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Mary Beth Bruder, Gloria L. Harbin, Kathleen Whitbread, Michael Conn-Powers, Richard Roberts, Carl J. Dunst, Melissa Van Buren, Cindy Mazzarella and Glenn Gabbard

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Establishing Outcomes for Service Coordination:

A Step Toward Evidence-Based Practice

Mary Beth Bruder
University of Connecticut
Gloria L. Harbin
University of North Carolina at Chapel Hill
Kathleen Whitbread
University of Connecticut
Michael Conn-Powers
Indiana University
Richard Roberts
Utah State University
Carl J. Dunst
Orelena Hawks Puckett Institute
Melissa Van Buren
Cindy Mazzarella
University of Connecticut
Glenn Gabbard
University of Massachusetts

The Research and Training Center (RTC) in Service Coordination is a federally funded project charged with carrying out an advanced research program to analyze current, and recommend future, policies and practices for service coordination under Part C of the Individuals with Disabilities Education Act amendments of 1997. One RTC objective was to identify outcomes of service coordination that could be measured to provide evidence for effectiveness. To accomplish this objective, four national studies were implemented with multiple stakeholder groups. The outcomes generated from each of the four studies were then combined and reduced to a set of child and family outcomes that could be measured as evidence of effective service coordination. These outcomes were then embedded in a service coordination logic model to illustrate the complexity of variables contributing to achievement of positive outcomes for families and their children.

There are obvious benefits to integrated, coordinated service delivery models, the most important being an improvement in service delivery to the target population. This occurs as a result of more efficient and effective use of services, providers, and funding streams across agencies (Dinnebeil, Hale, & Rule, 1999; Roberts, Innocenti, & Goetze, 1999; Summers et al., 2001). In addition, collaborative efforts enable parents and service providers to efficiently locate and manage the varied resources, supports, and services required by a family (Dunst & Bruder, 2002). Unfortunately, in analyzing the long history surrounding the concept of service integration, one is struck by its nobility of intent, its tenacity of purpose, and the ineffectiveness of its implementation (Kagan & Neville, 1993).

No one in the field of early intervention would argue that infants and toddlers with disabilities or those at risk for disability often require the combined expertise of numerous personnel, services, and agencies (Bruder, 2005). However, the coordination and integration of these entities is frequently overwhelming. For example, personnel having medical expertise, therapeutic expertise, educational/developmental, and social service expertise traditionally have been involved in the provision of services to infants and young children with disabilities and their families (Bruder & Bologna, 1993). Each of these service providers may represent a different professional discipline, be employed by a different agency, and practice under conflicting philosophical models of service delivery. In fact, at the service level, coordination can be fraught with tension because of the inherent structure of personnel preparation programs and subsequent discipline-specific practices (Bruder, 2005; Kilgo & Bruder, 1997). Equally problematic are those issues confronting

Address: Mary Beth Bruder, University of Connecticut Center on Disabilities, 263 Farmington Ave. – MC 6222, Farmington, CT 06030.

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the states and territories that administer intervention programs, such as funding, target clientele, eligibility criteria, and collaboration (Guralnick, 2001).

To address the service delivery challenges associated with independent programs, agencies, and personnel, Part C of the Individuals with Disabilities Education Act (IDEA) requires that each enrolled family have a service coordinator (C.F.R. §303.302 (a)(1)). The regulations for the law do not designate any one professional to assume this role, although the duties of the service coordinator are defined and include assisting an eligible child and the child's family in receiving the rights, procedural safeguards, and services that are authorized under the state's early intervention program. Service coordinators are responsible for coordinating all services across agency lines and serving as the single point of contact in helping parents to obtain the services and assistance they need (C.F.R. §303.302(b)). Additionally, they are responsible for implementing seven discrete activities (C.F.R. §303.302(d)):

- Coordinating the performance of evaluations and assessments
- Facilitating and participating in the development, review, and evaluation of IFSPs
- Assisting families in identifying available service providers
- Coordinating and monitoring the delivery of available services
- Informing families of the availability of advocacy services
- Coordinating with medical and health providers
- Facilitating the development of a transition plan to preschool services, if appropriate

Although straightforward as described by law, the complexities of service coordination activities across the multiple levels of early intervention (family, service providers, and system administrators) are growing every day. Underlying each of these levels are fiscal challenges facing both families of children with multiple needs and state and local systems of care that are trying to coordinate multiple, shrinking, confusing, and diverse funding streams for service delivery (Akers & Roberts, 1999; McCollum, 2000; Striffler, Perry, & Kates, 1997). This is occurring simultaneously with expanding reforms across systems such as welfare (Knitzer & Kreader, 2004; Robinson & Rosenberg, 2004; Rosman & Knitzer, 2001), childcare (Booth-LaForce & Kelly, 2004), health (American Academy of Pediatrics, 2002; Freund, Boone, Barlow, & Lim, 2005; Nickel, Cooley, McAllister, & Samson-Fang, 2003), and mental health (Knitzer, 2000; Thomasgard & Merrilees, 2004).

Over the years there has been a plethora of recommendations on how to design and implement service coordination for infants and young children and their families (Bruder, 2005; Harbin, McWilliam, & Gallagher, 2000; Jung & Baird, 2003; Park & Turnbull, 2003; Roberts, Rule, & Innocenti, 1998; Romer & Umbreit, 1998). As yet, however, there has not been national consensus on a framework for describing and evaluating the effectiveness of service coordination. The current emphasis on outcomes and evidence-based practices in the field of special education and early intervention services is a timely challenge for service coordination (Harbin, Rous, & McLean, 2005). In particular, this emphasis has focused attention on the need to operationalize and measure service coordination outcomes as one indicator of the effectiveness of early intervention under Part C of IDEA (Bruder, 2005).

BACKGROUND

The Research and Training Center (RTC) in Service Coordination was funded by the Office of Special Education Programs of the U.S. Department of Education to carry out a coordinated, integrated, advanced research program to address current and recommended policies and practices in service coordination under Part C of IDEA. The program included studies examining the status and structure of service coordination, outcomes resulting from service coordination, and practices associated with positive outcomes. All studies were designed to be participatory to ensure that stakeholders from all levels of the early intervention system participated in study design, implementation, and synthesis. The participatory approach presumes that knowledge is socially constructed, contextually grounded, and experience based (Sagor, 1992). This approach also supports the ecological systems theory proposed by Bronfenbrenner (1992), which emphasizes the interaction and interdependence that exists among systems and acknowledges the complexity of such systems (Knapp, 1995). All studies were also designed to provide data that would allow a convergence of perspectives, using both qualitative and quantitative methodology. The design and analysis of studies were aided by a multicultural advisory board that consisted of policymakers, system administrators, service providers, and families.

The first set of studies completed by the center described and examined the status and structure of service coordination in each of the country's 57 states and territories (see Harbin et al., 2004). A key finding was that 47% of states and territories reported variability across the models of service coordination in use. Twenty-seven percent reported using a dedicated model (identifying a person whose sole responsibility was service coordina-

TABLE 1. Focus Group Participants

Setting	Program administrator[a]	Service provider (Indiana)[b]	Service coordinator[c]	Childcare provider[d]	Family[e]	Physician[f]
Rural						
n	32	8	58	17	26	0
%	37	36	40	31	32	0
Suburban						
n	30	6	49	26	28	5
%	35	27	34	48	35	55
Urban						
n	24	8	37	11	26	4
%	28	36	26	20	32	44

[a]*n* = 86. [b]*n* = 22. [c]*n* = 144. [d]*n* = 54. [e]*n* = 80. [f]*n* = 9.

tion), and the remainder of the respondents reported a variety of models within their states and territories. Additional studies addressing this objective found that a majority of family leaders did not have knowledge about the service coordination system in their community or state, nor did a majority of states mandate that service coordinators receive training on service coordination tasks. One study found that when training was available, the mean length of time for training was 2.5 days (Bruder, 2005). This series of studies concluded that current state policies and practices in service coordination do not provide enough clarity and specificity to enable service coordinators to fulfill their job responsibilities and achieve positive outcomes for children and families.

The second series of studies conducted by the RTC identified recommended outcomes of effective service coordination. It was clear from our first set of studies that the field of early intervention did not have consensus on policies, processes, and outcomes of effective service coordination within and across system levels and stakeholders. To address this, we designed a series of studies to identify outcomes that would represent a shared vision of early intervention service coordination outcomes from which practices, processes, and measures could evolve. The following is a synopsis of four studies designed to elicit information through different methodologies across multiple stakeholder groups, which were then compared, combined, and refined by the RTC staff and the advisory board.

STUDY 1: FOCUS GROUPS

RATIONALE

Focus groups have been used in market research for a number of years (Morgan, 1988). More recently, this methodology has expanded to other fields as a tool to gather information. Focus groups can be used either as a method in their own right or as a complement to other methods (Morgan). Focus group benefits include the interaction that occurs between members (Kitzinger, 1995; Morgan & Kreuger, 1993) and the value to participants, in that they are viewed as experts and collaborators with researchers (Goss & Leinbach, 1996). The first study utilized focus group methodology as a way to gather preliminary information on recommended outcomes in service coordination.

PARTICIPANTS

The two samples for this study represented a national group and four state groups. The national sample included families, Part C coordinators, and Interagency Coordinating Council (ICC) chairs, all recruited at a national meeting in Washington, DC. The four states that were used (Connecticut, Indiana, Massachusetts, and North Carolina) differed on their early intervention service coordination model as well as other Part C system variables. Each state sample included families, service coordinators, service providers, program administrators, childcare providers, and physicians, and these participants were recruited from urban, suburban, and rural locations. The data from the states sample are broken down in Table 1.

METHOD

The methodology for focus groups was developed using a combination of the Focused Conversation Method (Stanfield, 2000) and the Workshop Method (Spencer, 1989) created by the Institute of Cultural Affairs. The

Focused Conversation Method is a simple process that enables a conversation to flow from surface-level facts to more in-depth personal beliefs about a topic. A facilitator leads the conversation through a series of questions on four levels:

1 the objective level, which involves questions related to facts;
2. the reflective level, which involves questions that evoke immediate personal reactions;
3. the interpretive level, which is concerned with questions that draw out meaning and values; and
4. the decisional level, which involves questions that enable the group to make a decision about the topic discussed.

The Workshop Method is based on a natural decision-making thought process consisting of five steps: setting the context, brainstorming, categorizing, naming categories, and evaluating the work. The methodology for the focus groups was piloted with four groups of stakeholders recruited at a national early intervention meeting.

The participants in the focus groups were asked to generate outcome statements to the question "If service coordination were of the highest quality for children, families, and systems, how would you know it?" They were asked to record as many ideas as possible on a sheet of paper. They were then asked to write their three clearest ideas on large index cards and to share these ideas with a small group of three to five people. These ideas were placed on a large wall chart, and the entire focus group organized these cards into clusters. The group named each cluster with a three- to four-word title that expressed all the ideas represented in that cluster. For example, Connecticut family focus group participants generated the following list of ideas (outcome indicators) in response to the focus question:

- Families have practical information.
- Families advocate for themselves.
- Families have choices.
- Family participation is increased.

RESULTS

Forty-seven focus groups were held in Connecticut, Massachusetts, Indiana, and North Carolina. Outcomes were reduced to eliminate redundancies, yielding a total of 250 outcomes. Of the final 250 outcomes, 15 were generated across physician groups (*N* = 9), 42 across childcare provider groups (*N* = 54), 64 across program administrator groups (*N* = 86), 19 across service provider groups (*N* = 22), 54 across service coordinator groups (*N* = 144), and 56 across family member groups (*N* = 80).

STUDY 2: DELPHI

RATIONALE

The purpose of Study 2 was to reduce and refine, through use of the Delphi method, the list of service coordination outcomes generated in Study 1. A Delphi approach draws on the collective wisdom and opinion of knowledgeable "experts" who are highly conversant about the topic or issue for which consensus is desired (Dalkey, 1969; Linstone & Turoff, 1975; Moore, 1987; Sackman, 1975). The technique involves a series of "rounds" of data collection in which panel members are polled separately, with each person's opinion having equal weight in the process of reaching consensus. The approach used in this study differed from typical Delphi applications in one important way: The method generally involves a small number of expert respondents; in this study, however, we purposefully included a large number of respondents (all from Study 1) with diverse experience regarding the implementation of service coordination.

PARTICIPANTS

All stakeholders who attended focus groups for Study 1 were recruited for Study 2. Table 2 contains information about those stakeholders who responded to the Delphi questionnaire.

METHOD

Following the completion of focus groups, the outcomes generated by each stakeholder group and each state were used to design surveys. All outcome lists for each stakeholder group had been coded by state, enabling center staff to group outcomes across stakeholders within and across states. Outcomes were listed alphabetically in a column on the left side of the page, with directions appearing across the top instructing respondents to rate the outcomes according to a 5-point scale ranging from *not at all desirable* to *extremely desirable.* Outcome lists were mailed to focus group participants with a cover letter describing the Delphi process, a stamped self-addressed envelope, and instructions to return the survey within 5 working days. Participants were also invited to make any wording changes they deemed necessary to improve the meaning of the outcome.

TABLE 2. Delphi Respondents

Group/state	*n*	% returned	# outcomes rated extremely desirable by 75% or more respondents	# outcomes rated extremely desirable by 65% or more respondents	# outcomes rated above 65%	# outcomes rated above 55%
			Stakeholder group			
Service coordinators	144	48.6	8	10		
Program administrators	87	47.1	10	16		
Families	8	21.2	6	13		
Childcare providers	54	29.6	2	6		
Service providers	22	63.6	0	2		
Physicians	9	66.6	1	2		
			State			
Connecticut	81	41.9			3	11
Indiana	115	44.3			2	9
Massachusetts	92	47.8			4	9
North Carolina	104	46.1			10	22

RESULTS

The first round of Delphi responses resulted in a 46% return rate. Frequency distributions were generated for all survey returns. Two research assistants then identified outcomes that 55% of the respondents chose as *extremely desirable*. These were reviewed for discrepancies by the project coordinator. The remaining outcomes were alphabetized, redundancies eliminated, and a list of 75 outcomes formatted into a Delphi survey for Round 2. These 75 outcomes represented 6 outcomes from the physicians' group, 11 from childcare providers, 22 from program administrators, 4 from service providers, 14 from service coordinators, and 18 from families.

The Round 2 survey contained a reduced Likert scale of three choices: *not at all desirable, somewhat desirable,* and *extremely desirable*. Participants received the final Round 1 list of outcomes that was unique to their stakeholder group. The data reduction procedure for Round 2 was the same as for Round 1, with a change in criteria to identify the outcomes that 75% of the respondents chose as *extremely desirable* to refine the list. The top six outcomes for stakeholder groups and top six outcomes for states were prepared for review. Comparison charts listing the type of Delphi (state or stakeholder), the number distributed, percentage returned, number of outcomes over 65% (for states only), and number of outcomes over 75% (for stakeholders) were also prepared. Two independent coders then reviewed lists to eliminate redundant items and combine similar items. Eighty percent accuracy between raters was achieved. Each list (combined state outcomes and combined stakeholder) was then reviewed by RTC investigators and staff to further combine similar outcomes and delete redundancies. The final list of outcomes generated from the Delphi survey follow:

- Children reach their full potential.
- Children are healthy.
- Children's development is enhanced.
- Children have successful transitions.
- Families are involved in decision-making.
- Families are informed about resources and services.
- People work together as a team.

STUDY 3: NATIONAL SURVEY

Survey methodology was used to gather information from a large number of stakeholders across the country. To further quantify the desired outcomes of service coordination, a national survey of early intervention program administrators, providers, and parents was conducted (see Dunst & Bruder, 2002). Participants were recruited from mailing lists of Part C programs in all states. Study respondents were 879 early intervention program practitioners and directors (59%) and parents of children with disabilities (41%) in 48 states. Providers and parents were an average of 38.12 (*SD* = 9.00) and 34.38 (*SD* = 7.70) years of age, respectively. The average years of formal schooling completed by the providers and parents, respectively, was 16.81 (*SD* = 1.30) and 14.89 (*SD* = 2.21). Providers were older ($t = 6.34$) and had completed more years of formal schooling ($t = 16.01$, $df = 878$, $p < .0001$, $ES = .97$) than the parents.

METHOD

The three main sections of the questionnaire included definitions of service coordination, early intervention, and natural environments and asked the participants to indicate from a list of 69 possible outcomes (derived from Study 1) the 10 outcomes they considered to be the most important benefits of each Part C activity. (See Dunst & Bruder, 2002, for the method used for data reduction.)

RESULTS

Two summary scores were calculated for each outcome category. The first was the total number of items within categories that a respondent indicated was a desired benefit or outcome for each Part C activity. The second was the standardized scores for the summated measures for service coordination, early intervention, and natural environments for each outcome category. Standardized scores for each outcome category were calculated by aggregating the scores for the three Part C activities (service coordination, early intervention, and natural environments), producing a combined score having a mean of zero and standard deviation equal to one, and disaggregating the combined measures to obtain a score for each Part C activity. Five categories were identified as beneficial outcomes of service coordination: systems coordination, information and referral, family support and resources, family-centered practices, and teaming.

STUDY 4: FAMILY/SERVICE COORDINATOR INTERVIEWS

RATIONALE

The fourth study utilized a variation of case study methodology (Yin, 1994) to record and analyze individual family experiences and outcomes as a result of service coordination. Interviews were chosen as a means of data collection because of the rich detail that can be generated by allowing others to share their stories (Patton, 1990).

PARTICIPANTS

Participants for this study consisted of 100 family members who had a child enrolled in an early intervention program in one of the four focal states (Connecticut, Indiana, North Carolina, Massachusetts [CT, IN, NC, MA]) and each family's early intervention service coordinator. Families were recruited according to specific guidelines to ensure that a representative cross-section was obtained. A recruitment grid listing each of the family and child demographic variables desired for participation in this study was sent to project staff in each of the focal states. Efforts were made to achieve a balance across each state based on demographics, including ethnicity (Black, Latino, White, Asian/Middle Eastern/Other); child's level of intellectual functioning using existing assessment scores (*mild* = between 1 and 2 standard deviations below the mean of the testing instrument used; *moderate* = between 2 and 3 standard deviations below the mean of the testing instrument used; *severe* = between 3 and 4 standard deviations below the mean of the testing instrument used); child's age; family location (rural, suburban, urban); and socioeconomic status (low income, not low income).

Data from 80 families were included in the final analysis. Table 3 contains background information on these families in regard to ethnicity, age, needs, and locale. Of the 80 families, 40% lived in urban areas, 36% lived in suburban areas, and 24% lived in rural areas. The majority of the families were White (42%), 24% were Black, 12% were Latino, and 21% were listed as Asian/Middle Eastern/Other. Approximately 42% of the families were from low-income households and 57% from non–low-income households based on parental report. The children with disabilities were categorized according to three age groups: 0 to 1 year (31%), 1 to 2 years (31%), and 2 to 3 years (37%). Children were also categorized according to the severity of their needs. Of the 80 families, 44% had children categorized as having mild needs, 31% had children with moderate needs, and 25% had children with severe needs.

In each of the four focal states, some of the service coordinators served more than one family in the study, making the number of service coordinators ($n = 65$) smaller than the number of families ($n = 80$). Of the service coordinators participating in this study, 41% worked part time and 58% worked full time. The majority of service coordinators had 1.1 to 5 years of experi-

TABLE 3. Family Characteristics

		Child age and needs								
		Less than 1 year			1–2 years			2–3 years		
Ethnicity	**Setting**	**Mild**	**Moderate**	**Severe**	**Mild**	**Moderate**	**Severe**	**Mild**	**Moderate**	**Severe**
Black	Urban	1-IN	1-CT 1-IN	1-CT 1-CT	1-NC	2-IN		1-NC	1-CT 1-MA	
	Rural	1-IN			2-NC	1-NC				
	Suburban		1-IN					2-NC		
Latino	Urban			1-MA				1-MA	1-MA	1-MA
	Rural			1-NC						
	Suburban		1-CT 1-IN		1-IN 1-CT			1-CT		1-CT
White	Urban	1-IN	1-MA 1-IN	1-MA		1-MA	1-MA	1-IN 1-MA	1-CT	1-MA
	Rural	1-IN		1-IN	1-IN 1-NC	1-IN	1-CT	1-NC	1-IN	1-IN 1-CT
	Suburban	1-NC	1-CT 2-IN	1-MA 1-NC	1-CT 1-MA	1-IN	1-IN	1-IN	1-CT	1-MA 1-IN
Asian/ Middle Eastern/ Other	Urban	1-IN			1-NC 1-MA			1-CT 1-MA	1-NC 1-MA	
	Rural	1-NC					1-NC	1-MA		
	Suburban	1-NC 1-MA			1-MA	1-NC	1-NC	1-MA	1-MA	

Note. IN = Indiana; CT = Connecticut; NC = North Carolina; MA = Massachusetts.

ence (45%), 26% had 5.1 to 10 years of experience, 18% had less than 1 year of experience, and only 5% had more than 15 years of experience.

METHOD

The interview process was designed to gain input from families and service coordinators about their experiences with early intervention and service coordination, in particular, to (a) identify outcomes of effective service coordination, (b) measure the outcomes of effective service coordination as perceived by families, and (c) identify and measure practices that lead to effective service coordination outcomes.

The RTC investigators developed an interview protocol that was piloted, revised, and practiced by nine interviewers (all research assistants or graduate students) in June 2001 and early July 2001. These staff members were trained in the protocol and data collection procedures for the family and service coordinator interviews via a 2-day training session in Connecticut. The interview staff members were taken through the entire process step by step for both the family and service coordinator interviews. This included the purpose of the project, confidentiality procedures and signing of all appropriate forms, explanation of the interview process, and the actual interview. Each interviewer engaged in role playing by using the interview protocol. RTC staff members provided feedback on interview techniques and procedures. Staff also used the mock interview to practice how to fill out the appropriate information on the data collection forms. Families were recruited through the state system of early intervention in each of the four states, and the RTC office in Connecticut mailed packets of the interview protocols, which included an introductory letter, the interview forms, and a self-addressed return envelope, to families who agreed to participate in the study.

The protocol was structured and began by describing the family's concept of service coordination and then asking the parents to describe their family, their child, their experience with early intervention, and the status of services being provided. The interviewer, during the course of listening to the family's story, identified outcomes that were described by the family during the interview as being attributed to the function of service coordination. At the conclusion of the story, the interviewer asked a variety of specific questions about each identified service coordination outcome to elicit information about

- the importance of the outcome,
- who assisted the family in achieving the outcome,
- how service coordination helped achieve the outcome,
- what specific tasks the service coordinators performed to achieve the outcome, and
- how long it took to achieve the outcome.

In addition to interviewing families, project staff interviewed each family's service coordinator by phone. A protocol was developed that included questions regarding the service coordinator's training, supervision, and work activities. In addition, the following questions were included:

1. Please take a moment to think about the ____________ family. If you were to ask this family what outcomes are important to them, what do you think they would say?
2. [For each of the outcomes that the service coordinator identifies, respond with:] "You said that ____________________ was an important outcome for the family." How close is the family to reaching that outcome?
3. Who on the team helped reach that outcome?
4. How did service coordination help the family reach that outcome?
5. Did anything else happen that helped the family reach that outcome?
6. How long did it take to accomplish that outcome?
7. If service coordination were working its absolute best for this family, how would you know it?

All interviews with family members were conducted in a location the family identified as being convenient. At the time of the interview, families were asked to give written informed consent to (a) conduct the interview, (b) obtain a copy of their child's most recent Individualized Family Service Plan (IFSP), and (c) contact and interview their service coordinator. Families were given a copy of the interview guide prior to the interview. In addition to documenting key points on a data-recording form, project staff audiotaped each interview to provide accuracy during data analysis. Member checks were completed at the end of each interview to ensure the researchers captured the true intent of what families communicated.

Upon completion of the family interviews, project staff called each family's early intervention service coordinator to request a copy of the child's most recent IFSP and to request a time to conduct a telephone interview with the service coordinator. Telephone interviews were scheduled at times convenient for the service coordinators. Each interview was audiotaped, and the researcher documented critical information regarding outcomes and practices of service coordination on a data-recording form.

A reliability check was conducted on a randomly selected sample of 20% of tapes from the initial 100 interviews. From the transcribed interviews, the trained researcher denoted outcomes, who helped to achieve those outcomes, and the practices used to achieve the outcomes. A comparison of data sets extracted from the interviewer and those of the project researcher was performed and demonstrated 81.6% correspondence between interviewer and researcher. Project staff elected to transcribe all 80 interviews and analyze data from the transcriptions only. Reliability checks were then completed on 100% of the initial family and service coordinator interviews.

RESULTS

Of the 100 families who were recruited and interviewed, 20 of the interview tapes did not yield enough data for analysis or the tape was not audible, yielding a total participation of 80 families and their early intervention service coordinator. Once all credible interview transcripts were complete, RTC staff began the process of reducing the data (Li, Marquart, & Zercher, 2000) into meaningful data sets. Figure 1 shows the process used for data reduction. Statements pertaining to outcomes families hoped to achieve as a result of early intervention, persons responsible for addressing those outcomes, and the practices they used were extracted from the transcriptions and organized into a master database of outcomes, practices, and persons who helped. Project staff independently coded the family interview outcome data separately from the service coordinator interview data. Outcome statements were coded to consensus, with the project coordinator and the data manager conducting reliability checks on 100% of the coded outcomes. Family interview data were compared to service coordinator interview data to determine the level of agreement between families and service coordinators on key issues related to service coordination outcomes. The individual outcomes generated from interviews with family members and outcome responses from service coordinators were further analyzed by sorting the individual outcomes and creating themes that encompassed the meaning of like-outcome statements. Two independent research assistants who were not involved with the previous Delphi outcome coding sorted the family interview outcomes into themed categories. Likewise, two different independent research assistants sorted outcomes identified by service coordinators into themed categories. The themes were tested and refined through recursive review to ensure category independence. Coding to consensus and reliability checks were completed for 100% of the interview data for families and service coordinators. Reliability was also completed for 100% of data entry for both family and service coordinator data. One of the project investigators and the project coordinator reviewed the list of categories and collapsed similar themes to generate a list of 14 family and 13 service coordinator interview outcome themes.

The principal investigator for the project, the project coordinator, and three project staff members resorted the family and service coordinator outcomes to see if they fit the themed outcome categories. The second sorting yielded additional outcome categories, for a total of 16 family outcome categories and 14 service coordinator outcome categories. Frequencies and percentages for all of the categories were calculated and rank-ordered to compare the family and service coordinator outcomes. The investigator and project coordinator collapsed outcome categories with less than 5% frequency into other categories that reflected similar content, for a final listing of eight themed categories, which were the same for both family outcomes and service coordinator outcomes. A state-by-state comparison of the eight outcome categories was conducted for further analysis. This process resulted in the following final interview outcomes:

- Families make informed decisions about services and opportunities in the community for their children with a disability.
- Families acquire and/or maintain a quality of life that enhances their well-being.
- Families are self-sufficient.
- Families are knowledgeable of their child's disability.
- Children's development is enhanced.
- Children are safe and healthy.
- Children will have successful transitions.
- Children and families receive early intervention services that are individualized, coordinated, and effective

A CONVERGENCE OF RECOMMENDED OUTCOMES

Data reduction across the four studies suggested a convergence of independent outcome statements that could be attributed to the effective implementation of service coordination activities under Part C. A final refinement and reduction of all of the outcomes generated from the four studies was completed by the RTC advisory board (15 members representing families, service coordinators, and state-level administrators of service coordination) and RTC investigators. Some outcome statements were combined and some deleted (e.g., transition, because it is a service coordination activity), and these outcomes were ordered logically in a sequential model to provide a concise framework for measuring the success of service coordination (see Figure 2).

DISCUSSION

These outcome-generating studies in service coordination support the ecological framework of Bronfenbrenner (1993). This framework requires that attention be given to the multiple characteristics of a service system and to the interactions and interdependence among them. For example, a child and the child's family exist within a series of complex contexts, such as their history, values, culture, ethnicity, structure, home routines and community activities, child disability, child age, economic status, and geographic location. Likewise, service providers and coordinators possess attitudes, values, knowledge (of resources and recommended practices), previous experiences, and training and skills, and they bring these to the service coordination role. Service coordination is also influenced by the existing system infrastructure. The infrastructure is made up of multiple organizations, agencies, and programs—and such associated variables as funding, personnel, caseload, and service structure, which may be unique to each entity. Last, families, service providers, and service system infrastructure are embedded within community contexts, all combining to influence not only the nature of service coordination but the consequent outcomes as well.

The number and complexity of the variables involved in service coordination challenge early intervention systems intent on measuring the effectiveness of service coordination. The outcomes that were generated in this study must be considered within this complexity. To delineate the multiple variables that interact to produce such outcomes, RTC investigators developed a logic model to illustrate these relationships (see Figure 2).

Logic models have been described as providing a picture of how something works as they provide a link to outcomes (both short- and long-term) from program vari-

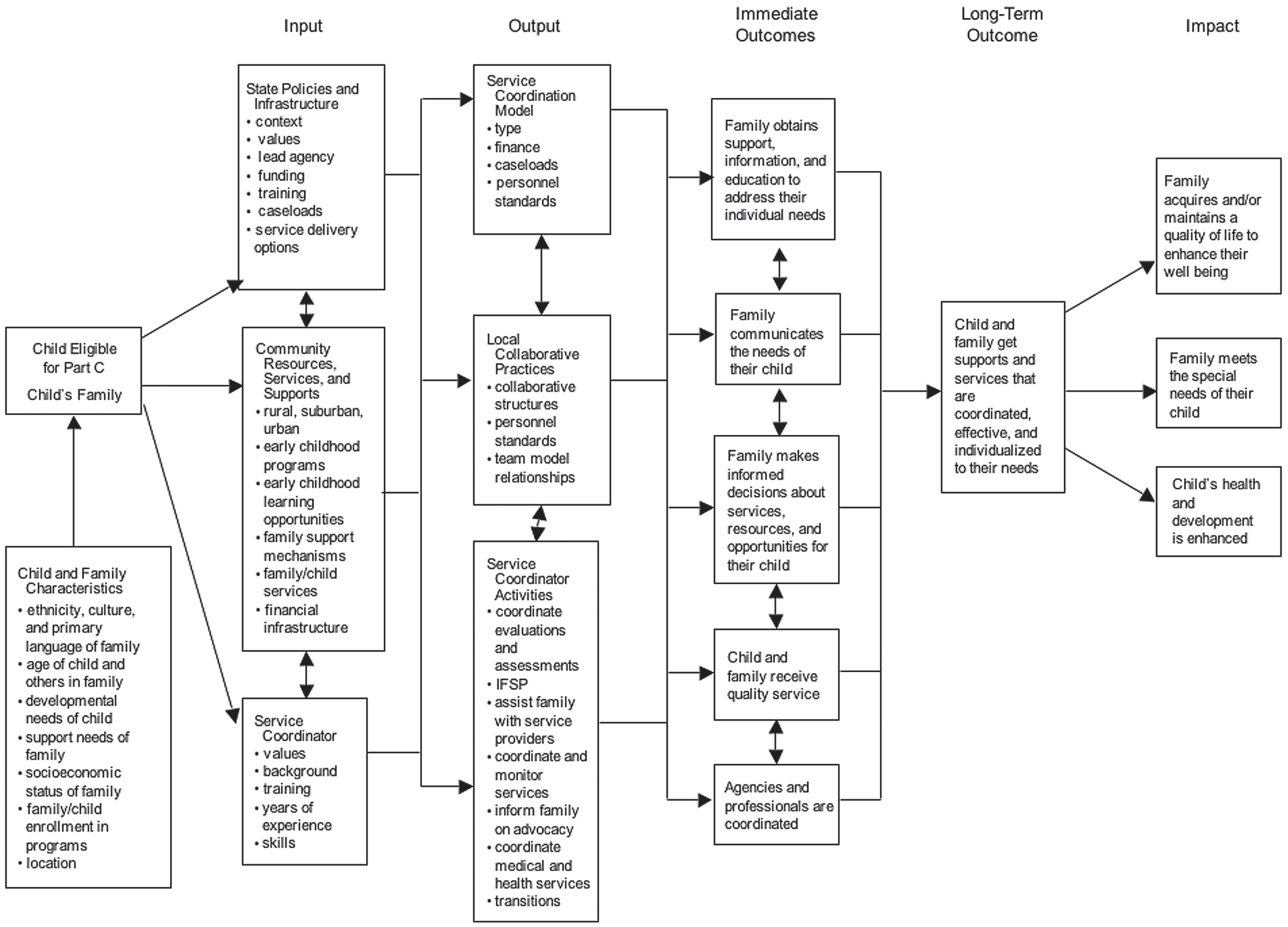

FIGURE 1. Data reduction protocol.

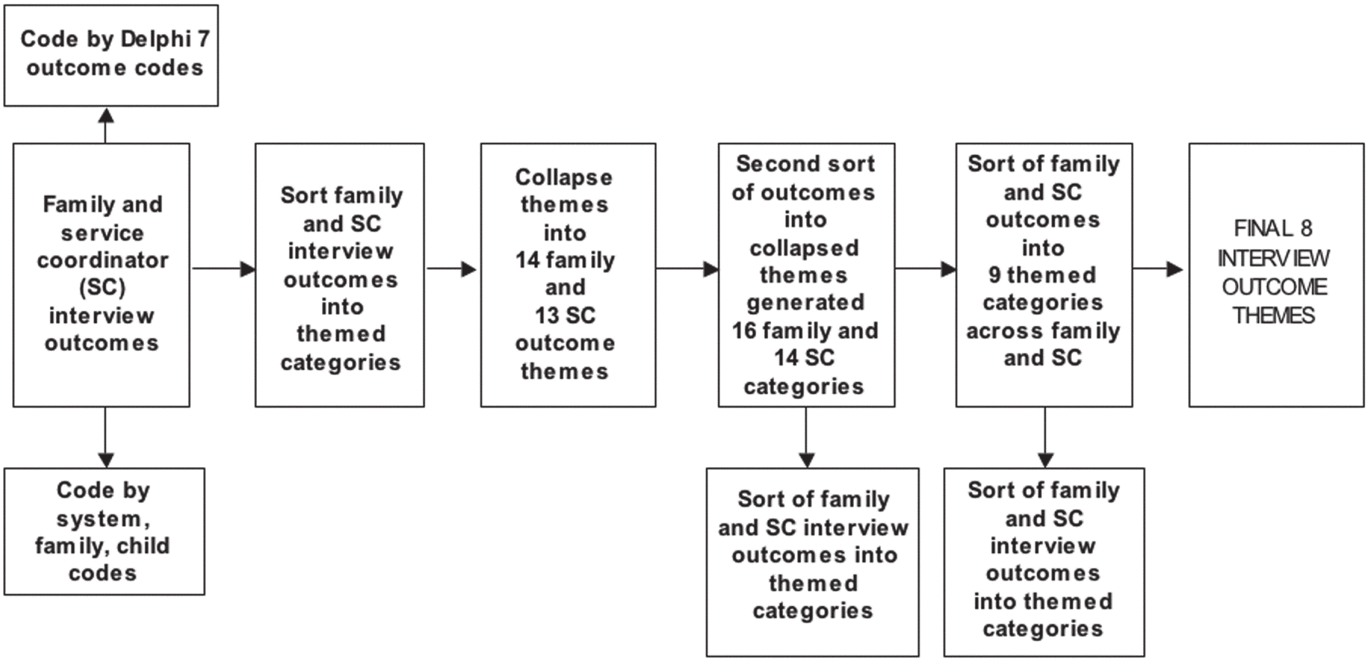

FIGURE 2. Logic model for service coordination.

ables and processes (W. K. Kellogg Foundation, 2001, p. iii). Logic models are being used increasingly to help program developers and evaluators account for the complexity of systems, especially human service systems. There have been a number of examples in early childhood evaluation (Gilliam & Leiter, 2003), although none thus far developed for service coordination under Part C.

The proposed service coordination logic model attempts to describe service coordination variables and community and state contexts that contribute to child and family outcomes. These series of studies demonstrate the necessity of using such a model to conduct future research on the variables associated with the achievement of positive child and family outcomes as a result of service coordination.

CONCLUSION

The outcomes in this article have been generated to describe and measure the effectiveness of service coordination. Of most importance to the field is the fact that outcomes were generated and analyzed across multiple systems using multiple stakeholders and multiple methodologies. These results contribute to a vision that places service coordination in the context of early intervention service delivery. However, future studies are needed to explicitly test the proposed logic model in regard to various system components as represented by service coordination activities and effective practices (Dunst & Bruder, 2002; Guralnick, 2002). These studies would contribute to an understanding of the interrelationship of state models, local contexts, service coordination practices, and family characteristics that interact to produce positive outcomes for all participating in Part C of IDEA. ◆

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