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ABSTRACT

This final report describes activities and accomplishments of the NICU Follow-Through Project, a 3-year project designed to help hospital neonatal intensive care units (NICUs) and community developmental centers serving infants with disabilities or very low birth weights (VLBW) replicate the project's innovative and successful training components. The model provided training to medical and early intervention professionals in 18 outreach communities within 10 states. Program accomplishments included: (1) assisted medical and early intervention professionals to train and facilitate parents in supporting their VLBW infants with severe disabilities while engaging them in caregiving activities and social interactions; (2) assisted medical and intervention professionals to interpret the neurobehavioral cues expressed by these infants and to respond in an appropriate contingent manner during caregiving, assessment, or intervention sessions; (3) assisted medical and early intervention professionals to implement a comprehensive interagency coordinated service plan for VLBW/severely disabled infants and their families; and (4) trained medical/educational professionals to become trainers of a neurobehavioral assessment. Individual sections of this report describe the project's goal and objectives, outreach training communities, implementation of objectives, evaluation of training programs, and products. Eight appendices provide additional information and materials such as training materials for team building, naturalistic observation of newborn behavior, infant behavioral assessment, and examples of action plans. (Contains 73 references.) (DB)

The NICU Follow-Through Project

FINAL REPORT

Early Education Program for Children With Disabilities

U.S. Department of Education

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ABSTRACT

NICU FOLLOW-THROUGH PROJECT
Early Education Program for Children with Disabilities

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The NICU Follow-Through Project will help hospital neonatal intensive care units (NICUs) and community developmental centers replicate the model's innovative and successful training components. The NICU Follow-Through Project includes the following four components and associated objectives:

A. Provide neurobehavioral training to hospital NICU and developmental center staff focused on supporting the neurophysiological organizational capacity of the very low birthweight/disabled infant population.

1. Train NICU staff to assess infants' behavioral cues utilizing the Naturalistic Observation of Newborn Behavior (NONB), and provide appropriate neurobehavioral caregiving.

2. Train Developmental center staff to assess infants' behavioral cues utilizing the Infant Behavioral Assessment (IBA), and provide appropriate neurobehavioral intervention.

B. Help staff at hospital NICUs and community developmental centers develop and implement a comprehensive transition and intervention plan for very low birthweight/disabled infants and their families.

1. Assist hospital NICU and developmental center staff to develop and implement a Transition Action Plan to better serve very low birthweight/disabled infants and their families.

2. Assist hospital NICU and developmental center staff to develop and implement a Neurobehavioral Action Plan for caregiving and intervention.

C. Train a professional, previously certified in the administration of the IBA, to become an IBA instructor.

D. Evaluate trainee attainment of competence, providing technical assistance as necessary.

The result will be a comprehensive hospital-to-home transition plan for a continuum of services for the family and infant during this most critical transition phase. Parents will benefit from more informed participation in the transition process as well as learning to respect and support the neurophysiological integrity of their infant. The very low birthweight/disabled infant population will benefit indirectly from improved services through increased agency cooperation and neurobehavioral training received by both hospital NICU and developmental center staff in the neurobehavioral components of this model. The hospital NICU and developmental center staff will benefit from the development and/or refinement of interagency cooperation thus ensuring possibilities for future agency collaborations, as well as learning to provide appropriate neurobehavioral support to these fragile infants during a caregiving or intervention session.

NICU Follow-Through Project

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Final Report

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I. THEORETICAL AND CONCEPTUAL FRAMEWORK

Low Birthweight: Incidence and Sequelae--Research Findings

Advances in neonatal intensive care technology permit many more infants born with very low birthweight or severe disabilities to survive and return home with their parents than ever before. In the United States, about 7% of all infants are born weighing less than 2,500 grams each year. In 1988, 247,668 infants were born weighing less than 2,500 grams, and 43,161 weighed less than 1,500 grams (Hack, Horbar, Mallooy, Tyson, Wright, & Wright, 1991). Since 1985, further refinements in obstetric and neonatal care have dramatically reduced mortality for very low birthweight infants (VLBW) (1001-1500 grams). These infants are reported to have an 80-90% chance of survival (Office of Technology, 1987). Current survival rates of infants born at extremely low birthweight (501-1000 grams) are described to be 49-52% (Bennett, 1988; Hack, et. al., 1991).

The decrease in mortality rates, however, are associated with an increased prevalence of children with poor long-term neuro-developmental outcomes related to low birthweight (Bennett, 1984; Collin, Halsey, & Anderson, 1991; Grunau, 1986). Serious disabilities associated with this population are: cerebral palsy, mental retardation, sensorineural hearing loss, and visual impairment, often in combination. Bennett (1987a) estimates that approximately 20% of preterm VLBW (1,000-1,500 grams) infants suffer one or more of these major handicapping conditions. For infants under 1,000 grams the incidence increases to approximately 30--40% (Bennett, 1987a; Klein, Hack, Gallagher, & Fanaroff, 1985; Knobloch, Malone, et al., 1982). As with serious disabilities, the prevalence of mild disabilities (e.g., borderline intelligence [IQ 70-84], gross/fine motor milestone delays, communication disorders, temperament difficulties) increases with decreasing birth weight and gestational age. Current estimates of mild handicaps in VLBW infants vary between 15% and 25% (Bennett, 1987b). The incidence of major and minor handicapping conditions existing in the VLBW infant population totals 35--45%, demonstrating a residual, neuro-developmental problem that compromises their age expected function (Saigal et al., 1982). Longitudinal studies of premature very low birthweight infants, indicate that this population has an increased risk of school dysfunction (Marlow, D'Souza, & Chiswick, 1987; Saigal, Szatmari, Rosenbaum, Campbell, & King, 1990); the risk for VLBW is estimated at nearly 50% (Bennett, 1987a). Approximately 65% of infants under 1,000 grams experience school problems, with particular difficulties in reading comprehension, mathematics, perceptual skills, and fine motor balance and coordination (Nickel, Bennett, & Lamson, 1982; Sell, 1986).

Hunt, Cooper and Tooley (1988) found that 50% of children born with VLBW had mild disabilities at 8 and 11 years of age and almost 11% had moderate to severe problems. The incidence increases for infants with significant neonatal illness who come from homes of low parent education and poor social milieu. Hunt et al. (1988) reported that 81% of these children had some mild problem and approximately 55% had some moderate to severe problem. Escalona (1984) labeled these children as being at "double hazard" for poor developmental outcome, as a result of both biological and environmental interference. However, even in homes with high parent education, a significant neonatal illness takes a major long-term toll, with 81% of infants showing at least mild problems and almost 10% showing moderate to severe problems (Escalona, 1984).

More recently, in a school-age follow-up study, Hack, Taylor, Klien, Eiben, Schatschneider, and Merucuri-Minich (1994) found that infants born with birthweights under 750 grams were at high risk for neurobehavioral dysfunction and poor school performance. These children were significantly impaired with respect to cognitive ability, psychomotor skills, and academic achievement. They had poorer social skills and adaptive behavior and more behavioral and attention problems.

Infant Characteristics

Many VLBW infants or infants born with severe disabilities are difficult babies during the neonatal period and for months after arriving home. Once discharged from the hospital neonatal intensive care unit (NICU), these infants continue to lack a well organized central nervous system which results in less control of sleep, arousal, alerting, attention, fussing, and feeding. Consequently, these infants behave in unexpected and often frustrating patterns for the first three to six months after homecoming (Gorski, 1984). These infants exhibit less attentiveness (Field, 1977; Goldberg, Brachfeld, & DiVitto, 1980), less game playing (Field, 1979a), less smiling and positive affect (Field, 1979b), greater fussiness and irritability (DiVitto & Goldberg, 1979; Elmer & Gregg, 1967), and are verbally inactive and avert their gaze during early social interactions (Brown et al., 1980; Brown & Bakeman, 1979; Goldberg et al., 1980; Hedlund & Tatarka, 1991b). Because many of the VLBW infants diagnosed with severe disabilities or at-risk lack the physiological control to respond to stimuli appropriately or predictably, they are unable to provide the internal feedback that normally reinforces the infant to progress to higher developmental tasks (Beckwith & Cohen, 1980; Beckwith et al., 1976). These infants also fail to provide predictable, clear behavioral cues that assist parents to respond in a manner that will produce organized and contingent responses in their baby. When the infant is born with very low birthweight or a severe disability, parents face the difficulty of caring for a child with frequent feeding and sleeping difficulties (Campbell, 1989; Schaffer, 1984), of interpreting confusing signals or lack of signals, and of overcoming their own grief and lack of confidence to care for a fragile infant. As these children often cannot give their parents clear behavioral cues that are easy to interpret and respond to, the lack of clear cues may in turn have a deleterious effect upon their caregivers (Als, 1992; Hedlund, 1989a).

The long-term implication of infant behavioral characteristics has been demonstrated in longitudinal studies that show the persistence of neurobehavioral disorganization in infants who are VLBW beyond early childhood (Als,1988, 1994; Barnard et al., 1984; Field, 1983, 1984). Jones (1977) observed similar continuities in behavior with prelinguistic children with Down syndrome. In observations of infants with disabilities, Kogan (1980) found aberrant parent-child interactions persisting into preschool age. Crawley and Spiker (1983) found correlations between cognition and infants' social responsiveness, social initiative, and play maturity at 2 years of age.

Parental Response to the Infant

Parents need help in learning how to cope with their VLBW/severely disabled infant's disorganized behaviors and lack of clear signals. While caregivers are naturally imbued with a desire for reciprocal, contingent interaction and seem to be biologically programmed for normal newborn behavior (Als et al., 1992), these infants pose many problems. A substantial body of research suggests that parents of these infants show continuing anxiety and low confidence in their caregiving competence, at least during the first year of their infants' lives. These parental concerns are thought to be related to specific interaction patterns that have been observed between these infants and their caregivers. Infants born with very low birthweight or severe disabilities have problems with information processing and are therefore easily disorganized in their overall behavior (Als, 1992). Parents of these infants may be frustrated or feel tremendous guilt in response to the infant's disorganized behavior (Gorski, Davison, & Brazelton, 1979), may be frightened by the great sensitivity of the infant (Als et al., 1988), may be hesitant to interact with their fragile infant (Minde, Whitelaw, Brown, & Fitzhardinge, 1983), or may often experience emotional , physical, and financial stresses which place the infants at high risk for child abuse and neglect (Egeland & Sroufe, 1981; Frodi, Lamb, Leavitt, Donovan, Neff, & Sherry, 1978; Stern & Hildebrandt, 1984). Field (1983) observed that parents may need to work harder to generate smiles, attention and contented vocalizations. However, the parents' efforts were often counterproductive and frequently elicited stress in their infants. Parents must learn to sublimate the natural

tendency to "try harder" when the infant demonstrates a hypoactive or inappropriate response to their stimulation (Barnard & Kelley, 1990). An infant's poor responsiveness, difficult temperament and diminished adaptability have been found to contribute to parental levels of stress (Bendell, Goldberg, Urbano, Urbano, & Bauer, 1987), even more so than an altered rate of development (Beckman, Thiele, Pokorni, & Balzer-Martin, 1986).

The impact of the infant's behaviors upon the parent, as well as the parent's sensitivity to reading the infant's cues, has received increased attention in the literature. Research in the 1970s and 1980s on infant-parent interaction and its relation to infant development revealed the central role of parents' responsiveness to infant signals in mediating infant cognitive and linguistic development, as well as infant sociability (Ainsworth & Bell, 1974; Ainsworth, Bell, & Stayton, 1974; Bretherton & Walters, 1986; Cohen & Parmelee, 1983; Greenburg & Crnic, 1988; Heinicke, Beckwith, & Thompson 1988; Holdgrapher & Dunst, 1986; Piaget & Inhelder, 1969; Simeonsson, Bailey, Huntington, & Comfort, 1986; Tronick & Gianino, 1986b). The formation of an enduring attachment relationship (Bowlby, 1969) between parent and infant appears to be directly affected by the mutual social regulation between the partners in the dyad (Beebe, Alson, Jaffe, Feldstein & Crown, 1988). The infant's sense of security may result from adequate homeostatic regulation within the caregiving relationship, with the earliest form of "security of attachment" encoded physiologically in the experience of nondisruptive and need-satisfying regulation of neurobehavioral organization (Pipp & Harmon, 1987).

With the recognition of the critical role social interactions play in the development of the child as well as the impact the infants' characteristics have on the caregiver, a new approach in supporting mutually satisfying parent-infant interactions, is most desperately warranted. Parents of infants born with VLBW or severe disabilities need help and support from medical/early intervention professionals in: 1) observing their infant and trusting their own observations (Als, 1992), 2) recognizing and interpreting the often unpredictable behavioral cues expressed by their baby (Yoos, 1989), 3) providing the neurobehavioral support to the infant that is suggested by the expression of these cues (Kraus, 1990; Vandell & Wilson, 1987), and 4) experiencing pride and joy in their infant and trusting their own importance and effectiveness in parenting their baby (Als. 1992).

II. THE NICU FOLLOW-THROUGH PROJECT

Infants who are born with very low birth weight (VLBW), with severe disabilities, or at-risk for failures in developmental outcome require an array of intensive services throughout their first two years of life. There has been an explosion in the creation of "infant stimulation" programs offered via schools and private, community-based intervention programs (Als, 1992; Barrera, Rosenbaum, & Cunningham, 1986; VandenBerg, 1985). "The past two decades have seen an increase in both the number of clinicians involved and the number of programs aimed at optimizing developmental recovery during and following neonatal hospitalization and at preventing or ameliorating associated neurodevelopmental morbidities. Professional support has extended to the home environment, where family and community provide much of the support for survivors of high-technology care" (Bennett, 1990, p. 34).

Infant stimulation programs, in hospital and developmental centers continue to take a stimulus/environmental deprivation approach to intervention, helping the child to "catch up" by introducing him or her to various modes of sensory stimulation and instruction in age-appropriate developmental skills (Bennett, 1987a; Guralnick & Bricker, 1987). This form of intervention is inappropriate or even harmful for these VLBW/severely disabled infants, as they are not stabilized at the neurophysiological level that would allow them to effectively process the sensory input offered (Als, 1992, 1994; Barnard & Kelly, 1990; Gorski, 1984; Nurcombe, Howell, Rauh, Teti, Ruoff, & Brennan, 1984). "Stimulation that is too complex or intense or inappropriately timed in terms of infant state threshold maturity or physiologic status can be as harmful as lack of stimulation" (Blackburn, 1983, p. 78). Efforts to stimulate these infants to compensate for developmental deficits or sensorially impoverished environments may, in fact, cause overstimulation (Als, 1992; Barnard & Kelly, 1990) and force them into coping at the expense of their physiologic function and stability (McCollum & Stayton, 1985). VLBW infants and infants with severe disabilities should be provided opportunities to engage in social and environmental interactions when they are contingent upon the behavioral cues expressed by the infant (Als et al., 1988; Brazelton, 1984b; Hedlund, 1989a). Unfortunately, very few models now exist that help both parents as well as medical and early intervention professionals to recognize and support the neurobehavioral stability of these fragile infants.

As VLBW infants and infants with severe disabilities are discharged from hospital neonatal intensive care units, parents are confronting the long-term implications of their child's special needs. "Support and neurobehavioral intervention cannot end when the infant is discharged from the NICU, but must systematically link families and infants to sound models of community-based supports that build on the neurobehavioral care and intervention provided in the NICU" (Als, 1992). The research literature has clearly demonstrated a need for the development of a continuum of intervention services, beginning at the hospital NICU and spanning the transition to home and community service providers. Intervention offered these infants and their families must capitalize on family strengths and resources to empower parents to make informed decisions, create opportunities for parent-to-parent contact, develop a range of services to make informed decisions, focus intervention goals on parent-identified needs, and facilitate and support the development of mutually satisfying parent-infant interactions. To date, very few model exist that specifically address this state-of-the-art intervention need.

In response to the needs described above, the NICU Follow-Through Project has provided training to medical and early intervention professionals in 18 outreach communities within 10 states. This innovative approach:

1. assisted medical and early intervention professionals to train and facilitate parents in

supporting their VLBW/severely disabled infant while engaging them in caregiving activities and social interactions;

2. assisted medical and intervention professionals to interpret the neurobehavioral cues expressed by these infants and to respond in an appropriate contingent manner during a caregiving, assessment, or intervention session;

3. assisted medical and early intervention professionals to implement a comprehensive interagency coordinated service plan for very low birthweight/severely disabled infants and their families; and

4. trained medical/educational professionals to become trainers of a neurobehavioral assessment.

The NICU Follow-Through Project's goal, objectives, and activities; a description of the implementation of the objectives; evaluations of the training components; and a description of the project products, is presented in the following report.

III. PROJECT GOALS AND OBJECTIVES

The NICU Follow-Through Project objectives and corresponding sub-objectives are listed below.

GOAL: **TO PROVIDE AND/OR IMPROVE EDUCATIONAL SERVICES TO VLBW/ DISABLED INFANTS DISCHARGED FROM LOCAL NICUs, AND THEIR FAMILIES BY HELPING AT LEAST 56 NEW OUTREACH SITES (YEARS 1- 3) TO ADOPT THE NICU FOLLOW-THROUGH PROJECT THROUGH REPLICATION OF ITS MAJOR COMPONENTS.**

OBJECTIVE 1: Assist hospital NICU staff to develop a comprehensive Transition and Neuro-behavioral Action Plan for VLBW/disabled infants and their families.

Objective 1.1: Assist the NICU staff to develop and implement a Transition Action Plan with the developmental center staff via instruction in the Team Building for Transition training component.

Objective 1.2: Assist the NICU staff to develop and implement a Neurobehavioral Action Plan for caregiving in the NICU.

Objective 1.3: Assess progress made in the implementation of the Transition Action Plan. Determine a new transition objective for NICU/developmental center staff to collaboratively implement.

Objective 1.4: Assess progress made in the implementation of the Neurobehavioral Action Plan. Determine a new neurobehavioral objective for the NICU staff to implement.

OBJECTIVE 2: Assist community developmental centers to develop and implement a comprehensive Transition and Neurobehavioral Action Plan for VLBW/disabled infants and their families.

Objective 2.1: Assist the developmental center staff to develop and implement a Transition Action Plan with the NICU staff via instruction in the Team Building for Transition training component.

Objective 2.2: Assist the developmental center staff to develop and implement a Neurobehavioral Action Plan for therapeutic/education intervention in the developmental center.

Objective 2.3: Assess progress made in the implementation of the Transition Action Plan. Determine new transition objective for NICU/developmental center staff to collaboratively implement.

Objective 2.4: Assess progress made in the implementation of the Neurobehavioral Action Plan. Determine a new neurobehavioral objective for the developmental center staff to implement.

OBJECTIVE 3: Train NICU/developmental center staff at each of the outreach sites to assess infants' behavioral cues utilizing the Naturalistic Observation of Newborn Behavior (NONB) and the Infant Behavioral Assessment (IBA) and provide appropriate neuro-behavioral caregiving/developmental intervention.

Objective 3.1: Instruct 6 NICU trainees and 8 developmental center trainees in the Synactive Model of Newborn Behavioral Organization and Development.

Objective 3.2: Instruct the 6 NICU trainees in the administration of the NONB and the implementation of appropriate neurobehavioral caregiving.

Objective 3.3 Instruct the 8 developmental center trainees in the administration of the IBA and assist them to apply the IBA results to provide sensitive infant educational/ therapeutic intervention.

Objective 3.4: Conduct reliability checks and certification in the NONB and IBA with the 6 NICU trainees and 8 developmental center trainees.

OBJECTIVE 4: Train a professional previously certified in the administration of the IBA, to become an IBA instructor.

Objective 4.1: Conduct reliability and competency checks with the prospective trainer utilizing the IBA and intervention strategies.

Objective 4.2: Assist the prospective trainer to learn and present the didactic lecture on the Synactive Model of Newborn Behavioral Organization and Development.

Objective 4.3: Provide instruction to the prospective trainer in the IBA training format, manual, and instructional materials.

Objective 4.4: The prospective trainer will observe the NICU Follow-Through Project instructors conduct an IBA training workshop.

Objective 4.5: NICU Follow-Through Project instructor will observe the prospective trainer conduct an IBA training workshop in his/her own outreach community.

Objective 4.6: NICU Follow-Through Project instructor will observe the prospective trainer conduct an IBA certification session.

OBJECTIVE 5: Evaluate trainee attainment of competence, providing technical assistance as necessary.

For each of these major objectives/sub-objectives, specific activities have been identified in order to evaluate the quality of implementation and the timeliness of the completion of tasks and activities. The objectives, activities, and timelines that were followed during the 3 years of the implementation of this project are presented in Table 1.

Table 1

Project Objective, Activities, and Timelines

Project Management

OBJECTIVES AND ACTIVITIES	PERSON(S) RESPONSIBLE	TIMELINE
Project Management		
a. Notify sites of funding.	Principle Investigator Project Director	Month 1
b. Hold planning meeting with sites/telephone conferences.	Project Director	Months 2-7
c Refine instructional format/procedures for training Prospective IBA Trainers.	Project Director Pediatric Physical Therapist	Months 1-5
d. Refine evaluative NICU Follow-Through Project Questionnaires.	Project Director Pediatric Physical Therapist Pediatric Nurse	Months 1-3
e. Gather/duplicate materials.	Project Director Pediatric Physical Therapist Pediatric Nurse	Months 1-3
f Monitor budget.	Principle Investigator Project Director	Months 1-12
g. Prepare and send reports to OSERS.	Principle Investigator Project Director	Months 7-8

Objective 1.0: Assist hospital NICU staff to develop a comprehensive Transition and Neurobehavioral Action Plan for VLBW/disabled infants and their families.

OBJECTIVES AND ACTIVITIES	PERSON(S) RESPONSIBLE	TIMELINE
1.1: Assist the NICU staff to develop and implement a transition Action Plan with the developmental center staff via instruction in the Team Building for Transition training component.		
a. Instruct trainees in Team Dynamics.	Project Director Pediatric Physical Therapist	Months 5-10
b. Instruct trainees in the utilization of the Action Plan via case study.	Project Director Pediatric Physical Therapist	Months 5-10
c. Trainees will demonstrate effective use of Action Plan with case study.	Pediatric Physical Therapist	Months 5-10

OBJECTIVES AND ACTIVITIES	PERSON(S) RESPONSIBLE	TIMELINE
d. Assist trainees to determine specific transition objective(s) that they would like to collaborate on with community developmental centers.	Project Director Pediatric Physical Therapist	Months 5-10
e. Develop implementation and monitoring plan for determined transition objective(s) utilizing the Action Plan Worksheet.	Project Director Pediatric Physical Therapist	Months 5-10
1.2: Assist the NICU staff to develop and implement a Neurobehavioral Action Plan for caregiving in the NICU.		
a. Assist the NICU staff to utilize the Action Plan Worksheet to identify and implement a neurobehavioral objective for their NICU.	Project Director Pediatric Physical Therapist	Months 5-10
b. Assist the NICU staff to develop an inservice workshop on the Synactive Model, the NONB and related intervention strategies, for those NICU professionals who were unable to participate in the NONB training.	Project Director	Months 5-10
1.3: Assess progress made in the implementation of the Transition Action Plan. Determine new transition objective NICU/developmental center staff to collaboratively implement.		
a. Review progress made in the implementation of Transition Action Plan during initial site visit.	Project Director Pediatric Nurse	Months 7-12
b. Make modifications/refinements in plan where warranted.	Project Director Pediatric Nurse	Months 7-12
c. Assist NICU/developmental center staff to identify a second transition objective.	Project Director Pediatric Nurse	Months 7-12
d. Develop an implementation/monitoring plan for determined transition objective utilizing Action Plan.	Project Director Pediatric Nurse	Months 7-12
1.4: Assess progress made in the implementation of the Neurobehavioral Action Plan. Determine a new neurobehavioral objective for the NICU staff to implement.		
a. Review progress made in the implementation of the Neurobehavioral Action Plan during initial site visit.	Pediatric Nurse	Months 7-12
b. Make modifications/refinements in plan where warranted.	Pediatric Nurse	Months 7-12

OBJECTIVES AND ACTIVITIES	PERSON(S) RESPONSIBLE	TIMELINE
c. Assist NICU staff to identify a second neurobehavioral objective.	Pediatric Nurse	Months 7-12
d. Develop an Implementation/Monitoring plan for determined transition objective utilizing Action Plan Worksheet.	Pediatric Nurse	Months 7-12

Objective 2.0: Assist community development centers to develop and implement a comprehensive Transition and Neurobehavioral Action Plan for VLBW/disabled infants and their families.

OBJECTIVES AND ACTIVITIES	PERSON(S) RESPONSIBLE	TIMELINE
2:1: Assist the developmental center staff to develop and implement aTransition Action Plan with the NICU staff via instruction in the Team Building for Transition training component.		
a. Instruct trainees in Team Dynamics.	Project Director Pediatric Physical Therapist	Months 5-10
b. Instruct trainees in the utilization of the Action Plan via case study.	Project Director Pediatric Physical Therapist	Months 5-10
c. Trainees will demonstrate effective use of Action Plan with case study.	Project Director Pediatric Physical Therapist	Months 5-10
d. Assist trainees to determine specific transition objective(s) that they would like to collaborate on with hospital NICU.	Project Director Pediatric Physical Therapist	Months 5-10
e. Develop implementation and monitoring plan for determined transition objective(s) utilizing Action Plan Worksheet.	Project Director Pediatric Physical Therapist	Months 5-10
2.2: Assist the developmental center staff to develop and implement a Neurobehavioral Action Plan for therapeutic/educational intervention in the developmental center.		
a. Assist the developmental staff to utilize the Action Plan Worksheet to identify and implement a neurobehavioral objective for their developmental center.	Pediatric Physical Therapist	Months 5-10

OBJECTIVES AND ACTIVITIES	PERSON(S) RESPONSIBLE	TIMELINE
b. Assist the developmental center staff to develop an inservice workshop on the Synactive Model, the IBA and related intervention strategies, for those developmental center professionals who were unable to participate in the IBA training.	Pediatric Physical Therapist	Months 5-10
2.3: Assess progress made in the implementation of the Transition Action Plan. Determine a new transition objective for NICU/developmental center staff to collaboratively implement.		
a. Review progress made in the implementation of Action Plan during initial site visit.	Project Director Pediatric Nurse	Months 7-12
b. Make modifications/refinements in plan where warranted.	Project Director Pediatric Nurse	Months 7-12
c. Assist NICU/developmental center staff to identify a second transition objective.	Project Director Pediatric Nurse	Months 7-12
d. Develop an implementation/monitoring plan for determined transition objective utlizing the Action Plan.	Project Director Pediatric Nurse	Months 7-12
2.4: Assess progress made in the implementation of the Neurobehavioral Action Plan. Determine a new neurobehavioral objective for developmental center staff to implement.		
a. Review progress made in the implementation of the Neurobehavioral Action Plan during the initial site visit Workshop #1.	Project Director	Months 7-12
b. Make modifications/refinements in plan where warranted.	Project Director	Months 7-12
c. Assist developmental center staff to identify a second neurobehavioral objective.	Project Director	Months 7-12
d. Develop an implementation/monitoring plan for determined neurobehaviora. objective utilizing the Action Plan.	Project Director	Months 7-12

Objective 3.0: Train NICU/developmental center staff at each of the outreach sites to assess infants' behavioral cues utilizing the Naturalistic Observation of Newborn Behavioral (NONB) and the Infant Behavioral Assessment (IBA) and provide appropriate neurobehavioral caregiving/developmental intervention.

OBJECTIVES AND ACTIVITIES	PERSON(S) RESPONSIBLE	TIMELINE
3.1: Instruct 6 NICU trainees and 8 developmental center trainees in the Synactive Model of Newborn Behavioral Organization and Development.		
a. Instruct developmental center staff in the significance of the 4 subsystems of communication.	Project Director	Months 5-10
b. Provide training in approach, stress, and self-regulatory behaviors expressed by infants.	Project Director	Months 5-10
c. Instruct trainees in the integration of the 4 subsystems of communication.	Project Director	Months 5-10
d. Present studies (Als, 1986, 1988) which support the utilization of neurobehavioral caregiving and intervention.	Project Director	Months 5-10
e. Provide instruction in caregiving/developmental strategies that support the neurobehavioral organizational capacity of the infant.	Project Director	Months 5-10
3.2 Instruct the 6 NICU trainees in the administration of the NONB and the implementation of appropriate neurobehavioral caregiving.		
a. Discuss NONB Observation Sheet to guide the assessment of observed behaviors.	Project Director	Months 5-10
b. Define infant behaviors via NONB videotapes and item-by-item review of Observation Scan Sheet.	Project Director	Months 5-10
c. Review NONB Observation Protocol.	Project Director	Months 5-10
d. Assist trainees to adapt their caregiving techniques to more closely support the neurophysiological organization of the infant.	Project Director	Months 5-10
e. Sensitize trainees to NICU environmental stimuli, positioning/handling techniques and their impact on the infant's neurobehavioral organization.	Project Director	Months 5-10
f. Observe a specific infant before, during, and after a caregiving intervention by the infant's nurse.	Project Director	Months 5-10

OBJECTIVES AND ACTIVITIES	PERSON(S) RESPONSIBLE	TIMELINE
g. Summarize observation and discuss implications for care.	Project Director	Months 5-10
h. Develop an individual care plan for the infant that was observed.	Project Director	Months 5-10
i. Review trainees "homework" for the following months and schedule date for assessment of skills learned and certification in the NONB.	Project Director	Months 5-10
3.3 Instruct the 8 development center trainees in the administration of the IBA and assist them to apply the IBA results to provide sensitive infant educational/therapeutic intervention.		
a. Provide item-by-item review of IBA.	Pediatric Physical Therapist	Months 5-10
b. Review professional videotape/slide presentation of behaviors identified by IBA.	Pediatric Physical Therapist	Months 5-10
c. Administer and score IBA utilizing videotape examples of interventionist/caregiver-infant interaction.	Pediatric Physical Therapist	Months 5-10
d. Summarize observation and discuss implications for intervention.	Pediatric Physical Therapist	Months 5-10
e. Assist trainees to adapt their intervention techniques and strategies to more closely support the neurophysiological organization of the child.	Pediatric Physical Therapist	Months 5-10
f. Provide intervention strategies that will optimize an intervention session with an infant attaining the "best performance" from the child.	Pediatric Physical Therapist	Months 5-10
g. Sensitize trainees to environmental stimuli, positioning/handling techniques, and their impact on the infant's neurobehavioral organization.	Pediatric Physical Therapist	Months 5-10
h. Sensitize trainees to their own interactional style during intervention episode via "live" observation of interventionist-infant interaction and review of past videotapes made prior to site visit by development center staff.	Pediatric Physical Therapist	Months 5-10
i. Highlight the interactional strategies/modalities that interventionist may utilize and how this effects the infant.	Pediatric Physical Therapist	Months 5-10

OBJECTIVES AND ACTIVITIES	PERSON(S) RESPONSIBLE	TIMELINE
j. Teach trainees to utilize professional videotape to assist parents to "tune in" to the behavioral cues of their infant.	Pediatric Physical Therapist	Months 5-10
k. Provide instruction in the use of parent handouts/materials.	Pediatric Physical Therapist	Months 5-10
l. Review trainees' "homework" for the following months and schedule date for assessment of skills learned and certification in the IBA.	Pediatric Physical Therapist	Months 5-10
3.4: Conduct reliability checks and certification in the NONB and IBA with the 6 NICU trainees and 8 developmental center trainees.		
a. NONB Reliability Phase	Pediatric Nurse	Months 7-12
1) Observe infant in the NICU before, during, and after a caregiving episode. 2.) Make independent written observation/recommendations for modification of care. 3) Compare and discuss respective observations/recommendations. 4) A second observation is conducted as deemed necessary by the trainer.	Pediatric Nurse	Months 7-12
b. IBA Reliability Phase	Project Director	Months 7-12
1) Observe infant during a caregiving, social/intervention activity. 2) Make independent written observations/recommendations. 3) Compare and discuss respective observations/recommendations. 4) A second observation is conducted as deemed necessary by the trainer. 5) Review trainees' post-training videotape. 6) Check 10 reliabilities. 7) Administer IBA post-test.	Project Director	Months 7-12

Objective 4.0: Train a professional, previously certified in the administration of the IBA, to become an IBA instructor.

OBJECTIVES AND ACTIVITIES	PERSON(S) RESPONSIBLE	TIMELINE
4.1: Conduct reliability and competency check with the prospective trainer utilizing the IBA and intervention strategies.		
a. Review prospective trainer's videotapes.	Project Director Pediatric Physical Therapist	Month 6
b. Review and evaluate the IBA Trainer's Competency Checklist.	Project Director Pediatric Physical Therapist	Month 6
c. Presentation of case studies developed by prospective trainer in their work with families and professionals while utilizing the IBA and supplemental training materials.	Project Director Pediatric Physical Therapist	Month 6
d. Two "real time" observations of two infants, conducted at NFTP site, in which a minimum of 85% agreement is attained with the prospective trainer.	Project Director Pediatric Physical Therapist	Month 6
e The prospective trainer presents independent written observations and recommendations based on the two "real time" observations utilizing the IBA and neurobehavioral intervention strategies.		
4.2: Assist the prospective trainer to learn and present the didactic lecture on the Synactive Model of Newborn Behavioral Organization and Development.		
a. Review slide and video presentation of the Synactive Model of Neurobehavioral Organization and Development with the accompanying presentation outline and text describing:	Project Director	Month 6
1) Low Birthweight: Incidence and Sequelae 2) Behavioral/Temperament Characteristics of Selected Infant Populations. 3) CNS Development 4) Neuro-Social/Behavioral Development 5) The Synactive Model 6) Research Findings 7) Historical Overview of Infant Interventions 8) Interventions Strategies	Project Director	Month 6
4.3: Provide instruction to the prospective trainer in the IBA training format, manual, and instructional materials.		

OBJECTIVES AND ACTIVITIES	PERSON(S) RESPONSIBLE	TIMELINE
a. Review IBA Syllabus and instructional format.	Pediatric Physical Therapist	Month 6
b. Review IBA Training manual and provide instructional procedures for its utilization during the training session.	Pediatric Physical Therapist	Month 6
c. Review and describe procedures for use of IBA slides and videotapes.	Pediatric Physical Therapist	Month 6
d. Instruct prospective trainer in the utilization of IBA infant video segments.	Pediatric Physical Therapist	Month 6
e. Instruct prospective trainer in the neurobehavioral intervention techniques/strategies taught in the workshop.	Pediatric Physical Therapist	Month 6
f. Review an provide instruction in the use of all training materials/handouts.	Pediatric Physical Therapist	Month 6
4.4: Prospective trainer will observe the NICU Follow-Through Project instructors conduct an IBA training workshop.		
a. The prospective trainer observes the IBA instructors train 8 professionals in the administration of the IBA and the utilization of neurobehavioral intervention strategies.	Project Director Pediatric Physical Therapist	Month 6
4.5: NICU Follow-Through instructor will observe the prospective trainer conduct an IBA training workshop in his/her own outreach community.		
a. The prospective trainer conducts the 3-day IBA workshop with 8 professionals in their own outreach community.	Project Director	Month 9
b. Prospective trainer is critiqued by IBA instructor. Training feedback is provide to the prospective trainer at the conclusion of the workshop.	Project Director	Month 9
4.6: NICU Follow-Through Project instructor will observe the prospective trainer conduct an IBA certification session.		
a. The prospective trainer conducts certification session with the 8 professionals that initially received instruction during the IBA workshop from the prospective trainer	Project Director	Month 11
b. Certification as an IBA trainer is granted upon successful completion of all requirements.	Project Director	Month 11

Objective 5.0: Evaluate trainee attainment of competence, providing technical assistance as necessary.

Please see: **VI. Evaluation of Project Training Components**

IV. OUTREACH TRAINING COMMUNITIES: YEARS 1-3

In the first year, the NICU Follow-Through Project trained over 400 medical and educational professionals at 19 sites (6 Hospital NICUs, 13 Developmental Service Agencies) located in 6 outreach communities within 4 states: Missouri, New Hampshire, Utah, and Washington. (please see Figure 1).

In the second year, the project trained approximately 450 medical and educational professionals at 20 sites (7 Hospital NICUs, 13 Developmental Service Agencies) located in 6 outreach communities within 5 states: Idaho, Massachusetts, Missouri, South Dakota, and Washington (please see Figure 2).

In the third year, the NICU Follow-Through Project trained approximately 450 medical and educational professionals at 17 sites (6 Hospital NICUs, 11 Developmental Service Agencies) located in 6 outreach communities within 5 states: California, Florida, Massachusetts, Ohio, and Washington (please see Figure 3). The demand for training in Massachusetts was so great, that we actually provided additional training to a second group of trainees in the administration of the Infant Behavioral Assessment and the Newborn Individualized Developmental Care and Assessment Program.

Figure 1

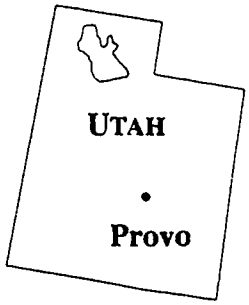
NICU Follow-Through Project

6 Outreach Sites: Year 1

6 Outreach Communities: 6 Hospital NICUs
13 Developmental Service Agencies

WASHINGTON
Tacoma

1. Tacoma General Hospital
   - Tacoma Learning Center
   - Valley Learning Center
2. Mary Bridge Children's Hospital
   - Mary Bridge Therapy Center
   - Visiting Nurses Association



UTAH
Provo

3. Utah Valley Regional Medical Center
   - Provo Early Education Program
   - Kids on the Move
   - City-County Health Department of Utah County

MISSOURI
Kansas City

4. Kansas City Children's Mercy Hospital
   - Children's Home Care
   - Visiting Nurses Association

St. Louis

5. St. Louis Children's Hospital
   - Hospital Home Health Department
   - Nurses for Newborns

NEW HAMPSHIRE
Lebanon

6. Dartmouth-Hitchcock Medical Center
   - United Development Services
   - Milestones, Inc.

Figure 2

NICU Follow-Through Project

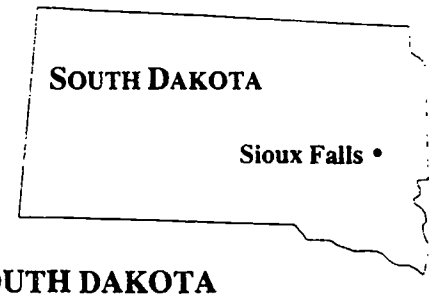
6 Outreach Sites: Year 2

6 Outreach Communities: 7 Hospital NICUs

13 Developmental Service Agencies

MISSOURI
Kansas City

1. Children's Mercy Hospital
   - NICU Follow-Up Clinic
   - Children's Home Care



SOUTH DAKOTA
Sioux Falls

2. Souix Valley Hospital
   - Sioux Falls Public Schools: Early Childhood Program
   - City-County Health Department

WASHINGTON
Seattle

2. Children'sHospital and Medical Center
   - Merrywood School
   - Northwest Center

Spokane

4. Sacred Heart Medical Center
   Deaconess Medical Center
   - Children's Guild School
   - Visiting Nurses Association

MASSACHUSETTS
Winchester

5. Winchester Hospital
   - Winchester Early Intervention Program
   - Tri-City Early Intervention Program

IDAHO
Boise

6. St. Luke's Regional Medical Center
   - St. Luke's High Risk Clinic
   - St. Luke's Home Care
   - Adult & Child Development Center

Figure 3

NICU Follow-Through Project

Outreach Sites: Year 3

6 Outreach Communities: 6 Hospital NICUs

11 Developmental Service Agencies

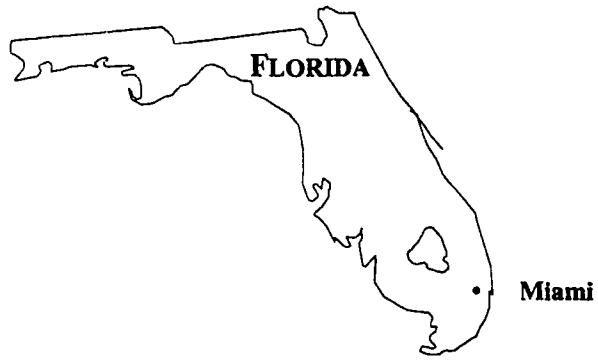
WASHINGTON

Everett

1. Providence General Medical Center
   - Providence High Risk Center
   - Providence Children's Center

Seattle

2. Center on Human Development & Disability
   - High Risk Clinic
   - Experimental Education Unit: Infant Program



FLORIDA

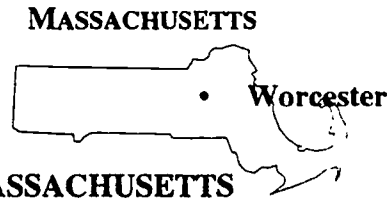
Miami

4. University of Miami/Jackson Memorial Hospital
   - Mailman Center: Department of Pediatrics
   - Mailman Center: The Early Intervention Program

OHIO

Toledo

3. The Toledo Hospital
   - Children's Hospital: NICU Follow-Up Clinic
   - Lucas County Board of Mental Retardation and Developmental Disabilities Early Intervention Program



MASSACHUSETTS

Worcester

4. The Medical Center of Central Masschusetts
   - Worcester Early Intervention Program
   - Marlboro Early Intervention Program

CALIFORNIA

San Diego

4. Mary Birch Hospital for Women at Sharp Memorial
   - High Risk Clinic

V. IMPLEMENTATION OF PROJECT OBJECTIVES

Objectives 1.1-3.4: Workshops #1 and #2

To accomplish these objectives, each outreach community was visited twice. Objectives 1.1-1.2, 2.1-2.2, and 3.1-3.3 were accomplished during Workshop #1 (please see Table 2). A second visit, Workshop #2, was scheduled approximately two months later, to complete objectives 1.3-1.4, 2.3-2.4, and 3.4 (please see Table 3). Table 6: Timeline for Objective Implementation, provides a schematic of the training schedule that was utilized to ensure the timely implementation of each objective for each outreach training site during Years 1-3.

Objective 4.1-4.4: The IBA Trainer Workshop

We have trained three individuals to become IBA Trainers. These include: Mary Quinn-Hurst, a pediatric occupational therapist at Sacred Heart Medical Center in Spokane, Washington; Murry Ralston, a pediatric occupational therapist at St. Lukes Regional Medical Center in Boise, Idaho; and Laurie Mouradian, a pediatric occupational therapist at the Winchester Early Intervention Program in Winchester, Massachusetts. We had originally projected to train more individuals as IBA Trainers but found that each individual prospective trainer needed additional time and technical assistance to integrate the information and master the presentation of the IBA training workshops. Our energies and time were thus directed to assisting each of the 3 prospective trainers to individually master the IBA training materials for the presentation and guidance of their own trainees. Table 4 provides a schematic of the training which accomplished Objectives 4.1-4.4.

Objective 4.5-4.6: IBA Trainer Site Visits #1 and #2

To implement Objective 4.5 the NICU Follow-Through project director visited the site of the prospective trainer to observe the candidate conduct an IBA training session with 8 professionals from her own community (Site Visit # 1: Table 5). The NICU Follow-Through project director then returned to the site of the prospective trainer, Objective 4.6 (Site Visit #2: Table 5) to observe the prospective trainer certify the 8 professionals that she originally trained. Table 6: Timeline for Objective Implementation, provides a schematic of the training schedule that was utilized to ensure the implementation of objectives 4.1-4.6. In order to meet the training needs of each of the prospective trainers, additional site visits were scheduled to assist them to further refine their instructional techniques.

Objective 5.0: Evaluate trainee attainment of competence, providing technical assistance as necessary.

Please see: **VI. Evaluation of Project Training Components**

Table 2

NICU Follow-Through Project Workshop #1

Objectives: 1.1-1.2, 2.1-2.2, 3.1-3.3

	Day #1 Thursday	Day #2 Friday	Day #3 Saturday	Day #4 Sunday	Day #5 Monday
Targeted Staff:	Morning Session: 8:00-12:00 6 NICU Trainees 8 Early Intervention Trainees Invited Community Professionals Afternoon Session: 1:00-5:00 6 NICU Trainees 8 Early Intervention Trainees	Full Day Session: 8:00-5:00 4 NICU Trainees: Bedside Observation: 2 Trainees in the morning 2 Trainees in the afternoon Full Day Session: 8:00-5:00 8 Early Intervention Trainees	Morning Session: 8:00-12:00 2 NICU Trainees Bedside Observation Afternoon Session: 1:00-6:00 6 NICU Trainees NIDCAP Interview Full Day Session: 8:00-5:00 8 Early Intervention Trainees	Full Day Session: 8:00-5:00 6 NICU Trainees 8 Early Intervention Trainees	Full Day Session: 8:00-5:00 6 NICU Trainees 8 Early Intervention Trainees
Objectives:	Morning Session Instruct 6 NICU Trainees, 8 Early Intervention Trainees, and invited outreach community professionals in the Synactive Model of Neonatal Behavioral Organization and Development. Afternoon Session Begin instruction of the 6 NICU Trainees in the administration of the Naturalistic Observation of Newborn Behavior (NONB) and the implementation of appropriate neurobehavioral caregiving.	Full Day Session Continuation of instruction in the administration of the NONB with NICU Trainees. Begin instruction of 8 Early Intervention Trainees in the administration of the Infant Behavioral Assessment (IBA) and assist them to apply the IBA results to provide sensitive infant educational/therapeutic intervention.	Full Day Session Continuation of instruction in the administration of the NONB with NICU Trainees Continuation of instruction in the administration of the IBA with Early Intervention Trainees.	Full Day Session Begin instruction in Team Building for Transition	Morning Session Continuation of Team Building for Transition: Develop Transition Action Plan. Afternoon Session The NICU and Early Intervention Trainees meet separately to develop their Neurobehavioral Action Plan for caregiving and therapeutic/education intervention.
Amount of Time Specified:	8 Hours	8 Hours	8 Hours	8 Hours	8 Hours
Outreach Trainers Responsible:	Rodd Hedlund, M.Ed. Mary Tatarka, M.S., P.T.	Rodd Hedlund, M.Ed. Mary Tatarka, M.S., P.T.	Rodd Hedlund, M.Ed. Mary Tatarka, M.S., P.T.	Rodd Hedlund, M.Ed. Mary Tatarka, M.S., P.T.	Rodd Hedlund, M.Ed. Mary Tatarka, M.S., P.T.

Table 3

NICU Follow-Through Project Workshop #2

Objectives: 1.3-1.4, 2.3-2.4, 3.4

	Day #1 Friday	Day #2 Saturday	Day #3 Sunday
Targeted Staff:	Morning Session: 8:00-12:00 2 NICU Trainees 3 Early Intervention Trainees Afternoon Session: 1:00-5:00 2 NICU Trainees 3 Early Intervention Trainees	Morning Session: 8:00-12:00 2 NICU Trainees 2 Early Intervention Trainees Afternoon Session: 1:00-5:00 PM 6 NICU Trainees 8 Early Intervention Trainees	Morning Session: 8:00-12:00 6 NICU Trainees 8 Early Intervention Trainees
Objectives:	Morning/Afternoon Session Conduct reliability checks and certification in the NONB and IBA.	Morning Session Conduct reliability checks and certification in the NONB and IBA. Afternoon Session Review/Problem Solving: Assess progress made in the implementation of the Neurobehavioral Action Plan with each group. Determine a new neurobehavioral objective that each group will implement.	Morning Session Review/Problem Solving: Assess progress made in the implementation of the Transition Action Plan. Determine new transition objective for the team to collaboratively implement.
Amount of Time Specified:	Two 4 Hour Sessions	Two 4 Hour Sessions	4 Hours
Outreach Trainers Responsible:	Rodd Hedlund, M.Ed. gretchen Lawhon, Ph.C.	Rodd Hedlund, M.Ed. gretchen Lawhon, Ph.C.	Rodd Hedlund, M.Ed. gretchen Lawhon, Ph.C.

Table 4

NICU Follow-Through Project Trainer Workshop

Training the Prospective IBA Trainer: Objective 4.1-4.4

This workshop is conducted at the University of Washington

Prospective Trainer's Arrival: Thursday Evening
Prospective Trainer's Departure: Wednesday Evening

	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday
Targeted Staff:	1 Prospective IBA Trainer	1 Prospective IBA Trainer	1 Prospective IBA Trainer	1 Prospective IBA Trainer	1 Prospective IBA Trainer	1 Prospective IBA Trainer
Objectives:	4.1: Conduct reliability and competency check with prospective trainer utilizing IBA and intervention strategies.	4.2: Assist trainee to learn and present the didactic on the Synactive Model of Neonatal Behavioral Organization and Development.	4.3: Provide instruction to the prospective trainer in the IBA training format, manual, and instructional materials.	4.4: Prospective trainer observe NICU Follow-Through Project instructor conducting IBA training sessions.	4.4: Prospective trainer observe NICU Follow-Through Project instructor conducting IBA training sessions.	Summation of IBA trainer workshop. Review the training session conducted by NICU Follow-Through Project instructor with prospective trainer.
Amount of Time Specified:	8 Hours	8 Hours	8 Hours	8 Hours	8 Hours	8 Hours
Outreach Trainer Responsible:	Project Director Pediatric Physical Therapist	Project Director Pediatric Physical Therapist	Project Director Pediatric Physical Therapist	Project Director Pediatric Physical Therapist	Project Director Pediatric Physical Therapist	Project Director Pediatric Physical Therapist

Table 5

Training the IBA Trainer
IBA Trainer Site Visits #1 and 2: Objective 4.5-4.6

The NICU Follow-Through Project Director visits the prospective trainer at her own outreach site during Visits #1 and #2.
OBJECTIVE 4.5: NICU Follow-Through Project Director observes the prospective trainer conduct an IBA training workshop in her own outreach community.

SITE VISIT #1

	Day #1: Thursday	Day #2: Friday	Day #3: Saturday
Targeted Staff:	Prospective IBA Trainer	Prospective IBA Trainer	Prospective IBA Trainer
Objective:	4.5: NICU Follow-Through Project instructor observes prospective trainer conduct IBA training session with 8 professionals within his/her own outreach community.	4.5: Continuation of NICU Follow-Through Project instructor's observation of prospective IBA trainer conducting IBA training session.	4.5: NICU Follow-Through Project instructor critiques the observed IBA training session with the prospective IBA trainer.
Amount of Time Specified:	8 Hours	8 Hours	5 Hours
Outreach Trainer Responsible:	Project Director	Project Director	Project Director

OBJECTIVE 4.6: NICU Follow-Through Project instructor observes the prospective trainer conduct an IBA certification session.

SITE VISIT #2

	Day #1: Friday	Day #2: Saturday
Targeted Staff:	Prospective IBA Trainer	Prospective IBA Trainer
Objective:	4.6: NICU Follow-Through Project instructor observes prospective trainer certify the 8 professionals who were originally trained by the prospective trainer in site Visit #1.	4.6: NICU Follow-Through Project instructor critiques the observed IBA certification process with the prospective trainer. Certification as an IBA trainer is granted upon successful completion of all requirements.
Amount of Time Specified:	8 Hours	8 Hours
Outreach Trainer Responsible:	Project Director	Project Director

Table 6

Timeline for Objective Implementation

Major Activities	Performed By	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Project Management													
Notify sites of funding	Bennett Hedlund	X											
Hold planning meetings with sites/Telephone Conference	Hedlund	X—	—	—	—	—	—	—	—	—	—	—	—X
Refine instructional format/procedures for NFTP training	Hedlund Tatarka Lawbon	X—	—	—	—X								
Gather/duplicate materials	Hedlund Tatarka Lawbon	X											
Monitor budget	Bennett Hedlund	X—	—	—	—	—	—	—	—	—	—	—	—>
Prepare/send reports to OSERS	Bennett Hedlund								X				

A. Objective 1.0: Assist hospital NICU Staff to develop and implement a comprehensive Transition and Neurobehavioral Action Plan for VLBW/handicapped infants and their families.

Major Activities	Performed By	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Training Objectives					NICU Follow-Through Project Workshop #1								
1.1 Assist NICU staff to develop and implement an Action Plan for transition with the developmental center via instruction in the Team Building for Transition training component.	Hedlund Tatarka			Sites:	1	2	3	4	5	6			
1.2 Assist the NICU staff to develop and implement a Neurobehavioral Action Plan for caregiving in the NICU.	Hedlund				1	2	3	4	5	6			
					NICU Follow-Through Project Workshop #2								
1.3 Assess progress made in the implementation of the Transition Action Plan. Determine new transition objective for NICU/ developmental center staff to collaboratively work on.	Hedlund Lawhon					Sites:	1	2	3	4	5	6	
1.4 Assess progress made in the implementation of the Neurobehavioral Action Plan. Determine a new transition objective for NICU staff to implement.	Lawhon					Sites	1	2	3	4	5	6	

B. Objective 2.0: Assist community developmental centers to develop and implement a comprehensive Transition and Neurobehavioral Action Plan for VLBW/handicapped infants and their families.

Major Activities	Performed By	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
					NICU Follow-Through Project Workshop #1								
2.1 Assist developmental center staff to develop and implement an Action Plan for transition with the NICU staff via instruction in the Team Building for Transition training component.	Hedlund Tatarka			Sites:	1	2	3	4	5	6			
2.2 Assist the developmental center staff to develop and implement a Neurobehavioral Action Plan for therapeutic/ education intervention in the developmental center.	Tatarka				1	2	3	4	5	6			
					NICU Follow-Through Project Workshop #2								

Major Activities	Performed By	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
2.3 Assess progress made in the implementation of the Transition Action Plan. Determine new transition objective for NICU/ developmental center staff to collaboratively work on.	Hedlund Lawhon					Sites:	1	2	3	4	5	6	
2.4 Assess progress made in the implementation of the Neurobehavioral Action Plan. Determine a new neurobehavioral objective for the developmental center staff to implement.	Hedlund						1	2	3	4	5	6	

C. Objective 3.0: Train NICU/developmental center staff at each of the outreach sites to assess infants' behavioral cues utilizing the Naturalistic Observation of Newborn Behavior (NONB) and the Infant Behavioral Assessment (IBA) and provide appropriate neurobehavioral caregiving/developmental intervention.

Major Activities	Performed By	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
		NICU Follow-Through Project Workshop #2											
3.1 Instruct 6 NICU trainees and 8 developmental center trainees in the Synactive Model of Neonatal Behavioral Organization and Development.	Hedlund			Sites:	1	2	3	4	5	6			
3.2 Instruct the 6 NICU trainees in the administration of the NONB and the implementation of appropriate neurobehavioral caregiving.	Hedlund				1	2	3	4	5	6			
		NICU Follow-Through Project Workshop #1											
3.3 Instruct the 8 developmental center trainees in the administration of the IBA and assist them to apply the IBA results to provide sensitive infant educational/therapeutic intervention.	Tatarka			Sites:	1	2	3	4	5	6			
		NICU Follow-Through Project Workshop #2											
3.4 Conduct reliability checks and certification in the NONB and IBA with the 6 NICU trainees and 8 developmental center trainees.	Hedlund Lawhon					Sites:	1	2	3	4	5	6	

D. Objective 4.0: Train professionals previously certified in the administration of the IBA to become IBA Trainers.

Major Activities	Performed By	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
4.1 Conduct reliability and competency check with prospective trainers utilizing IBA and intervention strategies.	Hedlund Tatarka												
4.2 Assist trainees to learn and present the didactic on the Synactive Model of Neonatal Behavioral Organization and Development.	Hedlund		IBA workshop conducted in Seattle X										
4.3 Provide instruction to the prospective trainer in the IBA training format, manual, and instructional materials.	Hedlund Tatarka												
4.4 Prospective trainer observes NICU Follow-Through Project instructors conducting IBA training session.	Hedlund Tatarka												
4.5 NICU Follow-Through Project instructor observes the prospective trainer conduct an IBA training workshop in her own outreach community.	Hedlund						VISIT #1 Prospective Trainer X						
4.6 NICU Follow-Through Project instructor observes the prospective trainer conduct an IBA certification session.	Hedlund								VISIT #2 Prospective Trainer X				

E. Objective 5.0: Evaluate trainee attainment of competence providing technical assistance as necessary.

Major Activities	Performed By	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Collect, analyze, and report results of: 1) NFTP Training Evaluative Questionnaires, 2) Effectiveness of Transition and Neurobehavioral Action Plans, and 3) IBA, NONB certification results.	Hedlund Lawhon Tatarka				X—	———	———	———	———	———	———	———	——>

VI. EVALUATION OF PROJECT TRAINING COMPONENTS

The NICU Follow-Through Project has offered outreach training to medical and early intervention staff located in 18 outreach communities within 10 states. These outreach communities have represented a wide range of service providers including staff at: Hospital neonatal intensive care units, hospital NICU follow-up clinics, developmental centers, school districts, and public health agencies. The medical/early intervention staff at these sites provide services to well over 15,000 infants born with very low birth weight or severe disabilities and their families per year (please see Tables 1-3).

Data collected from these outreach communities demonstrate that the NICU Follow-Through Project has been very well received by all participants. This model has been effectively applied as a training model for NICU/developmental center staff that work with very low birth weight/severely disabled infants and their families. Specific evaluation results of this training are reported below:

1. Evaluations of the NICU Follow-Through Project's Training Components:

   a. Didactic: The Synactive Model of Neonatal Behavioral Organization. Approximately 1300 NICU/developmental center staff have attended the didactic on the theoretical construct of the Synactive Model and corresponding intervention/caregiving strategies. The didactic is offered to all NICU/developmental center staff as well as other community professionals. Professionals who may not be receiving training in the administration of these instruments are thus given the opportunity to learn more about the theory and its application. On all fourteen evaluation questions, between 85%-96% of the participants rated the training "excellent" (please see Table 7).

   b. Naturalistic Observation of Newborn Behavior (NONB). One hundred- three NICU nurses, physical therapist, and respiratory therapist have now been trained and certified in the administration of the NONB. On thirteen of the fourteen evaluation questions, between 83%-91% of the trainees rated the training as "excellent" (please see Table 8).

   c. Infant Behavioral Assessment (IBA). One hundred-seventy developmental service providers (e.g., public health nurses, occupation/physical therapists, special educators) have been trained and certified in the administration of the IBA. On thirteen of the fourteen evaluation questions, between 88%-96% of the trainees rated the training as excellent (please see Table 9).

   d. Team Building for Transition. Approximately 360 hospital NICU and developmental center staff have received instruction in Team Building for Transition. On thirteen of the fourteen evaluation questions, between 81%-93% of the trainees rated the training as "excellent" (please see Table 10).

   e. All IBA and NONB trainees (N = 273) fulfilled the specified training requirements and were granted certification in the administration of these neurobehavioral instruments.

Table 7

TRAINING EVALUATION

DIDACTIC: SYNACTIVE MODEL OF NEWBORN BEHAVIORAL ORGANIZATION

N = 1300

The numerals below indicate the number and approximate percentage of trainee responses in each of the rating categories below.

	Poor	Fair	Good	Very Good	Excellent
Instructor Evaluation Indicate your assessment of the preceptor in terms of the following:					
1. Clarity and organization of presentations:				167(13%)	1133 (87%)
2. Usefulness of presentations in understanding course content:				178 (14%)	1122 (86%)
3. Skill in use of instructional resources (overheads, slides, etc.):			36 (3%)	155 (12%)	1109 (85%)
4. Enthusiasm and stimulation of participant interest:			20 (2%)	87 (7%)	1193 (92%)
5. Over all teaching effectiveness:			31 (2%)	(63) 5%	1206 (93%)
Lecture Evaluation: Content and Organization					
6. As a whole, the organization of the presentation was:			35 (3%)	42 (3%)	1223 (94%)
7. The appropriatemess of presentation content to the current level of trainee knowledge:				86 (7%)	1214 (93%)
8. The amount I learned in this presentation was:			17 (1%)	52 (4%)	1231 (95%)
9. Clarity of content was:			30 (3%)	63 (5%)	1207 (92%)
Overall					
10. Rating for the lecture as a whole:			15 (1%)	42 (3%)	1243 (96%)
11. The overall contribution of this lecture to my understanding of the Synactive Model and its application to developmental assessment, intervention, and caregiving was:			19 (1%)	48 (4%)	1233 (95%)

Table 8

TRAINING EVALUATION

NATURALISTIC OBSERVATION OF NEWBORN BEHAVIOR (NONB)

N = 103

The numerals below indicate the number and approximate percentage of trainee responses in each of the rating categories below.

	Poor	Fair	Good	Very Good	Excellent
Instructor Evaluation Indicate your assessment of the preceptor in terms of the following:					
1. Clarity and organization of presentations:				12 (12%)	99 (88%)
2. Usefulness of presentations in understanding course content:				15 (15%)	88 (85%)
3. Skill in use of instructional resources (overheads, slides, etc.):				12 (12%)	91 (88%)
4. Enthusiasm and stimulation of participant interest:				10 (10%)	93 (90%)
5. Over all teaching effectiveness:				14(14%)	89 (86%)
Lecture Evaluation: Content and Organization					
6. As a whole, the organization of the presentation was:			3 (4%)	14 (13%)	86 (83%)
7. Overall clarity of participant responsibilities:			2 (2%)	17 (16%)	84 (82%)
8. Definition of reading assignments, and small group tasks:			7 (6%)	15 (15%)	83 (81%)
9. The appropriateness of workshop content to the current level of trainee knowledge			2 (2%)	9 (9%)	86 (83%)
Overall					
10. The amount I learned in this workshop was:			6 (5%)	12 (12%)	94 (91%)
11. Overall, the reasonableness of the amount of assigned readings was:			6 (5%)	12 (12%)	85 (83%)
12. Clarity of content was:			6 (5%)	13 (13%)	84 (82%)
13. Rating for the lecture as a whole:			4 (4%)	8 (8%)	91 (88%)
14. The overall contribution of this lecture to my understanding of the Synactive Model and its application to developmental assessment, intervention, and caregiving was:				10 (10%)	93 (90%)

Table 9

TRAINING EVALUATION

INFANT BEHAVIORAL ASSESSMENT (IBA)

N = 170

The numerals below indicate the number and approximate percentage of trainee responses in each of the rating categories below.

	Poor	Fair	Good	Very Good	Excellent
Instructor Evaluation Indicate your assessment of the preceptor in terms of the following:					
1. Clarity and organization of presentations:				14 (8%)	156 (92%)
2. Usefulness of presentations in understanding course content:				9 (5%)	161 (95%)
3. Skill in use of instructional resources (overheads, slides, etc.):				16 (9%)	154 (91%)
4. Enthusiasm and stimulation of participant interest:				11 (6%)	159 (94%)
5. Over all teaching effectiveness:			5 (3%)	13 (8%)	152 (89%)
Lecture Evaluation: Content and Organization					
6. As a whole, the organization of the presentation was:				7 (4%)	163 (96%)
7. Overall clarity of participant responsibilities:			8 (5%)	11 (6%)	151 (89%)
8. Definition of reading assignments, and small group tasks:			8 (5%)	13 (8%)	149 (88%)
9. The appropriateness of workshop content to the current level of trainee knowledge			1 (1%)	14 (8%)	155 (91%)
Overall					
10. The amount I learned in this workshop was:				6 (4%)	164 (96%)
11. Overall, the reasonableness of the amount of assigned readings was:			11 (6%)	6 (4%)	153 (90%)
12. Clarity of content was:			3 (1%)	8 (5%)	159 (94%)
13. Rating for the lecture as a whole:				8 (5%)	162 (95%)
14. The overall contribution of this lecture to my understanding of the Synactive Model and its application to developmental assessment, intervention, and caregiving was:				6 (4%)	164 (96%)

Table 10

TRAINING EVALUATION

TEAM BUILDING FOR TRANSITION

N = 360

The numerals below indicate the number and approximate percentage of trainee responses in each of the rating categories below.

	Poor	Fair	Good	Very Good	Excellent
Instructor Evaluation Indicate your assessment of the preceptor in terms of the following:					
1. Clarity and organization of presentations:			12 (3%)	35 (10)	313 (87%)
2. Usefulness of presentations in understanding course content:			3 (1%)	33 (9%)	324 (90%)
3. Skill in use of instructional resources (overheads, slides, etc.):			23 (6%)	32 (9%)	305 (85%)
4. Enthusiasm and stimulation of participant interest:			22 (6%)	42 (13%)	292 (81%)
5. Over all teaching effectiveness:			7 (2%)	35 (10%)	318 (88%)
Lecture Evaluation: Content and Organization					
6. As a whole, the organization of the presentation was:			12 (3%)	19 (5%)	329 (89%)
7. Overall clarity of participant responsibilities:			9 (3%)	36 (10%)	315 (86%)
8. Definition of reading assignments, and small group tasks:			22 (6%)	42 (12%)	296 (82%)
9. The appropriateness of workshop content to the current level of trainee knowledge			9 (3%)	39 (11%)	312 (87%)
Overall					
10. The amount I learned in this workshop was:			4 (1%)	38 (11%)	318 (88%)
11. Overall, the reasonableness of the amount of assigned readings was:			19 (5%)	47 (13%)	294 (82%)
12. Clarity of content was:			9 (3%)	50 (14%)	301 (84%)
13. Rating for the lecture as a whole:				33 (9%)	327 (91%)
14. The overall contribution of this lecture to my understanding of the Synactive Model and its application to developmental assessment, intervention, and caregiving was:				25 (7%)	335 (93%)

2. The establishment of a Newborn Individualized Developmental Care and Assessment (NIDCAP) National Training Center

The Newborn Individualized Developmental Care and Assessment Program (NIDCAP) has been established to provide education and specific training in developmental observation and assessment for health care professionals who have responsibility for the long- and short-term care of high-risk newborns and preterm infants and their families, and for staff members who are involved in the implementation of their care on a day-to-day basis. NIDCAP consists of the following training components:

a. Level I: Developmental Care Education and Observational Training for Individual Professionals;

b. Level II: Nursery Integration of Developmental Care; and

c. Level III: Establishing a NIDCAP Training Center

The NICU Follow-Through Project provided training to NICU staff in the administration of the Naturalistic Observation of Newborn Behavior (NONB), Level I training offered by NIDCAP. Through our initial training at St. Lukes Regional Medical Center in Boise, Idaho, their NICU staff decided to work towards the development of a NIDCAP Training Center. With continued technical assistance from our project staff (G. Lawhon & R. Hedlund), the dedicated work of their staff, and the work and guidance provided by Dr. Heidelise Als, we are most happy to report the establishment of a National NIDCAP Training Center at St. Lukes Regional Medical Center. St. Lukes Training Center is one of 9 National Training Centers situated across the country, and the only one within the northwest region of the country. As a National Training Center, St. Lukes will now train other hospital NICU staff in Level I training of NIDCAP and thus continue the neurobehavioral training that was initially implemented by the NICU Follow-Through Project.

3. Response to Interagency Team Building

Brewer (1994), with the support of the NICU Follow-Through Project staff, conducted a study to compare and contrast team approaches employed by the hospital NICU, NICU follow-up clinics, and early intervention staff who participated in the NICU Follow-Through project's "Team Building for Transition" training component. A survey with open ended questions was sent to 55 staff members from 3 sites that had participated in the Team Building workshop. Descriptive and qualitative analyses were used in this study. Common themes, comparisons, and contrasts among the three sites were described.

Of the 19 respondents the majority (78%) indicated that relationships had been affected positively as a result of the Team Building training. Increased communication and rapport were cited most frequently as examples of how relationships had been affected. Respondents from all sites reported that identifying a common goal was an effective strategy in achieving positive outcomes for transition of infants from hospital-to-home or to-community early intervention programs. Respondents from all three sites also reported that an increase in coordination of follow-up services for NICU graduates was an outcome that probably would not have occurred without the training. A common theme throughout the responses was the impact that the training had upon the participant's awareness of community resources.

In summary, based upon this small sample, many positive outcomes for the transition of infants were cited as having occurred as a result of the NICU Follow-Through Project.

4. Team Building for Transition Action Plans

Approximately 360 hospital medical/early intervention staff, representing the 18 outreach communities have developed an interagency plan for collaboration. This Team Building Action Plan has been successfully implemented in all the outreach communities to facilitate interagency service delivery for infants born with very low birthweight or severe disabilities and their families. An example of one of these Action Plans that has been developed by one of our outreach communities may be found in Appendix E.

5. Neurobehavioral Action Plans

Over the course of the last 3 years 103 NICU staff received training in the Naturalistic Obeservation of the Newborn Behavior (NONB) and 170 developmental service providers received training in the Infant Behavioral Assessment (IBA). Neurobehavioral Action Plans were developed by each of these two training groups within their respective out reach community. This assisted the trainees to fulfill the certification requirements and implement appropriate neurobehavioral intervention strategies. Please see Appendix F for examples of the IBA/NONB Neurobehavioral Action Plans that were created by each of these groups.

6. Validation of the Infant Behavioral Assessment

The NICU Follow-Through Project staff has been continuing with the test development of the Infant Behavioral Assessment (IBA). Co-authors of the IBA (R. Hedlund & M. Tatarka) were involved in an ongoing study that will allow us to examine the IBA's reliability, construct validity (by the test's ability to differentiate among groups of infants), concurrent validity (correlations with neonatal behavioral measures and with an infant motor assessment [i.e., Movement Assessment of Infants]) and predictive validity (correlations with later standardized developmental tests).

The primary purpose of the study was to evaluate the effects of cocaine exposure in utero on the neurobehavioral competence of infants at four months of age. Our sample of drug-exposed infants (n = 190) was a subset of a larger group of infants from a major NIDA-funded study entitled, "Cocaine: Pregnancy Use and Offspring Development," Ann Streissguth, Principal Investigator. The NIDA study involves the longitudinal assessment of a cohort of 500 infants (during the newborn period and then at 4, 6, 12, and 26 months of age). With the support of the NIDA group, the IBA was added to the 4-month protocol to further sensitize that evaluation to the subtle differences in motor organization, attention, and interaction observed in these infants.

The subjects were drawn from four groups of mothers with varying prenatal drug use: 1) Cocaine plus high levels of marijuana, alcohol, and cigarettes (MAC); 2) cocaine plus low levels of MAC; 3) no cocaine plus high MAC levels; and 4) no cocaine plus low MAC levels. Infants were divided approximately equally among the four groups. All subjects had provided informed consent in accordance with human subjects' guidelines at the University of Washington (see Appendix G for Human Subjects' application).

The IBA was scored twice for each infant during the course of the 4-month motor assessment. The first IBA administration served as a baseline measure, and the second occurred after the infant had been "stressed" by the handling required during the motor examination. A method of collapsing the data to obtain a single change score between the first and second observations has been devised to derive a composite measure of each infant's attention/organization (Appendix H : IBA Scoring Protocol).

Data from the NIDA study are being analyzed through a grant from the Association for Retarded Citizens of Washington (Tatarka, Hedlund, & Schwartz, 1994). We will obtain the descriptive statistics of our smaller

sample from the Streissguth data. We will obtain the following statistics:

1. Inter-rater reliability on a subset of the IBA's;

2. comparisons of the IBA behaviors and composite (change) scores and behavioral clusters for each infant group; and

3. comparisons of neurobehavioral characteristics with dose measures and maternal variables.

7. Training Efficacy and Inter-observer Agreement of the IBA

Tatarka & Hedlund (1994) examined the inter-observer agreement of the IBA to evaluate the efficacy of the training and accuracy of the current form of the assessment. Sixty pairs of raters were selected from among medical/early intervention professionals who had received training during the implementation of the NICU Follow-Through Project. Two different forms of the IBA were used by the IBA trainees. Thirty pairs of raters independently scored the 1990 version of the assessment and thirty different pairs of raters scored the 1991 (current) version. IBA assessments were chosen from among the 10 required from each trainee for certification. The corresponding infants for each of the two forms included two groups; half of the infants ($n = 15$ for each form) were typically developing and half ($n = 15$ for each form) were identified by the raters as having, or being at risk for, a developmental disability.

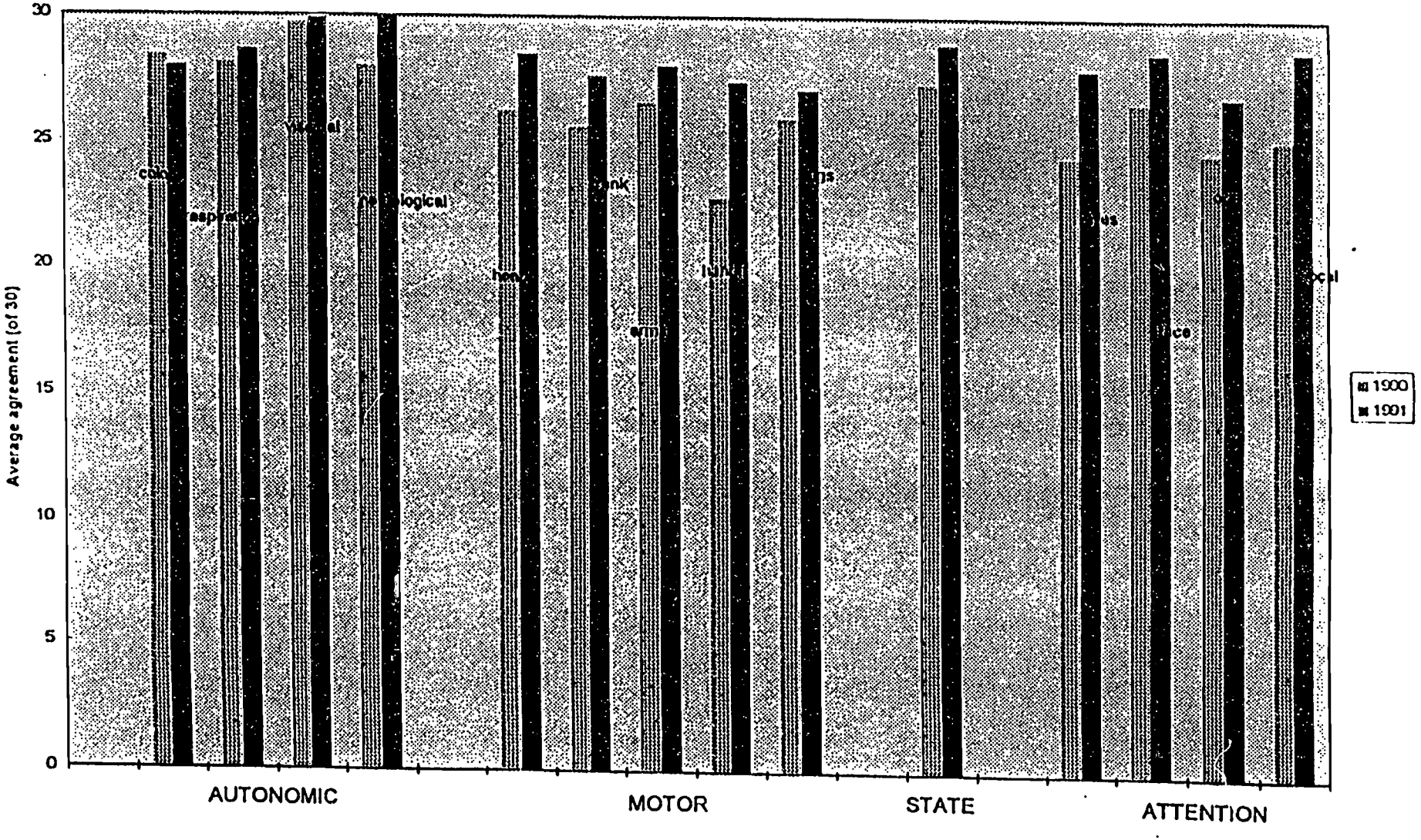
Figure 4 depicts the average agreement of the two groups of raters by IBA category. In all but one category there were improvements in the inter-observer agreement from the old version to the new version of the assessment. Item-by-item percent agreement on the old version ranged from 76% (hand movements) to 99% (visceral signals). On the current version, item-by-item agreement ranged from 90% (oral behaviors) to 100% (neurological indicators).

Two possible explanations may account for the nearly universal improvement in inter-observer agreement: 1. Changes in the training format may account for the differences, or 2. changes in the operational definitions of the individual items may have improved rater consistency. In all likelihood, it is some combination of these two factors that contributed to the improvement in instrument reliability.

In summary, the Infant Behavioral Assessment as well as the associated training continue to undergo revisions. The aforementioned study confirms our success with both the quality of training and the development of the assessment.

Figure 4

INTER-OBSERVER AGREEMENT BY SUBSYSTEM: COMPARISON OF TWO FORMS



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VII. PROJECT PRODUCTS

The following products have been developed/revised as part of our past/current neurobehavioral work (Hedlund, 1986, 1989, 1992). The NICU Follow-Through Project has disseminated these products to its 18 outreach sites.

Infant Behavioral Assessment (Appendix C): The Infant Behavioral Assessment (IBA) (Hedlund & Tatarka, 1988) sensitizes educational and medical professionals to the neurophysiological state and organizational system of the infant while assisting them to adjust their intervention style to more closely match the neurobehavioral and developmental needs of the infant. Drawing upon the work of Drs. Heidelise Als (1984, 1985, 1986), T. Berry Brazelton (1984a, 1984b). Kathryn Barnard (1978), Hedlund and Tatarka (1988) developed the IBA. This assessment focuses upon the behavioral repertoire of the infant, pinpointing specific stress, approach; and self-regulatory behaviors that the child utilizes during social interactions as a means of communicating his/her needs and wants. The IBA is used to assess the infant's behavioral repertoire, the self-regulatory capacity of the infant, and specific behavioral antecedents that may be responsible for the expression of these behaviors.

The identification of the infant's unique behavioral repertoire as it develops over time assists the professional to: 1) help parents to "tune into" the ever changing behavioral cues of their child and adjust their interactional style to more closely mesh with that of their infant's, and 2) monitor the behavioral cues expressed by the child during an assessment, educational, or therapeutic intervention session. The medical or educational professional can then adopt specific intervention strategies that are sensitive to the neurophysiological capabilities and sensory threshold of the infant and prescribe home activities that ensure parental success when they interact with their baby.

Infant Behavioral Assessment Training Manual (Appendix C): The Infant Behavioral Assessment Training Manual (Hedlund & Tatarka, 1991b) was developed as an instructional aid to be utilized by trainees during their course of study in the administration of the IBA. Specific areas addressed in the manual include: 1) the rationale and demonstrated need for a neurobehavioral assessment, 2) an overview of the literature with regard to neurobehavioral organization as reflected in selected infant populations, 3) the theoretical construct of the IBA, and 4) specified procedures with regard to the actual administration of this instrument.

Infant Behavioral Assessment Slide and Video Presentation: A slide and video training program has been developed as part of the IBA instructional format. The slide presentation provides examples of each of the infant behaviors identified on the IBA. These are utilized during the item-by-item review of the IBA behavioral definitions. The video presentation consists of video segments of infants during caregiving and intervention sessions. These videotapes are utilized to assist the IBA trainees to attain inter-rater reliability with this instrument. Copies of these IBA slides and videos have been made available to the prospective IBA trainers to assist them in their training presentations.

Synactive Model Slide and Video Presentation: Slides and videos have been developed to assist the prospective IBA trainers in presenting the four hour didactic on the Synactive Model of Newborn Behavioral Organization. The slide presentation provides supplemental material with regard to:

The incidence and sequelae of the very low birthweight infant population
Behavioral/temperament characteristics of this population

CNS development
CNS vulnerability
Neuro-social/behavioral development
The Synactive Model of Newborn Behavioral Organization
A historical overview of infant intervention
Neurobehavioral intervention strategies

The video presentation consists of video examples of neurobehavioral strategies for supporting the neurophysiological organizational capacity of the infant during an assessment, intervention, or caregiving procedure. Copies of both the slide and video presentation have been made available to the prospective IBA trainers to assist them in their training presentations.

The IBA Trainers' Training Materials (Appendix D): The training materials provide the format and organization for the instruction of each prospective trainer. These include an outline and description of prospective trainer's responsibilities, instructions for the development of the prospective trainer's videotape and case study requirements, and the course syllabus of the first training workshop that is held in Seattle.

Parent Training Materials (Appendix C): We have developed several parent training materials to assist the medical and educational professionals to help parents read and respond to the behavioral cues of their infant and engage in appropriate activities that meet the neurophysiological needs of their child. These include:

1. "Getting to Know Your Baby.....and Keeping Track of Those Important First Years". Parents utilize this baby scrapbook as a means of keeping track of medical appointments, medications, intervention recommendations. It serves as a resource for the parents, and the medical and early intervention professionals that may be visiting the home. Parents record their child's neurobehavioral/developmental progress and anecdotal data as their child matures.

2. "Your Baby's Responsiveness, States: The Sleep/Wake Rhythms of Newborns". This parent hand-out identifies the state organizational system of the newborn and describes in non-technical terms the six levels of consciousness (i.e., deep sleep, light sleep, drowsy, alert, active alert, cry). Each state is illustrated with a photograph that accompanies the description of each state. Parents are thus assisted to recognize these states and adjust their home environment and interactional style to match the needs of their baby's state organizational system.

3. "Getting to know Your Baby: Interactional Cues". This hand-out helps parents to appreciate infant behaviors as truly meaningful. Approach, stress, and self-regulatory behaviors are discussed and examples of each behavior are provided. Parents are encouraged to identify the unique behavioral cues of their own infant, interpreting and responding to them in a manner which supports the neurobehavioral organizational capacity of their infant. Specific ways to assist parents console their child as well as ways to assist the child to self-regulate on his/her own are suggested.

Video Training Tape: Infant Behaviors: A Communication System. Video is a valuable medium for capturing the often fleeting and subtle behavioral cues that infants who are born with very low birthweight or severe disabilities express in everyday social/caregiving interactions with their parents and interventionists alike. Infant Behaviors: A Communication System (Hedlund & Tatarka, 1991a) is a 25 minute videotape that

introduces both parents and professionals to the special "body language" that infants use while interacting with others. Based upon Dr. Heidelise Als' extensive research with premature infants, this videotape provides both parents and interventionist with an overview of the self-regulatory, stress and approach behaviors that infant utilize to express their needs and wants. This videotape enables us to:

1. Educate parents about the significance of their baby's body language by providing video examples which clearly define the range of infant behaviors that may be expressed by their child.

2. Help parents "tune in" to their own interactional style and how that affect their child. Once parents become sensitive to their baby's behavioral repertoire, they begin to reflect upon how their own interactional style effects their baby.

3. Help parents, through guided practice and encouragement, to adapt their interactional styles as their infant develops. The ways that parents and their babies interact and play together change as the baby grows and develops, requiring parents to continually adjust their responses and interactional style. When parents notice and understand the variations in their child's interactional style, they can maximize their opportunities to successfully interpret and respond to their child's ever changing communication behaviors.

Training professionals to "tune in" and respond in an appropriate manner to the communication behaviors of the infant will enhance the quality of care and intervention that they offer to families and their very young fragile babies. This videotape assists medical and educational professionals to:

1. Monitor the infant's behaviors during assessment, educational, therapeutic or caregiving sessions and thus provide intervention that is sensitive to the neurophysiological capabilities and sensory threshold of each infant.

2. Set goals for both child and family that are based on the child's true capabilities. Information from an infant's developmental assessment is often used to develop a therapeutic/educational program and to set goals for the infant's family. This videotape helps professionals conduct assessments that facilitate the best performance from the infant, through the utilization of neurobehavioral supportive strategies, and thus yield appropriate goals and objectives for child and family alike.

3. Develop individualized educational and therapeutic care plans that are within the limits of the child's capabilities, and prescribe home activities that ensure parental success when they interact with their child. This videotape sensitizes professionals to individual parents' abilities to effectively read and appropriately respond to their child's behavioral cues. The medical/educational professional then uses this knowledge to select and adapt specific home activities that will promote a positive parent-infant relationship.

VIII. Assurance of Statement of Dissemination of Final Report

The final report for the NICU Follow-Through Project has been sent to ERIC Clearinghouse on Handicapped and Gifted Children. Copies of the title page and abstract have been sent to:

1. NEC*TAS
2. National Clearinghouse for Professions in Special Education
3. National Information Center for Children and Youth with Disabilities (NICHY)
4. Technical Assistance for Parent Programs Project (TAPP)
5. National Diffusion Network
6. Child and Adolescent Service System Program (CASSP)
7. Northeast Regional Resource Center
8. MidSouth Regional Resource Center
9. South Atlantic Regional Resource Center
10. Great Lakes Area Regional Resource Center
11. Mountain Plains Regional Resource Center
12. Western Regional Resource Center
13. Federal Regional Resource Center

IX. REFERENCES CITED IN THIS REPORT

Ainsworth, M. D.S., & Bell, S.M. (1974). Mother-infant interaction and the development of competence. In K. J. Connolly & J. S. Bruner (Eds.), The Growth of Competence. New York, NY: Academic Press.

Ainsworth, M. D.S., Bell, S., & Stayton, P. (1974). Infant-mother attachment and social development: 'Socialization' as a product of a reciprocal responsiveness to signals. In M. Richards (Ed.), The Integration of a Child into a Social World. London, England: Cambridge University Press.

Als, H. (1984). Manual for the Naturalistic Observation of Newborn Behavior (Preterm and Fullterm Infants). Children's Hospital, Boston, MA 02115.

Als, H. (1986). A synactive model of neonatal behavioral organization: Framework for the assessment and support of neurobehavioral development of premature infants and their parents in the environment of the NICU. In J.K. Sweeney (Ed.), Physical and Occupational Therapy in Pediatrics, Vol. 6, Numbers 3/4. New York, NY: Haworth Press.

Als, H. (1992). Individualized, family-focused developmental care for the very low birthweight preterm infant in the NICU. In S.L. Friedman & M.D. Sigman (Eds.), Advances in Applied Developmental Psychology. The Psychological Development of Low Birthweight Children. Norwood, NJ: Ablex.

Barnard, K. (1978). Nursing Child Assessment and Satellite Training Manual. Seattle, WA: University of Washington.

Barnard, K. & Kelly, J. (1990). Assessment of parent-child interaction. In S. Meisels & J. Shonkoff (Eds.), Handbook of early childhood intervention (pp. 278-302). Cambridge, MA: Cambridge University Press.

Barnard, K., Bee, H., & Hammond, M. (1984). Developmental changes in maternal interactions with term and preterm infants. Infant Behavior and Development, 7, 101-113.

Barrera, M., Rosenbaum, P., & Cunningham, C. (1986). Early home intervention with low birth weight infants and their parents. Child Development, 57, 20-33.

Beckman, P., Thiele, J., Pokorni, J., & Balzer-Martin, L. (1986). Stability of behavioral characteristics in preterm infants. Topics in Early Childhood Special Education, 6 (2), 57-67.

Beckwith, L., & Cohen, S.E. (1980). Interactions of preterm infants with their caregivers and test performance at age 2. In T. Field, S. Goldberg, D. Stern, & A. Sostek (Eds.), High risk infants and children. New York, NY: Academic Press.

Beckwith, L., Cohen, S.E., Kopp, C.Y., Parmelee, A.H., & Marcy, T.G. (1976). Caregiver-infant interaction and early cognitive development in preterm infants. Child Development, 47, 579-587.

Bendell, D., Goldberg, M., Urbano, M., Urbano, R., & Bauer, C. (1987). Differential impact of parenting sick infants. Infant Mental Health Journal, 8, 28-36.

Bennett, F.C. (1984). Neurodevelopmental outcome of low birthweight infants. In V.C. Kelley (Ed.), Practice of Pediatrics (pp. 1-24). Philadelphia, PA: Harper & Row.

Bennett, F.C. (1987a). The effectiveness of early intervention for infants at increased biologic risk. In M.J.Guralnick & F.C. Bennett (Eds.), The Effectiveness of Early Intervention for At-Risk and Handicapped Children. Boston, MA: Harcourt Brace Jovanovich, Publishers.

Bennett, F.C. (1987b). Neonatal follow-up in predicting the long-term outcome of the low birthweight infant. Paper presented at the conference Developmental Interventions in Neonatal Care. San Francisco, CA. July 16-18,1987.

Bennett, F.C. (1990). Recent advance in developmental intervention for biologically vulnerable infants. Infants and Young Children, 3 (1), 33-40.

Bennett, F.C. (1988). Neurodevelopmental outcome in low birthweight infants: the role of developmental intervention. In R.D. Guthrie (Ed.), Neonatal Intensive Care, Clinics in Critical Care Medicine. Livingstone, New York, NY: Churchill.

Blackburn, S. (1983). Fostering behavioral development of high-risk infants. Journal of Obstetrics and Gynecologic Neonatal Nursing, May/June (Supplement), 76-84.

Bowlby, J. (1969). Attachment and Loss, Volume I. City, State: Basic Books.

Brazelton, T.B. (1984a). Neonatal Behavioral Assessment Scale. London, England: Spastics International Medical Publications.

Brazelton, T.B. (1984b). Why early intervention? In J.D. Call, E. Galenson, & R.L. Tyson (Eds.), Frontiers of infant psychiatry, Vol. 11. New York, NY: Basic Books, Inc.

Bretherton, I., & Walters, E. (Eds.) (1986). Growing Points of Attachment Theory and Research. Monographs of the Society for Research in Child Development, 50 (no. 12, Serial No. 209). Chicago, IL: University of Chicago Press.

Brewer, D.J. (1994). The NICU Follow-Through Project: Team Building for Transition. Manuscript submitted for publication, Seattle, Washington.

Brown, J.M., & Bakeman, R. (1979). Relationships of human mothers with their infants during the first year of life: Effect of prematurity. In R.W. Bell & W.P. Smotherman (Eds.), Maternal Influences and Early Behavior. New York, NY: Spectrum, 1979.

Brown, J.V., LaRossa, M.M., Aylward, G.P., Davis, D.J., Rutherford, P.K., & Bakeman, R. (1980). Nursery-based intervention with prematurely born babies and their mothers: Are there effects? Journal of Pediatrics, 97, 487-491.

Campbell, P. (1989). Dysfunction in posture and movement in individuals with profound disabilities: Issues and practices. In F. Brown & D. Lehr (Eds.), Persons with profound disabilities: Issues and practices. Baltimore, MD: Paul H. Brookes.

Cohen, S., & Parmelee, A. (1983). Prediction of five-year Stanford-Binet scores in preterm infants. Child Development, 54,1242-1253.

DiVitto, B., & Goldberg, S. (1979). The effects of newborn medical status on early parent-infant interactions. In T. Field, A. Sostek, S. Goldberg, & H.H. Shuman (Eds.), Infants Born at Risk. New York, NY: Spectrum.

Egeland, B., & Sroufe, L.A. (1981). Developmental sequelae of maltreatment in infancy. In R. Rizley & D. Cicchetti (Eds.), Developmental Perspectives in Child Maltreatment (pp. 77-92). San Francisco, CA: Jossey-Bass.

Elmer, E., & Gregg, D. (1967). Developmental characteristics of abused children. Pediatrics, 40, 596-602.

Escalona, S. (1984). Social and other environmental influences on the cognitive and personality development of low birthweight infants. American Journal of Mental Deficiency, 88, 508-512.

Field, T. (1977). Effects of early separation, interactive deficits, and experimental manipulations on infant-mother face-to-face interaction. Child Development, 48, 763-771.

Field, T. (1979a). Games parents play with normal and high-risk infants. Child Psychiatry and Human Development, 10, 41-48.

Field, T. (1979b). Interaction patterns of high-risk and normal infants. In T. Field, A. Sostek, S. Goldberg, & H.H. Shuman (Eds.), Infants Born at Risk. New York, NY: Spectrum.

Field, T.M. (1983). High risk infants "have less fun" during early interactions. Topics in Early Childhood Special Education, 3 (1), 77-87.

Field, T.M. (1984). Follow-up developmental status of infants hospitalized for nonorganic failure to thrive. Journal of Pediatric Psychology, 9, 241-256.

Frodi, A.M., Lamb, M.E., Leavitt, L.A., Donovan, W.I., Neff, C., & Sherry, D. (1978). Fathers and mothers' responses to the faces and cries of normal and premature infants. Developmental Psychology, 14, 490-498.

Goldberg, S., Brachfeld, S., & DeVitto, B. (1980). Feeding, fussing, and playing: Parent-infant interaction in the first year as a function of prematurity and prenatal problems. In T. Field, S. Goldberg, D. Stern, & A. Sostek (Eds.), High-Risk Infants and Children: Adult and Peer Interactions. New York, NY: Academic Press.

Gorski, P.A. (1984). Experience following premature birth: Stresses and opportunities for infants, parents, and professionals. In J.D. Call, E. Galenson, & R.L. Tyson (Eds.), Frontiers of Infant Psychology, Vol. II (pp. 145-151). New York, NY: Basic Books, Inc.

Gorski, P., Davison, M., & Brazelton, T. (1979). Stages of behavioral organization in the high-risk neonate: Theoretical and clinical considerations. Seminars in Perinatology.

Greenberg, M., & Crnic, K. (1988). Longitudinal predictors of developmental status and social interaction in premature and full-term infants at age two. Child Development, 59, 554-570.

Grunau, R. (1986). Education achievement. In G. Dunn (Ed.), Sequelae of Low Birthweight: The Vancouver Study (pp. 179-204). Philadelphia, PA: J.B. Lippincott Co.

Guralnick, M.J., & Bricker, D. (1987). The effectiveness of early intervention for children with cognitive and general developmental delays. In M.J. Guralnick, & F.C. Bennett (Eds.), The Effectiveness of Early Intervention for At-Risk and Handicapped Children (pp. 115-173). Boston, MA: Harcourt Brace Jovanovich.

Hack, M., Hobar, J., Mallooy, M. Tyson, J., Wright, E., & Wright, L. (1991). Very low birth weight outcomes of the national institute of child health and human development neonatal network. Pediatrics, 87 (5), 587-597.

Hack, M., Taylor, H., Klein, N., Eiben, R., Schatschneider, C. & Mercuri-Minich, N. (1994). The New England Journal of Medicine, 331 (12), 753-759.

Hedlund, R., & Tatarka, M. (1988). Infant behavioral assessment. Publication available from Experimental Education Unit, CDMRC, WJ-10, University of Washington, Seattle, WA 98195.

Hedlund, R., & Tatarka, M. (199la). Infant behaviors: A communication system. Videotape available from CDMRC Media Resources, WJ-10, Seattle, WA 98195.

Hedlund, R., & Tatarka, M. (199lb). The infant behavioral assessment training manual. Publication available from NTP, EEU, WJ-10, Seattle, WA 98195.

Hedlund, R., Bennett, F., & Booth, C. (1989a). The transactional family systems model project. Unpublished data. Seattle, WA: University of Washington.

Holdgrafer, G., & Dunst, C. (1986). Communicative competence: From research to practice. Topics in Early Childhood Special Education, 6 (3), 1-22.

Hunt, J.V., Cooper, B.A.B., & Tooley, W.H. (1988). Very low birth weight infants at 8 and 11 years of age: Role of neonatal illness and family status. Pediatrics, 82, 596-603.

Klein, N., Hack, M., Gallagher, J., & Fanaroff, A.A. (1985). Preschool performance of children with normal intelligence who were very low birthweight infants. Pediatrics, 75, 531-537.

Knobloch, H., Malone, A., Ellison, P.H., Stevens, F., & Zdeb, M. (1982). Considerations in evaluating changes in outcome for infants weighing less than 1501 grams. Pediatrics, 69, 285-295.

Kogan, K. (1980). Interaction systems between preschool aged handicapped or developmentally delayed children and their parents. In T. Field, S. Goldberg, D. Stern, & A. Sostek (Eds.), High-risk infants and children: Adult and peer interactions. New York, NY: Academic Press.

Kraus, K.J. (1990). Fostering family integrity. In M.J. Craft & J.R. Denehy (Eds.), Nursing Interventions for Parents and Children. WB Saunders Company, 43-52.

McCollum, J., & Stayton, V. (1985). Infant/Parent Interaction: Studies and intervention guidelines based on the SIAI Model. Journal of the Division for Early Childhood, 9, 125-135.

Minde, K., Whitelaw, A., Brown, J., & Fitzhardinge, P. (1983). Effect of neonatal complications in premature infants on early parent-child interactions. Developmental Medicine and Child Neurology, 25, 763-777.

Nickel, R.E., Bennett, F.C., & Lamson, F.N. (1982). School performance of children with birthweights of 1000 grams or less. American Journal of Diseases of Children, 136,105-110.

Nurcombe, B., Howell, D.C., Rauh, V.A., Teti, D.M., Ruoff, P., & Brennan, J. (1984). An intervention program for mothers of low birth-weight infants: Preliminary results. Journal of the American Academy of Child Psychiatry, 23, 319-325.

Office of Technology Assessment, (1987). Neonatal intensive care for low birthweight infants: Costs and effectiveness.

Piaget, J., & Inhelder, B. (1969). The psychology of the child. New York, NY: Basic Books.

Saigal, S., Rosenbaum, P., Stoskopf, B., & Milner, R. (1982). Follow-up of infants 501 to 1500 grams birthweight delivered to residents of a geographically defined region with perinatal intensive care facilities. Journal of Pediatrics, 100, 606-613.

Schaffer, H.R. (1984). The child's entry into a social world. London, England: Academic Press.

Sell, E.J. (1986). Outcome of very, very low birth weight infants. Clinics in Perinatology, 13, 451-459.

Simeonsson, R.J., Bailey, D.B., Huntington, G.S., & Comfort, M. (1986). Testing the concept of goodness of fit in early intervention. Infant Mental Health Journal, 7, 81-94.

Stern, M., & Hildebrandt, K. (1984). A prematurity stereotype: The effects of labeling on adults' perceptions of infants. Developmental Psychology, 20, 360-362.

Tatarka, M., Hedlund, R., & Schwartz, first initial? (1994). Neurobehaviorial characteristics of infants exposed to cocaine. Association of Retarded Citizens of Washington Trust. Seattle, Washington.

Tatarka, M., Hedlund, R., & Schwartz, first initial? (1994). Interobserver agreement on the infant behavioral assessment: Comparison of two forms. Unpublished data. University of Washington. Seattle, Washington.

Tronick, E. Z., & Gianino, A. (1986). The transmission of maternal disturbance to the infant. In E.Z. Tronick & T. Field (Eds.), Maternal depression and infant disturbance (Vol. 34, pp. 31-47). San Francisco, CA: Jossey-Bass.

Vandell, D.L., & Wilson, K.S. (1987). Infants' interactions with mother, sibling, and peer: Contrasts and relations between interaction systems. Child Development, 58, 176-186.

VandenBerg, K. (1985). Revising the traditional model: An individualized approach to developmental interventions in the intensive care nursery. Neonatal Net~Network: The Journal of Neonatal Nursing, April, 3 (5), pages?.

Yoos, L. (1989). Applying research in practice: Parenting the premature infant. Applied Nursing Research, 2 (1), 30-34.