant mechanisms support some of NIDRR's flagship programs, including traumatic brain injury (MS-TBI), spinal cord injury (MS-SCI), and burn injuries (MS-Burn), adjustments were made to the sampling pool to ensure that these programs would be included in the sample. We went back to the nearest year that yielded a total of at least two grants, which was 2008 for MS-Burn and MS-TBI (n = 5 for Burn and n = 9 for MS-TBI, with 1 in 2009 and 8 in 2008) and 2007 for MS-SCI (n = 9) and included these grants in the pool. The DBTAC, DRRP-KT, ARRT, and DRRP-Section 21 were excluded from the pool for this first cycle of evaluations. Small Business Innovation Research, Phase I, grants were also excluded

1 from the sampling pool because they do not produce “outputs” and therefore did not align with
2 the evaluation parameter to review two outputs for each project within a grant. After these
3 adjustments, the total pool consisted of 111 grants across 9 NIDRR program mechanisms. It is
4 possible that the older grants included in the evaluation had an advantage over the grants ending
5 in 2009 because of the additional time for their outputs to have had an impact.

6 From this pool of 111 grants, 30 grants (27%) were randomly selected for review in the
7 following way. To balance the desire for the sample of grants to represent the nine program
8 mechanisms included in the pool, the sampling was stratified at the program mechanism level as
9 a proportion of all grants in the sampling pool. For example, there were 36 Field Initiated Project
10 grants in the sampling pool as shown in Table 6-1. This was 32% of all of the grants in the
11 sampling pool (N=111). Therefore, 32% of the 30 grants in the sample should be FIPs (n=10).
12 The 36 FIPS in the sampling pool were numbered 1 through 36 and then 10 FIP grants were
13 randomly selected using a website that generated random numbers.

14 Table 6-2 in the next section shows the number of grants included in the sample by
15 program mechanism. Proportionally the number of grants sampled in each program mechanism
16 did not reflect the actual proportions of all grants in the larger NIDRR data set (N=248), but the
17 sampling method did allow for the largest number of grants in the sample to be FIP grants, which
18 was the largest program mechanism in the NIDRR data set.

1 TABLE 6-1 NIDRR Grants Ending Between 2006 and 2010, by Program Mechanisms

Program/Funding Mechanism	Number of Grants	% of all Grants	Mean Duration of Grant (years)	Total Grant Funds in Program Mechanism	% of Total NIDRR Grant Funding for Grants Ending 2006-2010	Number of Grants in Program Mechanism, by Year Ending, with Grants Included in Sampling Pool Highlighted				
						06	07	08	09	10
Model Systems Grants										
Burn Injury (MS-Burn)	5	2.02%	6.1	\$7,271,563	2.34%	0	0	5	0	0
Traumatic Brain Injury (MS-TBI)	16	6.45%	5.6	\$29,132,862	9.38%	0	7	8	1	0
Spinal Cord Injury (MS-SCI)	17	6.85%	6.5	\$33,977,321	10.94%	8	9	0	0	0
Center Grants										
Rehabilitation Engineering and Research Centers (RERC)	12	4.84%	5.7	\$55,816,980	17.98%	0	0	0	8	4
Rehabilitation Research and Training Centers (RRTC)	21	8.47%	5.9	\$82,920,345	26.71%	0	0	0	10	11
Research and Development Grants										
Disability and Rehabilitation Research Projects (DRRP)	18	7.26%	5.0	\$30,627,386	9.87%	0	0	0	14	4
Field Initiated Projects (FIP)	74	29.84%	3.8	\$35,881,454	11.56%	0	0	0	36	38
Small Business Innovation Research, Phase I (SBIR)	31	12.50%	0.6	\$2,323,305	0.75%	0	0	0	16	15
Small Business Innovation Research, Phase II (SBIR)	16	6.45%	2.5	\$7,990,171	2.57%	0	0	0	8	8
Translation Grants										
DRRP-Disability Business Technical Assistance Centers (DBTAC)	1	0.40%	1.8	\$1,742,400	0.56%	0	0	1	0	0
DRRP-Knowledge Translation (DRRP-KT)	3	1.21%	5.0	\$8,179,933	2.64%	0	0	0	0	3
Training Grants										
Advanced Rehabilitation Research Training (ARRT)	11	4.44%	5.8	\$8,229,338	2.65%	0	0	0	1	10
Switzer Fellowships	20	8.06%	1.3	\$1,220,000	0.39%	0	0	0	12	8
DRRP-Section 21	3	1.21%	6.1	\$5,141,955	1.66%	0	0	1	1	1
Total	248	100.00%		\$310,455,013.00	100.00%	8	16	15	107	102
Number grants in sampling pool by end year						0	9	13	89	0
Total number grants in pool						111				

1 After the proposed evaluation methods received approval from the institutional review
2 board of the National Academies, the sample of 30 grants was drawn and invitations to
3 participate were sent to the principal investigators (PI) of the 30 grants; the PIs were fully
4 informed about the methods to be used in the evaluation and what would be required of them.
5 Of the original 30 grantees invited, three declined because they did not have time to fulfill the
6 evaluation requirements (n=2) or changed institutions (n=1). Three additional grants were then
7 randomly selected from the pool to bring the final sample to 30 grants. We acknowledge that
8 bias from self-selection could have crept into the evaluation findings making the final sample of
9 30 grants that participated in the evaluation less representative of the larger population of grants.

11 **Compiling Outputs to Be Reviewed and Number of Outputs Reviewed**

12 As noted, the PIs of the grants included in the sample were provided with written
13 instructions about how to submit their outputs for the review and provide supplemental
14 information about the outputs. Committee staff worked with the grantees to clarify the instructions
15 and to encourage them to submit their output packages. Because some grants had ended several
16 years before our review (2007 and 2008 for the Model Systems grants), some grantees had
17 difficulty in submitting materials because the PIs had changed institutions or departments within
18 the same university or had other competing priority activities during the time period of our
19 review. Staff accommodated these PIs by providing additional time for submitting their
20 materials and in five cases by assisting them in completing the questionnaires through telephone
21 interviews. Two grantees did not provide the supplemental questionnaires.

22 As described above, grantees were sent questionnaires on which they were asked to list
23 each project under their grant and nominate two outputs per project to be reviewed by the committee.

They were asked to identify the “top” two outputs per project that reflected their grant’s best achievements. In order to permit assessment of outputs beyond journal publications, grantees were asked to offer at least one nonjournal publication per project, if such outputs were available. The number of projects for each grant varied by size, from 1 for small field-initiated grants to 10 on larger center grants.

A total of 156 outputs were submitted for review across the 30 grants selected. Eight outputs were considered highly related to other outputs, and they were reviewed together. This occurred when one output was a derivative or different expression of another output, and when the PI responses to criteria questions were basically the same. Therefore, the number of outputs for analysis was 148. Table 6-2 presents the number of grants included in the sample by program mechanism and the types of outputs that were reviewed.

TABLE 6-2. Number of Grants and Distribution of Outputs Reviewed by Program Mechanism

NIDRR Grant Category and Program Funding Mechanisms	Grants	Publications	Tools	Technology	Information	Total
Model Systems Grants						
Burn Injury (MS-Burn)	2	12	2	0	4	18 (12%)
Traumatic Brain Injury (MS-TBI)	2	12	0	0	2	14 (10%)
Spinal Cord injury (MS-SCI)	2	11	0	0	0	11 (7%)
Center Grants						
Rehabilitation Research and Training Center (RRTC)	3	16	0	0	12	28 (19%)
Rehabilitation Engineering and Research Centers (RERC)	2	16	2	5	3	26 (18%)
Research and Development Grants						
Disability and Rehabilitation Research Projects (DRRP)	4	13	4	0	5	22 (15%)
Field Initiated Projects (FIP)	10	17	1	3	1	22 (15%)
Small Business Innovation Research, Phase II (SBIR)	2	1	0	1	0	2 (1%)
Training Grants						
Switzer Fellowship	3	5	0	0	0	5 (3%)
Total and proportion of output types in sample	30	103 (70%)	9 (6%)	9 (6%)	27 (18%)	148

Total and proportion of output types in sampling pool	111	1,060 (76%)	101 (7%)	84 (6%)	148 (11%)	1,393
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To put the outputs reviewed into the larger context of the outputs produced by grantees in the sampling pool of 111 grants, Table 6-2 also shows that the proportion of publications and other outputs (tools, technology, and information products) that were reviewed by the committee were relatively close to the proportions of the various outputs types produced by grantees in the larger sampling pool. The proportion of publications reviewed was somewhat lower at 70% (versus 76% in the sampling pool), and the proportion of information products reviewed was somewhat higher at 18% (versus 11% in the sampling pool).

The Review Process

The committee members, whose expertise covers social sciences, rehabilitation medicine, engineering, evaluation, and knowledge translation, were divided into three groups each consisting of five members. The subgroups were organized to ensure that outputs would be reviewed by a group of individuals with the collective expertise necessary to judge their quality. The subgroups were convened on three occasions, in October 2010, December 2010, and February 2011. Because of the relatively short period of time in which to conduct the reviews, grants were scheduled for review according to size, with the smaller grants being invited first (e.g., FIPS, Switzers, SBIRs), and the larger grants (DRRPs, models systems, center grants) being invited to participate in the later rounds. The rationale for this was that the smaller grants had fewer outputs and would need less preparation time for the review than the larger grants which had many projects and more outputs to prepare for the review. Therefore the content of the grants tended to be mixed during each round of reviews and required a corresponding mix of expertise in each subgroup. However, efforts were made to match the expertise of the reviewers in each subgroup with the outputs they would be reviewing (e.g., technology output was assigned

1 to a subgroup with engineering expertise). The review procedures are described in detail in the
2 box that follows.

3 4 **Box 6-2: Committee Member Review Procedures**

Committee Member Review Procedures

Each of the 30 grants was assigned to one of the three subgroups, so that all outputs from a grant were reviewed by the same subgroup. To ensure consistency in approach across subgroups, the committee chair attended each subgroup meeting.

Based on direct review of the output itself and descriptive information about the output provided in the APR and questionnaire responses from grantees, each subgroup member independently rated every output assigned to that subgroup, assigning a quality criteria score for each of the four quality criteria (technical quality, advancement of knowledge or the field, likely or actual impact, and dissemination), as well as an overall score for the output and a rationale for the overall score. Scores were assigned using a seven-point scale, ranging from 1 to 7 and anchored at 3 points: 1 = poor quality, 4 = good quality, and 7 = excellent quality.

For each output, one subgroup member was assigned as the primary reviewer; the remaining four subgroup members were secondary reviewers.

The process for arriving at consensus scores was as follows:

- The primary reviewer opened discussion of each output by presenting a brief summary of the output and his or her rationale for rating each relevant criterion plus the overall score.
- The secondary reviewers then presented their ratings for each output and a brief rationale.
- The subgroup then developed consensus group ratings for each output through discussion facilitated by the subgroup chair.

Following the discussion of all outputs from an individual grant, the subgroup considered the full spectrum of the reviewed material, along with the grant's overall purpose and objectives (using the grant's APR), and assigned an overall performance rating for the grant using the same 7-point scale.

5
6 The committee's expert review involved a qualitative consideration and assessment of the
7 multiple quality dimensions of the outputs — a process that has been recommended as a valid

1 method for evaluating the relevance and quality of federal research programs (COSEPUP, 1999).
2 The 7-point rating scale was used in order to more precisely describe the results of the output
3 assessment in terms of the varying levels of quality. During the reviews, the committee members
4 frequently discussed how they were applying the criteria and interpreting the anchors of the
5 rating scale so they could calibrate their ratings. In addition, brief narrative statements were
6 written summarizing the rationale for the subgroups' ratings of each output. These statements
7 were reviewed after the ratings were completed to identify attributes that particularly
8 characterized the varying levels of quality and were helpful in further exemplifying the
9 dimensions of the criteria.

10 Although the final scores used to report results of the output assessment were based on
11 their consensus scores, the committee conducted an inter-rater reliability analysis of their initial
12 independent ratings (i.e., raw scores before their discussion) to determine the degree to which the
13 individual committee members were using and interpreting the scale in the same way. The
14 interrater reliability analysis was conducted, using methods suggested by MacLennan (1993), for
15 more than two raters with ordinal data. This method calculates an intraclass correlation
16 coefficient (ICC) that represents an average correlation among raters.

17 The interrater reliability analyses were run on 15 grants that had at least 3 outputs
18 reviewed by the subgroups. The ratings compared were the individual committee members' raw
19 scores (before discussion) on each of the criterion. According to Yaffee (1998), the minimum
20 acceptable ICC is .75 to .80. Results on the *technical quality* criterion showed that 13 out of the
21 15 grants had statistically significant ICCs ($p < .05$) greater than .75; on the *knowledge*
22 *advancement* criterion 10 grants had ICC's greater than .75; on the *impact* criterion 11 grants had
23 ICC's in this acceptable range; and on the *dissemination* criterion nine grants had ICC's in this

1 acceptable range. Although the results show greater challenges in achieving interrater reliability
2 on the criteria other than technical quality, the ICC results suggest that individual members were
3 using and interpreting the 7-point scale in a similar manner prior to the full subgroup's
4 discussions of the output ratings and their subsequent determination of consensus scores.

6 RESULTS OF THE EVALUATION OF GRANTEE OUTPUTS

7 This section presents the results of the quality ratings according to the four criteria that
8 were used and discusses the ratings by the types of outputs. In reviewing publications the
9 committee also referred to well known sources that rate journal impact factors and which count
10 the number of times published articles have been cited. Results of these are summarized for the
11 publications reviewed. Finally, conclusions and recommendations are presented for NIDRR to
12 consider in improving the quality of grantee outputs.

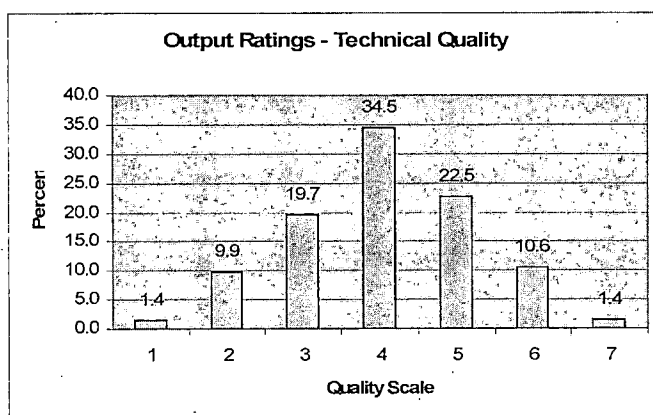
14 Quality Assessment of Outputs Reviewed

15 Figures 6-1 through 6-4 illustrate the distribution of ratings for all outputs² on each of the
16 four quality criteria. Percentages show the proportion of outputs that received the various ratings
17 along the seven-point scale. Figures 6-5 and 6-6 show distributions in aggregate for the "overall"
18 ratings that were determined for each output (i.e., considering all four criteria), and for the "grant
19 performance" (i.e., considering all outputs submitted by a grantee). Results for each criterion are
20 discussed below the figures.

² Although a total of 148 outputs were reviewed, the numbers vary slightly across the criteria in the figures (N= 138 to 142). The committee was not able to rate 8 outputs because the information available was not sufficient. Examples of these were a technical workshop which had not yet been convened, a national conference, a technical standard, a satellite clinic, an intervention program, a list of publications, and an advocacy curriculum. A few other outputs could be rated on some criteria, but not all four, for the same reason.

In addition brief statements were written summarizing the rationale for the committees' ratings of each output. These statements were reviewed after the ratings were completed to identify attributes which particularly characterized the ratings of the quality criteria; these statements clarified the dimensions comprising specific quality criteria. The attributes that characterized the lower rated and higher rated outputs are summarized for each criterion below each respective figure.

Figure 6-1. Distributions of Quality Ratings for Technical Quality (N=142)



Technical Quality

With regard to *technical quality* (Figure 6-1 above) the majority of outputs (69%) were rated in the higher quality range (4-7). However, more than a quarter of the outputs (31%) were rated in the lower quality range (1-3).

Several characteristics distinguished the lower ratings of technical quality (2-3) from the higher ratings. An example is *lack of information that was presented in the output itself or in the accompanying descriptive questionnaire*. Reviewers commented that there was an insufficient description of the output itself, the publication was written poorly, methods or protocols for tools were not described thoroughly, results were not clearly presented to understand how the research question was answered, a lack of documentation on how a measure was developed, testing

1 results of a technology product were not presented, or not enough substance presented in an
2 informational product to assess it. Another example was *lack of clarity in information that was*
3 *presented*. Reviewers commented that questions on a survey did not appear to be well thought
4 out, not fully explaining weak findings in their conclusions, unclear whether adequate validation
5 was actually done on a measure or technology product, unclear whether a new technology was
6 based on scientific evidence, or unclear role of the grant in contributing to a standard of a new
7 technology or device.

8 When outputs were rated lower in areas of *design and methods*, comments included:
9 small sample sizes not being representative or using a single group designs with self-reported
10 measures, no controls, and pre-test only. These study designs and methods could still be strong if
11 treated as pilot or feasibility studies. These types of studies were seen as weak particularly if
12 there were claims to have potential for changing policy or practice. Not describing or addressing
13 limitations in some way was described as a weakness, particularly in cases where there were high
14 attrition rates or low response rates. Many of these weaknesses in lack of information or lack of
15 clarity could be addressed by using standards for reporting research and protocols, which are
16 now widely available (might be good to cite the equator network website here given it is
17 provides a compendium of such guidelines). Weaknesses were identified in *analyses* that used
18 obsolete datasets, did not use standard methods of analysis, did not fully use all of the variables
19 available, or described statistical analyses that appeared to be ad hoc.

20 *Informational products* that were rated lower included newsletters that presented data but
21 did not synthesize the data for users or presented tips for practice without providing the
22 supporting evidence, and websites that were hard to navigate, had missing links, or no interactive
23 elements to be fully able to access or utilize the information.

1 In contrast outputs that were rated on the higher end of the scale had comments that
2 praised attributes of *presentation and clarity*, such as: very thorough paper, careful and scholarly
3 approach, great literature review and framing of issues, very systematic approach that was
4 described well, recommendations for change were drawn clearly from the analysis, and narrative
5 descriptions are of high quality and accurately represent key issues in technical and conceptual
6 terms.

7 Examples of comments on *measurement qualities* included: good measurement planned
8 and described; good description of feasibility, usability, accessibility, and consumer satisfaction
9 testing; and used simulator plus neurological tests.

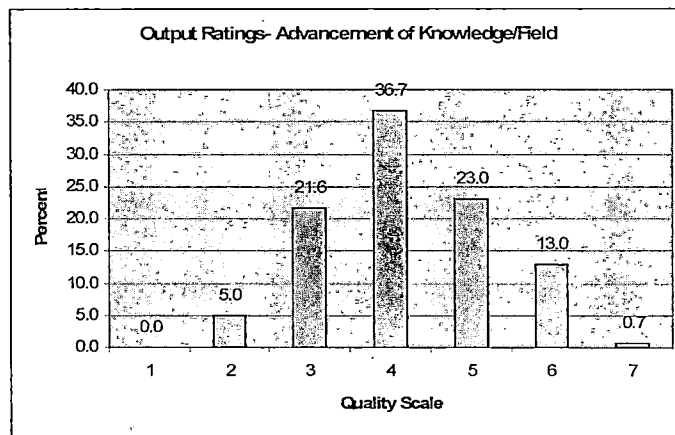
10 Outputs that were rated higher on *methodology and analytic techniques* were noted as:
11 competent though using a convenience sample with a longitudinal design, good sample size, use
12 of a prospective sample that was monitored across a two year period and used several predictors;
13 and analytic methods and interpretation appeared sound.

14 Some particular attributes of *tools and technology products* that were rated high were:
15 strong design, article on a technological innovation won a prize for technical quality in the
16 journal in which it was published. One grantee stood out as presenting three outputs in a
17 cohesive manner that illustrated the technical quality of research and development by presenting
18 the first output that described the research base, the second which described the software
19 application, and the third which assessed use of the protocol.

20 Some highly rated *informational products* (websites) were described as: easy to navigate
21 through, evidence was presented on consulting with users and tailoring the website to users, data
22 on website was highly accessible and usable.

1 **Figure 6-2. Distributions of Quality Ratings for Advancement of Knowledge or the Field**

2 (N=139)



3
4 **Advancement of Knowledge or the Field**

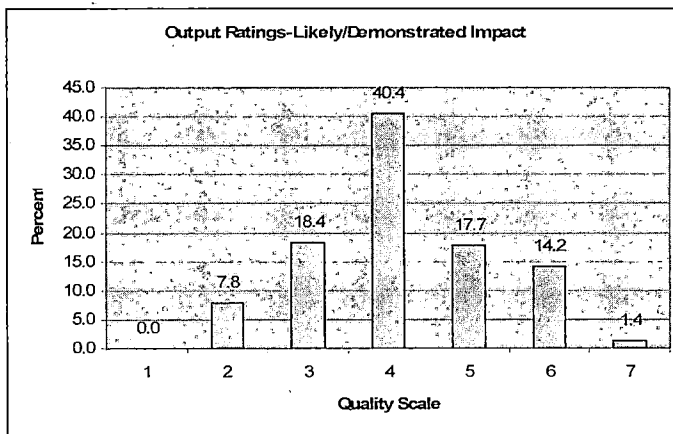
5 The output ratings on the *advancement of knowledge or the field* (figure 6-2 above)
6 shows that almost three quarters of the outputs were determined to be in the higher quality range
7 (73%). But again slightly more than a quarter fell into the lower range.

8 This criterion also distinguished between lower and higher rated output quality. Those
9 rated lower received comments such as: nothing new or novel presented, unclear how this work
10 is an advancement over current knowledge, no new theory work and unclear how output will
11 break new ground, dated concepts in the field, unclear what the advancement is in some
12 knowledge transfer outputs, and evolution of technology not driven by this product development.

13 In contrast, comments on outputs scoring on the higher end of the quality rating scale
14 included: novel and interesting topic; unique work which is a good contribution to the state of the
15 knowledge; ground-breaking and innovative; added to the field knowledge about a practice;
16 formal test of a hypothesis regarding a clinical technique used widely in the field; randomizing to
17 conditions was new in this technology; setting new prevalence rates by using new indicators;
18 moves the knowledge base forward by linking concepts and measures to change how we do

1 measurement; significant advancement and clear improvement to current classification systems;
2 provides a useful descriptive base of information about risk factors; could lead to new ways of
3 studying a condition and developing new models that can be used for training and designing
4 interventions or developing new study approaches; and experimental design is well conceived
5 and well designed with potential for moving field forward.

6 **Figure 6-3. Distribution of Quality Ratings for Likely or Demonstrated Impact (N= 141)**



8 **Likely or Demonstrated Impact**

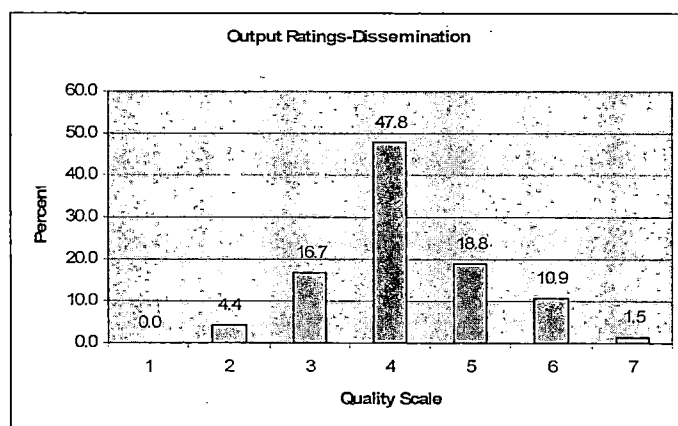
9 Similarly the ratings on *likely or demonstrated impact* (figure 6-3 above) shows that 74%
10 of the outputs were determined to be in the higher quality range. But again slightly more than a
11 quarter fell into the lower range.

12 Outputs that were rated low on this criterion generally did not present evidence of likely
13 or demonstrated impact and it was not apparent from examining the output itself. In one case it
14 appeared that a paper may have had more potential for impact if it had been published in a
15 journal more suited to the information presented and in another if the investigators had
16 collaborated more upfront with agencies in trying to adapt a measure.

17 When outputs were rated high, the likely or demonstrated impact was readily seen. They

1 were published in journals that were peer reviewed and that had appropriate impact factors; they
2 were relatively well cited or had promise to be (for newer articles), and may have been cited in
3 national newspapers. These were outputs that had clear potential to improve the lives of persons
4 with disabilities through increasing accessibility, had clear and possibly transformative clinical
5 and policy implications, and whose results may hold promise of supporting new insurance
6 coverage, providing an intervention at lower cost, or for commercialization. Some of the outputs
7 that were rated high had demonstrated their impact through already influencing the direction of
8 research, being widely used in the field, helping to inform and move healthcare legislation,
9 shedding light on institutional bias, or building capacity in for the use of statistical products.

10 **Figure 6-4. Distribution of Quality Ratings for Dissemination (N=138)**



12 Dissemination

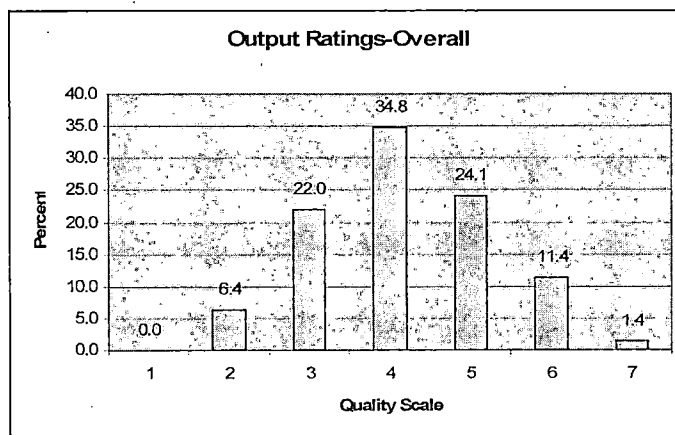
13 Output ratings on the *dissemination* criteria (figure 6-4 above) are somewhat different
14 than the others with a higher proportion (79%) of the outputs being rated in the higher quality
15 range, and less than a quarter (21%) falling in the lower range.

16 When outputs were rated low on the dissemination criteria it was for a variety of reasons
17 that pertained to not conforming to some of the basic principals of knowledge translation, such

as: it was not clear who the target audience was; the information was not targeted to the audience identified; it was unclear how the audience will use output; or the voice, content, or format was not consumer friendly or not of high quality. Sometimes it was not clear whether or how outputs were disseminated and what the volume or scope of dissemination was.

On the other hand, outputs that were rated high on this quality criteria were characterized as: having extensive dissemination and good description of the evidence of this (e.g., numbers distributed to different audiences); the method of dissemination and format were appropriate; there was evidence of reaching the target audience, they were disseminating through a patent and commercialization; the output was widely disseminated by a federal agency; there was strategic dissemination targeted to states or associations; dissemination was using multiple media outlets such as webinars, TV coverage, senate testimony, website, DVD, and/or social network sites. One technology product was planning to disseminate through its university's support to license the technology for possible commercialization.

Figure 6-5. Distribution of Overall Quality Ratings for each Output (N=141)



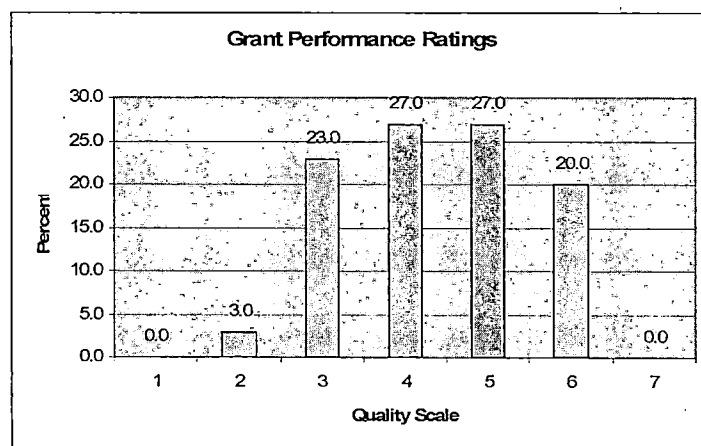
Ratings of Overall Quality of Outputs

The *overall quality* ratings were determined by considering the four criteria ratings. Thus

figure 6-5 above reflects the same pattern of a fairly symmetrical distribution of scores, skewed slightly toward the higher range with 72% of the outputs being rated in the higher quality range, and 28% as lower quality.

All outputs were noted as having strengths and weakness. However, those that received lower overall scores of 2 to 3 had a preponderance of lower ratings across the individual criteria whereas the opposite was true for the outputs that received the higher overall scores. Those outputs that received ratings of 4 had a greater mix of both positive and negative critiques which made the products good, but not exceptional.

Figure 6-6. Distribution of Quality Ratings for Grant Performance Score (N=30)



Ratings of Grant Performance on Outputs

After reviewing all of the outputs of an individual grant, the committee considered and rated the grant's overall performance with regard to all of the outputs reviewed by that grantee. In rating the grant performance the committee also considered the fact that the outputs reviewed had been identified by the grant's Principal Investigators as the "top" two outputs per project, which best reflected the grant's achievements. Taking into consideration this designation, the overall ratings of each output, and the grant's overall purpose and objectives (using the grant's

1 APR), a grant performance rating was assigned using the same 7-point scale. Figure 6-6 above
2 which shows the distribution of scores on the performance of grants is quite different than the
3 ratings of the individual outputs. While three quarters of the grants' overall performance was
4 rated in the higher quality range and one quarter were rated as lower quality, a smaller proportion
5 of grants were rated at the midpoint of 4 (27%) and much larger proportions were rated on the
6 higher end of the scale with 27% receiving a rating of "5" and 20% scoring a "6". This result
7 may reflect that the grants' performance on the particular outputs reviewed was determined to be
8 more than the sum of its outputs. Still there was great concern that the committee did not have
9 enough information to rate the grant-level performance by focusing so exclusively on only two
10 outputs and not more on how the outputs fit in the context of the grants' aims and developmental
11 trajectories. This was particularly the case for larger, more complex projects such as the
12 RRTC's, model systems, and RERC grants. The NIDRR Annual Program Reports (APR), which
13 were taken into consideration, in some cases did a good job of providing this larger context, but
14 for many reviewing the APR alone was not sufficient.

16 **Journal Impact and Citation Analysis of Publication Outputs**

17 Assessing the quality criteria described above included referring to the impact factors of
18 the journals associated with each publication. This involved determining the quality of the
19 journal in which the paper was published, as well as the number of times a paper had been cited
20 in other published manuscripts. While this type of analysis has the benefit of providing very
21 quantifiable metrics, it is also fraught with many limitations that are particularly relevant to
22 NIDRR grantees. Many NIDRR-funded researchers publish in specialty journals that may have
23 lower impact factors because they are researching narrow fields that are not well populated with

researchers. In addition, the citation half life (the time it takes for a paper to receive half of its total citations by others) can be quite long. The citation half life for the Archives of Physical Medicine and Rehabilitation (one of the leading journals in this field), for example, is about eight years. Thus, it may take many years before a paper's true value is revealed using this metric. Because most of the grants reviewed ended in 2009, the citation data for the publications reviewed was collected within a very short time window (0-24 months).

Acknowledging these limitations, we used Scopus and the Web of Science to access information on the journal impact factors and the number of citations of each particular article. Table 6-4 shows all the journals in which publications reviewed by the committee were published, the SJR and ISI impact factors, and the number of outputs reviewed that were published in these particular journals.

Table 6-3 Journal Impact Factors of Published Articles Reviewed (N=30 grants, 80 papers)

Journal Name	SJR	ISI	Number of NIDRR funded articles published in the journal
Archives of Physical Medicine and Rehabilitation	0.17	2.18	18
Journal of Spinal Cord Medicine	0.12	1.40	12
Journal of Burn Care and Research	0.15	1.62	5
Disability and Rehabilitation	0.10	1.56	4
Health Affairs	0.37	3.58	3
International Journal of Telerehabilitation	NA	NA	2
Journal of Burn Care and Rehabilitation	NA	NA	2
Journal of Head Trauma Rehabilitation	0.17	2.93	2
Journal of Neurotrauma	0.37	4.26	2
Journal of Rehabilitation Research and Development	0.11	1.37	2
Rehabilitation Psychology	0.06	NA	2
Topics in Stroke and Rehabilitation	0.10	1.23	2
AER-Journal of Research and Practice in Visual Impairment and Blindness	NA	NA	1
Assistive Technology	0.04	NA	1
Brain Injury	0.11	1.53	1
Burns	0.14	1.95	1

Journal Name	SJR	ISI	Number of NIDRR funded articles published in the journal
Developmental Neurorehabilitation	0.10	NA	1
Disability and Health Journal	0.04	NA	1
Generations	0.04	NA	1
Hearing Journal	0.04	NA	1
IEEE Transactions on Biomedical Engineering	0.15	NA	1
Interacting with Computers	0.06	1.70	1
International Journal of Geriatric Psychiatry	0.16	1.98	1
Journal of Aging and Social Policy	NA	NA	1
Journal of Applied Rehabilitation Counseling	NA	NA	1
Journal of Behavioral Nutrition and Physical Activity	0.22	2.63	1
Journal of Cardiopulmonary Rehabilitation and Prevention	0.17	NA	1
Journal of Occupational Rehabilitation	0.12	NA	1
Journal of Vocational Rehabilitation	0.04	NA	1
Lecture Notes in Computer Science	0.04	NA	1
NeuroRehabilitation	0.14	NA	1
Neurorehabilitation Neural Repair	0.36	5.40	1
Physical Medicine Clinics of North America	0.09	NA	1
Rehabilitation Education	NA	NA	1
Spinal Cord	0.15	1.78	1
Telemedicine and E-Health	0.09	0.97	1
Total published articles reviewed			80

Key:

SJR (Scopus) = SCImago Journal Rank which reflects prestige of source. Calculates the value of weighted citations per document [Retrieved on 3-31-11 at <http://www.scopus.com/source/eval.url>]

ISI (Web of Science) = Average number of citations received per paper published in that journal during the two preceding years [Retrieved 3-31-11 at http://thomsonreuters.com/products_services/science/academic/impact_factor/]

NA= not available in the databases used

As can be seen in the table, the journal with the largest number of articles reviewed (N=18) was the Archives of Physical Medicine and Rehabilitation, followed by the Journal of Spinal Cord Medicine (N=12). The wide variety of journals corresponds to the broad portfolio of NIDRR. Scopus classifies 33 journals in the subject area of Rehabilitation and the impact factors of these range from a low of .101 (*Athletic Therapy Today*) to a high of 5.4 (*Neurorehabilitation*

1 and *Neural Repair*). The most widely cited journal in this category is the Archives of Physical
2 Medicine and Rehabilitation, which has an impact factor of 2.184. (Retrieved 2-16-2011 from
3 Web of Science at <http://admin-apps.isiknowledge.com/JCR/JCR>). Thirty-four percent of the
4 papers were published in journals with ISIs greater than 2.0. On the other hand, 26% percent
5 were published in journals that are not listed in ISI.

6 To put the results of Table 6-4 into context, Appendix 6-1 at the end of this chapter
7 includes another table that lists the journals in which the larger pool of 111 NIDRR grantees
8 published. (These were the grantees in the original pool of NIDRR grants from which the 30
9 grants in the sample were drawn). Thirty percent of these papers were published in prestigious
10 journals (ISI >2), and about 20-30% were published in journals that are not listed in ISI.

11 Using a different metric of citation analysis, in Scopus we were able to identify citations
12 for 52 of the 80 journal articles which the committee reviewed. The number of citations for these
13 ranged from 1 (10 articles had one citation) to 74 (one article had 74 citations). The median
14 number of citations was seven.

16 Conclusions and Recommendations

17 The study question was: To what extent are the final outputs from NIDRR grants of high
18 quality? The committee found that the ratings on all of the criteria were symmetrically
19 distributed along the quality scale with the largest proportions of scores falling at the midpoint of
20 4 (good quality), and with most being slightly skewed toward the higher end of the quality scale.
21 Although close to 75% of the outputs rated were found to be in the higher range of the quality
22 scale (i.e., with mean rating of 4 or greater) across all of the criteria a quarter of the outputs
23 reviewed were found to be in the lower quality range.

1 While expert review is a widely accepted method used for assessing the quality of
2 research grant proposals, it must be emphasized that the ratings of outputs here were based on
3 expert opinion rather than quantifiable effects. Another important consideration is that not all
4 NIDRR program mechanisms were included in the pool of grants from which our sample was
5 drawn (Section 21, DBTAC, DRRP-KT, and AART). Because NIDRR grant competitions for
6 different program mechanisms are on different funding cycles, there were not enough grants (at
7 least 2) in these particular funding mechanisms to include in the pool. Finally, it is also important
8 to view the conclusions in light of the fact that in selecting the outputs to be reviewed, grantees
9 tended to submit publications as evidenced by the fact that 70% of the outputs reviewed were
10 publications. Other limitations in the methods developed for rating the outputs are discussed in
11 Part C of this chapter. However, the quality rating system used in the summative evaluation
12 worked very well for publications in particular. Using the four criteria (i.e., technical quality,
13 advancement of knowledge or the field, likely or demonstrated impact, and dissemination) the
14 reviewers were able to identify and describe varying levels of quality and the characteristics
15 associated with these. Based on the evidence, we offer NIDRR a set of recommendations to
16 assist their grantees in continuously improving the quality of their outputs.

17 **Improving Quality of Outputs**

18 As stated earlier in this report, the quality of outputs is the product of multiple complex
19 factors that involve the priority writing process, the funding level, the peer review process, and
20 the quality of proposed the science/research and the grantees, and ultimately the nature (quality)
21 of the research findings. Findings from earlier chapters showed that for grantees that are not
22 performing optimally NIDRR has the option of conducting ongoing formative reviews with
23 experts to identify strategies for improvement. We learned also that NIDRR has started to

1 routinely add to their staff meetings an agenda item for project officers to consult about lower
2 performers, and that POs have flexibility to require additional reporting as needed from grantees.
3 From the grants management chapter we learned that grantees perceive that NIDRR's oversight
4 and reporting function foster successful grants and high quality outputs by: assisting them in
5 adhering to their budget and timeline, providing an external quality assurance mechanism for
6 their project management, and prompting them to maintain their focus on project goals for high
7 quality products.

8
9 **Recommendation 6.1. Although close to 75% of outputs were rated as high**
10 **quality (ie., 4 or higher on the 7-point quality scale), NIDRR should increase**
11 **expectations for all grantees to achieve high levels of quality in their outputs.**

12 For publications, which were 70% of the outputs reviewed, NIDRR should
13 set higher expectations for grantees to publish in higher impact journals. For the
14 other 30% of outputs that are not publications, NIDRR should establish standards
15 for high quality and adopt appropriate metrics to assess whether grantees are
16 meeting them. One way of setting the bar higher that NIDRR could implement
17 would be to begin to encourage grantees to use standardized reporting forms and
18 checklists for reviewing the technical quality of their own work before subjecting
19 it to external review. There are many resources for reviewing different types of
20 research manuscripts and other types of non-publication outputs to ensure that the
21 necessary technical elements have been covered. (See [http://www.equator-](http://www.equator-network.org/)
22 [network.org/](http://www.equator-network.org/) for examples of these types of standards for outputs such as
23 publications, health information products, and clinical guidelines). For various

1 technologies and devices, resources such as the Principles of Universal Design
2 (Story & Mueller, 2002) provide a good starting point for assessing quality in
3 terms of access and usability. Although the evidence base for these types of
4 checklists and standards may vary (Testing is stated in the protocols), they do
5 provide indicators of quality for on-going self assessment. When grantees
6 provided evidence of self assessment, along with external review by consumers,
7 academics, and other stakeholders their outputs were rated higher on the quality
8 scale. Finally, a frequent weakness noted on the tools and technology outputs in
9 particular was that there was insufficient evidence of the science underlying the
10 development. Relying on checklists and standards should assist in reminding
11 developers of the need to document their evidence base.

12
13 Despite limitations in using bibliometrics as described in an earlier section of this
14 chapter, it is a valuable and objective set of metrics that can be used in combination with other
15 assessment strategies. NIDRR has conducted bibliometric analyses in the past, but has not
16 routinely incorporated use of these metrics into its performance measurement.

17 **Recommendation 6.2. NIDRR should consider undertaking bibliometric analyses on**
18 **a more routine basis for performance measurement.**

19 For example, a question examining impact might involve gathering bibliometric
20 data on both NIDRR funded and non-NIDRR funded work in some selected research
21 domains, identifying what proportion of the articles were published by NIDRR funded
22 research, analyzing citations, and comparing the quality of the journals in which the
23 work is published.

ASSESSMENT OF THE COMMITTEE'S REVIEW METHODS

The committee endeavored to assess its evaluation methods throughout the study process. Members engaged in continuous reflection and recording of strengths and weaknesses during the rating process conducted in subgroup meetings. To facilitate this effort, the committee chair participated in all subgroup meetings to ensure members understood how each subgroup was applying the rating methods. In addition, conference calls with the full committee were held after each set of subgroup meetings to discuss the evaluation process and refine the methods. Lastly, during its final meeting, the committee devoted a half-day session to discussion of the strengths and weaknesses of the process and developing conclusions and recommendations for future evaluations. This discussion was based on the continuous reflections of committee members along with findings from an informal, anonymous poll of committee members about the review process.

In the poll each committee member was asked to rate his or her level of confidence in 16 aspects of the review process and 8 topics related to its replication. For each of these aspects, members assigned a confidence rating on a 5-point scale in which 1 indicated "no confidence at all" and 5 indicated "extreme confidence." The poll was intended to provide an indicator of each committee member's impressions of the output rating process. Poll results confirmed that individual members were generally confident in the review process and the potential replication of the process, with confidence ratings above the midpoint for all but one of the review process aspects and all but one of the replication topics.

Aspects of the review process in which the committee had the greatest confidence (with scores above 4 on the rating scale) were:

- 1 • the technical quality score,
- 2 • the face validity of the consensus scores that were produced for outputs,
- 3 • the ability of the committee to evaluate outputs without having consumers on
- 4 subgroups, and
- 5 • the appropriateness of a 7-point quality rating scale.

6 These results were consistent with the impressions developed by the committee as a whole in
7 reflecting on the strengths and weakness of the evaluation process over the course of its work.

8 With regard to the poll item on the ability of the committee to evaluate outputs without
9 having consumers on subgroups, the committee notes that its confidence rating on this item is not
10 meant to suggest that the input of individuals with disabilities is not a necessary part of the
11 process. The committee included two subject matter experts who are also individuals with
12 disabilities, and the point above relates to committee members' view that the subgroups, while
13 lacking consumers without relevant scientific expertise, did assign appropriate scores to the
14 outputs.

15 The poll also confirmed committee impressions regarding the challenge of rating outputs
16 other than peer-reviewed journals. This was the one aspect of the review process receiving an
17 average confidence rating below the midpoint of the scale.

18 The results of the poll related to replication of the review process largely mirrored the
19 results related to the review process itself. Committee members expressed the greatest
20 confidence in the ability to match appropriate reviewer expertise with outputs to review and the
21 ability to appropriately secure knowledgeable reviewers. The only issue that received an average
22 confidence rating below the midpoint was the ability to assess the overall quality of grants by
23 reviewing selected outputs.

1 Overall, members' reflections on the summative evaluation process suggest that it
2 worked well and achieved what it was designed to do. However, the committee encountered
3 several challenges and limitations during the course of our work that limit the generalizability of
4 the findings from this evaluation and restrict what can be said about the totality of outputs
5 generated by all NIDRR grantees. In the next section we discuss limitations and issues related to
6 NIDRR evaluations.

8 RECOMMENDATIONS FOR FUTURE EVALUATIONS

9 In this section the committee presents its conclusions, recommendations, and suggestions
10 on defining evaluation objectives, strengthening the output assessment, and improving NIDRR's
11 APRs to capture data for future evaluations. The goal of our recommendations and suggestions
12 is to address aspects of the process that might be reconsidered to improve future evaluation
13 efforts and to ensure that evaluation results optimally inform NIDRR's efforts to maximize the
14 impact of its research grants.

15 Defining Future Evaluation Objectives

16 The primary focus of the committee's summative evaluation was to assess the quality of
17 research and development outputs produced by grantees; this evaluation did not allow for an in-
18 depth examination or comparison of the larger context of the funding programs, grants, or
19 projects in which the outputs were produced. Although capacity building is a major thrust of
20 NIDRR's center and training grants, assessment of training outputs, such as the number of
21 trainees moving into research positions, was not part of our charge.

22 NIDRR's grant mechanisms or programs vary substantially in both size and duration (see
23 Table 1), with grant amounts varying from under \$50,000 (Field Initiated Projects) to more than

1 \$4 million (Center Grants) and grant duration varying from less than one to more than five years.
2 Programs also differ in their objectives, so the expectations of the grantees under different
3 programs vary widely. For example, a Switzer training grant is designed to increase the number
4 of qualified researchers active in the field of disability and rehabilitation research. In contrast,
5 Center Grants and Model Systems have multiple objectives that include research, technical
6 assistance, training, and dissemination. Model Systems have the added expectation of
7 contributing patient-level data to a pooled set of data on the targeted condition (i.e., Burn, TBI,
8 SCI).

9 The number of grants to be reviewed was predefined by the committee's charge as 30,
10 which represented about one-quarter of the pool of 111 grants from which the sample was drawn.
11 The committee's task included drawing a sample that was representative of NIDRR's program
12 mechanisms. Even though 5 program mechanisms were not included in the sampling pool, the
13 number of grants reviewed for any of the remaining 9 program mechanisms was very small—the
14 largest number for any single program was 10. Since the number of grants reviewed for any
15 given program was small, comparison of the type or quality of outputs by program mechanism
16 was not attempted.

17 The committee was directed by NIDRR to review two outputs for each of the projects
18 identified by a given grantee. Therefore, a grantee with a single project had two outputs
19 reviewed, a grantee with 3 projects had 6 outputs reviewed, and so on. Although larger grants
20 with more projects also had more outputs reviewed, the current design considers neither grant
21 size nor duration. The design also did not take into consideration the relative importance of a
22 given project within a grant.

1 The committee was asked to produce an overall grant rating based on the outputs
2 reviewed and the information available about the grants from the APR. Results at the grant level
3 are subject to more limitations due to the general lack of information about how the outputs did
4 or did not interrelate; whether, and if so how, grant objectives were accomplished; and the
5 relative priority placed on the various outputs. In addition, for larger, more complex grants, such
6 as Center Grants, a number of grant expectations, such as capacity building, dissemination,
7 outreach, technical assistance, and training, are unlikely to be adequately reflected in the
8 approach used, which focused exclusively on specific outputs. The relationship of outputs to
9 grants is more complex than this approach allowed.
10

11 **Recommendation 6.3: NIDRR should determine whether assessment of the**
12 **quality of outputs should be the sole evaluation objective.**
13

14 Considering other evaluation objectives might offer NIDRR further opportunities
15 to continuously assess and improve its performance and achieve its mission. Alternative
16 designs would be needed to evaluate the quality of grants or to allow comparison across
17 program mechanisms. For example, if one goal of an evaluation is to assess the larger
18 outcomes of grants (i.e., the overall impact of a grant's full set of activities), in addition
19 to the methods used in the current output assessment, the evaluation would need to
20 include interviewing grantees about their original grant objectives, to learn about how the
21 grant was implemented and any changes that may have occurred in the projected
22 pathway, how various projects were tied into the overall grant objectives, and how the
23 outputs demonstrated the achievement of the grant and project objectives. This would

1 also involve conducting bibliometric or other analyses of all publications and examining
2 documentation of the grant's activities and self-assessments, including cumulative APRs
3 over time. Focusing at the grant level would provide evidence of movement along the
4 research and development pathway (e.g., from theory to measures, from prototype testing
5 to market) as well as allowing for assessment of other aspects of the grant, such as
6 training and technical assistance, and the possible synergies of multiple projects within
7 one grant.

8 If the goal of an evaluation is to assess and compare the impact of program
9 mechanisms, the methods may vary across different programs depending on the
10 expectations for each program mechanism, but would include those mentioned above and
11 also stakeholder surveys to learn about the specific ways that individual grants affect
12 their intended audiences. With regard to sampling methods, larger grant sample sizes that
13 allow for generalization and comparison across program funding mechanisms would be
14 needed. An alternative would be to increase the grant sample size in a narrower area by
15 focusing assessments on grants working in specific research areas across different
16 program mechanisms or on grants with shared objectives (e.g., product development,
17 knowledge translation, capacity building).

18 NIDRR's own pressing questions would of course drive future evaluations, but
19 other levels of analysis that NIDRR might focus on could include the portfolio level (e.g.,
20 Model System grants, research and development, or training grants), which NIDRR has
21 done in the past; the program priority level (i.e., grants funded under certain NIDRR
22 funding priorities) to answer questions regarding the quality and impact of NIDRR's
23 priority setting; and institute-level questions aimed at evaluating the net impact of

1 NIDRR grants or test assumptions embedded in NIDRR's logic model. For example,
2 NIDRR's intermediate outcome arena targets adoption and use of new knowledge leading
3 to changes/improvements in policy, practice, behavior, and system capacity (Federal
4 Register, Feb. 15, 2006, p. 8173-8175).

5 The number of outputs reviewed should depend on the unit of analysis. At the
6 grant level, it might be advisable to assess all outputs to examine their development, how
7 they relate to one another, and their impacts. A case study methodology could be used for
8 subsets of outputs that are related. If NIDRR aims its evaluation at the program funding
9 mechanism or portfolio level, sampling grants and assessing all outputs would be the
10 preferred method. For output-level evaluation, having grantees self-nominate their best
11 outputs, as was done in the present evaluation, is a good approach.

12 Although assessing grantee outputs is of great value, it is the committee's view
13 that the most meaningful results would come from assessing outputs in the context of a
14 more comprehensive grant-level and program mechanism-level evaluation. More time
15 and resources would be required to trace a grant's progress over time in accomplishing its
16 objectives, to understand its evolutionary development that might have altered original
17 objectives, and to examine the specific projects that produced the various outputs.
18 However, more closely examining the inputs and processes of grant implementation that
19 produced the outputs would yield broader implications for the value of grants, their
20 impact, and future directions for NIDRR.

Strengthening the Output Assessment

The committee was able to create a reasonably reliable system for evaluating the outputs of NIDRR grantees that was based on criteria used in assessing federal research programs both in the United States and other countries. With refinements, it could be applied to evaluate future outputs even more effectively. In implementing the output-level assessment, particular challenges and issues arose that relate to the diversity of outputs, the timing of evaluations, sources of information, and reviewer expertise.

Diversity of Outputs

The quality rating system used in the summative evaluation worked very well for publications in particular, which comprised 70 percent of the outputs reviewed. Using the four criteria developed by the committee, the reviewers were able to identify varying levels of quality and the characteristics associated with each of these. However, each of the quality criteria was not so easily applied for such outputs as websites, conferences, and interventions; these outputs require more individualized criteria for assessing specialized technical elements and sometimes more in-depth evaluation methods. Applying one set of criteria, even though broad and flexible, could not guarantee sufficient and appropriate applicability to every type of output.

Timing of Evaluations

The question arises as to when best to do an assessment of outputs. Assessing technical quality can be done immediately but assessing impact of outputs requires time to pass between the release of output and its eventual impact. Evaluation of outputs during the final year of an award may not allow sufficient time for them to have full impact. For example, some

1 publications will be forthcoming, and others will not have had sufficient time to have an impact.

2 The trade-off of waiting a year or more after the end of a grant is the likelihood that staff
3 involved with the original grant may not be available, recollection of grant activities may be
4 compromised, and engagement or interest in demonstrating results may be reduced. However
5 publications can be tracked regardless of access to the grantee. Outputs other than publications,
6 such as technology products, could be assessed in an interim evaluation in order to examine the
7 development of outputs.

9 Sources of Information

10 Committee members were provided with structured briefing books containing the outputs
11 to be reviewed and supplemental information that members could draw on if additional
12 information was needed to assign quality scores. This supplemental information included
13 information submitted through the grantees' APRs and information provided in a supplemental
14 questionnaire developed by the committee (as noted above, the questionnaire is included in
15 Appendix B at the end of the report). The primary source of information used by committee
16 members in assigning scores was direct review of the output itself. The supplemental information
17 played a small role in assessing publications; for outputs such as newsletters and websites, this
18 information could provide needed context and additional evidence helpful in determining quality
19 scores. However, it is important to note that the supplemental information involved grantees'
20 self-reports, which may be susceptible to social desirability bias. Therefore, committee members
21 were cautious in the degree to which this information could serve as the basis for boosting output
22 scores. Moreover, the APR is designed as a grant-monitoring tool rather than as a source of

1 information for a program evaluation. As a supplemental source the information supplied on the
2 APR and the questionnaire was not always sufficient to inform the quality ratings.

3 As examples, the technical quality of a measurement instrument was difficult to assess if
4 there was insufficient information about its conceptual base or its development and testing. For
5 conferences, workshops, and websites, it would have been preferable for the grantee to identify
6 the intended audience, so that the committee might better assess whether the described
7 dissemination activities were successful in reaching it.

8 For the output categories of tools, technology, and informational products, grantees
9 sometimes provided a publication that did not necessarily describe the output. In addition, some
10 outputs were difficult to assess when there was no corroborating evidence provided to support
11 grantees' claims about technical quality, advancement of the field, impact, or dissemination
12 efforts.

13 The committee did not employ standardized reporting guidelines, such as CONSORT
14 (Schultz et al., 2010) or PRISMA (Mohrer et al., 2009), which journals use in their peer review
15 processes for selecting manuscripts for publication. The committee members generally assumed
16 that publications that were peer-reviewed warranted a minimum score of 4 for technical quality,
17 which could be changed after the committee's discussion. Had reporting guidelines been used in
18 the review of research publications, it is possible that the ratings would have changed. (In some
19 cases, peer-reviewed publications were ultimately given technical quality scores both above and
20 below 4 following committee discussion.)

21 22 **Reviewer Expertise**

1 The committee was directed to assess the quality of four types of pre-specified outputs.
2 While the most common output type was publications, NIDRR grants produce a range of other
3 complex, varied outputs, including tools and measures, technology devices and standards, and
4 informational products. These outputs vary widely in their complexity and the investment
5 needed to produce them. For example, a newsletter is a more modest output than a new
6 technology or device. To assess the quality of outputs, the committee members used criteria that
7 were based on the cumulative literature reviewed and their own research expertise in diverse
8 areas of rehabilitation and disability research, medicine, and engineering, as well as expertise in
9 evaluation, economics, knowledge translation, and policy. However, the combined expertise of
10 the panel did not include every possible content area in the broad field of disability and
11 rehabilitation research.

12
13 **Recommendation 6.4: If future evaluations of output quality are conducted,**
14 **the process developed by the committee should be implemented with**
15 **refinements to strengthen the design related to the diversity of outputs, the**
16 **timing of evaluations, sources of information, and reviewer expertise.**

17
18 Corresponding to the points above, these refinements include the following.

19 *Diversity of outputs.* The dimensions of the quality criteria should be tailored and
20 appropriately operationalized for different types of outputs, such as devices, tools, and
21 information products (including newsletters, conferences, and websites) and should be
22 field-tested with grants under multiple program mechanisms and refined as needed.

1 For example, the technical quality criterion includes the dimension of
2 accessibility and usability. The questionnaire asked grantees to provide evidence of these
3 traits. However, the dimensions should be better operationalized for different types of
4 outputs. For “tools,” such as measurement instruments, the evidence to be provided
5 should pertain to pilot-testing and psychometrics. For informational products, such as
6 websites, the evidence should include results of user testing, assessment of usability
7 features, compliance with Section 508 standards (regulations from the 1998 amendment
8 to the Rehabilitation Act of 1973 requiring the accessibility of federal agencies’
9 electronic and information technology to people with disabilities), etc. For technology
10 devices, the evidence should document the results of research and development tests
11 related to human factors, ergonomics, universal design, product reliability and safety, etc.

12 The quality criterion related to dissemination provides other clear examples of the
13 need for further specification and operationalization of the dimensions. For example, the
14 dissemination of technology devices should be assessed by examining the progress
15 toward commercialization, grantees’ partnerships with relevant organizations, including
16 consumers and manufacturers, and the delivery of information through multiple media
17 types and sources tailored to intended audiences for optimal reach and accessibility.

18 *Timing of evaluations.* The committee suggests that timing of an output
19 assessment should vary by output type. Publications would best be assessed at least two
20 years after a grant ends. However, plans for publications, dissemination, audience for
21 scientific papers could be included as an item in the final report. As stated earlier other
22 outputs developed during the course of the grant should be evaluated on an interim basis
23 to assess the development and evolution of products. Outputs that have potential for

1 practice or policy change may require longer periods of time to pass before impact
2 materializes and can be measured, so would best be evaluated on an interim basis also.

3 *Sources of information.* A more proactive technical assistance approach is needed
4 to ensure that grantees provide the data necessary to assess the specific dimensions of
5 each quality criteria. As stated earlier, the information supplied on the APR and the
6 questionnaire was not always sufficient to inform the quality ratings. (See also the
7 discussion of information requested via the grantee questionnaire, above, and the
8 discussion of the Annual Performance Report below.)

9 *Reviewer expertise.* The committee suggests that future output evaluations should
10 consider including an accessible pool of experts in different technical areas who are
11 called on to review selected grants and outputs. In addition, it is essential that future
12 review panels include scientists with disabilities.. Consumers could also play a vital role
13 as review panel members who could address the impact and dissemination criteria.

14 15 **Improving Use of the Annual Performance Report**

16 NIDRR's Annual Performance Report System has many strengths, but the committee
17 identified some points that NIDRR should consider in building greater potential for use of these
18 data in evaluations. The APR system (RTI, 2009) includes the grant abstract, funding
19 information, descriptions of the research and development projects, outcome domains targeted
20 by projects, as well as a range of variables for reporting on the four different types of grantee
21 outputs, as shown in Table 6-4. The system is tailored to different program mechanisms as
22 needed. All of the descriptive information listed above, plus the output-specific variables listed

in Table 6-4, were utilized in the evaluation. The data were provided in electronic data bases and in the form of individual grant reports

TABLE 6-4 Data Elements Related to Outputs That Are Covered in the APR

Variables in APR (using APR report format for Rehabilitation Research and Training Centers as an example)	Publications	Tools	Technology	Information
Type of output	X	X	X	X
Name and full citation	X	X	X	X
Brief description of purpose		X	X	X
Brief description of how output was validated or tested		X	X	X
Whether publication was peer reviewed or not	X			
Whether the research and related activity reported in the article took place during current, immediate past, or previous (nonconsecutive) funding cycle	X			
Whether publication was sent to NARIC for inclusion in REHABDATA	X			
Whether publication was produced as a direct result of receiving funding for this grant?	X			
"Most important" ^a outputs that contributed the most to achieving the outcome-oriented goals for the award	X	X	X	X
Outcome-oriented goal that corresponds to most important outputs (advances knowledge; increases capacity for research, training, or knowledge translation; or facilitates change in policy, practice, or system capacity)	X	X	X	X
NIDRR outcome arena that corresponds to most important outputs (health and function, employment, participation and community living, cross-cutting)	X	X	X	X
Whether output is described in a publication output and indicate which one		X	X	X
Key findings or lessons learned	X			
How output is contributing to the outcome-oriented goal by solving a problem, closing an identified gap, or benefiting the target population	X	X	X	X
Description of "Other Accomplishments and Contributions"	X	X	X	X

^a Defined for grantees by NIDRR as "those that contributed most to achieving the outcome-oriented goals for the award by advancing knowledge, increasing capacity for research, training or knowledge translation; or facilitating changes in policy, practice, or system capacity."

The APR data set provided to the committee by NIDRR at the outset of our work was helpful in profiling the grants for sampling and in listing all of the grantees' projects and outputs. This facilitated asking the grantees to nominate outputs for our review, since we were able to generate comprehensive lists of all reported projects and outputs to make the task of output selection less burdensome for the grantees. If grantees had more recent outputs that originated

1 from their NIDRR grants that they wished to nominate as their top two for the committee's
2 review, they had the option to do so.

3 NIDRR also provided grantees' narrative APRs from the last year of their grants as well
4 as their final reports. These narratives were very useful to the committee for compiling
5 descriptions of the grants³. However, the quality of the information contained in these narrative
6 annual reports varied. For example, grant abstracts were not uniform in the information they
7 contained. Some stated their grant objectives, whereas others omitted them and focused on
8 summarizing their main grant activities. The APRs of the grants reviewed were inconsistent in
9 providing useful information for understanding how the outputs being reviewed fit into the
10 overall grant or projects. The final reports in most cases did not provide a cumulative overview
11 of the life cycle of the grants and outputs, which would have been helpful. The APR does collect
12 information on changes in the course of grants. It was not always easy to understand this
13 information from just viewing the last year's APR or the final report.

14 Not all of the specific outputs reviewed by the committee were reported in the APRs.
15 Some could have been reported in earlier reporting periods or had been produced after the
16 NIDRR grant ended. However NIDRR also provided the committee with special text reports
17 containing some of the narrative information in the APR concerning the outputs other than
18 publications. These reports included such information as the purpose of the output, NIDRR
19 outcome domains targeted by the output, how the output was validated, and how the output
20 contributes to achievement of the grantee's goals. These reports have the potential to supply
21 relevant information for evaluations. However, the quality of this information varied across the

³ The APR is a large information technology system that is used for monitoring and tracking grantee progress and for reporting on NIDRR's performance measures to GPRA. The system was not designed to serve as the basis for grantee evaluations. A systematic evaluation of the APR was not part of our charge. Though the quality and level of detail included in the APRs varied, these narratives were useful in providing descriptive grant information.

1 text reports describing the tool, technology, and information outputs that the committee
2 reviewed. Only half contained substantive descriptive information.

3
4 **Recommendation 6.5: NIDRR should consider revising its APR to better**
5 **capture information needed to routinely evaluate the quality and impacts of**
6 **outputs, grants, or funding mechanisms. They might consider such efforts as**
7 **consolidating existing data elements or adding new elements to capture the**
8 **quality criteria and dimensions used in the present summative evaluation.**

9
10 From a recent interview with NIDRR executives, the committee learned that
11 NIDRR takes pride in having stabilized their APR system in recent years after prior
12 periods of changing and improving it to make the data more usable for grantees, for grant
13 monitoring by project officers, and for agency performance reporting. They are currently
14 in the process of adding a new "accomplishments" module to the APR that will focus on
15 the external use and adoption of NIDRR-funded outputs. In this new module, NIDRR
16 will consolidate some data elements that are already being collected and add new ones.
17 For up to five outputs that have been used or adopted by persons or groups external to the
18 grant during the reporting period, grantees will be asked to provide information for each
19 output on who adopted the outputs (in 16 categories, such as researchers, practitioners,
20 service providers, etc.); how the output is being used or adopted by the target audience;
21 the source of the evidence; and if and how the output may be contributing to changes in
22 policy, practice, system capacity, or other impact areas. These efforts under way to
23 improve the APR will address the quality criteria used in the present evaluation for

1 assessing the advancement of knowledge or practice and the likely or demonstrated
2 impact of outputs.

3 For the technical quality criterion, the current APR system collects data on
4 whether articles were published in peer-reviewed journals. For the technical quality of
5 outputs other than publications, we provide examples in Recommendation 2 of ways to
6 operationalize dimensions of accessibility and usability, such as providing evidence of
7 testing the psychometrics of measurement instruments, assessing the usability features of
8 informational products, and documenting the results of research and development tests of
9 technology products that relate to human factors, ergonomics, universal design, product
10 reliability, and safety. The APR system currently asks for information on how outputs
11 were validated, but data elements that relate to such testing might be further specified in
12 the APR system.

13 The APR system might also be modified to capture evidence on the quality
14 criterion of dissemination of outputs through such data elements as target audiences for
15 dissemination activities, media types, number of outputs disseminated, and reach of
16 dissemination, such as number of hits on websites, etc.

17
18 **Recommendation 6.6: NIDRR should investigate ways to work with grantees**
19 **to ensure the completeness and consistency of information provided in the**
20 **APR.**

21 The committee fully appreciates the necessity of minimizing the data collection
22 burden on grantees and acknowledges the challenges and feasibility issues related to
23 modifying the APR system while at the same time providing continuity in the system.

1 The committee thinks that embedding evaluation data collection processes into existing
2 processes will lead to greater efficiencies and reduce grantee burden while enhancing
3 NIDRR's ability to evaluate quality and impact. The committee acknowledges that the
4 refinements suggested would have to be undertaken in the context of a larger assessment
5 of the APR system as part of NIDRR's ongoing initiatives to improve the system.
6

7 In closing, the committee was able to create a reasonably reliable and valid system for
8 evaluating the outputs of NIDRR grantees. If future evaluations of output quality are conducted,
9 the process developed by the committee should be implemented with refinements to strengthen
10 the design and process. Whereas assessing grantee outputs is of great value, the committee thinks
11 that even greater value would come from assessing outputs in the context of a more
12 comprehensive grant-level and program mechanism-level evaluation, which could yield broader
13 implications for the value of grants, their impact, and future directions for NIDRR.
14
15

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APPENDIX 6-1

Journal Impact Factors of published articles by grants in the original pool from which the sample of 30 grants were drawn (N=111 grants, 631 papers)

Journal Name	SJR*	ISI**	Number times that articles were published in this journal
Archives of Physical Medicine and Rehabilitation	0.167	2.184	75
Journal of Spinal Cord Medicine	0.121	1.395	32
Journal of Head Trauma Rehabilitation	0.168	2.391	28
Journal of Burn Care & Research	0.148	1.617	27
Disability And Rehabilitation	0.103	1.555	24
Topics in Stroke Rehabilitation	0.096	1.226	17
American Journal of Physical Medicine & Rehabilitation	0.117	1.556	16
Rehabilitation Psychology	0.059	NA	15
Brain Injury	0.114	1.533	10
Hearing Loss	NA	NA	10
NeuroRehabilitation	0.137	NA	9
Assistive Technology	0.044	NA	8
Burns	0.141	1.95	7
Journal of Rehabilitation Research and Development	0.107	1.367	7
Physical Medicine And Rehabilitation Clinics Of North America	0.094	NA	7
Research And Practice For Persons With Severe Disabilities	0.035	NA	7
Trends in Amplification	0.097	NA	7
American Journal of Hospice & Palliative Medicine	NA	NA	6
Assistive Technology Outcomes and Benefits	NA	NA	6
Muscle & Nerve	0.284	2.287	6
Rehabilitation Counseling Bulletin	0.044	NA	6
Respiratory Care	0.109	1.524	6
Exceptionality	NA	NA	5
Journal of Vocational Rehabilitation	0.036	NA	5
Multiple Sclerosis	0.306	3.279	5
Topics in Spinal Cord Injury Rehabilitation	0.041	NA	5
Clinical Neuropsychologist	0.121	1.766	4
Critical Care Medicine	0.603	6.373	4
General Hospital Psychiatry	0.213	2.669	4
Health Affairs	0.369	3.582	4
Journal of Clinical and Experimental Neuropsychology	0.145	1.885	4
Neurology	0.718	8.172	4

Journal Name	SJR*	ISI**	Number times that articles were published in this journal
Shock	0.339	2.871	4
Stroke	0.73	7.041	4
Annals of Biomedical Engineering	0.244	2.409	3
Career Development for Exceptional Individuals	0	NA	3
Developmental Disabilities Research Reviews	0.467	2	3
Exceptional Children	0.063	NA	3
Exceptional Parent	NA	NA	3
IEEE Transactions on Biomedical Engineering	0.151	2.154	3
International Journal of Clinical and Experimental Hypnosis	0.13	NA	3
Journal of Disability Policy Studies	0.055	NA	3
Journal of Early Intervention	0.041	NA	3
Journal of Intellectual Disability Research	0.125	NA	3
Journal of Neurotrauma	0.371	4.255	3
Journal of Rehabilitation	0.038	NA	3
Pediatrics	0.509	4.687	3
Psychosomatic Medicine	0.352	4.236	3
Spine	0.208	2.624	3
Violence Against Women	0.072	NA	3
ADVANCE for Director's in Rehabilitation	NA	NA	2
American Journal of Speech-Language Pathology	0.082	NA	2
Annals of Neurology	1.417	9.317	2
Archives of Clinical Neuropsychology	0.146	2.497	2
Archives of Neurology	0.77	6.312	2
Body Image	0.1	NA	2
Children and Youth Services Review	0.053	NA	2
Developmental Neurorehabilitation	0.1	NA	2
Disability and Health Journal	0.039	NA	2
Disability and Rehabilitation Assistive Technology	0.051	NA	2
Education and Training in Developmental Disabilities	0.039	NA	2
E-Medicine	NA	NA	2
Giornale Italiano delle Disabilità [Italian Journal on Disability]	NA	NA	2
Infants And Young Children	0.059	NA	2
Inside MS	NA	NA	2
International Journal of Telerehabilitation	NA	NA	2
Journal of Burn Care and Rehabilitation	NA	NA	2
Journal of Developmental Disabilities	0.044	NA	2
Journal of Mine Action	NA	NA	2
Journal of Neurology Neurosurgery and Psychiatry	0.422	4.869	2

Journal Name	SJR*	ISI**	Number times that articles were published in this journal
Journal of the Acoustical Society of America	0.086	1.523	2
Journal of Visual Impairment & Blindness	NA	NA	2
Journal on Developmental Disabilities	NA	NA	2
Lancet Neurology	1.627	18.126	2
Medicine And Science In Sports And Exercise	0.243	3.707	2
MS in Focus	NA	NA	2
Neuropsychological Rehabilitation	0.094	1.879	2
Pain	0.583	5.371	2
Physical Therapy	0.183	2.082	2
Progress in Brain Research	0.398	2.491	2
Prosthetics and Orthotics International	0.06	0.563	2
Rehabilitation Education	NA	NA	2
Remedial and Special Education	0.045	NA	2
Spinal Cord	0.148	1.783	2
TASH Connections	NA	NA	2
Academic Radiology	0.176	2.092	1
ADVANCE for Managers of Respiratory Care	NA	NA	1
AER-Journal of Research and Practice in Visual Impairment and Blindness	NA	NA	1
American Annals of the Deaf	0.037	NA	1
American Journal of Medicine	0.48	4.466	1
American Journal of Pathology	5.673	1.02	1
American Occupational Therapy Association	0.072	NA	1
Amyotrophic Lateral Sclerosis	0.25	2.963	1
Annals of Behavioral Medicine	0.247	NA	1
Annals of Surgery	0.877	7.9	1
Arthritis & Rheumatism-Arthritis Care & Research	NA	4.152	1
Assessment for Effective Instruction	NA	NA	1
Behaviour & Information Technology	0.048	0.767	1
Brain and Language	0.211	2.973	1
Brain Injury Professional	NA	NA	1
Chest	0.599	6.36	1
Chronic Illness	0.129	NA	1
Clinical Biomechanics	0.136	1.759	1
Clinical Rheumatology	0.151	1.668	1
Communication Disorders Quarterly	0	NA	1
Composites Part B-Engineering	NA	1.704	1
Connective Tissue Research	1.97	1.552	1
Critical Care	0.346	4.931	1
Current Opinion in Neurology	0.585	5.43	1

Journal Name	SJR*	ISI**	Number times that articles were published in this journal
Current Treatment Options in Neurology	0.135	NA	1
Cyberpsychology & Behavior	NA	NA	1
Datum, Medical College of Wisconsin	NA	NA	1
Design Principles and Practices: An International Journal	NA	NA	1
Ear and Hearing	0.183	2.091	1
Exercise And Sport Sciences Reviews	0.273	3.228	1
Generations	0.035	NA	1
Hearing Journal	0.037	NA	1
Hearing Review	NA	NA	1
Hospital News (nationally syndicated)	NA	NA	1
Human Molecular Genetics	1.982	7.386	1
IEEE Engineering in Medicine and Biology Magazine	0.083	1.081	1
IEEE transactions on neural systems and rehabilitation engineering	0.182	2.417	1
IEEE Transactions on Power Electronics	0.106	2.929	1
Intellectual And Developmental Disabilities	0.046	NA	1
Interacting with Computers	0.055	1.698	1
International Journal of Advances in Rheumatology	NA	NA	1
International Journal of Disability, Development, and Education	NA	NA	1
International Journal of Geriatric Psychiatry	0.16	1.981	1
International Journal of Medical Informatics	0.16	NA	1
International Journal of MS Care	0	NA	1
International Journal of Psychiatry in Medicine	0.117	0.909	1
International Journal of Web Engineering and Technology	0.045	NA	1
Internet Research	0.042	0.844	1
Intervention in School and Clinic	0.032	NA	1
Journal for Vocational Special Needs Education	NA	NA	1
Journal of Aging and Social Policy	NA	NA	1
Journal of Applied Rehabilitation Counseling	NA	NA	1
Journal of Behavioral Nutrition and Physical Activity	0.221	2.627	1
Journal of Biomedical Materials Research Part A	0.225	2.816	1
Journal of Cardiopulmonary Rehabilitation and Prevention	0.172	NA	1
Journal of Clinical Psychology	0.094	NA	1
Journal of Clinical Psychology in Medical Settings	0.061	NA	1
Journal of Communication Disorders	0.121	NA	1
Journal of Disability Policy	NA	NA	1

Journal Name	SJR*	ISI**	Number times that articles were published in this journal
Journal of Health Communication	0.135	NA	1
Journal of Interpersonal Violence	0.092	NA	1
Journal of Marriage and The Family	0.068	NA	1
Journal of neural engineering	0.326	3.739	1
Journal of Occupational Rehabilitation	0.119	NA	1
Journal of Orthopaedic Research	0.254	3.112	1
Journal of Pain	0.375	3.778	1
Journal of Pain and Symptom Management	0.279	2.423	1
Journal of Policy and Practice in Intellectual Disabilities	NA	NA	1
Journal of Policy and Practice in Intellectual Disabilities, 6, 25-31	NA	NA	1
Journal of Policy and Practice in Intellectual Disability	NA	NA	1
Journal of Positive Behavior Interventions	0.047	NA	1
Journal of Positive Psychology	0.057	NA	1
Journal of Primary Prevention	0.055	NA	1
Journal of Prosthetics and Orthotics	0.05	NA	1
Journal of Psychosomatic Research	0.223	2.908	1
Journal of Special Education	0.048	NA	1
Journal of The American Geriatrics Society	0.345	3.656	1
Journal of The International Neuropsychological Society	0.232	2.766	1
Journal of Trauma-Injury Infection And Critical Care	NA	2.626	1
Journal of Usability Studies	NA	NA	1
Journal of Vocational Special Needs Education, 27(3), 4-14	NA	NA	1
Journal of Web Engineering	NA	0.531	1
Kansas Public Policy Journal	NA	NA	1
L'Audition Revue D'Informations Techniques et Scientifiques	NA	NA	1
Learning Disabilities Quarterly	NA	NA	1
Lecture Notes in Computer Science	0.036	NA	1
Medical Care	0.352	3.241	1
Medical Care Research and Review	0.241	2.79	1
Mississippi Brain Injury Association Newsletter	NA	NA	1
Missouri Medicine	0.042	NA	1
Momentum	NA	NA	1
MS Exchange	NA	NA	1
Neuroimage	0.712	5.739	1
Neuromuscular Disorders	0.396	2.977	1
Neurorehabilitation Neural Repair	0.363	5.398	1

Journal Name	SJR*	ISI**	Number times that articles were published in this journal
Novartis Foundation Symposium	NA	NA	1
O&P Business News	NA	NA	1
OT Practice	0.031	NA	1
Paraplegia News	NA	NA	1
Pediatric Critical Care Medicine	0.193	2.376	1
Perspectives on Neurophysiology and Neurogenic Speech and Language Disorders	NA	NA	1
Phys Occ Ther Geriatrics	0.034	NA	1
Planning	0.03	NA	1
Principal Leadership	NA	NA	1
Proceedings of IEEE Virtual Rehabilitation	NA	NA	1
Psychiatric Rehabilitation Journal	0.079	NA	1
Psychiatric Services	0.176	2.813	1
Psychological Assessment	0.151	NA	1
Psychology in the Schools	0.051	NA	1
Rehabilitation Nursing	0.057	0.667	1
Rehabilitation Outlook	NA	NA	1
Seminars in Arthritis and Rheumatism	0.447	4.724	1
Seminars in Hearing	0.047	NA	1
Social Work	NA	NA	1
Technology and Disability	0.043	NA	1
Telemedicine and E-Health	0.09	0.967	1
The ASHA Leader	NA	NA	1
The Journal of Special Children Education (Korea)	NA	NA	1
The Judge's Journal	NA	NA	1
The RT News, Newsletter of AER Division 11	NA	NA	1
Universal access in the information society	0.043	NA	1
US-ISPO Highlights	NA	NA	1
Women's Health Issues	NA	NA	1
Wound Repair and Regeneration	0.286	2.781	1
Young Exceptional Children	0	NA	1
Total published articles reviewed			631

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