October 2004

Applying Evidence-based Practice Approaches to Support Children's Participation in Home and Community Experiences

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Evidence-based Practice Resources

Applying Evidence-based Practice Approaches to Support Children's Participation in Home and Community Experiences

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Cite as: Muhlenhaupt, M. (2004). *Applying Evidence-based Practice Approaches to Support Children's Participation in Home and Community Experiences*. Philadelphia: Thomas Jefferson University, Department of Occupational Therapy, Child and Family Studies Research Programs.

This report is available online from the Child and Family Studies Research Programs website at http://jeffline.tju.edu/cfsrp/ebp.html

Learning Objectives

At the end of this module, the reader will be able to:

1. Distinguish developmental, educational and health-related services for children that incorporate evidence-based approaches.

2. Identify a practice question that includes terms that can be used when searching for published evidence relevant to evaluation or intervention planning for children with disabilities and their families.

3. Recognize characteristics of credible evidence sources.

4. Identify ways to gather and use evidence related to specific intervention approaches that support the participation of children with disabilities in a variety of home, school and community-based activities.

Contents

Introduction

In recent years an increasing amount of attention has been directed to identifying the benefits of education, early intervention, medical, health and rehabilitation services for the children and adults who use these services. Health care and education personnel – physicians, therapists and teachers - are responsible for providing interventions that make a difference in the lives of the persons they serve.

?   Do various interventions lead to specific outcomes and under what conditions?

?   Are some interventions better than others?

?   Which approaches are effective for specific populations?

?   Does an individual prefer one intervention option over another?

Questions such as these encourage professionals to find and use evidence to guide their selection and use of a specific intervention in a given situation. A major challenge for service providers in pediatric practice is to understand how to provide valid interventions within the context of the environments and activities in which children and their families spend time. This module provides background information and discusses strategies that individuals can implement as they look for and use evidence to plan and recommend interventions. A number of additional resources that are helpful in order to learn about and apply evidence-based practice approaches are also included.

> *What do you know about the effects and benefits of services designed to enable children with disabilities to participate in a variety of activities and routines in their home, school and community experiences?*
>
> *If you currently provide services, what sources do you consult, and what types of information do you use, when making decisions about the types of intervention you provide for a particular child/family or student/teacher?*

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

1

What Is Evidence-Based Practice?

Evidenced-based practice is a phrase that is increasingly seen and heard in pediatric rehabilitation, developmental and educational services. Evidence-based practice is about finding and using accurate and reliable information to influence decisions about what one does in day-to-day practice. The rationale for basing decisions on sound evidence is clear. Recommendations that are substantiated with data and other verification lead to an informed action plan. Evidence-based decision-making supports interventions that are effective for a particular situation in relation to a targeted outcome.

Dr. David L. Sackett and his colleagues have defined *evidence-based medicine* as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996, p. 71). In the second edition of their book about practicing and teaching evidence-based medicine, Sackett and coauthors explained that evidence-based medicine is the "integration of best research evidence with clinical expertise and patient values" (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000, p. 1). Sackett's work has influenced the development of evidenced-based approaches in rehabilitation (Law, 2002). The occupational, physical and speech therapy professions are committed to evidence-based practice (AOTA, 2000; APTA, 2000; ASHA, 2003). Occupational therapy literature includes Dr. Margo Holm's (2000) description of an evolution in evidence-based practice from services based on "doing things right," to "doing the right things," to "doing the right things right" (p. 576). She referred to evidence as "ways of knowing" (p. 576) that guide how one practices.

The No Child Left Behind Act of 2001 (NCLB, 2002) requires that federally funded education programs be grounded in scientifically based research (SBR). While we may think of education programs as being those for typically-developing children who attend public schools, the definition of federally-funded education programs includes both early childhood and school programs for all children -- both those with and those without disabilities or special needs. Other federal education laws that target children with disabilities are linked to the No Child Left Behind Act (NCLB) and include the same requirements for grounding programs in scientifically-based research. The Individuals with Disabilities Education Act of 1997 (IDEA) that governs services provided for children with disabilities in early intervention, preschool, school, and post-school education programs is currently in the process of reauthorization. A recent report by the President's Commission on Special Education, "A New Era: Revitalizing Special Education for Children and Their Families" (US Department of Education, 2002), included the recommendation that NCLB themes be applied to IDEA.

Federal law defines SBR as "research that involves the application of rigorous, systematic, and objective procedures to obtain reliable and valid knowledge relevant

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

2

to education activities and programs" (NCLB § 9101(37)). The following characteristics of scientifically based research are identified:

- employs systematic, empirical models
- includes rigorous data analyses to test hypothesis and justify conclusions
- relies on measurement methods that provide reliable and valid data across examiners, observations, and studies
- uses experimental or quasi-experimental designs to evaluate the condition of interest
- provides sufficient detail and clarity to allow for study replication
- has been accepted by a peer-reviewed journal or approved by panel of independent experts through objective review.

Supporters of evidence-based practice in educational programs for children see incorporating scientific research as a "means for improving education and developing a knowledge-base for what works" (Beghetto, 2003, p. 4).

On November 5, 2002, President George Bush signed the Education Sciences Reform Act of 2002 (Education Sciences Reform Act, 2002) and established the Institute of Education Sciences (IES). This agency is responsible for advancing education research and supporting evidence-based education in all areas of education including early intervention, preschool, regular education, and special education. Dr. Grover Whitehurst, director of the IES, has defined evidence-based education as "the integration of professional wisdom with the best available empirical evidence in making decisions about how to deliver instruction" (Whitehurst, 2003). As a related initiative, the U.S. government has funded the *What Works Clearinghouse* (http://www.w-w-c.org/). This resource offers online documents that report on education practices and products that are supported by research. Although this clearinghouse currently includes a majority of information on traditional teaching (e.g., what is the best way to teach algebra to middle school students?), a recent addition covers peer-assisted learning as an intervention and material about interventions to address problem behavior is anticipated. Information is constantly being updated and expanded on this site.

Debate is acknowledged about the quality of current education research and whether or not its conclusions are sufficient to inform education policy and practice (National Research Council, 2002). Dunst and his colleagues (Dunst, Trivette, & Cutspec, 2002a, 2002b) have suggested definitions and models of evidence-based practice that emphasize scientific rigor while at the same time support the generation of information that helps practitioners know what they can do differently when working with families and children.

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

3

Types of Evidence to Inform Services That Support the Participation of Children With Disabilities in Family and Community Activities

A 'three-pronged' approach to evidence-based practice (Tickle-Degnen & Bedell, 2003) includes available research and other data, the practitioner's clinical reasoning, and client perspectives. Evidence-based practice is a *combination of* these dimensions, rather than a reliance on one element in preference over another. What this means is that a teacher or therapist who is working with children and families considers evidence from all three perspectives in determining the optimal ways of providing services - including conducting evaluations, determining intervention strategies, or measuring the benefits and effects of their services for individual children and families. In the case of infants and young children, client perspectives are provided by the family; when children are participating in child care, the client may include both the family and childcare providers; in education programs for school-aged students, the client includes the student, teacher, family and even the school system itself.

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

4
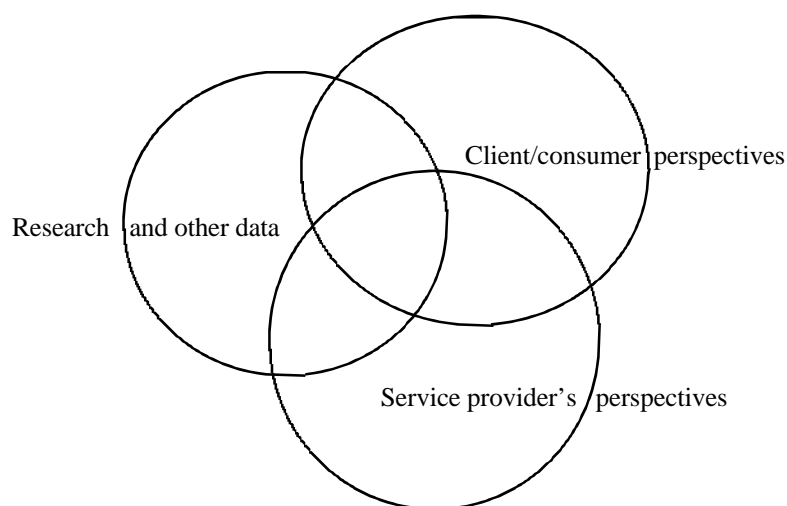
Available research and other data

Research reports and other types of published information are the basis of this dimension of evidence-based practice. Books and periodicals such as journals, magazines, newspapers, and other serial publications, as well as pamphlets and bulletins, form the bulk of the published literature. Anyone can have material published into a lasting product for dissemination, either through his or her own resources or through a commercial publishing company. Depending on the publisher and type of publication, different missions, goals, editorial standards, and procedures are applied to guide content and to promote or ensure the quality of work included. Service providers need to understand the different features that characterize various types of publications they may consider using as evidence to inform their practice decisions.

Peer-reviewed journals are the "gold standard" for research publications. Peer review means that a published article has been reviewed and determined as appropriate for publication by a group of reviewers. For example, the *Journal of Early Intervention* is an official publication of the Council for Exceptional Children's Division of Early Childhood. This peer-reviewed journal includes research and practice related to intervention for infants and young children with special needs and their families. Only those manuscripts that are related to the journal's focus and meet the journal's publication standards are considered for review. On the other hand, a publisher who is not dedicated to policies and practices that support families and enhance optimal development of young children may produce and distribute materials that report

information that has not been reviewed or met a standard of "acceptable for publication." These materials may not reflect current knowledge, best practices, or research but may describe perspectives of one or more individuals. For example, newsletters, practice publications of various organizations, or self-published materials or guides are used to report perspectives and trends or provide practical information about particular topics.

Editorial processes vary among the different types of periodical literature. The editors for popular magazines and trade magazines are often employed based on their management and business backgrounds. The editorial boards for these publications may include persons with expertise related to the periodical's subject matter. These individuals serve in an advisory capacity regarding important topics or specific content. They may review and critique individual manuscripts that are submitted for publication. Or the publication's editorial board may be primarily concerned with optimizing writing style and grammatical accuracy.

The editor and editorial board that serve a peer-reviewed journal are appointed based on their expertise related to the journal's focus. Typically they are researchers and faculty members who have established a record of scholarship and contribution in the field. These board members are responsible for reviewing submitted material for its importance to the field, accuracy of procedures used, and conclusions made. The "refereed process" that is used by scholarly journals to develop

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

5

articles for publication is considered the highest level of peer review for periodical literature. A small group of scholars, researchers, and experts in the manuscript's specific subject matter complete a blind review (meaning that the author's name is unknown to them) of the submission. Their critique includes comments on the manuscript's relevance, study methodology, use of statistics, and conclusions. Generally, manuscripts submitted to scholarly journals are returned to the author with suggestions for revision, followed by resubmission after changes are made. A final review is completed to determine if the manuscript is accepted for publication. Published peer-reviewed literature is an important source for valid and reliable information that helps to inform practice.

Reputable textbook publishers require that a proposal be submitted, reviewed, and approved by content experts before they agree to accept material for publication. Once the chapter or textbook manuscript is submitted, the materials are reviewed by outside expert reviewers and by the publisher's own in-house staff.

What periodicals are you familiar with and where do they fit in the following classification?		
Scholarly journal	Trade publication—magazine or newspaper	Popular magazine

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

6

Other Types of Published Information

Published audiovisual media, including audiotapes, videotapes, and digital recordings, also contribute to the pool of published resources. Practice standards and guidelines are issued by a variety of accrediting agencies, associations, and regulatory bodies that ensure the provision of quality education and therapy services. Professional documents, including codes of ethics, practice papers, and position statements that are issued by national associations and their state and regional chapters or affiliates are another important guide to practice within therapy and education fields. As an example, the Council for Exceptional Children's paper that defines criteria for a competent special education teacher (CEC, 2004) includes standards for the minimum knowledge, skills and dispositions of a qualified teacher in order to support effective instructional practices. (You can access this report at http://www.cec.sped.org/pp/well-prepared-teacher.pdf)

Accessing Published Information

Articles published in professional journals provide an important source of empirical evidence for informing practice. Limited time as well as insufficient knowledge and skills to access published literature, have been identified as barriers to increased evidence-based practice by personnel working in a variety of practice settings (Dysart & Tomlin, 2002). For example, in an investigation about the use of research-based evidence to guide occupational therapy practice, Philbert, Snyder, Judd & Windsor (2003) surveyed occupational therapists and occupational therapy assistants about their reading habits and how they used information in the articles they reviewed. Therapists who don't read professional literature identified several constraints. Difficulty interpreting study results, too much scientific information and a lack of clinical relevance in published reports were cited as barriers. In addition, survey results indicated that among the therapists who did read professional literature, the information they learned was not used in their practice. Instead, these therapists reported using information from continuing education courses or from mentors to guide their practice.

Philbert and her colleagues (2003) suggest that providing access to published evidence in a user-friendly format is one way to encourage practitioners to use research to inform their practice. Child and Family Studies Research Programs (CFSRP) at Thomas Jefferson University, as well as other research programs, have begun to develop syntheses of available evidence to help providers understand and incorporate research and practice evidence in their work with children and families. You can access materials that are available from CFSRP and link to other recommended sites at http://jeffline.tju.edu/cfsrp/ebp.html.

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

7

Try using a Web site on which research information about a particular topic has been synthesized. Access the CFSRP Web site or identify another Web site through a search engine such as Google or Yahoo. See what topics about which you can find information.

Non-published Sources of Information

Therapists, teachers, child-care workers and others learn about ways to support children's participation from a variety of sources beyond the published audiovisual materials, professional documents, books, and periodical literature just discussed. Knowledge that is accumulated by individuals is commonly transmitted to others through on-the-job experiences and other personal contacts such as team meetings (Powell & Case-Smith, 2003). Information and support from supervisors or mentors and exchanges between colleagues in the workplace are a frequent source of data that pediatric service providers use as they plan, implement and evaluate the results of their intervention.

Conferences and other professional development opportunities are a way to learn new information and stay current with emerging trends in practice. These programs may include a combination of reports about pilot research, locally field-tested practices, theory-based intervention approaches, or interventions based on sound and conclusive outcomes research. In contrast, the information may reflect the presenter's opinion or own experiences, or it may be based on a need to market a specific program within a region. Electronic listserv activities, chat rooms, e-mail, and bulletin boards for discussion have become an increasingly popular source of information and support for teachers, therapists and families who are seeking information to help their children. These communication networks enable the exchange of text, formatted documents, photos, and audiovisual files and provide new opportunities for service providers to share ideas or information and to invite collaboration. Communication through these channels may tend more towards reports of individuals' on-the-job experiences or own perspectives as a provider or recipient of services, rather than information supported by other forms of evidence. Because of this, information from these sources needs to be carefully considered.

Collecting and using ongoing data regarding a child's performance once intervention is implemented is a recommended method to inform decisions about practice, but this is not a routine activity in many systems. When a data-based decision-making approach is put into place, therapists, teachers, and other service providers document the impact of their interventions by systematically keeping records of children's progress. For example, for a child who is not adjusting easily to a child care situation, the caregiver might keep a daily record for each hour that the child is in the program, indicating whether or not the child was engaged in the activity, was upset, roamed around the room, etc. Once there is data to help describe what the child's actual behavior looks like, an intervention is provided and additional data is collected. In this

example, the therapist who believes that having a child wear a weighted vest provides increased proprioceptive input so that the child can attend to activities for longer periods of time during the day, might then have the daycare provider keep track of the length of time that the child participated appropriately in routines and play activities while wearing the vest (as well as while not wearing the vest). These sets of observations are compared to the initial data to determine whether or not any change in the child's performance resulted when the weighted vest intervention was implemented. Each time that information is systematically collected about the effects of an intervention with an individual child, that data is used to inform subsequent decisions about whether or not that child learned, or increased his or her participation.
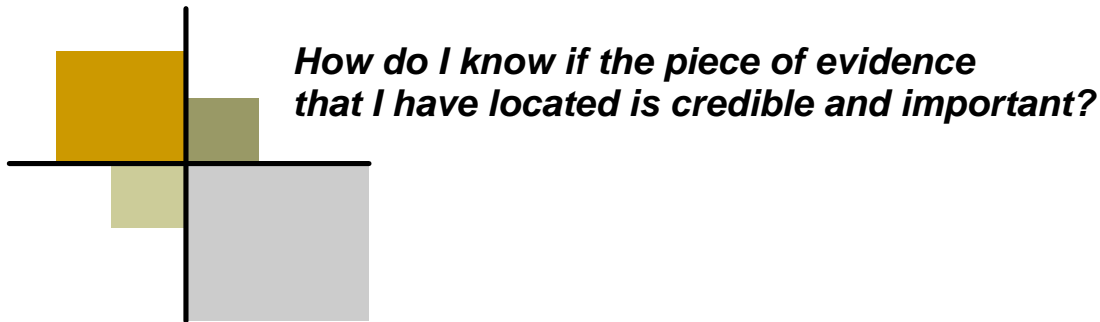
Information from a Provider's Own Perspectives

A service provider's own perspectives, developed through his or her professional training, values, beliefs, and personal and professional experiences, contribute to evidence-based practice. Each professional brings strengths in terms of training and experience but this training and experience is always limited. Therefore, a provider's own perspective provides an important source of evidence, but it's the weakest type since it is limited by an individual professional's knowledge, experience and biases. Individuals often solicit intervention ideas and recommendations from colleagues and combine these with their own personal perspectives. Another provider's opinions through either general or specific responses (exchanged during meetings, through electronic listserve activity, or through supervisory relationships) represent a weak source of evidence to support intervention.

Information from Client/Consumer's Own Perspectives

It is also important for providers in programs that serve children and their families to collect information and data from the caregiver(s), teachers, and others who know the child. This data helps to inform decision-making that is relevant to the child's individualized needs and the situations he or she experiences. At times, the communication, interview and collaborative processes through which this information is collected and shared can be challenging to accomplish. In order to gather information from other people, it is important to remember that your conversations or discussions have the purpose of learning from another person. In other types of situations, conversations and discussions have a purpose of your providing information to another person. To learn about something from somebody else, your primary role needs to be as the listener – not as the talker. These situations require the use of active listening which means that you ask people questions that encourage them to talk about something you want to learn more about. For example, a therapist asked a parent to tell them about an average day with their son, John. A special instructor asked a child caregiver to talk a little bit about how Susan does during snack time. The service coordinator for Shakia asked her mother how well the baby did with nutritional intake when the mom fed her smaller amounts more frequently throughout the day, rather than larger amounts at regularly scheduled mealtimes.

What are some types of information you can collect and how will you use it?		
Data gathering opportunity	**What information can you collect?**	**What can you learn from this information and how does that help you plan and implement intervention?**
Meeting with parent at home		
Meeting with classroom teacher		
Visit with daycare provider		
Conversation with another team member or another person of the same professional background		
Team meeting or meeting where all team members are present (e.g., IEP/IFSP meeting)		

***How do I know if the piece of evidence
that I have located is credible and important?***

As well as looking for and finding information and evidence from multiple sources, it is also important for information users to know the origin of the evidence and to evaluate its quality and validity. In addition to the guidelines that have already been discussed, there are some specific classification systems that exist to help you consider the value of published research information you read. In the next section we consider several different approaches that are available to rank the strength and reliability of findings within published evidence reports. While they all share some common elements, each offers unique features.

Centre for Evidence-Based Medicine

The Centre for Evidence-Based Medicine (CEBM) in Oxford, England, has developed levels of evidence that are frequently referenced when evidence-based approaches are considered in medicine and health-related fields (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000). This rating system applies to the research methodologies that are used to examine an intervention and its effect. In the CEBM model, five different levels form a hierarchy that guides decisions about whether or not a source or a report provides reliable evidence that a particular intervention is responsible for a given outcome. Reports that fit within the lower numerical rankings (e.g. Level I or II) are considered to provide stronger evidence than those at the higher end of the rating scale (e.g. Level IV or V).

CEBM's classification applies primarily to group study designs. This rating system views randomized control trials as the gold standard for credible evidence, ranking these at the top of the hierarchy (Level I). Expert opinion about intervention methods and their associated outcomes (such as that in a published intervention case study report) is ranked at Level V, the lowest level of this hierarchy. The CEBM levels are described on the next page.

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

11

CEBM Rating Levels and Corresponding Types of Studies

Level	Description
Level I	Large randomized trials producing results with a high probability of certainty. These include studies with positive effects that show statistical significance and studies demonstrating no effect that are large enough to avoid missing a clinically significant effect.
Level II	Small randomized trials producing uncertain results. These are studies that have a positive trend that is not statistically significant to demonstrate efficacy or studies showing a negative effect that are sufficiently large to rule out the possibility of a clinically significant effect.
Level III	Nonrandomized prospective studies of concurrent treatment and control groups, such as cohort comparisons between contemporaneous participants who did and did not receive the intervention.
Level IV	Nonrandomized historical cohort comparisons between participants who did receive the intervention and earlier participants who did not.
Level V	Case series without controls. The clinical course of a group of clients is described, but no control of confounding variables is undertaken. This is a descriptive study that can generate hypotheses for future research but does not demonstrate efficacy.

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

12

American Academy for Cerebral Palsy and Developmental Medicine

The American Academy for Cerebral Palsy and Developmental Medicine (AACPDM) has developed another methodology for considering evidence about interventions. The AACPDM (2002) Levels of Evidence Classification is adapted from the work of Sackett and his colleagues. This classification considers the four different research methods that are commonly used to evaluate intervention outcomes in developmental disabilities: group (between-subjects), single-subject (within-subjects), qualitative, and outcomes research. The AACPDM levels are summarized below.

This five-level classification is recommended for use in the field of developmental disabilities, because the small numbers of individuals who share similar characteristics make group designs difficult to use with this population. The hierarchical ranking of different types of single-subject designs is a unique feature of the AACPDM methodology. This classification rates only whether the study as described demonstrates that the intervention is responsible for the outcome, leaving the reader to make decisions as to whether or not the report's results can be generalized to other specific clients (Butler & Darrah, 2001).

Summary of American Academy for Cerebral Palsy and Developmental Medicine (AACPDM) Levels of Evidence Classification

Level	Types of study designs	What do the results mean?
I	Group: randomized control trial, all-or-none case series	These reports offer evidence that is most definitive to establish causality between intervention and outcome for the conditions in the study.
II	Group: non-randomized control trial, prospective cohort study with concurrent control group Single-subject: ABABA design, alternating treatments, multiple baseline across participants Outcomes research: Analytical survey	Reports at this level represent tentative conclusions about causality between the intervention and the outcome.
III	Group: Case-control study, cohort study with historical control group Single-subject: ABA design	Results from studies at this level hint at causality between the intervention and the outcome.
IV	Group: Before-and-after case series without control group Single-subject: AB design	
V	Nonempirical: Descriptive case series, case reports, anecdotes, expert opinion, theories based on physiology, bench or animal research, common sense	Results from designs at this level only suggest the possibility of a relationship between treatment and outcome

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

13

Applying Evidence-Based Practice Approaches
in Children's Services

Therapists and other early intervention service providers who have participated in evidence-based practice initiatives sponsored by the Child and Family Studies Research Programs have acknowledged the importance of integrating evidence into their practice. Despite their understanding of the value of evidence in practice, the process of integrating and maintaining evidence-based strategies as they evaluate, plan and implement intervention remains a challenge. Bury and Mead (1998) described a five-step sequence that can be applied as one searches for evidence about the assessment and intervention practices they use:

1. Define the practice question (identify client, intervention and outcome).
2. Find the evidence (sources: published literature, clinical expertise, beliefs and values, assessment data, client preferences).
3. Critically appraise the evidence (quality, relevance, and applicability).
4. Implement findings into practice (define and document intervention protocol).
5. Evaluate impact of intervention (did client performance change? were outcomes achieved?)

This model is compatible with the three-pronged approach already discussed in this module.

Identifying a Practice Question

Asking questions is the first step in applying evidence-based approaches into services that are designed to support children. Although numerous practice questions related to enabling children's participation in home and community experiences may be articulated, identifying a question that is relevant and focused on the individual child is critical. The Centre for Evidence Based Medicine (CEBM, 2003) offers a strategy that is helpful as one begins to refine a practice question. CEBM's approach uses the acronym PICO to indicate **P**atient or **P**roblem, **I**ntervention, **C**omparative intervention, and **O**utcome. Each component is defined in relation to the child's unique situation to form the "PICO question" (CEBM, 2003).

Because the PICO question guides the search for information, the specific components need to be concise and focused on information that is individualized to the particular child or family and situation. Think about the intervention methods you might consider to enable a child or caregiver to accomplish a targeted outcome. The child or caregiver, the intervention, and the anticipated result (i.e., the outcome that should be achieved when intervention is successful) are the bases of your practice question. Only when you are considering two different approaches to accomplish the outcome is an alternate intervention included in the question. The following are some examples of practice questions that have been identified by participants in projects implemented by the Child and Family Studies Research Programs (PICO elements are indicated in parentheses):

1. Will therapeutic taping as a home program (I) for an infant with Down Syndrome (P) increase the sitting balance he demonstrates during floor play? (O)
2. Does a 4 year old with Pervasive Developmental Delay (P) increase his participation in classroom arts and crafts group (O) following a period of out-of-classroom therapy strategies that are focused on his sensory defensiveness (I)?
3. What is the effect of coaching for parent (I) as an intervention to
   - increase parent confidence (O) when feeding his or her child with developmental delay (P) and
   - develop the child's feeding behavior (O)?
4. Does embedding multiple practice opportunities into the family's daily routine (I) increase the independent crawling behavior (O) of a toddler with cerebral palsy (P)?

The worksheet on the following page, based upon the CEBM model, was developed in the Child and Family Studies Research Programs in order to help providers define their specific practice questions. You may wish to use it as you develop some practice questions related to your own interests or circumstances.

Think about different situations that you have encountered in practice and define questions you might ask. Identify the P, I, C and O elements of each question.

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

15

Worksheet for Developing A Question

My interest area: _____

_____

Ideas for components of my question (PICO):

Patient *(relevant characteristics of individual infant/toddler or group of children):*	**I**ntervention *(the strategy or approach that I want to apply into child and family's activities and routines):*
Comparative Intervention *(optional – do I want to compare the intervention to another possible treatment/approach?):*	**O**utcome *(what benefit will the child and family see from this planned intervention?):*

Conclusion. Focused question: _____

_____

_____

Concepts and phrases useful in literature search for evidence related to this question:

Finding the Published Evidence

Using Bury and Mead's (1998) process as a guide, once a focused practice question and the desired outcome are defined, a search begins for evidence to answer the question. In the past, a visit to the library to locate journal articles and textbooks represented an obvious next step in reviewing relevant material. With the increasing availability of technology, the Internet is a preferred option for many who are looking for information in a time-efficient manner.

Electronic Databases of Published Literature

There are a number of electronic, or automated literature databases available that list the contents of publications related to health, developmental, medical and educational services. Generally, a database entry includes the article title, author, publication date, journal title, page numbers and possibly, an abstract of the article. Most accredited, peer-reviewed journals are indexed in more than one of these databases. The choice of a specific database likely depends on several factors, including database availability and cost to access the database, the specific journals or publications of interest, ease of use when searching within the system, and the relevance and applicability of search results to one's day-to-day practice.

The reference departments in local universities or colleges may offer visitor privileges to access their electronic databases and literature collections. Some colleges offer library privileges to their alumni. It's also wise to check employer resources to determine whether or not the agency subscribes to specific databases and journal collections. School district staff members may be granted access to database or journal subscriptions that are available through state education department or school district resources. Local public libraries are another resource through which individuals can access electronic databases of published literature. Students, faculty and staff at Thomas Jefferson University have access to a variety of databases through Scott Library. Librarians are available to assist those who need help to search through these resources.

A number of these electronic literature databases are available to the public through the Internet. For example, Internet access to the MEDLINE database through PubMed and to the ERIC database is free of charge at this time. Many of the entries in CINAHL and PsycInfo databases are also available through MEDLINE in full citation format. Other databases are available through time-limited or extended subscriptions, as explained on individual Web sites.

Those who are unfamiliar with the process of searching through a literature database should take advantage of any available tutorials that explain how to use the specific language and search features within the database selected. For example, PubMed currently offers several animated tutorials that run for ten minutes and demonstrate how to use its features to translate words that define a practice-related topic into the vocabulary system that's used in the database. The time devoted to this initial review will help the user devise efficient search strategies to access information within the particular database. Ultimately, this will streamline the process of finding specific information during future searches.

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

17

Once relevant articles are located in PubMed, a list of references or article abstracts can be printed out or sent to an individual email address. Read the individual database's Web site for information and details about fees that are charged to retrieve a full article.

◆·◆

Look up each of these databases on the Internet. What resources are available in each? Do they include only brief citations, abstracts of the articles, or links to full text? Write some notes about what you find, as well as anything else you want to remember about the source.

MEDLINE: www.ncbi.nlm.nih.gov/PubMed	
CINAHL—Cumulative Index of Nursing and Allied Health Literature: www.cinahl.com	
PsycInfo—http:// www.psycinfo.com/psycinfo/	
ERIC—Educational Resources Information Center: www.eric.ed.gov	
Choose one: • www.otseeker.com • APTA's Hooked on Evidence (APTA members only— www.apta.org) • PEDro Physiotherapy Database— www.pedro.fhs.usyd.edu.au	

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

18

Using an Electronic Data Base: PubMed Illustrated

This section presents a practice situation and reports a therapist's focused question and literature search strategies. Results of the literature search related to the therapist's specific practice question are also included using the PubMed Database as a source.

Practice Situation

Sandy is an OT in a day-care center that includes several young children with special needs. The center has a developmental program of early childhood stimulation and enrichment. Sandy and the staff have been considering new program options to support the children's development and participation in a variety of early childhood play and learning activities. They are concerned about whether or not the traditional programming approaches are sufficient to meet the needs of the children with disabilities in the classrooms. Sandy is considering the inclusion of weekly groups that emphasize vestibular, proprioceptive and tactile activities based upon sensory integration approaches. Before presenting a recommendation for space and a request for funding to purchase suspended equipment and additional materials, she decides to review the evidence that intervention based upon this frame of reference has demonstrated benefit over other early childhood program options. She also is interested in learning what types of specific outcomes have been attributed to sensory integration intervention approaches.

The PICO Question Defined

Sandy's question: Are group sessions that include intervention based on sensory integration theory [I] more effective than other traditional early childhood approaches [C] in developing play, socialization and learning behavior [O] in young children with developmental delays or motor disabilities [P]?

Sandy needed to look for articles whose major emphasis was on sensory integration or sensorimotor integration, rather than on sensory integration combined with other therapy intervention approaches or occupational therapy in general. The phrases <u>sensory integration</u> and <u>sensorimotor integration</u> were important in her search strategy. She wanted to find information related to intervention for <u>children</u> and child <u>outcomes</u> that have been reported from sensory integration approaches.

Using the PICO Question to Guide the Evidence Search

Complete the following steps while logged on to PubMed's search site. Once connected to the Internet, there are two options to access the PubMed resources:

1. Type pubmed (not case sensitive) in your Internet search engine and open the link (go to PubMed or Entrez-PubMed; do not go to PubMed Central).
2. Or, go directly to PubMed's search page at www.ncbi.nlm.nih.gov/PubMed.

A copy of the PubMed opening screen is shown on the next page of this module. From this screen, click on Tutorial along the left margin and advance through an animated training program that shows how to search through the PubMed database. The tutorial explains how words that are typed into the "query box" guide the subsequent search. PubMed's empty query box is at the top of the screen, just to the right of the words "Search PubMed for."

Words typed into PubMed's query box are mapped against several vocabulary systems – MeSH (Medical Subject Headings), journal and author listings and PubMed's phrase list. The terms are then searched within various fields in the database records. Click on MeSH Database in the left column of the main search page for more details about how to use this vocabulary.

Placing the connectors "AND", "OR" between terms influences how phrases are mapped against these vocabularies. When "AND" is placed between two terms, only items with both of the concepts are retrieved. "OR" between two terms yields all references that include either one of the terms

What did you find when you put in some search terms?

1. After you've typed search terms into the query box and pressed "Go," look at the list of citations that came up on your screen and select one that interests you. A sample list of citations begins on page 22.
2. Click on the abstract icon to the left of the citation and then read the article's abstract.
3. Print the article citation and abstract, or send it to your email address so you have it for future reference.
4. From the citation list look to the right of the author's name and click on the highlighted "Links." Click on "LinkOut" in the drop down menu and you can access a list of libraries that include the article in their print or online collections. Perhaps one of these resources is in your local area.
5. Go back to the citation list, look to the right of the author's name and click on the highlighted "Related Articles." This brings you to the results of another search that uses PubMed's own strategies to identify items related to the specific article you selected. Since this search may focus on one keyword related to your article, you may be led to a list of references that are broadly related to the article, rather than only to those with its specific focus.

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Child & Family Studies Research Programs—October 2004

20

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Related Resources
Order Documents
NLM Catalog
NLM Gateway
TOXNET
Consumer Health
Clinical Alerts
ClinicalTrials.gov
PubMed Central

☐ **1:** Johnson HM, Reid SM, Hazard CJ, Lucas JO, Desai M, Reddihough DS.   Related Articles

Effectiveness of the Innsbruck Sensorimotor Activator and Regulator in improving saliva control in children with cerebral palsy.
Dev Med Child Neurol. 2004 Jan;46(1):39-45.
PMID: 14974646 [PubMed - indexed for MEDLINE]

☐ **2:** Zangen T, Ciarla C, Zangen S, Di Lorenzo C, Flores AF, Cocjin J, Reddy   Related Articles
SN, Rowhani A, Schwankovsky L, Hyman PE.

Gastrointestinal motility and sensory abnormalities may contribute to food re in medically fragile toddlers.
J Pediatr Gastroenterol Nutr. 2003 Sep;37(3):287-93.
PMID: 12960651 [PubMed - indexed for MEDLINE]

☐ **3:** Gisel EG, Tessier MJ, Lapierre G, Seidman E, Drouin E, Filion G.   Related Articles

Feeding management of children with severe cerebral palsy and eating impairment: an exploratory study.
Phys Occup Ther Pediatr. 2003;23(2):19-44.
PMID: 12951786 [PubMed - indexed for MEDLINE]

☐ **4:** Fung EB, Samson-Fang L, Stallings VA, Conaway M, Liptak G,   Related Articles
Henderson RC, Worley G, O'Donnell M, Calvert R, Rosenbaum P,
Chumlea W, Stevenson RD.

Feeding dysfunction is associated with poor growth and health status in chilc with cerebral palsy.
J Am Diet Assoc. 2002 Mar;102(3):361-73.
PMID: 11902369 [PubMed - indexed for MEDLINE]

☐ **5:** Gangil A, Patwari AK, Aneja S, Ahuja B, Anand VK.   Related Articles

Feeding problems in children with cerebral palsy.
Indian Pediatr. 2001 Aug;38(8):839-46.
PMID: 11520994 [PubMed - indexed for MEDLINE]

☐ **6:** Sayre JM, Pianta RC, Marvin RS, Saft EW.   Related Articles

Mothers' representations of relationships with their children: relations with n characteristics and feeding sensitivity.
J Pediatr Psychol. 2001 Sep;26(6):375-84.
PMID: 11490040 [PubMed - indexed for MEDLINE]

☐ **7:** Selley WG, Parrott LC, Lethbridge PC, Flack FC, Ellis RE, Johnston KJ,   Related Articles
Foumeny MA, Tripp JH.

Objective measures of dysphagia complexity in children related to suckle fee histories, gestational ages, and classification of their cerebral palsy.

Dysphagia. 2001 Summer;16(3):200-7.
PMID: 11453568 [PubMed - indexed for MEDLINE]

8: Vik T, Skrove MS, Dollner H, Helland G.

Related Articles

[Feeding problems and growth disorders among children with cerebral palsy
south and north Trondelag]
Tidsskr Nor Laegeforen. 2001 May 20;121(13):1570-4. Norwegian.
PMID: 11446040 [PubMed - indexed for MEDLINE]

9: Cockerill H, Carroll-Few L.

Related Articles

Non-invasive technique for assessment and management planning of oral-
pharyngeal dysphagia in children with cerebral palsy.
Dev Med Child Neurol. 2001 Jun;43(6):429-30. No abstract available.
PMID: 11409835 [PubMed - indexed for MEDLINE]

10: Haberfellner H, Schwartz S, Gisel EG.

Related Articles

Feeding skills and growth after one year of intraoral appliance therapy in
moderately dysphagic children with cerebral palsy.
Dysphagia. 2001 Spring;16(2):83-96.
PMID: 11305226 [PubMed - indexed for MEDLINE]

11: Troughton KE, Hill AE.

Related Articles

Relation between objectively measured feeding competence and nutrition i
children with cerebral palsy.
Dev Med Child Neurol. 2001 Mar;43(3):187-90.
PMID: 11263689 [PubMed - indexed for MEDLINE]

12: Welch K, Pianta RC, Marvin RS, Saft EW.

Related Articles

Feeding interactions for children with cerebral palsy: contributions of moth
psychological state and children's skills and abilities.
J Dev Behav Pediatr. 2000 Apr;21(2):123-9.
PMID: 10791480 [PubMed - indexed for MEDLINE]

13: Hermann RP, Phalangas AC, Mahoney RM, Alexander MA.

Related Articles

Powered feeding devices: an evaluation of three models.
Arch Phys Med Rehabil. 1999 Oct;80(10):1237-42.
PMID: 10527080 [PubMed - indexed for MEDLINE]

14: Reilly S, Skuse D, Poblete X.

Related Articles

Prevalence of feeding problems and oral motor dysfunction in children with
cerebral palsy: a community survey.
J Pediatr. 1996 Dec;129(6):877-82.
PMID: 8969730 [PubMed - indexed for MEDLINE]

15: Gisel EG, Applegate-Ferrante T, Benson JE, Bosma JF.

Related Articles

Effect of oral sensorimotor treatment on measures of growth, eating efficie
and aspiration in the dysphagic child with cerebral palsy.
Dev Med Child Neurol. 1995 Jun;37(6):528-43.
PMID: 7789662 [PubMed - indexed for MEDLINE]

16: Gisel EG, Alphonce E.

Related Articles

Classification of eating impairments based on eating efficiency in children
cerebral palsy.
Dysphagia. 1995 Fall;10(4):268-74. Review.

PMID: 7493509 [PubMed - indexed for MEDLINE]

☐ **17:** Tcheremenska AR, Gisel EG.   Related Articles

Use of substitute food textures for standard eating assessment in children w
cerebral palsy and children without disabilities.
Am J Occup Ther. 1994 Jul;48(7):626-32.
PMID: 7943152 [PubMed - indexed for MEDLINE]

☐ **18:** Stevenson RD, Allaire JH, Blasco PA.   Related Articles

Deterioration of feeding behavior following surgical treatment of drooling.
Dysphagia. 1994 Winter;9(1):22-5.
PMID: 8131421 [PubMed - indexed for MEDLINE]

☐ **19:** Dahl M, Gebre-Medhin M.   Related Articles

Feeding and nutritional problems in children with cerebral palsy and
myelomeningocoele.
Acta Paediatr. 1993 Oct;82(10):816-20.
PMID: 8241637 [PubMed - indexed for MEDLINE]

☐ **20:** Iammatteo PA, Trombly C, Luecke L.   Related Articles

The effect of mouth closure on drooling and speech.
Am J Occup Ther. 1990 Aug;44(8):686-91.
PMID: 1698021 [PubMed - indexed for MEDLINE]

Items 1 - 20 of 21   Page: 1   of 2
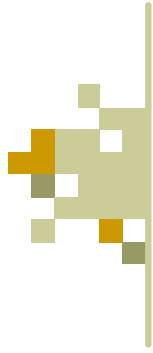
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Sep 14 2004 18:26:21

Using Electronic Databases: Additional Considerations

PubMed, as well as other automated retrieval systems, include advanced search features that help to streamline the process. Descriptions of these capabilities are available within each system, either within the Tutorial section or through "Frequently Asked Questions" or other "Help" features that are posted on the site. The following are some things to consider when you search for literature in PubMed or similar databases:

1. Begin your search with fewer terms in the query box, because a more general initial strategy yields a larger number of citations from which to choose.
2. Try different word combinations, with or without connectors (AND or OR), in order to be specific enough but not too narrow.
3. Read the Tutorial or Help section if you need help to understand how connectors are used in a search.
4. If your search yields a large number of articles even after you have tried a variety of term combinations, you may wish to use the database "Limit" feature to restrict citations to those published from 1995 to the present, a very reasonable boundary for "recent research."

Try your own search using PubMed or any other database. Perhaps you can arrange to do this together with a coworker or other colleague who is also learning about evidence-based practice approaches.

Work individually or pairs, searching for own preferred topic or choice from range of topics that are particularly relevant to services provided within your agency.

Use the "Worksheet for Developing a Question" that was included earlier in this module as your begin the process.

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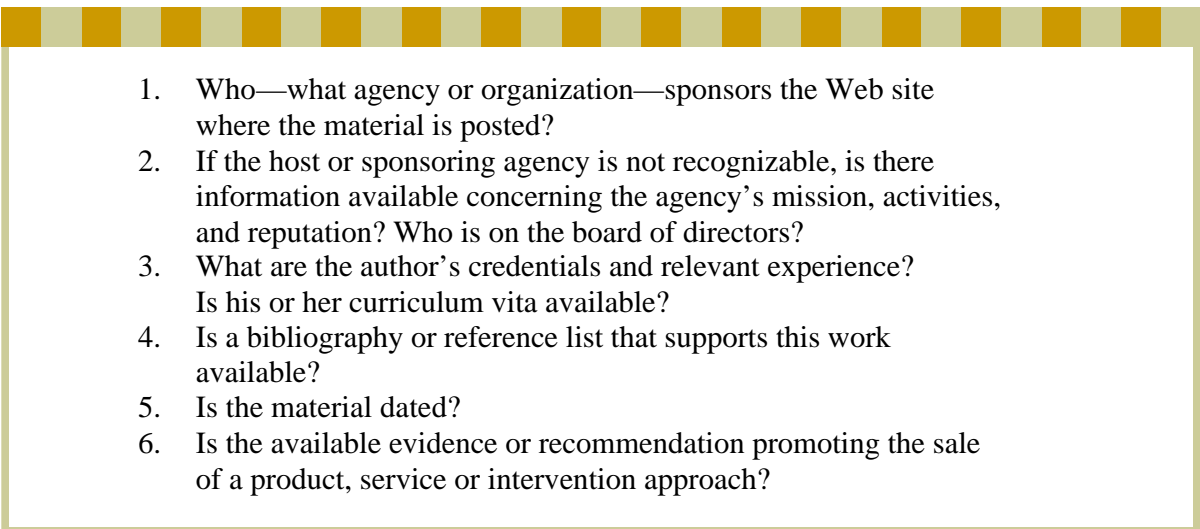*Child & Family Studies Research Programs—October 2004*

25

Information and Evidence Available on the Internet

The flexibility, accessibility, and economics of Internet use make it a practical way for service providers and families to gain information about an area of interest. The Internet connects users to a vast amount of information that can be overwhelming at times. Knowing how to search for resources in the midst of so much information is one issue, but then evaluating the credibility of material found is another matter.

Considering the Different Types of Information Available on the Internet

Information posted on the Internet ranges from special interest papers and pamphlets to full text of articles published in scholarly journals. Screening, review by experts, product development according to particular standards, and editing are not an inherent part of the Internet publication process. As you will see when you search the Internet, the validity, reliability, and timeliness of published materials are subject to considerable variations across Web site hosts. Each host site has its own criteria for material that is posted on its Web pages. For example, large teaching universities or medical centers maintain Internet publishing standards with levels of rigor that are very different from those of a vendor who is marketing his or her own products or an individual who is disseminating particular information and resources. Consider the following when evaluating the credibility of Internet resources to inform practice:

1. Who—what agency or organization—sponsors the Web site where the material is posted?
2. If the host or sponsoring agency is not recognizable, is there information available concerning the agency's mission, activities, and reputation? Who is on the board of directors?
3. What are the author's credentials and relevant experience? Is his or her curriculum vita available?
4. Is a bibliography or reference list that supports this work available?
5. Is the material dated?
6. Is the available evidence or recommendation promoting the sale of a product, service or intervention approach?

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

26

Web publishing of individual articles and full issues of scholarly journals is increasing. For example, subscribers to many journals can now choose electronic access rather than receiving a hard copy of the journal through the mail. Some journals post the full text of sample articles as well as the entire content of past issues on their Web sites so that it is available to anyone who logs on to the site. These options eliminate storage issues, offer cost savings and ease of access, and are likely to become more common as technology use gains acceptance. The table below lists several Internet sites through which you can access the full text of professional journals and trade publications.

Full Text Journal sites

<www.freemedicaljournals.com> - includes mostly foreign journals and some e-text journals that are free, but also links to journal sites where there is a cost for downloading.

Physical Therapy Journal – <www.ptjournal.org/info/pt_abs.cfm>

Linkout (this is also discussed in this module's section about PubMed): <http://www.ncbi.nlm.nih.gov/entrez/linkout/> -- or go to PubMed and on the right hand side of the screen, look for services, and under services, look for Linkout. Site lists over 4000 journals and the sites where full text articles may be downloaded. Many are at no cost but some carry a fee for non-journal sub-scribers.

<http://highwire.stanford.edu/> -- links to journals where some (or all) arti-cles may be downloaded at no cost. Mostly medical journals.

<http://www.aera.net/pubs/> -- links to journals of the American Education Research Association. Selected full text articles are available at no cost.

<http://www.apa.org/about/publicprod.html> -- links to journals of the Ameri-can Psychological Association. Selected full text articles from current and back issues may be downloaded at no cost.

<http://www.unesco.org/unesdi/index.php/eng/accueil/> — UNESCO avail-able social and human sciences journals and links to journals with free full-text articles. This is a worldwide site and includes international journals.

<www.biomedcentral.com> —journals covering biology and medicine

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

27

SUMSearch

SUMSearch, sponsored by the University of Texas Health Science Center at San Antonio (http://sumsearch.uthscsa.edu), is an Internet search engine that is designed to locate quality health care and medical information and evidence. SUMSearch does not search throughout the Internet, but restricts its search to sites that contain medical and health-related information written by qualified professionals. Its primary sources are the National Library of Medicine, the Database of Abstracts of Reviews of Effectiveness (DARE), and the National Guideline Clearinghouse, all government-sponsored sites. SUMSearch also searches through the Merck Manual (Beers & Berkow, 1999). SUMSearch does not complete a systematic and exhaustive review of published literature. Search results are organized into categories that range from those with a broad emphasis to those with specific focus. Practice guidelines, systematic reviews, and original research are additional subdivisions into which results are sorted.

The following example illustrates how SUMSearch may be used in the context of pediatric service provision. Ramon is a 3 year old boy with cerebral palsy who is entering preschool. Ramon's parents have heard about some "newer approaches" that might help him to progress and have told the staff that they want Ramon to receive the "best possible services" while he's in preschool. During the upcoming IEP meeting, team members want to discuss what options should be considered as part of Ramon's preschool program. The terms "cerebral palsy" and "education" were typed into the SUMSearch query bar in this format: cerebral palsy AND education. On the date this search was executed, results included 1 general review, 3 sets of practice guidelines,

17 systematic reviews and 33 documents representing original research. The results covered various interventions, including conductive education, selective dorsal rhizotomy, occupational, physical and speech and language therapy and other alternative therapies. The following pages include excerpts from the SUMSearch summary list of citations as well as examples of some of the abstracts of systematic reviews (see pages titled Centre for Reviews and Dissemination). These abstracts present review findings according to a template that identifies primary findings about what was done, the results and implications for practice.

From the SUMSearch results, Ramon's team members identified some evidence to consider. The initial result was an article in the British Journal of Medicine, "Cerebral palsy: what parents and doctors need to know," written by Peter Rosenbaum and published in 2003. The full text of this article was accessible online at no cost (go to http://bmj.bmjjournals.com (type Rosenbaum into the Search box). The article provided helpful developmental implications, important questions that parents and service providers need to consider, current perspectives on goal setting, and a discussion about evidence behind new treatment approaches.

A review of evidence related to conductive education for children with cerebral palsy, published by the American Academy of Cerebral Palsy and Developmental Medicine, was listed in SUMSearch results. By visiting this organization's Web site (www.aacpdm.org) and clicking on "Outcome Studies," the full text of that evidence summary was located.

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

28

SUMSearch - Documents found

Search for:CEREBRAL PALSY AND
EDUCATION
(Focus: NOFOCUS, ages: all, subjects:
HUMAN)

New Online EBP calculator - requires Java
Plug-in
(from the Centre for Evidence-Based
Medicine)

For broad discussions that are easy to read, but not as up-to-date

Reviews/Editorials

Selected journals at PubMed   **1** documents.

Scroll down or Click here to view

Practice Guidelines *(some guidelines are systematic reviews)*

National Guideline Clearinghouse™   **3** documents.

Scroll down or Click here to view

PubMed (possible documents)   **0** documents.
PubMed-Guides did not complete a response
within time, consider searching PubMed-
Guides directly or searching later.
*Error may have occurred at this Internet server
(PubMed-Guides). Click here to search this server
again.*

For more up-to-date answers to specific questions, but are harder to read

Systematic reviews *(what is so good about systematic reviews?)*

DARE (includes Cochrane abstracts)   **7** documents.

Scroll down or Click here to view

PubMed (possible systematic reviews)   **10** documents.

Scroll down or Click here to view

Original research

PubMed (4 searches)   **33** documents.

Scroll down or Click here to view first 20

**Warning: SUMSearch had to do 4 searches to reduce the number of
original studies in your search to 33 original studies. This may cause
important studies to be missed because either your terms were not the
focus of a study, or the study was not published in a AIM Journal. If you
want to reduce this risk, consider:**

- **Hints for choosing which documents to review in this search**
- **Hints for constructing a new search**
  - **You did not 'focus' your search (this mainly affects the original
    reseach section of your search results)**

- - **Click here to repeat your search focusing on controlled trials** (Same as 'treatment' focus button)
    - **Click here to repeat your search focusing on diagnostic studies** (Same as 'diagnosis' focus button)
    - Click **here** to return to the search screen to select other focus.
  - **You only entered 2 search term(s). For searching, a well-built question may include the following search terms:**
    - **Patients or disease**
    - **Treatment, test, or etiologic/prognostic factor**
    - **Outcome of interest (eg mortality, or a specific morbidity)**

    Consider adding another search term:
    - Click **here** to return to the search screen to *add* another term.
  - **Make your question more specific.**

Results

Broad discussions

Consider repeating your search because of possible error at remote server

~~Reviews/editorials~~

Practice Guidelines

Click here to return to   EBM 'toolbox' from   Click here for details of   Click here for details about
~~NGC~~
search form. -   CEBM -   your strategy. -   SUMSearch
~~Systematic Reviews~~

~~DARE~~

~~PubMed~~   **Selected journals at PubMed - 1 document(s)**

Original Research

~~PubMed~~   1. Cerebral palsy: what parents and doctors want to know.   Related Articles
Rosenbaum P.
BMJ. 2003 May 3;326(7396):970-4. Review. No abstract available.
PMID: 12727772 [PubMed - indexed for MEDLINE]

Click here to go to PubMed and *modify your search for Selected journals* at PubMed

National Guideline Clearinghouse™ - 3 document(s)

1. Preterm birth prevention. Institute for Clinical Systems Improvement - Private Nonprofit Organization. 1995 Jul (revised 2003 Jul).

2. The use of electronic fetal monitoring. The use and interpretation of cardiotocography in intrapartum fetal surveillance. Royal College of Obstetricians and Gynaecologists - Medical Specialty Society. 2001 May.

3. Pediatric eye and vision examination. American Optometric Association - Professional Association. 1994 (revised 2002).

Click here to *modify your search at National Guideline Clearinghouse™.*

PubMed (possible documents) - 0 document(s)

Click here to go to PubMed and *modify your search for PubMed (possible documents) - offline*

DARE (includes Cochrane abstracts) - 7 document(s)

PubMed Citation Matcher
(good for locating MEDLINE abstracts of articles cited by DARE or Bedside Diagnosis)

1.

Effects of conductive education intervention for children with a diagnosis of cerebral palsy: an AACPDM evidence report.
Darrah J, Watkins B, Chen L, Bonin C. 2003.

2.

Selective dorsal rhizotomy: meta-analysis of three randomized controlled trials.
McLaughlin J, Bjornson K, Temkin N, Steinbok P, Wright V, Reiner A, Roberts T, Drake J, O'Donnell M, Rosenbaum P, Barber T, Ferrel A. Developmental Medicine and Child Neurology 2002; 44(1): 17-25.

3.

Management of upper limb dysfunction in children with cerebral palsy: a systematic review.
Boyd R N, Morris M E, Graham H K. European Journal of Neurology 2001; 8 (Supplement 5): 150-166.

4.

Identification and nursing management of dysphagia in individuals with neurological impairment.
Ramritu P, Finlayson K, Mitchell A, Croft G. Adelaide, S. Australia, Australia: Joanna Briggs Institute for Evidence Based Nursing and Midwifery 2000: 1-91.

5.

Conductive education for children with cerebral palsy.
Ludwig S, Leggett P, Harstall C. Edmonton, AB, Canada: Alberta Heritage Foundation for Medical Research 2000: 54.

6.

Screening for speech and language delay: a systematic review of the literature.
Law J, Boyle J, Harris F, Harkness A, Nye C. Health Technology Assessment 1998; 2(9): 1-184.

7.

Speech and language therapy to improve the communication skills of children with cerebral palsy.
Pennington L, Goldbart J, Marshall J. **Speech and language therapy to improve the communication skills of children with cerebral palsy (Cochrane Review).** In: The Cochrane Library, Issue 3, 2004. Chichester, UK: John Wiley & Sons, Ltd..

Click here to go to DARE (includes Cochrane abstracts) to see *additional* search results or to *modify* your search.

PubMed (possible systematic reviews) - 10 document(s)

Centre for Reviews and Dissemination

Full record display

Document 277621

Selective dorsal rhizotomy: meta-analysis of three randomized controlled trials
McLaughlin J, Bjornson K, Temkin N, Steinbok P, Wright V, Reiner A, Roberts T, Drake J, O'Donnell M, Rosenbaum P, Barber T, Ferrel A. Developmental Medicine and Child Neurology 2002; 44(1): 17-25.

This record is a structured abstract written by CRD reviewers. The original has met a set of quality criteria. Since September 1996 abstracts have been sent to authors for comment. Additional factual information is incorporated into the record. Noted as (A:....).

Authors' objectives
To identify the factors responsible for the different outcomes of the studies, and to clarify whether selective dorsal rhizotomy (SDR) makes a statistically-significant contribution to the functional improvement of children with spastic cerebral palsy up to one year after the operation.

Type of intervention
Treatment.

Specific interventions included in the review
SDR. The included studies compared SDR plus physiotherapy (PT) with or without occupational therapy versus PT with or without occupational therapy. PT consisted of programmes of stretching, strengthening, and training in functional movements intended to enhance mobility.

Participants included in the review
Children with spastic cerebral palsy. Children with dystonia, athetosis, ataxia or severe visual impairment were excluded. The mean age of the children in the included studies was 5.5 years (standard deviation, SD=2.8) and the percentage of females was 47%. The mean baseline score using the lower extremity Ashworth scale (see Other Publications of Related Interest no.1.) was 2.9 (SD=0.8), the mean baseline total Gross Motor Function Measure (GMFM) (see Other Publications of Related Interest no.2) was 2.9 (SD=0.8), and the mean baseline GMFM-66 was 62.5 (SD=16.0).

Outcomes assessed in the review
The Ashworth scale was used to measure spasticity, while the GMFM and GMFM-66 (an improved scaling method to that of the GMFM) were used to measure function. The primary outcome variables used in the included studies were GMFM total and diplegia composite, and spasticity, measured using the Ashworth scale with or without myometry or electromechanical torque measurement.

Study designs of evaluations included in the review

Randomised controlled trials (RCTs) were included. Randomisation was undertaken using a block age of less than 6 years and of at least 6 years; a block age of 3 to 11, 12 to 18 years and ambulatory status; or using no blocking. The duration of follow-up for the included studies was 9 months, one year, and one to 2 years. Two included trials were single-blind studies, while a further study was not blind.

What sources were searched to identify primary studies?
The review's authors had been involved in three relevant RCTs, and undertook a literature search to find out whether any other trials had been conducted as of December 2000. This included a search of MEDLINE, the Cochrane Controlled Trials Register and abstracts from recent scientific meetings, and contact with other researchers in the field.

Criteria on which the validity (or quality) of studies was assessed
The authors do not report a method for assessing validity. However, the review's authors were involved in the three included studies, and details of randomisation and blinding were reported in summary tables.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection. However, the review's authors had been involved in the included studies.

How were judgements of validity (or quality) made?
The authors do not state how the papers were assessed for validity, or how many of the reviewers performed the validity assessment. However, the review's authors had been involved in the included studies.

How were the data extracted from primary studies?
The authors do not state how the data were extracted for the review, or how many of the reviewers performed the data extraction.

The extracted data included: treatment; randomisation details; blinding; duration of follow-up; inclusion criteria; criteria for dorsal root tissue transection; post-operative management; time of assessment; primary outcome variables; secondary outcome variables; difference to detect; and the data analysis used in the primary outcome papers. Complete data were obtained for all the variables reported with the exception of baseline ambulatory status. No new data were collected for the review.

The markers of severity used by the studies were initial diagnosis (spastic diplegia), qualitative descriptors (mild, moderate or severe), ambulatory status and baseline GMFM score. For the review, the Gross Motor Function Classification System (GMFCS) was used to provide a means of rank-ordering the functional severity of cerebral palsy on age-adjusted clinical descriptors. A developmental paediatrician familiar with the GMFCS, and masked with respect to participant identification and study group assignment but not study site, retrospectively reviewed the selected clinical descriptions of all the participants. Data from each child were assigned a GMFCS baseline score, which was entered into the multivariate analysis.

Number of studies included in the review
Three RCTs involving 90 children were included. Of these, 82 were aged under 8 years old and 65 had GMFCS level II or III disability.

How were the studies combined?
For each outcome, the change in SDR plus PT group was compared with that in the PT-only group using two methods: blocked Wilcoxon's test (blocking on site; see Other Publications of Related Interest no.3); and analysis of variance, including factors for treatment group, site, and a treatment by site interaction.

Separate multiple regression analyses were conducted to evaluate the effect of characteristics or the effect of SDR on outcome, as measured by the Ashworth, GMFM and GMFM-66 scales. These analyses used backward selection and the following additional predictors: age, gender, birth weight, ambulatory status, baseline GMFM-66, and baseline lower-extremity Ashworth score. Site was included in the models, regardless of significance; all other variables required a significance level of p less than 0.05 to be retained. Once the significant main effects were identified, two-way interactions among the included variables were evaluated.

How were differences between studies investigated?
The differences were described in a narrative summary. Characteristics of the three samples were also compared using a Kruskal-Wallis distribution-free analysis of variance for continuous or ordered variables, and chi-squared or Fisher's exact tests for unordered categorical variables.

Results of the review
Two studies showed a statistically-significant advantage in the functional outcome for SDR compared with PT alone, while the third study showed no advantage. This third study was the only one to include children (n=8) who were at least 8 years of age at baseline; the study sample was also slightly more heterogeneous with respect to intellectual function and cause of cerebral palsy.

The pooled Ashworth data analysis confirmed a reduction of spasticity with SDR plus PT (mean change score difference -1.2; Wilcoxon p<0.001). The pooled GMFM data revealed greater functional improvement with SDR plus PT (difference in change scores 4.0; Wilcoxon p=0.008). When the GMF-66 scores were used, the mean difference in change score for the pooled data was smaller (2.6) and remained statistically significant (Wilcoxon p=0.002). No baseline characteristics were found to be significantly associated with outcome in the multivariate analysis. Multiple regression in the SDR plus PT group revealed a direct relationship between the percentage of dorsal root tissue transected and functional improvement: patients who had a larger amount of dorsal root tissue transected had more improvement on GMFM (p<0.001), GMFM-66 (p=0.02), and Ashworth score (p=0.03).

The potential effects of outliers and of sectioning S2 root tissue were examined by eliminating relevant data from the analyses. No appreciable effects were identified.

Was any cost information reported?
No.

Authors' conclusions
SDR plus PT was efficacious in reducing spasticity in children with spastic diplegia, and it had a small positive effect on gross motor function. There appeared to be a direct relationship between the percent of dorsal root tissue transected and the magnitude of the gain in function, although this statistical correlation may not reflect a true cause effect relationship.

CRD commentary
This was a meta-analysis of individual patient data, which was of reasonable quality. The aims of the review were clearly stated and details of the inclusion criteria were reported. The authors had been involved in three included RCTs, and they undertook a literature search to identify any further trials conducted as of December 2000. Only three electronic databases were searched and details of the search strategy were not reported. The possibility of publication bias was not discussed. Relevant details of the primary studies were presented in tabular format. No information was reported on the comparability of the characteristics of the two treatment groups. The authors did not state whether their meta-analysis was conducted on an intention to treat basis. Two participants were lost to follow-up in one trial and five in another. For this second trial, initial analyses were reported to have been undertaken using intention to

treat. Differences between the included studies were assessed in both a narrative summary analysis and a statistical analysis.

The studies were pooled appropriately and the authors' conclusions follow from the results. A detailed investigation was made of the possible factors associated with variations in the results of different trials, although the results were only partially presented.

What are the implications of the review?
Practice: Based on both clinical experience and the review data, the authors speculate that SDR might be most effective for a child between 3 and 18 years of age whose functional level falls into GMFCS III and IV. Children in this age range are easy to assess, tolerate the physiotherapy regimens, and have academic and social demands that can accommodate an intensive intervention. Children with more severe cerebral palsy may have more potential gain from an invasive procedure.

Research: The authors state that further sizable well-studied cohort studies of individuals with spastic diplegia followed to adulthood are required, to assess the beneficial effect of surgical treatment in terms of the long-term outcomes.

Other publications of related interest
1. Bohannon RW, Smith MB. Interrater reliability of modified Ashworth scale of muscle spasticity. Phys Ther 1987;67:206-7.
2. Russell D, Rosenbaum P, Cadman D, Gowland C, Hardy S, Javis S. The Gross Motor Function measure: a means to evaluate effects of physical therapy. Dev Med Child Neurol 1989; 31:341-52.
3. Marascuilo LA, McSweeney M. Nonparametric and distribution free methods for the social sciences. Monterey (CA): Brooks/Cole; 1997.

Subject index terms
Subject indexing assigned by NLM:
Cerebral-Palsy/su [surgery]; Child; Child,-Preschool; Disabled-Children; Ganglia,-Spinal/su [surgery]; Motor-Skills; Randomized-Controlled-Trials; Rhizotomy; Treatment-Outcome

Country code
United States

Review funding body
United Cerebral Palsy Research and Educational Foundation; National Institute for Neurological Disease and Stroke, grant number R01- NS27867; British Columbia Health Care Research Foundation; Easter Seal Research Institute of Canada; United Cerebral Palsy Research and Educational Foundation.

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Document 132341

Screening for speech and language delay: a systematic review of the literature
Law J, Boyle J, Harris F, Harkness A, Nye C. Health Technology Assessment 1998; 2(9): 1-184.

This record is a structured abstract written by CRD reviewers. The original has met a set of quality criteria. Since September 1996 abstracts have been sent to authors for comment. Additional factual information is incorporated into the record. Noted as (A:....).

Authors' objectives
To assess the value of screening and intervention for speech and language delays in children up to the age of 7 years. Two additional objectives were to identify priority areas for further investigation and to provide evidence-based direction for the future provision of services.

Type of intervention
Screening, treatment.

Specific interventions included in the review
The authors state that approaches to interventions vary considerably. The interventions covered four broad areas: didactic (elicited imitation or mand modelling) approaches; naturalistic (interactionist or incidental teaching) approaches; hybrid (milieu therapy) approaches; and other approaches (non-directive therapy, auditory training, comprehension monitoring, and cognitive therapy). Specific categories used to identify the particular area of language investigated by the study were: attention control/concentration/listening skills, other prelinguistic skills, speech, expressive language, receptive language, general language, pragmatics/social use of language, cognitive abilities, and parent- child interaction. Screening interventions had to use tests designed for use in primary health care settings and/or in an educational setting by non-specialist staff for early identification, not diagnosis.

Participants included in the review
For effectiveness of intervention: children up to 7 years of age. For accuracy of screening: normal and clinical populations within the 0-7 year age range.

Studies had to be of primary speech and language delay. Studies focussing on ADD/ADHD; deafness/sensorineural loss; autism; psychiatric or EBD; Down's Syndrome; cerebral palsy; dyslexia; effects of social disadvantage; or other secondary speech and language delay were excluded.

Outcomes assessed in the review
Impact on speech/language delay. Main areas considered were articulation/phonology, expressive language, and auditory discrimination. A wide variety of scales appear to have been used to assess

outcomes.

Study designs of evaluations included in the review

For intervention: the studies had to detail the number of participants in each group and the nature, duration, span, and delivery of treatment, provide a comparison of pre- and post- intervention speech and language measures, and fulfill one of three design criteria: experimental study with randomised non-treatment controls; quasi-experimental studies (with non-random/pseudo-random or non-equivalent non-treatment control groups); or a single-subject experimental design with graphical displays or session-by-session data for individuals.

For screening tests: studies also had to included information on sample size, whether drawn from the general population, or a clinical population, or a mixed population, and had to give clear criteria for scores and report results expressed by both sensitivity and specificity.

What sources were searched to identify primary studies?

A preliminary literature search of the Cochrane Database of Systematic Reviews, the Database of Abstracts and Reviews of Effectiveness, the Cochrane Controlled Trials Register, and the Cochrane Review Methodology Database failed to locate any reviews on this topic.

The authors then searched the electronic databases: Cumulative Index of Nursing and Allied Health; EMBASE; Educational Resources International Clearing House; Linguistics and Language Behaviour Abstracts; MEDLINE; and PsycLIT.

The authors handsearched relevant journals, compilation volumes, and bibliographies, and used Internet search engines, and databases of unpublished literature to identify additional studies. Contact was made with other professional organisation, institutions and authors, and feedback received and incorporated during the review.

The review also made use of funnel plots of standardised effect size by sample size and by study quality to examine whether there were gaps in the data set due to publication bias.

Criteria on which the validity (or quality) of studies was assessed

An overall rating of the quality of each study was made based upon study reliability and study validity, together with additional comments. In RCTs and quasi-experimental study designs, reliability scores (maximum of 19 points) ranged between 9 and 19 points, and validity scores (maximum 15 points) ranged between 8 and 14 points. Single-subject experimental designs were grouped into higher quality studies (study validity greater or equal to 10 points) or lower quality studies (study validity less than 10 points).

How were decisions on the relevance of primary studies made?

Final judgements about inclusion were made by two independent assessors, with discussion to resolve any disagreements.

How were judgements of validity (or quality) made?

Validity assessment was part of the data extraction form and was performed by two independent reviewers.

How were the data extracted from primary studies?

The data were extracted using data extraction forms by two independent coders. The percentage agreement rate was calculated for each of the four domains and the overall % agreement rates were: prevalence 84.8%; natural history 85.4%; intervention 89.0%; and screening 90.2%.

Coding categories for prevalence studies were: study details; criteria for language delay; sample; prevalence; and quality rating. Coding categories for natural history studies were: study details; subject characteristics; design; areas of investigation; study characteristics; outcome findings; and quality rating. Coding categories for intervention studies were: study details; subject characteristics; design; areas of intervention; study characteristics; outcome findings; and quality rating. Coding categories for screening were: study details; screening procedure; criteria; sample; reliability; validity; and quality rating.

Number of studies included in the review
For intervention: there were 10 RCTs with 151 subjects and 106 controls; 11 quasi-experimental studies with 203 subjects and 189 controls; and 26 single-subject experimental studies with 77 subjects.

For screening: there were 33 studies of concurrent validity of screening tests with 6,756 subjects given full testing and 18,022 in the screening sample; and 5 comparison studies of concurrent validity between screening tests with 829 given full screening and 1,096 in the screening sample.

How were the studies combined?
In the intervention studies, standardised effect sizes (ES) for the outcomes from randomised controlled trials (RCTs) and quasi- experimental designs and the PND statistic (percentage of non- everlapping data between baseline and post-baseline phases) for single-subject experimental designs were calculated.

For screening studies, sensitivity and specificity rates and likelihood ratios (LRs) were calculated.

How were differences between studies investigated?
The review inspected the direction of outcomes from excluded studies to examine the extent to which studies excluded on grounds of design also showed positive effects of intervention.

Results of the review
In the intervention data, results from RCTs and quasi-experimental designs show positive and statistically significant effects of intervention relative to untreated controls in all areas of speech and language skills. Comparable results for direct (clinician administered) and indirect treatment were observed in the case of expressive language. In contrast, direct intervention was more effective in the case of speech, whereas indirect intervention was more effective in the case of receptive language. Data from the single-subject experimental designs were synthesised and provide confirmatory evidence for the positive effects of intervention. The data reviewed do not provide information about the long-term outcomes of intervention, nor of the likelihood of intervention reducing prevalence in a given population. It is not possible to draw conclusions about the effects of subject variables such as socio-economic status or age upon the relative value of intervention. The screening evidence, few studies compare the performance of two or more screening tests when applied to one population, nor do they compare single screening measures across different populations. In general, specificity is higher that sensitivity, suggesting that it is easier to determine who is not a case than to establish who is. Parent-focused measures appear to be as useful as specific tests of child behaviour. There remains considerable disagreement as to what proportion of the population should be considered cases.

Was any cost information reported?
No.

Authors' conclusions
The authors state that early speech and language delay should be a concern to those involved with child health surveillance because of the problems for the individual child, because it may indicate other co-

morbid conditions such as hearing loss, developmental and behavioural difficulties, and because of the implications it may have for literacy and socialisation in school. The fact that there is not sufficient evidence to merit the introduction of universal screening does not imply that speech and language delay should not be identified by less formal checks.

CRD commentary

This is a good systematic review. The research questions and outcome measures are clearly stated, as are the inclusion and exclusion criteria for each outcome measure. The literature review is extensive and the search strategy is reported in the review. The study details are discussed in the text of the reviews, and summarised in tables and appendices.

The pooling of the data is appropriate and the conclusions follow from the results of the review.

What are the implications of the review?

The authors state that implications for practice include paying more attention to the role of parents in identifying children with speech and language delay, and that primary care workers should be involved in eliciting parental concerns and in making appropriate observations of children's communication behaviours. Because of the reported value of indirect approaches to intervention, there is a case for widening the range of professionals able to promote good interactive practice in parents of young children.

The implications for further research focus on:

1. Examining the impact of speech and language delay.

2. Examining the medium- and long-term effects of well described models of intervention.

3. Developing a screening measure that combines data on risk factors with parental report and professional observation.

4. Developing the predictive ability of different models of early identification and intervention needs.

Subject index terms

Subject indexing assigned by NLM:
Age-Factors; Child; Chi

The abstracts of other articles were available through links on the screen and the PubMed information on the following page illustrates the types of information that was retrieved. Some of the articles that were cited were published in March 2004, in one issue of the journal, *Seminars in Pediatric Neurology*. A check with this journal's Web site (located by typing the journal name into any Internet search engine) revealed that this was a special issue related to cerebral palsy (see other article titles in box below). Sometimes when you check a publisher's Web site in this way, you may find that the issue you are interested in is available as a sample with full online access. Otherwise, when a back issue of a journal stands out with particularly important contents, check with the publisher about whether or not a copy of that specific issue is available for purchase.

Author and article titles in *Seminars in Pediatric Neurology*, March 2004 issue

- King, S., Teplicky, R., King, G., & Rosenbaum, P. *Family-centered service for children with cerebral palsy and their families: a review of the literature*
- Majnemer, A. & Mazer, B. *New directions in the outcome evaluation of children with cerebral palsy.*
- Palisano, R., Snider, L., & Orlin, M. *Recent advances in physical and occupational therapy for children with cerebral palsy.*
- Russman, B. & Ashwal, S. *Evaluation of the child with cerebral palsy.*
- Rosenbaum, P. & Stewart, D. *The World Health Organization International Classification of Functioning, Disability, and Health: a model to guide clinical thinking, practice and research in the field of cerebral palsy.*
- Shevell, M. & Bodensteiner, J. *Cerebral palsy: defining the problem.*
- Tilton, A. *Management of spasticity in children with cerebral palsy.*

Summaries of Evidence Available on the Internet

Reliable sources for research summaries are emerging on the Internet on a regular basis. The Child and Family Studies Research Programs Web site includes a section that identifies recommended Internet sources for research briefs and other reports of evidence that support "best practice" in pediatric services. This site is regularly updated to include relevant resources as they become available. You can reach this site at http://jeffline.tju.edu/cfsrp/ebp-internet.html

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

40

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Family-centered service for children with cerebral palsy and the families: a review of the literature.

King S, Teplicky R, King G, Rosenbaum P.

CanChild Centre for Childhood Disability Research, McMaster University, Hamilton, Ontario, Canada.

Pediatric neurologists and other specialists working with children with cerebr palsy or other disabilities play important roles in providing services in ways t make a difference in the lives of these children and their families. This article defines family-centered service and outlines a conceptual framework of the premises and principles underlying this approach to service delivery. Resear evidence supporting family-centered service is presented for child, parent/fan and service system outcomes, with a focus on community-based rehabilitatio health care services. The research evidence shows strong support for family-centered service in promoting the psychosocial well-being of children and th parents and in leading to increased satisfaction with services. There is less ev for other outcomes. It is recommended that all service providers assess their l and behaviors about family-centered service.

Publication Types:
- Review
- Review Literature

PMID: 15132256 [PubMed - indexed for MEDLINE]

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Reviewing, Understanding and Using the Evidence

Bury and Mead (1998) recommend that the validity and usefulness of information found through the evidence search be critically appraised and then interpreted for its applicability to the specific situation. Using the three-pronged approach to evidence-based practice that was introduced at the start of this module, results of the literature review and other data are combined with other opinions to help interpret the child's behavior and develop an intervention plan. This fact finding and interpretation that combines perspectives of the service provider and other adults who know the child, leads to recommendations about intervention options that have team support and this is an important component of the implementation and reevaluation processes.

Reading Research Reports

Individuals providing pediatric services who have participated in projects through the Child and Family Studies Research Programs have identified several factors that influence their use of evidence in their practice. Finding time to review published resources is a scheduling challenge that limits their opportunities to read relevant articles and reports. As one option, you may begin to incorporate this step into the standard procedures that define your assessment protocol. This can be accomplished with the next evaluation you complete for a new student or within the process of upcoming individualized education program (IEP) or individual family service plan (IFSP) annual review evaluations for children you currently serve. In this way, you are able to find available information and use it when it is relevant to the team's review of an evaluation report and their subsequent decision making.

One way to encourage professionals to find and review current research reports is to establish a study group. Participants may select their own areas of interest or identify particular journals they will monitor on a regular basis. This type of group format is enriched if colleagues from other disciplines are included. General and special education teachers, speech therapists, occupational and physical therapists, psychologists, and child caregivers, building administrators or program directors may participate in this type of activity, each contributing current reports from their discipline's journals and magazines. These individuals also contribute different perspectives and ask different questions when they review reports from another discipline's journals and magazines. A monthly staff meeting agenda may include time to discuss an article that all have had the opportunity to read in advance. As another way to enhance discussion, several staff members from multiple disciplines can work together to facilitate this meeting. Providers from different programs that live within close proximity of each other can share this same experience when they establish a regional group that meets periodically during the year.
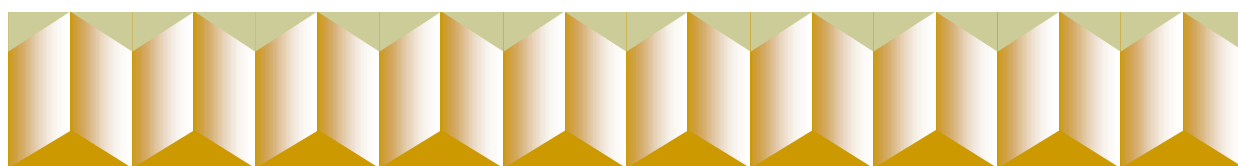
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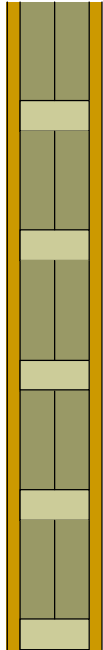*Child & Family Studies Research Programs—October 2004*

42

You need to know how to read the article and appraise the validity and reliability of what is being presented; for this you will need a working knowledge of basic statistics and the ability to evaluate a researcher's conclusions. Remember that articles published in peer-reviewed journals may not present all of the study's results and that different statistical analyses of the data presented may yield alternate interpretations. Knowing a study's design and methodology, along with other features of the intervention and outcomes, you can use the Centre for Evidence-Based Medicine (CEBM) hierarchy of evidence or the American Academy for Cerebral Palsy and Developmental Medicine (AACPDM) Levels of Evidence Classification to determine the strength of the findings reported in your article. As you read published study reports, look for findings that are relevant to the focus of your practice question.

There are several formats available that may help you to organize results as you review of different outcome studies. Log onto the Child & Family Studies Research Programs Web site and see the template that has been used to summarize information related to different topical areas (http://jeffline.tju.edu/cfsrp/ebp-topics.html). The Occupational Therapy Evidence-Based Practice Research Group at McMaster University in Canada has additional guidelines available to help you learn how to review both qualitative and quantitative research reports. Blank forms that you can use to summarize the important findings are available for downloading. (http://www-fhs.mcmaster.ca/rehab/ebp/)

Applying the Evidence into Practice

Professionals use their knowledge and clinical reasoning to consider the collected facts, data, and other information related to the practice question. The conclusions drawn are then used to inform and guide practice as the provider determines which intervention option is most appropriate in a particular situation. Think back to Sandy's question presented earlier. As a result of her search, she found several articles that discussed specific types of interventions based on sensory integration theory and compared them to other interventions that are typical in many children's education and therapy services. She also received a range of opinions and recommendations in response to her question which she posted on a popular listserve for pediatric therapists.

After considering what she learned from the different types of evidence she collected, Sandy decided not to advocate for the establishment of separate space in the preschool that was dedicated to a specialized environment for therapy activities based on sensory integration theory. Instead, she recommended some new activities for inclusion into the classroom curriculum, along with specific modifications and adaptations to the preschool routines – all based on sensory integration theory and knowledge. She also provided some in-service training to the staff to help them better understand both the positive and negative influence that various sensory experiences and features in the environment can have on a child's participation.

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

43

Incorporating Evidence Into the Evaluation Report

As suggested earlier in this module, a teacher, therapist, child caregiver, or other service provider may incorporate a literature review process into his or her evaluation protocol. Including findings in the written evaluation report is one clear way to apply the evidence and use it to support your practice decisions. As an example of this, excerpts from an evaluation report for a student with Pervasive Developmental Delay are shown below. Current research findings related to use of the Sensory Profile (Dunn, 1999) were incorporated in order to interpret the student's behavior. This report was provided to the IEP team to help them understand the student's behavior and make informed decisions regarding whether occupational therapy as a related service was indicated for the student, and then to plan appropriate intervention approaches. The full citation of the source that provides evidence for the specific recommendation is included, either at the bottom of the page where it's mentioned, or at the end of the report.

"Sensory Profile researchers suggest that information about a child's sensory profile may be most appropriately used to design activities and environments that match a child's sensory needs, rather than to guide interventions designed to change the child to meet the demands of specific environments (Dunn, 1999). Specific adaptations that heighten or dampen sensory events that TJ experiences in school routines and activities may be used to increase his performance when he has trouble balancing between reduced responsiveness and over arousal. The IEP team may include occupational therapy services in TJ's IEP in order to identify these options, devise a plan for their use as needed, and evaluate their impact.

Dunn, W. (1999). The Sensory Profile. San Antonio, TX: The Psychological Corporation.

Incorporating Evidence Into Intervention Planning

Both the "take home messages" and details regarding the intervention procedures that result from a review of pertinent literature are useful to inform practice decisions. The published report informs the reader about whether or not the intervention was effective in a given situation when its implementation and outcomes were systematically documented, reviewed and analyzed. On the other hand, the published report provides information that can be useful when designing a specific intervention and planning how it can be implemented within the child's routines and experiences.

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

44

For example, the article noted below supported the occupational therapist's belief that writing practice is important to help students develop their penmanship skills. In addition, based on the specific procedures reported in the study, the therapist recommended that the teacher alter aspects of the practice assignments given to the students. Rather than have them copy each singular letter numerous times, or write the same word enough times to fill the line across the page, the students wrote random sequences of the letters they were learning, and copied a list of nonsense words made from these letters. This altered approach, using an intermixed, unsystematic sequence of letters, was based on the protocol description that was validated in the study report. As this new strategy was implemented, the students' performance was tracked and measured in order to evaluate whether or not their penmanship skills were increasing.

Ste-Marie, D., Clark S., Findlay, L., & Latimer, A. (2004). High levels of contextual interference enhance handwriting skill acquisition. *Journal of Motor Behavior. 36,*115-26.

Considering Limitations in the Available Evidence Pool

Even a thorough search for research and other published evidence regarding an intervention may not yield results, or the search may lead to reports that are inconclusive regarding the intervention's effect. What happens when the evidence does not support a particular intervention, at least yet? Two questions need to be considered in either of these situations:

1. Does the professional's experience and judgment suggest that a particular intervention is appropriate for a particular child?
2. Are the child's parent and other professionals who are involved with the child interested in determining if the intervention may be helpful?

The Service Provider's Responsibility to Present Evidence to Team Members

Any professional needs to be clear about what outcomes are likely to occur as a result of any particular intervention that is provided to support an individual with a disability. The professional is also responsible for advising the team about what evidence supports his or her decision to recommend an intervention for a specific child or group of children.

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

45

Some interventions lack evidence beyond a professional's clinical opinion to support their usefulness. For example, the use of a particular strategy to teach self-dressing to a toddler or the use of a particular pencil grip to increase the time a student may take notes during a lecture may be based on the professional's previous successful experience with another young child or student who presented similar needs. In this situation, the professional should advise the team that beyond his or her own experience in practice, confirmation related to the effect of the specific intervention with children who have similar needs is not available. The intervention should be implemented with the understanding that its continuation depends on the outcomes that are documented for the particular student receiving the service.
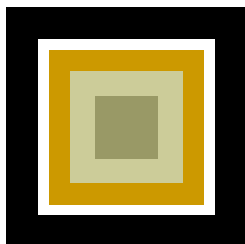
Conclusion

Planning and implementing education and therapy services to support children's participation in home and community activities depends upon information that's collected from a variety of sources. When considering how any information may be used, it's important to know what type of evidence forms the basis for the specific intervention, conclusion or recommendation. When there is interest in an approach that lacks any sound supporting evidence, a provisional or trial period of implementation with careful progress monitoring is an appropriate course of action. This strategy enables the provider to generate evidence regarding the child's performance once the intervention begins. It is important that before the intervention is implemented, the family and other team members are clear about the planned schedule for re-evaluation so that they reconvene to review the effect of the intervention in relation to the targeted outcome. Progress monitoring results are used to inform a team decision regarding the intervention's continuation, modification, or cessation.

American Academy of Cerebral Palsy and Developmental Medicine. (2002). *AACPDM Methodology for developing evidence tables and reviewing treatment outcomes*. Rosemont, IL: Author.

American Occupational Therapy Association. (2000). Occupational Therapy Code of Ethics (2000). *American Journal of Occupational Therapy, 54*, 614-616.

American Physical Therapy Association. (2000). Code of Ethics, Alexandria, VA: Author.

American Speech-Language Therapy Association. (2003). Code of Ethics (revised). ASHA Sup, 23, 13-15.

Beers, M. & Berkow, R. (Eds). (1999). *The Merck Manual of Diagnosis and Therapy*. Whitehorse Station, NJ: Merck & Co., Inc.

Beghetto, R. (2003). Scientifically Based Research. ERIC Digest 167 – April 2003. http://eric.uoregon.edu/publications/digests/digest167.html Retrieved March 17, 2004.

Bury, T. & Mead, J. (1998*). Evidence-based Healthcare: A Practical Guide for Therapists.* Boston: Butterworth-Heinemann.

Bulter, C. & Darrah, J. (2001). Effects of neurodevelopmental treatment (NDT) for cerebral palsy: An AACPDM evidence report. *Developmental Medicine and Child Neurology, 43*, 778-790.

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Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

47
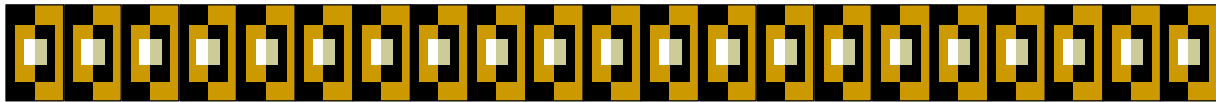
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Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

48

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Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

49

Index

A

B

C

D

E

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

50

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

51

Evidence-based Practice Approaches: Children's Participation in Home and Community Experiences
Child & Family Studies Research Programs—October 2004

52