

System and Cost Research Issues in Treatments for People with Autistic Disorders

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Parents of children with autism and pervasive developmental disorder and educational and clinical practitioners providing services to them regularly confront a wide range of service selection and financial decisions that are not as yet effectively addressed by applied research. Relevant systems issues span a very broad range of concerns: (a) systems delivery models and issues (e.g., costs of services, implementation of intensive intervention, and teacher or therapist training); (b) how best to integrate treatments; (c) providing treatment to those with limited monetary resources; (d) cost and cost/benefit analyses; (e) how to educate adult psychiatrists (as well as other practitioners and personnel) regarding autism; and (f) gaps between research and practice.

KEY WORDS: Autism; cost; service selection; early intensive behavioral intervention.

INTRODUCTION

Systems issues relating to treatment of people with autistic disorders span a very broad range of concerns. Concerns posed at the jointly sponsored research workshop include (a) systems delivery models and issues (e.g., teacher or therapist training); (b) how best to integrate treatments; (c) providing treatment to those with limited monetary resources; (d) cost and cost/benefit analyses; (e) how to educate adult psychiatrists (as well as other practitioners and personnel) regarding autism; and (f) gaps between research and practice. Efforts to address selected aspects of these issues through applied research and development activities include the 1998 National Institutes of Health, multi-institute program announcement PA-98-108 on

autism. This announcement solicits services research on (a) risk assessment; (b) contextual factors (but not mentioning organizational factors); (c) studies of fiscal, policy, or organizational factors affecting access, availability, quality, use, and outcomes of care; (d) effectiveness of interventions delivered in naturalistic settings, especially integrated services that target two or more settings; (e) impact of family involvement upon treatment planning and delivery; and (f) cost-effectiveness of various treatments and service delivery models.

A September 1999 search was performed using the CRISP (Computer Retrieval of Information on Scientific Projects) system. The system disclosed a total of 147 funded projects involving autism that were presently funded by the National Institutes of Health, including six related to fellowships, 2 related to traineeships, and 13 related to various aspects of the initiative for collaborative centers of research excellence in autism. Only a handful of funded, applied projects include applied behavior analysis (ABA) or behavioral and psychosocial assessment or treatment as a key feature. These include funded replication sites stemming from the Young Autism Project at the University of California at Los Angeles, an assessment project, a combined psychiatry/primary care clinic, and a parent intervention project.

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Except for the capacity of these behavioral research projects to address highly selected issues in services research, it appears that few projects broadly address a range of critical issues affecting service availability, quality, and, impact plausibly. In the following sections, selected aspects of key issues are discussed to indicate possible priorities for services research.

SERVICE COSTS—FINANCIAL AND SOCIETAL ISSUES

Cost–benefit analysis is frequently used to advance policy debates, especially when a case can be made for large differences between the costs and benefits of policy alternatives. The fundamental deception of cost–benefit analysis is that in reducing the processes and outcomes of effective therapeutic intervention to financial equivalents, it is too easy to forget that we are talking about value. The price people pay for goods and services varies with scarcity, need, competition, utility, and even sentiment. Relative value has many conditional determinants that are just as strongly influenced by behavioral, cultural, and biological variables as they are by purely economic ones.

How does one, after all, set the price of a bright future? How does one compensate a father for many dark nights spent awake listening to his child seem to suffer? How does one estimate the lost impact in dollars alone of children who will never grow to make artistic, scientific, or humanitarian contributions that would have transformed the lives of others, that would have given concrete expression to their own parents' patient teaching, nurturing, and care?

Behavioral intervention tends to be labor-intensive in terms of its planning and implementation. Labor costs can be very high. Intensive intervention during early childhood places financial burdens and time allocation constraints on young families just when their own economic potential is being realized. Even before treatment begins, families devote extensive time and expense searching for confirmation that something is truly wrong with the affected child, and researching the options available to them.

Life-Span Human Services Expenditures

Polder, Meering, Bonneux, and van der Maas (1999) examined total health care spending in the Netherlands by age, gender, and illness or disability. They reported that mental handicap was the single largest health care cost diagnosis for men, and the sec-

ond most costly diagnosis for women, exceeded only by dementia. Among mental disorders, vastly the most costly group of illnesses, mental retardation accounts for 35%, more than the share taken by alcohol and drug abuse, schizophrenia, and depression together. The life-span societal costs of mental retardation and psychiatric disorders occur during the middle years, from young adulthood through middle age.

In the United States, aggregate costs are difficult to track for a specific diagnosis because eligibility criteria are never completely consistent with disability classification criteria. Nevertheless, mental retardation and mental illness are doubtless having the same large impact on U.S. public social spending. Children with autism have typically remained significantly impaired for life, with a majority functioning intellectually in the mentally retarded range and a significant proportion exhibiting quite severe mental retardation.

What If There Already is an Effective Treatment?

Several credible studies have indicated that early intensive behavioral intervention (EIBI), addressing all deficit skill domains with active treatment of behavioral abnormalities, delivered using the principles and methods of applied behavior analysis (ABA) could result in substantial and sustainable benefit to children with PDD (Anderson, Avery, DiPietro, Edwards, & Christian, 1987; Birnbrauer & Leach), 1993; Fenske, Zalski, Krantz, & McClanahan, 1985; Lovaas, 1987; McEachin, Smith, & Lovaas, 1993; Sheinkopf & Siegel, 1998). In that behavioral intervention is itself an established and well-documented approach (Matson, Benavidez, Compton, Paclwaskyj, & Baglio, 1996), the early delivery, comprehensiveness and intensity of EIBI seem to be the most important determinants of the reported dramatic gains.

Jacobson, Mulick, and Green (1998), developed a cost–benefit analysis model of EIBI based on the range of outcomes reported by Lovaas (1987) and McEachin *et al.* (1993). The costs of services for children and adults with PDD and other economic information are detailed in Jacobson *et al.* (1998). These findings are mirrored and extended in a recent cost–benefit analysis conducted in Canada (Hildebrand, 1999), using similar assumptions to Jacobson *et al.* (1998) and cost assumptions based on financial data provided by the provincial government of British Columbia, in which substantial per capita cost savings were demonstrated from EIBI over the individual's lifetime.

Jacobson *et al.* (1998) assumed that EIBI would result in a range of effects, including normal functioning (20, 30, 40, and 50% were used in the model), partial effects, and minimal effects (for 10% of the children). It can be estimated from this model that the average cost benefit of providing public K–12 education to a normally developing child in Pennsylvania (career income to age 55 minus the cost of education) is about \$1.6 million. Subtracting the estimated cost of EIBI used in Jacobson *et al.*, the net savings for a child with PDD who achieves normal functioning is \$1.5 million. In contrast, the net cost in Pennsylvania of a child who obtains partial effects to age 55 is the cost of services for 52 years less income from supported work, or about \$3.4 million, while the net cost of a child who obtains little or no benefit from EIBI is \$4.4 million. Thus, the net savings for the child who achieves partial effects is roughly \$1 million.

Decision Analysis

Economic forecasts require assumptions about future service expenditures, future service use, and inflation. In addition, the rate of attainment of normal functioning remains unknown and will depend on the actual replicability of the early intervention effect ascribed to EIBI. Meinhold and Mulick (1992) offered a decision model applicable to selecting among risky alternatives when strong individual or social values are at stake and financial costs are important. In that model, information gathering, value statements, and identification of relevant technologies are separated as much as possible until all considerations can be assembled. Nevertheless, this value-driven process moves from deciding that some need requires redress or some situation represents a problem to be solved, to weighing the identified risks of proposed solutions against public perceptions and individual conscience. Meinhold, Mulick, and Teodoro (1994) were guided by the model in an examination of the risks and costs revealed in a case study of one family's legal battle to obtain medically safe aversive behavior modification at school for a severely disabled teenager with life threatening self-injurious behavior. There are sometimes conflicting needs identifiable for the child, the family, and the public agencies serving them.

The child's needs were instructional and related to his ability to remain at home and in his community free of sedating drugs and physical restraint. These needs were shared by his family, but the family also needed to reduce private expenditures on ineffective care, recover confidence in the child's set of services, become

free to pursue vocational and personal goals, and reduce stressful relationships. In contrast, the agencies serving the child and family needed to reduce risks associated with noncompliance with regulatory restrictions on the use of aversive treatment procedures, reduce overall program costs, improve its public relations, and discover an effective way to deal with the destructive behavior. The result was a complex and lengthy due process proceeding, in which the costs of professional services that had led to the recommendation for aversive treatment were dwarfed by the legal and professional service costs. An ultimately ineffective nonaversive treatment was mandated by the court before the decision to provide the requested therapy could again be raised.

One can only imagine the costs to the public agencies of the litigation and its aftermath, but they must have been staggering. Expert witnesses alone, hired to dispute the parents' advisors, cost tens of thousands each both for their testimony and for their services in implementing the failed program they designed (they received a service contract to achieve the benefits they had testified would occur). Legal fees for the district were doubtless more than \$100,000. This grand expenditure of public funds in legal fees and expert testimony to oppose parents is becoming commonplace when parents simply want EIBI services for their child. Some law firms offer annual seminars and a national workshops to school district administrators and school attorneys on how to defend the school from requests to implement ABA programs (Jacobson, in press).

Risk and Cost Comparison

Because there are few or no comparable outcome data to serve as a basis for estimation, there is presently no way to estimate the long-term effects of other forms of early intervention which presently compete with EIBI for public funding, such as developmentally appropriate early intervention, play-based intervention, the TEACCH model, and eclectic service programs of varying intensities and costs. Still, decisions must be made.

Meinhold and Mulick (1992) demonstrated the use of an ordinal method for estimating the risks and costs of controversial behavioral treatment alternatives. They applied an ordinal or estimation model of existing alternatives to parental and public agency bases for decision making about EIBI. The TEACCH model, EIBI, developmentally appropriate preschool, inclusion, and no treatment are examined with respect to risks of

increased symptomatic behavior, learning failure, and social undesirability of placement. Obviously, doing nothing at all is assessed as the most risky alternative for seriously disabled toddlers. Total inclusion (without supports) has high social desirability from a post-modern perspective, but is likely, because of the group and highly social format of regular preschool, to result in increases in symptomatic withdrawal and learning failure due to self-isolation. Developmentally appropriate special education is similar, because children with autism have a disorder that prevents them from learning well from typical environments, but less so because there would be small classes and some direct instruction (e.g., Hallenbeck & Kauffman, 1995). TEACCH is rated somewhat socially undesirable because it represents a categorical service setting, but reduction of symptoms and facilitation of adaptive learning is expected, albeit less so than the EIBI model based on very limited outcome data.

How do the costs line up? The no-treatment alternative is expected to result in increased parenting burden because the child will get worse and stay at home all day. Developmentally appropriate and inclusion services are expected to represent respite for the family with little or no required parent involvement in programming. Both TEACCH and EIBI involve parent participation, a bit less for the former because it more often offers center-based services. In general, front-loaded EIBI costs are expected, on average, to reduce societal costs over the long term. TEACCH may do so as well because the outcomes are matched to a well-established life-span community support system, at least in North Carolina, but without the savings from increased rates of normal function it may yield somewhat smaller long-term savings than EIBI.

Who Pays for Early Intensive Intervention?

Gaddis (1999), a parent from the Northeast, asked this question of a cyberspace community of EIBI advocates (C. Gaddis, personal communication J.A.M.). Parents who participated in this nonrandom but still instructive survey provided the following data. Of 57 respondents, 87.7% used paid EIBI consultants for their ABA programs. Of the 50 who used paid staff, almost three quarters were self-funded. The rest, a rather small minority, represented those who received funding from the school in full or in part, with a still smaller fraction receiving funding from insurance or family and friends. Obviously, well-designed surveys would be useful in determining just how much of the applied Research and Development for EIBI services actually has

been transferred to families and other third parties by our public agencies. To the extent that it has, this represents a serious financial barrier to all but the most affluent families, and is likely to be a problem overly represented among single-parent families and in minority communities. This issue constitutes a possible focus for public policy research.

Manpower on the Frontier of Public Policy

Demand for EIBI services has grown because of an articulate consumer movement. The EIBI service model that we see most frequently is similar to the typical clinical training pyramid which can be recognized in graduate psychology programs at universities all over the country. Undergraduates or bachelors level tutors or therapists are coached and guided by more advanced but still supervised team leaders. Sometimes these program supervisors or consultants have masters degrees. At the top of the pyramid is the program director. Often this director has acquired significant authority and an excellent local reputation among parents who come together to share resources and lobby for public funding by forming support and advocacy groups.

The present situation is akin to a cottage industry. While cottage industries suggest down to earth values and a lack of intimidation for consumers, they have drawbacks. These tend to be costly drawbacks, including the consequences of varying professional supervisory and technical expertise. Most costs are borne by parents and the legions of tutors who deliver the intervention in living rooms, converted spare bedrooms, and basements all over the country. Third-party funding is difficult to secure for nonprofessional providers. Quality control is highly variable. People generally leave cottage industries as soon as a job with benefits becomes available. Cottage industries are particularly vulnerable to competition from inferior but better recognized brand names with established distribution channels.

Using contemporary prevalence rates for autism and PDD, the job categories already mentioned, and median 1998 salary estimates for master and doctoral level personnel, it can be estimated that the current manpower shortage for EIBI providers at all levels is very unlikely to abate soon. The size of the labor market for just the expected 2- to 4-year-olds with autism who need EIBI services in the U.S. population is more than three quarters of a billion dollars consisting of 94,000 tutors, 588 doctoral level program directors, and 2,300 consultants. Currently, actual providers at the mid and higher levels in this very tight labor market

enjoy much more compensation than the median for the relevant degree, the tutors often receive much less. The societal conditions outlined above constitute a call for services research, some of which should include cost analyses.

HOW BEST TO INTEGRATE TREATMENTS

The research area “How best to integrate treatments?” is an excellent example of a services research priority that has not been sufficiently specified as a touchstone for research applications. One might ask, what treatment integration implies. For example, the very posing of this question suggests that there is a firm, empirical, and reliable basis for selecting and combining various psychosocial and professional interventions. It also suggests there is well-demonstrated utility to combined and coordinated medical and behavioral intervention, yet the question of which treatments result in clinically significant outcomes is not well resolved, at least in terms of how it is articulated in the field of administration in the developmental disabilities and educational sectors.

One could speculate that behavioral data on medication effects could improve the quality of pharmacologic intervention or that professionals in teams might coordinate their interventions more effectively than professionals working independently. Although treatment integration benefit appears to be a promising area of research at first glance, without a formulary for assessing the plausibility of increased benefit from integrating particular treatments, priority-setting and selection of target research projects would be serendipitous.

Some guidance is available, from a review conducted by the New York State Department of Health, using procedures established by the Agency for Health Care Policy Research (AHCPR) to identify empirically validated treatments. These procedures were used to assess the research evidence for various early intervention therapies for people with autistic disorders (summarized in Table I, from the Early Intervention Program, 1999). The Early Intervention Program’s review was based on research including children ages birth to 3 years and is applicable, because of the nature of subject samples, to age 6 years. The research literature appears to indicate support for integrating only a very limited number of markedly different interventions or treatments. There are service utilization data that indicate, moreover, that the extent to which preschoolers and primary schoolers with autistic disorders receive nonrecommended treatments, such as

sensory integration therapy, has increased markedly over the past 15 years (Jacobson, 1999). The utility of various treatment strategies for older individuals with autism has not been appraised in a comparable manner, although a large number of applied behavior analytic and behavioral treatments for specific problem behaviors among adolescents and adults with autistic disorders have been reported over the past 20 years (Matson, Benavidez, Compton, Paclwaskyj, & Baglio, 1996; Smith, 1999).

PROVIDING TREATMENT TO THOSE WITH LIMITED MONETARY RESOURCES

Due to the relatively high expense of early intensive behavioral treatment, there are well-justified concerns that children experience difficulty obtaining these services. For schoolchildren with autistic disorders the primary sources of payment for services are (a) local educational agencies, (b) personal health insurance, and (c) Medicaid, in no known order. For younger children and adults, Medicaid is likely to be the primary or major source of payment through (a) fee-for-service Medicaid card services, (b) authorized intensive behavior treatment services, and (c) home- and community-based services waivers. Several states have established Medicaid-funded specialty intensive behavioral intervention services, or have these under development, for example, Idaho, New York, and Wisconsin.

Because states are taking this initiative, the fundamental issues surrounding providing treatment for those who cannot self-pay may involve the impact of rates of reimbursement, within waivers and specialized services, on the feasibility of (a) hiring and maintaining adequately educated and trained assistants to provide direct services, (b) assuring reasonable supervision frequency and span of supervision, and (c) assuring the fiscal and pragmatic capability of preschool and primary school programs to deliver specialized, individualized, and empirically founded services to children with autism.

SYSTEMS DELIVERY MODELS

Probably the service delivery model issues that have been of greatest interest to professionals, managers, and administrators in the public and private sector involve the relative merits of center-based services, home-based services, or services delivered conjointly in centers and homes, including parent-delivered training. School programs are a form of center-based services.

Table I. Strength of Scientific Evidence and Recommended Use of Therapeutic Procedures with Young Children with Autistic Disorders Age Birth–Three Years (Early Intervention Program, 1999)

Therapeutic approach	Strength of scientific evidence
Intensive behavioral and educational programs	Strong ^a
Trials of psychoactive medications for behavior disorders	Strong ^b
Auditory integration therapy	Limited ^c
Touch therapy	Limited ^c
Vitamin therapies	Limited ^c
Antiyeast therapies	No evidence ^c
Developmental, individual difference, relationship (DIR) model	No evidence ^d
Diet therapies	No evidence ^c
Facilitated communication	No evidence ^c
Hormone therapies	No evidence ^c
Immunologic therapies	No evidence ^c
Music therapy	No evidence ^c
Parent training	No evidence ^d
Sensory integration therapy	No evidence ^c

^a Recommended when delivered in a comprehensive, intensive, and continuing manner, or as specific applied behavior analytic interventions

^b Recommended to treat maladaptive behaviors, social withdrawal, or other manifestations of autism . . . only for children with severe or difficult behavior problems, and only if other interventions have not been effective (Early Intervention Program, 1999, p. 169).

^c Not recommended.

^d Recommended selectively (i.e., implementation in conjunction with comprehensive interventions), because selected procedures are consistent with elements of interventions for which there is strong evidence; a recommendation based on panel opinion in the absence of evidence meeting criteria.

Although conceptualization of key concerns about models have probably been drawn to the issue of the nature or range of settings in which services are based or provided, it is quite likely that other organizational features of programs bear a stronger relationship to treatment benefits or outcomes. Good candidates for predictor variables include not only the breadth of intervention across settings, but also the extent and expertise of supervision, the education and preparation of personnel, supervisory methods, and educational methods. Generalized conclusions regarding integrated treatments cannot be presented because quasi-experimental research that could elucidate both the impacts of single versus multiple setting treatment and organizational and personnel effects has not yet been fielded or funded in a suitable form. A structural model for sampling of effects of intervention among multiple provider organizations could employ dimensions of provider type

(university, hospital, local consultant or agency, local educational agency, and remote consultant or agency), service context (center, home, or combined) and staff and parent expertise (a continuous variable). Broad sampling would be required to represent all variations of the model, and would need to employ statistical controls in lieu of random assignment. However, with this type of sampling frame, representation of each major variation in the three elements would entail participation by 30 organizations. Such basic considerations point to the need for involvement of coordinating groups in data collection, and movement to a model uniform data base for systems evaluation in funded medical and behavioral clinical research projects.

EDUCATION OF PROFESSIONALS AND PARAPROFESSIONALS

Although the education of adult psychiatrists regarding autistic disorders is an important issue, professional education about these disorders is a far larger issue. Psychiatrists serving adults constitute a minority of the medical professionals who require familiarity with available nonmedical services, specialty services, community organizations, and specialty practitioners serving people with autistic disorders. Children with autism are more likely to have periodic contact with educators, pediatricians, and psychologists than with psychiatrists (Jacobson, 1999). Adults are less likely to have contact with psychiatrists than with social workers, psychologists, and general or family practitioners. Moreover, there are both outstanding preservice and continuing education needs related to autism, not just for professionals but also for educators and potential paraprofessionals who may work with them.

Psychiatrists are unlikely to be the first-line referral source for specialty community treatment and instructional services, but should be included in training opportunities. Pediatricians, who are likely to be the first-referral sources, have been surveyed about general early intervention referral in several studies (Epps & Kroeker, 1995; Hell & Shishmanian, 1997; Scott, Lingaraju, Kilgo, Kregel, & Lazzari, 1993). These studies have documented desires for knowledge and practice training, specific information about early intervention systems, or specific skills or competencies (e.g., developmental screening), and collaboration or linkages with specialty or intervention providers.

Educating professionals about the findings of intervention research in autistic disorders requires not only publication of findings in clinical practice jour-

nals but also collaborative involvement and development of long-term consultative relationships between community medical and mental health practitioners and autism specialty services. Distance education and consultation offers a possible direction for these activities in rural areas, or areas where there is low practitioner availability. There is a corresponding need to evaluate the effectiveness of long-term consultation and education and training methodologies.

COST-BENEFIT ANALYSIS

Cost analysis is another area where research impact is constrained by a lack of comparative information for individual children or adults, especially assessment information that would permit analysis of the impact of disability characteristics on expenditures. The NIH program announcement mentions cost-benefit (i.e., level of benefit relative to cost) and cost-effectiveness (relative cost-benefit of two or more treatment options or providers) in the context of autism research. Indeed, a key question is whether there are differential outcomes and cost benefits associated with home-based early intensive intervention, with and without provider agency or consultant involvement, and center-based early intensive intervention, with children birth to 3 years, and 4 to 6 years, of age. This is quite a different matter than merely asking whether there are differences in either costs or benefits (Jacobson *et al.*, 1998). To date, relative costs of these two options have not been analyzed with emphasis on (a) level and type of intervention or treatment, and (b) logistical factors that affect timing, pacing, content, staffing, and organizational performance of the two alternatives.

Because state-of-the-art autism services tend to be much more expensive than services to peers with other disabilities, there are numerous econometric and comparative cost analyses that are warranted, aside from benefit and effectiveness. These include (a) cost minimization and cost offset studies (i.e., effects of decreasing costs or increasing income relative to cost); (b) cost utility analysis (i.e., level of benefit per unit of expenditure); (c) cost variation analysis (i.e., case follow-along and variation in individual and subgroup costs); and (d) cost consequences analysis (i.e., opportunity costs, and interactions of cost and operations or the operations environment) (e.g., Beecham, 1999; Broskowski, 1997).

Addressing such issues requires participation not only by multiple agencies, programs, or organizations as research and data solicitation sites but also by fam-

ilies as data sources. As previously mentioned, increased use of quasi-experimental designs (Sobell, 1996) is also necessary as an alternative to controlled experimental designs in order to obtain suitably representative samples and adequate information regarding organizational, social, and individual influences on cost. Although true, prospective experimental designs may be preferable (Smith, 1999), these may simply not prove feasible to implement in order to address all the salient issues in cost analysis, as well as treatment or educational effects.

GAPS BETWEEN RESEARCH AND PRACTICE

While the current generation of funded prospective applied and Centers of Research Excellence basic research projects continues, there is value in looking toward establishing complementary research programs that develop research findings not only from multisite approaches encompassing specialized and hospital- or institute-based research sites but also from mundane service settings. Some relevant recommendations have emerged from within NIMH: (a) "treatment settings must be more diversified to allow for a range of providers"; (b) "outcome measures will need to incorporate domains that are important to . . . policy makers" [and clinicians]; (c) "Research . . . must . . . delineate the factors that account for differences in the actual delivery of . . . treatment in the community" (Norquist, Lebowitz, & Hyman, 1999), (d) and "Randomized, controlled trials have come under attack . . . Effectiveness studies conducted in community clinics with actual patients are championed as an alternative design . . ." (Klein & Smith, 1999).

As a companion activity to these additional avenues of research, a uniform data set (e.g., incorporating Best Practice standard data elements (e.g., Collaborative Work Group on Autistic Spectrum Disorders, 1997) could be instituted in research "clinics," multisite research projects, or model autistic disorder service settings. Collection of key data elements that are consistent across these various research sites would facilitate understanding of services research findings and implications for researchers, clinicians, administrators, and funding agencies alike. Moreover, standardized assessment protocols should include both research diagnostic instruments and measures, such as the Childhood Autism Rating Scale (CARS) or Autism Behavior Checklist (ABC) (Sponheim, 1996), that are widely used in clinical practice and educational settings to facilitate communication and transfer of technology

to applied settings. We remain largely ignorant of service utilization patterns and consequently lack clear definition of the dimensions of public policy issues of availability, accessibility (including timeliness), quality, continuity, and equity as they relate to treatment of children and adults with autism. To support technology transfer, both individual and population service utilization studies are critical, as in other areas of child mental health, including studies that differentiate focused behavioral intervention from more comprehensive behavioral intervention.

A second strategy to expedite technology transfer could involve development and maintenance of Internet web sites on Excellence in Autism Research and Clinical Practice. For example, use of AHCPR standards for empirical evidence as a basis for placing and retaining data and treatment indications on the web site (Early Intervention Program, 1999) could be used. Presently, although there are a handful of authoritative web pages regarding autistic disorders of consistently high quality for mental health practitioners and parents, the information presented on them is circumscribed and of limited value in obtaining specific information on clinical practices and their probable clinical utility.

Strategies to aid technology transfer have also been suggested by Sobell (1996) and are consonant with the approaches already noted. These entail: "(a) involving practitioners in the planning, development, and implementation of clinical trials; (b) allowing for the intervention to be tailored to fit the needs of different community agencies and practitioners; (c) providing ongoing clinical support by the research team; (d) conducting infield training workshops; and (e) making relevant clinical materials readily available to practitioners and community agencies" (p. 316). Overall, the slow pace of technology transfer in dissemination of new knowledge regarding effective therapies in early and later intervention with autistic disorders continues to challenge the effectiveness of everyday service settings, in both specialized and general health and human service situations.

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